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Original Article

Adequacy of physician clinical rounds and nursing care elements for non-COVID-19 infected patients admitted during the COVID-19 pandemic



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ABSTRACT

Background: The COVID-19 pandemic created many challenges for healthcare systems. Frontline workers and especially healthcare professionals were the most severely affected through increased working hours, burnout and major psychological distress.

Objectives: To evaluate the changes in standard care elements which occurred during the COVID-19 pandemic, specifically the physician clinical rounds and nursing care provided to non-COVID-19 infected patients.

Design: Observational retrospective study.

Settings: The study was conducted at King Abdulaziz Medical City, Riyadh Saudi Arabia. KAMC is a 1200 bed tertiary care referral academic medical center.

Patients (materials) and methods: We compared the physician clinical rounds and nursing care elements in all admissions due to non-COVID-19 pneumonia and ST elevation myocardial infarction during the lockdown period with similar admissions in a baseline period in the same weeks in the previous pre-lockdown.

Main outcome measures: To evaluate the changes occurring during the COVID-19 pandemic in terms of the standard care elements, such as the physician rounds and nursing care.

Sample size: Total of 113 patients records were analyzed.

Results: During the lock down period, a total of 113 patients were admitted to the medical and cardiology wards, (95 patients with pneumonia and 18 patients with ST segment elevation myocardial infarction (STEMI)) compared to 89 patients in the pre lockdown period (74 patients with pneumonia and 15 patients with STEMI). Both groups were similar in age, gender, disposition, length of stay, goal of care planning and outcome. Chronic respiratory disease and Diabetes were more present in patients admitted on the pre lockdown time. Azithromycin was more frequently used as part of the initial antibiotic regimen for pneumonia during the pre-lockdown while doxycycline was significantly more during the lockdown.

For the 95 patients admitted in the medical wards during the lockdown, there were a total of 820 physicians' clinical rounds opportunities for senior and junior physicians each. The residents missed 133 (16.2%) and consultant missed 252 (30.7%) of those clinical rounds opportunities. Missed clinical rounds opportunities during the pre-lock down period was higher for residents and consultants at 19.3% ($P = 0.429$) and 36.3% respectively ($P = 0.027$). Similarly, missed clinical rounds opportunities was less during the lockdown period from 35.2% to 25% ($p 0.022$) and from 38.8% to 30.6% ($p = 1$) for junior staff and consultant cardiology respectively compared to pre lockdown period. For nursing care elements, there was a decrease

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in missed opportunities in vital signs measurement (p 0.47 and p 0.226), pain assessment (p 0.088 and p 0.366) and skin care (p 0.249 and p 0.576) for patients admitted during the lockdown period in medical and cardiology wards.

Conclusions: Caring for patients admitted for non COVID 19 infection reasons, physicians' clinical rounds did marginally increase compared to pre lockdown period while nurses monitoring for those patients was significantly higher. No difference in mortality was observed for patients admitted pre and during lockdown. The number of missed opportunities to do clinical rounds by physicians remains high during both periods and measures to improve adherence of physicians to performed clinical rounds are needed.

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Introduction

Health care systems across the world faced significant challenges during the COVID-19 pandemic including and not limited to the bed crisis, especially critical care beds, the urgent need for healthcare resource re-allocation and fear of the unknown [1,2].

Frontline workers especially healthcare professionals were the most severely affected. Healthcare workers experienced increasing working hours, burnout and major psychological distress [3–7]. In addition, they had to manage their fear of being infected or infecting their family members, particularly early in the pandemic when the modes of transmission were not fully understood and the news of several healthcare workers being infected [5,8–10].

Although some hospitals were converted to receive COVID-19 infected patients only, many continued to admit both COVID-19 infected and non-infected patients. The usual workflow and treatment protocols and procedures for non COVID 19 infected patients were modified in many disciplines to minimize exposure to COVID-19 patients [11–22].

Bedside rounds, patients' physical assessments and nursing care components are some essential care elements routines that could potentially have been negatively impacted during the pandemic for the non COVID 19 infected patients admitted during the pandemic. Bedside rounds are essential to review the patient's condition and communicate a plan of care to patients.

