Original article :

Surgeons Awareness, Practice, and Following guidelines for COVID-19 in Saudi Arabia

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Abstract

Background:
COVID-19 pandemic has sent an obnoxious wave of medical emergency all over world. Health care workers and subordinate medical services personals are vulnerable to COVID-19 transmission. With the growing number of cases, it becomes necessary to screen the health care workers for COVID-19 periodically. Surgeons should adhere to the strict precautions besides they should prepare operation room with certain standards to minimize the risk of virus spread

Aim:
to assess the awareness of COVID-19 and its related infection control practices among surgeons in Saudi Arabia.

Methods:
A cross sectional survey was conducted including all accessible surgeons in the governmental and private hospitals in of Saudi Arabia. Data was collected using pre-structured online questionnaire. The questionnaire included surgeons' personal data, academic position and setting. Awareness regarding COVID-19

الملخص

الخلفية :
تعتبر جائحة كوفيد ١٩موجة بغيضة من الطوارئ الطبية في جميع أنحاء العالم. إن العاملين في مجال الرعاية الصحية وشخصيات الخدمات الطبية الثانوية معرضون لانتقال كورونا على الرغم من عمليات رعاية المرضى المختلفة وسط أجهزة الحماية الشخصية وإجراءات مكافحة العدوى في المستشفى. مع تزايد عدد الحالات ، يصبح من الضروري إجراء فحص دوري للعاملين في مجال الرعاية الصحية لفيروس كورونا.يجب على الجراحين الالتزام بالاحتياطات الصارمة إلى جانب إعداد غرفة العمليات الجراحية بمعايير معينة لتقليل خطر انتشار الفيروس.

الهدف:
تقييم الوعي بمرض كوفيد١٩وممارسات مكافحة العدوى ذات الصلة بين الجراحين في المملكة العربية السعودية.

طريقة البحث:
تم إجراء مسح مقطعي مستعرض يشمل جميع الجراحين المتاحين في المستشفيات الحكومية والخاصة في المملكة العربية السعودية. تم جمع البيانات باستخدام استبيان مسبق التنظيم عبر الإنترنت. تضمن الاستبيان بيانات الجراحين الشخصية وموقعهم الأكاديمي وأماكن عملهم.تضمن الاستبيان درجة الوعي بشأن كورونا والاحتياطات المتعلقة بالعمل للجراحات تحت الوباء.

and work related precautions for surgeries under the epidemic.

Results:
A sample of 375 surgeons, 261 (69.6%) were general surgery staff. Exact of 99.5% of the surgeons reported that of COVID-19 transmission through respiratory droplets. About 91.7% of the surgeons selected immune-compromised persons as the risk group for COVID-19 infection then elderly (79.5%), and patients with chronic health problem (75.5%). Totally, good awareness level regarding COVID-19 was detected among more than three quarters of the surgeons.

Conclusions:
The study revealed that irrespective of the high awareness level recorded for the study participants regarding COVID-19 and its needed precautions. Pitfalls in many aspects especially at standards for surgeons work environment and screening for suspected cases need special precautions were noted.

Keywords:
COVID-19; Surgeons; Infection control; precautions; Awareness; Practice; Attitude

النتائج:
شمل المسح ثلاثمائة وخمسة وسبعين جراحًا ، منهم مئتين وواحد وستين (٦٩,٦٪) من تخصص الجراحة العامة والباقي من التخصصات الجراحية الأخرى. أفاد ٩٩,٥٪ من الجراحين أن انتقال كورونا يكون عبر قطرات الجهاز التنفسي. اختار حوالي ٩١,٧٪ من الجراحين الأشخاص الذين يعانون من ضعف المناعة كمجموعة خطر لعدوى فيروس كورونا تليها كبار السن (٧٩,٥٪) ، والمرضى الذين يعانون من مشكلة صحية مزمنة (٧٥,٥٪). بشكل عام ، تم الكشف عن مستوى وعي جيد بخصوص فيروس كورونا بين أكثر من ثلاثة أرباع الجراحين.

