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Abstract

Introduction: The Coronavirus Disease 2019 (COVID-19) is a public health emergency and during this unprecedented situation, health care providers across the globe are at the frontline in the fight against this disease. Countries that have been severely hit by the pandemic are using pharmacists to help triage patients. In order to ensure the continuity of these services, it is of paramount importance that pharmacists be formally involved and engaged in the management of this pandemic. In response to the underlying knowledge deficit, this study was undertaken as the first of its kind in the entirety of Saudi Arabia.

Methods: This study is a questionnaire based cross-sectional study that was carried out for a period of five months from March 2020 to July 2020 to assess the role of working pharmacists in the management of the COVID-19 pandemic under different health care settings across Saudi Arabia.

Results: A total of 398 responses were recorded, in which 51.1% of the respondents were not involved in any learning or awareness activities involving health care providers (HCPs) or patients. The majority of respondents (62.9%) were not involved in creating or evaluating therapeutic plans for COVID19 patients, and 55% were not involved in therapeutic mentoring of COVID19 patients. Only a very low percentage of respondents were participating in COVID19-related research within their institution. Only 37% of respondents reported being satisfied with their role and contribution in the management of COVID-19.

Conclusion: The present study reveals that pharmacists are underutilized in the management of COVID-19 patients in Saudi Arabia. As such, the findings emphasize the importance of enhancing the role and contribution of pharmacists in patient care management across all hospitals and especially under health care crisis conditions. The establishment of a crisis standard of care guideline for all HCPs, including pharmacists, would help in improving patient overall care under crisis conditions like the present COVID-19 pandemic.

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1. Introduction

The Coronavirus Disease 2019 (COVID-19) is a public health emergency, and during this unprecedented situation, healthcare providers across the globe are at the frontline (WHO, 2020). As the most accessible healthcare providers, pharmacists play a critical role in the fight against this pandemic through community pharmacies, hospitals, and other health-care settings, including long-term care (Gross and MacDougall, 2020; Ahmad et al., 2020; NCPA, 2020). Besides performing their routine duties, pharmacists are helping to reduce the burden on physicians and other health providers by providing drug information/telehealth services,
phone consultations, prescription orders, and conducting antiviral stewardship programs.

Countries that have been severely hit by the pandemic are also using pharmacists to help triage patients (WHO, 2020; Bukhari et al., 2020). In order to ensure continuity of these services, it is of paramount importance that pharmacists be formally involved and engaged in the management of this pandemic. Furthermore, there is a need to maximize their involvement in direct patient care. In Saudi Arabia, pharmacists are an important part of everyday healthcare and are capable of serving dynamically during the ongoing pandemic (Ahmad et al., 2020). However, though pharmacists have been acknowledged for their importance in preventive care, there is a paucity of published literature about the role of pharmacists in the management of COVID-19 in Saudi Arabia (Ahmad et al., 2020; Rasheed et al., 2019).

In response to that underlying knowledge deficit, this study was undertaken as the first of its kind in the entirety of Saudi Arabia. Healthcare systems should be able to monitor and assess areas that require more attention. Evidence suggests that job satisfaction is linked with motivation, and therefore has a major impact on productivity, innovation, and overall organizational performance (Benslimane and Khalifa, 2016). Accordingly, this study was designed to evaluate and assess the role and satisfaction of pharmacists in the management of the COVID-19 pandemic under different healthcare settings. The results of this study are expected to fill the existing knowledge gap and to highlight the involvement and utilization of the pharmacy workforce in handling emergency situations in general and the COVID-19 crisis in particular. This would further help in strengthening the delivery of pharmacist-oriented services and the rational utilization of their skills as front-line healthcare providers during public health crises.

2. Materials and methods

2.1. Study design and sample

This study is a questionnaire–based, cross-sectional study that was designed to evaluate and assess the role of working pharmacists in the management of the COVID-19 pandemic under different healthcare settings across Saudi Arabia. The study was carried out for a period of five months from March 2020 to July 2020. The questionnaire was randomly distributed among pharmacists, interns, and trainees involved in the management of COVID-19. Both male and female pharmacists involved in COVID-19 patient care management under different healthcare settings were included.