In this study, we aimed to evaluate the changes occurring during the COVID-19 pandemic in terms of the standard care elements, such as the physician rounds and nursing care.

Method

This was an observational retrospective comparative study of all non-COVID-19 infection admissions due to pneumonia and STEMI from 14 of March 2020 to 30 June 2020 and the admissions with a similar diagnosis during a baseline period of the same weeks in the previous year. The lockdown in Saudi Arabia during the COVID-19 pandemic started from 14th of March 2020. The study was conducted at King Abdulaziz Medical City (KAMC), Riyadh Saudi Arabia. KAMC is a 1200 bed tertiary care referral academic medical center. During the COVID-19 pandemic, the hospital admitted both COVID-19 infected patients and other disease categories.

Data was extracted from the electronic health record (EHR) and included age, gender, admission diagnosis, admission destination, admission investigations, daily residents and consultant physician visits, nursing visits, number of daily vital measurements taken, antibiotic treatment choices for patient with pneumonia, daily laboratory investigations and x-rays, ECG, type of myocardial infarction, and thrombolytic use.

According to the hospital policy, junior physicians (residents and fellows) are expected to perform at least one clinical round daily, and the senior physician (consultants) should conduct a clinical round daily or at least every other day. The occurrence of the physician visits was verified in the physician and nursing documentation. The

nursing care policy requires measuring the vital signs and doing a pain assessment at least 4 times per day and daily skin care.

The study was approved by the Institutional Review Board of King Abdullah International Medical Research Center, Riyadh, Saudi Arabia.

Statistical analysis

In this study, standard statistical procedures were done with the Statistical Package for Social Sciences (SPSS, version 22). Descriptive and inferential statistics have been performed for the socio-demographic and clinical variables. The categorical variables are presented as frequency and percentage with the continuous variables as mean \pm standard deviation. The categorical variables were compared using a chi-square test or Fisher's exact test, as appropriate. All tests were two-tailed and significance was accepted at a *p*-value $<$ 0.05.

Results

In total, 95 patients were admitted with pneumonia and 18 patients with STEMI from 14 March 2020 to 30 June 2020. In the pre-lockdown period, there were 89 admissions with pneumonia and STEMI (Pneumonia 74, STEMI 15). The patients with pneumonia admitted during lockdown were non-significantly younger (67.4 ± 20.1) vs (70.7 ± 19.9) ($P = 0.163$). The male to female ratio was comparable during the two periods (Table 1). There were more patients with diabetes mellitus ($p < 0.001$) and chronic respiratory illness admitted during the pre-lockdown period ($P = 0.017$). The patients were admitted to a general medical ward or ICU, which were similar between the two periods ($P = 1$). The hospital length of stay (LOS) was not significantly longer in the patients admitted with pneumonia during the lockdown (mean of 8.6 ± 4.5 vs 7.2 ± 3.8 , $P = 1$) as was the hospital mortality (Table 1).

The total admission days for the 95 patients admitted during the lockdown period was 820 vs 532 days for the 74 patients admitted pre-lockdown. During the admission days, physicians (residents) missed 133 opportunities to attend to patients (16.2%) compared to 103 of 532 opportunities in the pre-lockdown period (19.3%) ($P = 0.429$). The consultants missed 252/820 round opportunities (30.7%) compared to 193/532 opportunities during the pre-lockdown period (36.3%) ($P = 0.027$) (Fig. 1).

The number of missed vital signs measurements and skin care opportunities in the nursing care was 16 of 3280 (0.5%) and 37 of 820 (4.5%) during the lockdown and 30 of 2128 (1.5%) and 40 of 532 (7.5%) in the pre-lockdown period ($P = 0.47$ and 0.088). The missed pain assessment opportunities was also lower during the lockdown compared to pre-lockdown admissions (24/1640, 1.5% vs 52/1064, 4.8%, $P 0.249$).