الاستنتاجات والتوصيات:
في الختام ، كشفت الدراسة أنه بصرف النظر عن مستوى الوعي المرتفع المسجل للمشاركين في الدراسة بخصوص فيروس كوفيد١٩والاحتياطات اللازمة له ، ولكن كانت هناك مزالق في العديد من الجوانب خاصة في معايير عمل الجراحين وفحص الحالات المشتبه فيها الذين يحتاجون إلى احتياطات خاصة.

Introduction

By the end of the year 2019 and the start of 2020, the world was faced by a rapidly spreading epidemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2(SARS-CoV-2) which later was classified by WHO as Pandemic. [1] The outbreak started in Wuhan, Hubei province, China, in December 2019. The World Health Organization (WHO) classified the disease as a Public Health Emergency of International Concern on 30 January 2020 and recognized it as a pandemic on 11 March 2020. [2, 3]As of 8 April 2020, nearly 1.44 million cases of COVID-19 have been diagnosed in 209 countries ,with about 83,400 deaths. [4, 5] The majority of cases were old aged ,but some children cases and few deaths

among children's were recorded.

Worldwide, the healthcare systems are obligated to work at more than maximum capacity for a number of months due to the COVID-19 outbreak making health care staff at risk to catch the infection and recording many deaths at all levels of the healthcare workers, several adjustments in surgical services will be required. [6, 7]WHO recommended many preventive measures to prevent disease transmission, of which, hand washing and social distancing (updated now to physical distancing) by minimizing close contact between individuals. Physical distancing was applied by many procedures, including quarantines, travel restrictions, and the closing of gathering areas including universities and schools. Individuals were informed either friendly or by law for social distancing methods by staying at home, limiting travel, avoiding crowded areas, using no-contact greetings, and physically distancing themselves from others. [8, 9] The objective of this study was to assess the awareness of COVID-19 disease and its related infection control practices among surgeons in Saudi Arabia.

Methodology

A cross sectional survey was conducted, including all accessible surgeons in the governmental and private hospitals in Saudi Arabia. The data was collected using a pre-structured online questionnaire developed by the researchers after intensive literature review and expert consultation as a panel of 3 consultants reviewed the items independently, and any discrepancy regarding any item was resolved by consensus at first then by voting. After having the final questionnaire format, it was raised online using social media platforms and sent to all surgeons using a snowball sampling method by the researcher and all his colleges. The survey uploaded from 1st March till 10th of April, 2020.The questionnaire included surgeons' personal data, academic position, and setting. Awareness regarding COVID-19 covered three main domains. General Awareness regarding COVID-19 and its transmission methods, infection control measures according to WHO guidelines, [10], and work related precautions for surgeries under the epidemic. Surgeons practice and attitude regarding COVID-19 cases were also assessed in the questionnaire last section. All participants' responses were downloaded and filtered for missing or incorrect data at the after online submission.

Data analysis

After data were extracted, it was revised, coded, and fed to statistical software IBM SPSS version 22(SPSS, Inc. Chicago, IL).

All statistical analysis was done using two tailed tests. P value of less than 0.05 was considered to be statistically significant. For awareness items, each correct answer was scored one point, and the total summation of the discrete scores of the different items was calculated. A surgeon with a score of less than 60% (17 points) of the maximum score was considered to have poor awareness, while good awareness was considered if he had a score of 60% (18 points or more) of the maximum or more. Descriptive analysis based on frequency and percent distribution was done for all variables, including demographic data, awareness items, and surgeons practice and attitude. Cross tabulation was used to assess the distribution of awareness according to surgeons' personal and practice data. Relations were tested using the Pearson chi-square test.

Results

The survey included 375 surgeons of which, 261 (69.6%) were general surgery staff, and the remaining 114 (30.4%) were fine surgery staff. Exact of 296 (78.9%) of the surgeons worked at governmental hospitals and 43 (11.5%) worked at the private sector while 36 (9.6%) were the academic staff. Regarding their position, 200 (53.3%) of the respondents were consultants and 116 (31%) were specialists, and 59 (15.7%) were residents.