2.2. Research instrument

A self-administered questionnaire was designed, developed, and validated using the field pretesting method (Oksenberg, 1991; Foddy, 1996). The questionnaire was designed to evaluate the role and satisfaction of pharmacists involved in COVID-19 patient care management. The research instrument was distributed and administered among the focus group using Google Forms. Voluntary participation and data handling consent was obtained from the respondents at the beginning of the survey.

2.3. Questionnaire design and development

At the outset, a qualitative, closed-ended questionnaire consisting of two domains with ten questions was designed and developed. The elements of the questionnaire were based on a literature review and the researchers’ own field experience. Once developed, the questionnaire was validated for its lucidity and comprehensibility using the field pretesting method (Oksenberg, 1991; Foddy, 1996; Hilton, 2017).

2.4. Data collection and analysis

The questionnaires were distributed and administered to the focus group using Google Forms. Social media platforms like WhatsApp and Twitter were used to distribute the questionnaire among potential respondents. Respondent data was received online and was cleaned based on the completeness of the data. Missing or incomplete values were filtered to avoid statistical errors.

Descriptive statistical analysis was carried out to describe the study findings. For all the variables, data were presented as frequencies and percentages. We conducted subgroup analysis for in-patient pharmacists (hospital and clinical pharmacists) as they work directly with hospitalized COVID-19 patients. All analyses were carried out using R (The R Project for Statistical Computing) and SPSS software (IBM SPSS Statistics 24).

3. Results

3.1. Respondents and background

A total of 398 responses were recorded, wherein seven had incomplete information and therefore were excluded from the study. Among respondents, 50.6% (n = 198) were females, and the majority were practicing in the hospital pharmacy (54.5%, n = 213); second most prevalent were clinical pharmacists (19.2%, n = 75). The remaining 26.3% of total participants (n = 103) included community pharmacists, pharmacy residents and fellows, pharmacy technicians, and pharmacy students. Around 57.5% of respondents (n = 225) were practicing in large hospitals (>300 beds), and a similar number (57%, n = 223) belonged to Ministry of Health hospitals (MoHs). In addition, 32.7% of respondents (n = 128) have more than ten years of experience (n = 128); slightly less than half (46.5%, n = 182) had a Bachelor of Pharmacy degree as the highest educational qualification, and a fifth (19.9%, n = 78) were Pharm D graduates. In terms of region distribution, the highest response rate was recorded from Riyadh (43.5%, n = 170), followed by Makkah (16.1%, n = 63), as shown in Table 1.

3.2. Respondent satisfaction with contribution to management of the COVID-19 pandemic

The results obtained showed that around 87% (n = 340) of the surveyed hospitals were following MoH guidelines, with 70.3% (n = 275) of hospitals having, in addition, their own institutional protocol for COVID-19 management. In regard to healthcare and patient awareness activities, about 51.1% of the respondents (n = 196) were not involved in any learning or awareness activities involving healthcare providers (HCPs) or patients. The majority of respondents (62.9%, n = 246) were not involved in creating or evaluating therapeutic plans for COVID-19 patients, and likewise a majority (54.5%, n = 213) were not involved in therapeutic mentoring of COVID-19 patients. Only a very low percentage of respondents were participating in COVID-19-related research within their institution, as described in Table 2. Nonetheless, 23% of respondents reported being satisfied and 14% very satisfied with their role and contribution in the management of COVID-19, although a substantial percentage (45%) remained neutral about their satisfaction in the management of the pandemic, demonstrated in Fig. 1A.
Remarkably, in-patient pharmacists were not fully utilized as drug information resources for HCPs in their home institution, with only 41.7% (n = 120) reporting such involvement. In regard to satisfaction, only 11% and 22% of in-patient pharmacists were very satisfied and satisfied, respectively, with their role and contribution in the management of COVID-19, whereas a substantial percentage (50%) remained neutral about their satisfaction in the management of the pandemic, demonstrated in Fig. 1B.