The total number of chest X ray, CT images and blood test requested for patients with pneumonia were more in the lockdown period (Table 1). Echocardiogram request was lower during the lockdown period in both medical and cardiac patients. Choices of

Table 1
Sample characteristics admitted with pneumonia during the lockdown and pre-lockdown periods.

Parameter	During lockdown Pneumonia N = 95 (%)	Pre-lockdown Pneumonia N = 74 (%)	P value
Age (mean ± SD)	67.4 ± 20.1	70.7 ± 19.9	0.163
Gender			
Male	54 (56.8)	40 (54.1)	0.694
Female	41 (43.2)	34 (45.9)	
Co morbidities			
• CNS disease	29 (30.5)	3 (4.1)	0.282
• Cardiovascular disease	68 (71.6)	61 (82.4)	0.117
• Endocrine disease	7 (7.3)	10 (13.7)	0.736
• DM	50 (52.6)	49 (67.1)	< 0.001
• Malignancy	10 (10.5)	3 (4.1)	0.568
• Chronic renal disease	22 (23.2)	14 (18.9)	0.459
• Chronic respiratory disease	18 (18.9)	21 (28.4)	0.017
• Rheumatologic disease	6 (6.3)	3 (4.1)	0.599
• Others	27 (28.3)	29 (39.7)	0.406 ^a
Admission destination			
Ward	78 (82.1)	67 (90.5)	0.568 ^a
ICU	17 (17.9)	7 (9.5)	1.00 ^a
Support care	31 (32.6%)	15 (20.5%)	
Resuscitation limitation during admission	16 (16.8)	7 (9.5%)	0.975
Resuscitation limitation before admission	15 (15.8%)	8 (11%)	
Physician (Actual <u>No</u> visits/opportunity visits)			
• Residents	133/820 (16.2%)	103/532 (19.3%)	0.429 ^c
• Consultant	252/820 (30.7%)	193/532 (36.3%)	0.027 ^c
• Consultant ^b	128/410 (31.2%)	77/266 (28.9%)	0.956 ^c
Nursing care			
Missed vitals opportunities	16/3280 (0.5%)	30/2128 (1.5%)	0.47 ^c
Missed skin care opportunities	37/820 (4.5%)	40/532 (7.5%)	0.088 ^c
Pain assessment opportunities	24/1640 (1.5%)	52/1064 (4.8%)	0.249 ^c
Laboratory request			
Blood request	708	472	< 0.001 ^a
Blood culture (yes/no) (%)	72	70	0.567 ^a
Sputum culture (yes/no) (%)	34	28	0.070
Imaging requests on admission			
Number of Chest x ray requests	439	271	< 0.001 ^a
Number of CT scan chest requests	53	25	0.726
Number of Echocardiograms requests	50	63	0.983
Initial antibiotic Regimen			
Augmentin	12 (12.8)	8 (11.1)	0.213
Azithromycin	19 (20.2)	59 (81.9)	0.573
Ceftriaxone	30 (31.9)	33 (45.8)	0.804
Doxycycline	46 (48.9)	4 (5.6)	0.001
Meropenem	10 (10.6)	11 (15.3)	0.642
Moxifloxacin	12 (12.8)	13 (18.1)	0.464
Tazocin	64 (68.1)	33 (45.8)	0.843
Vancomycin	17 (18.1)	8 (11.1)	0.563
Others	21 (22.1)	13 (17.8)	0.715
Length of stay (mean ± SD)	8.6 ± 4.5	7.2 ± 3.8	1 ^c
Hospital mortality			
• Survivors	57 (60%)	59 (79.7%)	0.452
• Died	38 (40%)	15 (20.3%)	

^a Fisher exact test.^b Round every other day.^c Mann-Whitney U test.

initial antibiotic regimens were comparable except for azithromycin and doxycycline (Fig. 2).

The patients admitted with STEMI during the two periods were similar in terms of mean age (55.67 ± 9.74, 54.5 ± 12.2, $P=0.556$), male to female ratio, comorbidity distribution and location of MI (Table 2).