Table 1 illustrates surgeons' awareness regarding COVID-19. An exact of 99.5% of the surgeons reported that of COVID-19 transmission through respiratory droplets. About 91.7% of the surgeons selected immune-compromised persons as the risk group for COVID-19 infection followed by elderly (79.5%), and patients with a chronic health problem (75.5%). Regarding clinical symptoms, fever was recorded by 97.3% of the participants, followed by cough (90.7%). The correct incubation period (15 days) was reported by 84.5% of the surgeons. As for infection control precautions, hand washing as a measure to reduce the risk of infection was reported by 96% of the surgeons, followed by keeping a safe distance from others (90.4%). Washing hands with soap and water were recorded by 94.1% of the surgeons, and washing for 30 seconds or more was reported by 53.6%. About 91% of the surgeons reported intubation as a risky procedure for catching an infection and nasopharyngeal swab as a test sample was identified by 74.4% of the sample, while 13.9% know about Oropharyngeal swab. Using negative pressure operating room was reported by 77.1% of the surgeons, and 69.3% reported the need for a separate anaesthesia machine for suspected or infected cases

only. Only 61.1% of the surgeons reported that they know the protocol in their department for infected cases need surgery. Totally, good awareness level regarding COVID-19 was detected among 78.9% of the surgeons.

Table 1. Surgeon awareness regarding COVID-19 in Saudi Arabia

Domain	Awareness items		No	%
General awareness	Mode of COVID-19 transmission	Blood transfusion	8	2.10%
		Feco-oral	25	6.70%
		Respiratory droplet	373	99.50%
		Sexual Intercourse	7	1.90%
	The most risky people for severe infection	Elderly	298	79.50%
		Immune-compromised	344	91.70%
		Co morbidity Patients	283	75.50%
		Young	15	4.00%
	Clinical symptoms of COVID-19	Fever	365	97.30%
		Cough	340	90.70%
		Fatigue	262	69.90%
		Diarrhea	160	42.70%
	Incubation period	3 days	4	1.10%
		5 days	26	6.90%
		10 days	28	7.50%
		15 days	317	84.50%
Infection control measures	Measures could reduce the risk of infection	Regular Hand Washing	360	96.00%
		Wearing Surgical Mask	246	65.60%
		Safe distance from the others	339	90.40%
		Take regular vitamin C tablet	41	10.90%
	Method for hand disinfection	Water with soap	353	94.10%
		Alcohol Rub	229	61.10%
		Water	15	4.00%
	Effective duration of hand washing	5 seconds	5	1.30%
		10 seconds	4	1.10%
		20 seconds	165	44.00%
		30 or more	201	53.60%
	Safety distance needed during communication	1-2 m	329	87.70%
		2-3 m	44	11.70%
		3+ m	2	0.50%
	Procedures would increase the risk of infection	Intubation	343	91.50%
		Tracheotomy	194	51.70%
		NGT Insertion	205	54.70%

Infection control measures	What kind of test sample do you prefer to choose for COV-ID-19?	Nasopharyngeal Swab	279	74.40%
		Blood	29	7.70%
		Oropharyngeal swab	52	13.90%
		Sputum	15	4.00%
Work related precautions	The ideal operating room for emergency surgery for suspected or confirmed cases	Negative Pressure	289	77.10%
		Positive Pressure	32	8.50%
		Don't know	54	14.40%
	Need a separate an-aesthesia machine for suspected or infected cases only	Yes	260	69.30%
		No	48	12.80%
		Don't know	67	17.90%
	Know the protocol in your department for infected cases need surgery	Yes	229	61.10%
		No	77	20.50%
		Don't know	69	18.40%
	Know about PPE	Yes	359	95.70%
		No	16	4.30%
Overall awareness		Poor	79	21.10%
		Good	296	78.90%

Considering surgeons practice (table 2), 62.4% of the surgeons spend most of the time in the hospital and 76.3% of them change their clothes/scrub before and after the shift. Also, 5.3% of the surgeon reported that they shack hands during their duties, and only 27.2% Screen low risk patient for COVID-19 before emergency surgery but 70.9% screen high risk patients. About 89% of surgeons use personal protective equipment (PPE) during dealing with suspected or infected patients.