3.4. In-patient pharmacist satisfaction with contribution to management of the COVID-19 pandemic by their characteristics

Respondents from smaller healthcare facilities (bed size <100) were more satisfied with their roles as compared to respondents from secondary and tertiary care hospitals, as shown in Fig. 2. Similarly, respondents from university hospitals were more satisfied whereas military hospital respondents were more dissatisfied than those in other hospitals, as demonstrated in Fig. 3. Professional experience was found to have an impact on pharmacist involvement in the management of the COVID-19 pandemic, as respondents with more than ten years of professional experience were more satisfied with their role than those having lesser experience, as shown in Fig. 4.

4. Discussion

COVID-19 is a highly contagious virus, and infected patients progress rapidly. Management of COVID-19 requires a multidisciplinary approach with contributions from all types of HCPs. As frontline HCPs, pharmacists contribute immensely towards fighting this pandemic globally and remain an integral part of daily healthcare in Saudi Arabia. However, the level of pharmacist involvement under different healthcare settings and the corresponding satisfaction among pharmacists has remained arguable and questionable. Therefore, our study aimed to assess the level of involvement and satisfaction of pharmacists in the management of COVID-19 in Saudi Arabia.

Our results showed that more than 80% of the surveyed hospitals were following MoH guidelines, with 70% of hospitals having their own institutional protocol for COVID-19 management in addition, indicating overall adherence of hospitals to strong and robust management protocols. By serving as a resource to HCPs, patients, and the public, pharmacists are essential in mitigating adverse consequences arising from the COVID-19 pandemic (Ahmad et al., 2020; NCPA, 2020; Bukhari et al., 2020; Rasheed et al., 2019; Visacri et al., 2020; Tan et al., 2020). Moreover, pharmacists assist through evaluating literature related to new or off-label drug therapies (Ahmad et al., 2020; NCPA, 2020; Al-Jedai et al., 2016; Abdel Jalil et al., 2020). However, in contradiction to pharmacist roles and involvement on the global stage, our study found that more than 50% of respondents were not involved in any learning or awareness activities, creating or evaluating therapeutic plans, or therapeutic mentoring of COVID-19 patients. This disengagement could be attributed to pre-defined roles excluding any learning or awareness activities, creating or evaluating therapeutic plans, or therapeutic mentoring of COVID-19 patients. This neutrality may mean that respondents were not sure of their roles, responsibilities, and professional rights. The underlying gaps and barriers that result in the underutilization of pharmacist roles and involvement on the global stage, our study found that more than 50% of respondents were not involved in any learning or awareness activities, creating or evaluating therapeutic plans, or therapeutic mentoring of COVID-19 patients. This disengagement could be attributed to pre-defined roles excluding any learning or awareness activities, creating or evaluating therapeutic plans, or therapeutic mentoring of COVID-19 patients. This neutrality may mean that respondents were not sure of their roles, responsibilities, and professional rights. The underlying gaps and barriers that result in the underutilization of:

In order to precisely assess respondent satisfaction regarding pharmacist contributions to the care of patients with COVID-19, we looked at only those pharmacists who had the qualifications and high situational potential to work directly with a COVID-19 medical team and hospitalized patients. Specifically, the responses of in-patient pharmacists (n = 288, 73.7%), which include hospital pharmacists and clinical pharmacists, were reviewed and reported as shown in Table 3. Interestingly, only 43.1% (n = 124) of these pharmacists were involved in learning or awareness activities for HCPs or COVID-19 patients, and only 29.2% (n = 84) and 40.6% (n = 117) were respectively involved in either creating therapeutic plans or carrying out therapeutic mentoring for COVID-19 patients.

Table 1
Respondent demographics.

| Region          | n = 391 | Percentage |
|-----------------|---------|------------|
| Asir            | 50      | 12.8       |
| Bahah           | 18      | 4.6        |
| Eastern province| 14      | 3.6        |
| Hail            | 1       | 0.3        |
| Jawf            | 4       | 1.0        |
| Jizan           | 6       | 1.5        |
| Madinah         | 18      | 4.6        |
| Makkah          | 64      | 16.3       |
| Najran          | 20      | 5.1        |
| Northern borders| 7       | 1.8        |
| Qassim          | 6       | 1.5        |
| Riyadh          | 170     | 43.5       |
| Tabuk           | 11      | 2.8        |
| NR              | 2       | 0.5        |

*NR = No response.