The total admission days for the 18 patients admitted with MI during the lockdown period was 124 vs 108 days for the 15 patients admitted pre-lockdown. The junior physicians (residents/fellows) missed 31 of 124 opportunities to attend to patients (25%), compared to 38 of 108 opportunities in the pre-lockdown period (35.2%) ($P=0.022$). The consultants missed 38/124 visit opportunities (30.6%) compared to 42/108 visit opportunities during the pre-lockdown period (38.8%) ($P=1$) (Fig. 1).

The number of missed vital signs measurements and skin care opportunities in the nursing care was 6 of 496 (1.2%) during the lockdown and 10 of 432 (2.3%) in the pre-lockdown period ($P=0.226$). The missed pain assessment opportunities was marginally lower during the lockdown compared to pre-lockdown admissions (13/248, 5.2% vs 19/216, 4.8%, $P=0.576$).

There were no differences in the PCI use during the two periods ($P=0.190$). The use of the echocardiogram was marginally lower during the lockdown ($p=0.668$). Two patients received thrombolytic therapy during the lockdown, compared with none in the pre-lockdown period. The majority of the patients presented more than 90 min after the chest pain onset in both periods (77.8% and 86.6%). The LOS was similar during both periods (6.9 ± 3.8) and (7.2 ± 2.6), ($P=0.791$).

Percentage changes of missed opportunities

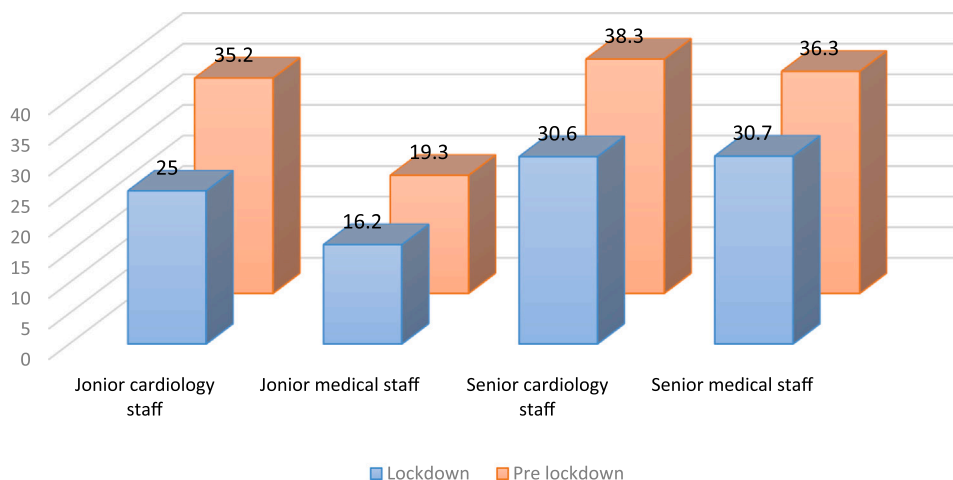


Fig. 1. Percentage changes of missed opportunity.