Table 2. Surgeon practice regarding COVID-19 in Saudi Arabia

Practice regarding COVID-19		No	%
Are you wearing surgical mask inside the Hospital?	No	30	8.0%
	Sometimes	111	29.6%
	Yes	234	62.4%
Do you change your clothes/scrub before and after the shift?	No	35	9.3%
	Sometimes	54	14.4%
	Yes	286	76.3%
Do you shake hands during your duty?	No	334	89.1%
	Sometimes	21	5.6%
	Yes	20	5.3%

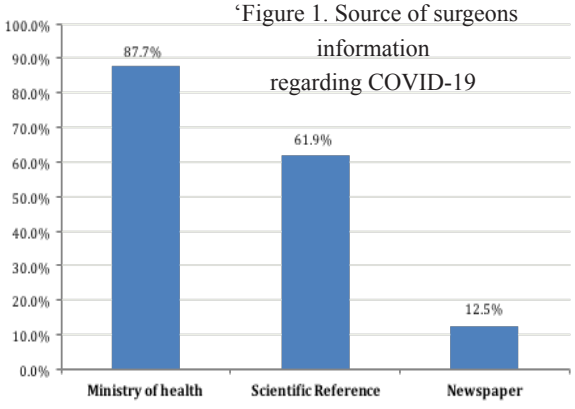
Screen low risk patient for COVID-19 before emergency surgery	Yes	102	27.2%
	No	273	72.8%
Screen high Risk patient for COVID-19 before emergency surgery	Yes	266	70.9%
	No	109	29.1%
Your precaution before operating in high risk/ infected cases	Standard	43	11.5%
	Using PPE	332	88.5%

Table 3 demonstrates surgeons' attitudes towards COVID-19 patients. About 59% of the surgeons worried about having infection with COVID-19, and 42.7% relax to do daily duty despite infected cases in the hospital. Exact of 58.4% of the surgeons willing to do duties in Emergency or Critical Care Department.

Table 3. Surgeon attitude regarding COVID-19 in Saudi Arabia

Surgeon attitude	No	%
Are you worried/ anxious to have infection with COVID-19?		
No	37	9.9%
Sometimes	117	31.2%
Yes	221	58.9%
Relax to do daily duty despite infected cases in your hospital		
No	132	35.2%
Yes	160	42.7%
Don't know	83	22.1%
Willing to do duties in Emergency or Critical Care Department		
No	156	41.6%
Yes	219	58.4%

As for surgeons source of information regarding COVID-19, 87.7% reported the ministry of health followed by scientific references (61.9%), and newspaper (12.5%). (Fig.1)



'Figure 1. Source of surgeons information regarding COVID-19

On relating surgeons data with their awareness level (table 4), 85% of the consultants had a good awareness level compared to 59.3% of the residents with recorded statistical significance (P=.001). Also, 85.1% of those who had their information from scientific sources had good awareness level compared to 79.9% of those who had information from ministry of health (P=.001). About 81% of the surgeons who screen for high risk patients before surgery had a good awareness level compared to 74.3% of those who didn't (P=.049). All other factors were insignificantly related to surgeon's awareness level (P> 0.05) for all.

Table 4. Distribution of surgeon awareness level according to their personal data and practice

Factors			Awareness level				P-value
			Poor		Good		
		No	%	No	%		
Speciality	ENT		1	10.0%	9	90.0%	.168
	General surgery		54	20.7%	207	79.3%	
	Maxillofacial		3	60.0%	2	40.0%	
	Obstetrics/ Gynaecology		0	0.0%	4	100.0%	
	Ophthalmology		3	21.4%	11	78.6%	
	Orthopaedic		8	36.4%	14	63.6%	
	Paediatric		2	11.8%	15	88.2%	
	Plastic		0	0.0%	6	100.0%	
	Thoracic		1	11.1%	8	88.9%	
	Vascular		7	25.9%	20	74.1%	
Work field	Academic		7	19.4%	29	80.6%	.502
	Governmental		60	20.3%	236	79.7%	
	Private		12	27.9%	31	72.1%	
Position	Resident		24	40.7%	35	59.3%	.001*
	Specialist		25	21.6%	91	78.4%	
	Consultant		30	15.0%	170	85.0%	
Screen high Risk patient for COVID-19 before emergency surgery	Yes		51	19.2%	215	80.8%	.049*
	No		28	25.7%	81	70.3%	