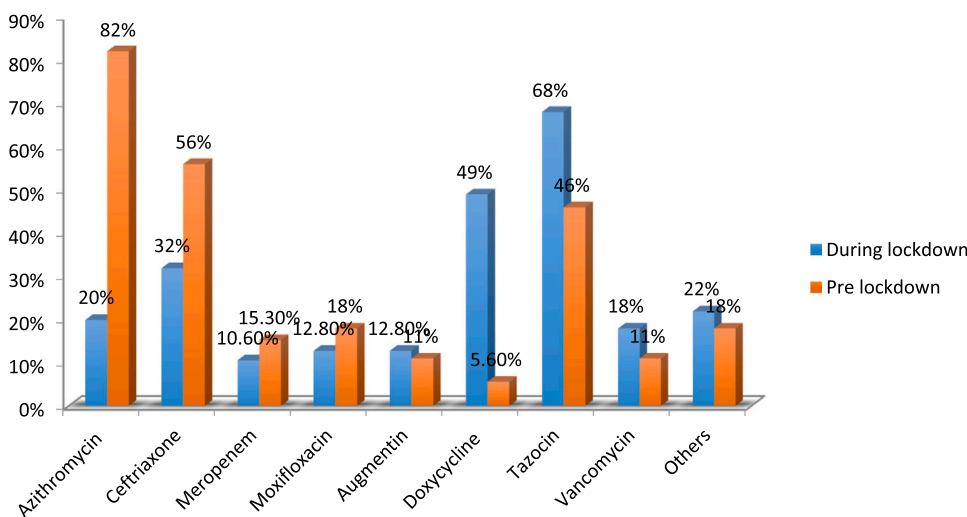


Fig. 2. Pneumonia antibiotics choices differences between lockdown and pre-lockdown period.

Discussion

Most of the current generation of healthcare providers has never experienced a situation such as the current COVID-19 pandemic. Globally, healthcare systems were stressed and some collapsed totally during the peak of the pandemic [23]. Many hospitals were converted to COVID-19 infected patients only. This alteration of healthcare resources made it more difficult for patients with other medical conditions to access healthcare [24,25].

The current study did not find a significant decrease in the number of patients admitted with non COVID 19 pneumonia and STEMI during the two periods. There were fewer patients with diabetes and chronic respiratory diseases admitted during the lockdown however. The analysis is limited only to admit patients and did not include patients presenting at the Emergency Department (ED). A significant reduction in admissions through the Emergency Room due to the COVID-19 pandemic has been reported [3,4]. An American College of Emergency Physicians (ACEP) survey conducted in April 2020 reported that 80% of patients had fears of contracting COVID-19 during a hypothetical visit to an ED, and 73% were concerned about placing an unnecessary burden on the healthcare system [5].

Patient disposition to ICU was more during the lockdown period. Patients admitted during the lockdown could be sicker than the pre lockdown period. During the lockdown, sicker patients usually present to ER while the less sick tend to presenting because of the COVID 19 fear. Alternatively, physicians during the lockdown may be more conservative preferring to early refer patients to ICU.

Antibiotic choices expectedly showed less use of azithromycin which was used more as a therapeutic option for COVID 19 pneumonia at that time and the use of doxycycline for atypical pneumonia coverage.

The number of PCI done during the lockdown were less compared to pre lockdown ($p=0.190$), however the small number of patient was small in both period. Other studies have shown a significant decrease in PCI in patients with MI likely to the fear of infection spread specially at the early stages of the pandemic [26].

The physician rounds and nursing care elements to non-COVID-19 infected patients admitted during the lockdown both has shown improvement during the lockdown period. The physicians, both juniors and seniors, were attending to their rounds more frequently compared to pre-lockdown. The decrease in the missed opportunities to do clinical rounds was significant among senior physicians in the medical

Table 2
Characteristics of patients admitted with STEMI during the lockdown and pre-lockdown periods.

Parameter	During lockdown N = 18 (%)	Pre lockdown N = 15 (%)	P value
Age (mean ± SD)	55.67 ± 9.74	54.5 ± 12.2	0.556 ^a
Gender			
Male	16 (88.9)	13 (86.7)	1 ^b
Female	2 (11.1)	2 (13.3)	
Co morbidities			
Cardiovascular disease	8 (44.4)	6 (40)	0.80 ^a
DM	9 (50)	5 (33.3)	0.342 ^a
Others	8 (44.4)	13 (86.7)	1 ^b
MI types			
Anterior MI	7 (38.8%)	7 (46.6%)	0.414 ^a
Inferior MI	11 (61.1%)	8 (53.3%)	
Physician (No visits/ opportunity visits)			
• Residents	31/124 (25%)	38/108 (35.2%)	0.022 ^a
• Consultant	38/124 (30.6%)	42/108 (38.8%)	1.00 ^a
• Consultant ^c	25/62 (40.3%)	30/54 (55.6%)	0.676 ^a
Laboratory request			
Blood request (actual)	100	90	0.655 ^a
Blood culture (yes/no) (%)	7	10	0.157 ^a
Imaging requests on admission			
Number of Chest x ray requests	30	35	0.326 ^a
Number of CT scan chest requests	0	1	0
Number of Echocardiograms requests	18	23	0.668 ^a
Nursing care			
Missed vitals opportunities	6/496 (1.2%)	10/432 (2.3%)	0.226 ^a
Missed skin care opportunities	5/124 (4.1%)	7/108 (6.4%)	0.366 ^a
Missed Pain assessment opportunities	13/248 (5.2%)	19/216 (8.8%)	0.576 ^a
Reperfusion therapy			
Thrombolytic	2 (11.1%)	0	0
PCI	16 (89.9%)	15 (100%)	0.190 ^a
Chest pain duration at the time of presentation			
< 90 min	4 (22.2%)	2 (13.3%)	
> 90 min	14 (77.7%)	13 (86.7%)	0.190 ^a
Length of stay (mean ± SD)	6.9 ± 3.8	7.2 ± 2.6	0.791 ^a
Hospital mortality			
• Survivors	16 (88.9)	13 (86.7)	0.685 ^a
• Died	2(11.1)	2 (13.3)	

^a Mann-Whitney U test.

^b Fisher exact test.

^c Round every other day.

wards. During the lockdown, there is a mobilization of all healthcare resources. Consultants from all other subspecialty services were participating in general medicine rounds. Senior physicians presence is emphasized to help management decisions including discharge and bed management. On the nursing care elements, there was also a general improvement, the number of missed opportunities were low in both periods however. The improvement in clinical care elements early in the pandemic could be related to administrative encouragement and increased sense of engagement by primary teams. Other studies also reported that the elements of care delivered to non-COVID patients, admitted during the pandemic, were not reduced but possibly improved [27]. Hospital mortality did not differ between the two periods, which is in contrast to other studies [16]. The small number of patients included preclude from making a solid conclusion of outcome difference however.

Physician's clinical rounds that include daily physical assessment of admitted patients by both junior and senior physicians are crucial to providing high-quality, safe care for patients in a timely, relevant

manner. Those multidisciplinary clinical rounds provide joint learning and educational venue, effective communication, information sharing and an opportunity for the team to review a patient's condition and develop a coordinated plan of care and facilitate involvement of the patient and/or family members in the care plan. The deficiencies in performing clinical rounds observed in this study where about one third of available opportunities to do clinical rounds by senior physicians are missed deprive both patients and junior staff of a critical management and educational components. Quality improvement projects should focus on providing adequate quality rounds.

Our study has a number of limitations. The sample size is small and the duration was short (4 months). We were limited by the total duration of the lockdown applied at the city of Riyadh, Kingdom of Saudi Arabia. Our hospital is a tertiary care hospital whose main patients are of military sector (National Guard) which along with an overall internationally reported decrease in non COVID 19 related admissions may give an explanation to the small number of patients admitted during the COVID 19 lockdown. The retrospective nature of the study where information source is only the data documented in healthcare system is another important limitation. Although our findings are limited to our healthcare system, we think further quality research to address the quality and adequacy in clinical rounds in other health sectors.

Conclusion

Caring for patients admitted for non COVID 19 infection reasons, physicians' clinical rounds did marginally increase compared to pre lockdown period while nurses monitoring for those patients was significantly higher. No difference in mortality was observed for patients admitted pre and during lockdown. The number of missed opportunities to do clinical rounds by physicians remains high during both periods and measures to improve adherence of physicians to performed clinical rounds are needed.

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Ethical approval

Not required.

Ethical Consideration

Ethical approval was obtained from Institutional Review Board of King Abdullah International Medical Research Center, Ministry of National Guard-Health Affairs, Riyadh, Kingdom of Saudi Arabia (Approval no. RC20/432/R). Patient confidentiality was ensured, and the patients' data were collected and used by the research team only. Due to the retrospective nature of the study, and the use of anonymized patient data, the requirement for informed consent was waived.

Competing interests

None declared.

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