Do you change your clothes/scrub before andafter the shift?	No		9	25.7%	26	74.3%	.578
	Sometimes		9	16.7%	45	83.3%	
	Yes		61	21.3%	225	78.7%	
Do you shake hands during your duty?	No		69	20.7%	265	79.3%	.684
	Sometimes		6	28.6%	15	71.4%	
	Yes		4	20.0%	16	80.0%	
Source of Knowledge about COVID-19	Ministry of health		66	20.1%	263	79.9%	.001*
	Scientific Reference		30	12.9%	202	87.1%	
	Newspaper		7	14.9%	40	85.1%	

P: Pearson $X^{2\,test}$

P < 0.05 (significant *

Discussion

The current study aimed to assess surgeons' awareness, practice and perception regarding infection control measures and precautions with the current COVID-19 pandemic attacking nearly the whole countries all over the world. This is vital as medical staff is the first defence line against the virus and they are daily exposed to intensive doses of the virus due to patient's care, which makes them at higher risk for catching the infection and even death. This was reported in different countries with a high mortality rate among their medical staff at all categories. This high risk makes the staff more careful and should follow more strict precautions than the general population and this was the WHO recommendation for the health care team. [11, 12] All medical staff included in the management of COVID-19 suspected cases must adhere to airborne precautions, hand hygiene, and donning of personal protective equipment. All aerosol-generating procedures should be achieved in an airborne infection isolation room. Double-gloving, as a daily practice at the unit, might provide extra protection and reduce spreading through contamination to the surrounding equipment after intubation. [13] Surgeons are one of the medical staff that is at risk of managing COVID-19 suspected or even confirmed cases for an emergency. They should adhere to the same strict precautions. Besides they should prepare the operation room with certain standards to minimize the risk of virus spread. Due to the lack of scientific evidence and information regarding the new virus and mode of transmission, surgeons should be aware of what is available and should do their

best for tracking safe behaviours.

The study revealed that awareness among surgeons regarding COVID-19 and infection control measures was satisfactory as about 3 out of each four had good awareness level. The awareness level was very good for the mode of transmission, clinical signs and symptoms, and incubation period but population at risk were identified by a moderate amount of surgeons, especially patients with the chronic health problem. Regarding infection control measures, surgeons recorded very high awareness except for duration of hand washing which was questionable to be wrongly recorded by nearly half of the surgeons but this can be explained by that the recommended duration was not proved scientifically as some scientific communities recorded at least 20 minutes and others recommended for 30 minutes. As for work related procedures to minimize the infection rate, two thirds only of the surgeons reported that they had clear protocol to deal with emergent cases, which is a defect in their work environment. Also, not all surgeons were aware of the nature of the emergency operating room standards with negative pressure and independent anaesthesia machine.

Regarding surgeons' practice, not all surgeons change their clothes/scrub before and after the shift and nearly 10% don't avoid shaking hands, which are un-recommended behaviour especially during work time. Also another significant finding was that about one third of the surgeons don't Screen High Risk patients for COVID-19 before emergency surgery, which is very dangerous and may make the surgeon to deal more loosely with these cases which are potential source of infection.

Considering surgeons perception regarding dealing with COVID-19 cases, more than half of the surgeons were worried about having infection with COVID-19 but also half of them willing to do duties in Emergency or Critical Care Department. Surgeons should be updated with any new precautions of guidelines. They may be a source of infection for many cases as they mainly deal with disabled patients using invasive procedures which all ideal environment for infection spread. If surgeons are unaware of all precautions, especially for medical staff, this will expose them to be infected, which causes more viral spread besides more shortage in the available staff already existing all over the world.

Conclusions and recommendations

In conclusion, the study revealed that irrespective of the high awareness level recorded for the study participants regarding COVID-19 and its needed precautions, but there were pitfalls in many aspects,

especially at standards for surgeons work environment and screening for suspected cases which require special precautions. Continuous exploring for the new information and standards is recommended for the medical personnel in general and surgeons who need more specific precautions in particular. This is the responsibility of the surgeons themselves and the ministry of health and scientific clubs who should at least construct online health education awareness sessions timely.

Data Availability

The data used to support the findings of this study are included within the article.

Ethical Approval

Ethical approval was obtained from the ethical committee of Najran University (06-09-1-2019), and informed written consent was obtained from all participants.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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