3.3. In-patient pharmacist satisfaction with contribution to management of the COVID-19 pandemic

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4. Discussion

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Our results showed that more than 80% of the surveyed hospitals were following MoH guidelines, with 70% of hospitals having their own institutional protocol for COVID-19 management in addition, indicating overall adherence of hospitals to strong and robust management protocols. By serving as a resource to HCPs, patients, and the public, pharmacists are essential in mitigating adverse consequences arising from the COVID-19 pandemic (Ahmad et al., 2020; NCPA, 2020; Bukhari et al., 2020; Rasheed et al., 2019; Visacri et al., 2020; Tan et al., 2020). Moreover, pharmacists assist through evaluating literature related to new or off-label drug therapies (Ahmad et al., 2020; NCPA, 2020; Al-Jedai et al., 2016; Abdel Jalil et al., 2020). However, in contradiction to pharmacist roles and involvement on the global stage, our study found that more than 50% of respondents were not involved in any learning or awareness activities, creating or evaluating therapeutic plans, or therapeutic mentoring of COVID-19 patients. This disengagement could be attributed to pre-defined roles excluding any learning or awareness activities, creating or evaluating therapeutic plans, or therapeutic mentoring of COVID-19 patients. This neutrality may mean that respondents were not sure of their roles, responsibilities, and professional rights. The underlying gaps and barriers that result in the underutilization of pharmacist roles and involvement on the global stage, our study found that more than 50% of respondents were not involved in any learning or awareness activities, creating or evaluating therapeutic plans, or therapeutic mentoring of COVID-19 patients. This disengagement could be attributed to pre-defined roles excluding any learning or awareness activities, creating or evaluating therapeutic plans, or therapeutic mentoring of COVID-19 patients. This neutrality may mean that respondents were not sure of their roles, responsibilities, and professional rights. The underlying gaps and barriers that result in the underutilization of pharmacist roles and involvement on the global stage, our study found that more than 50% of respondents were not involved in any learning or awareness activities, creating or evaluating therapeutic plans, or therapeutic mentoring of COVID-19 patients. This disengagement could be attributed to pre-defined roles excluding any learning or awareness activities, creating or evaluating therapeutic plans, or therapeutic mentoring of COVID-19 patients. This neutrality may mean that respondents were not sure of their roles, responsibilities, and professional rights. The underlying gaps and barriers that result in the underutilization of
Overall feedback of pharmacists on management of the COVID-19 pandemic.

| Survey Question                                                                 | Response n = 391 |
|----------------------------------------------------------------------------------|-----------------|
| 1. Is your hospital following Ministry of Health, COVID-19 management protocol/guideline? | Yes (%) | No (%) | NR (%) |
| 2. Do you have your own institutional protocol/guideline for COVID-19 management? | 340 (87.0%) | 45 (11.5%) | 6 (1.5%) |
| 3. Do you have your own pharmacy departmental protocol/guideline for COVID-19 management? | 275 (70.3%) | 115 (29.4%) | 1 (0.3%) |
| 4. Are you involved in providing awareness activities about COVID-19 to Health Care Providers or common public? | 220 (56.3%) | 166 (42.5%) | 5 (1.2%) |
| 5. Are you involved in evaluating and creating therapeutic plans for COVID-19 patients? | 196 (50.1%) | 187 (47.8%) | 8 (2.1%) |
| 6. Are you involved in monitoring medications in COVID-19 patients? | 136 (34.8%) | 246 (62.9%) | 9 (2.3%) |
| 7. Are you involved in medication dispensing and counselling to COVID-19 patients? | 173 (44.2%) | 213 (54.5%) | 5 (1.3%) |
| 8. Are you being utilized as a drug information resource for health care providers or public in the management of COVID-19? | 178 (45.5%) | 206 (52.7%) | 7 (1.8%) |
| 9. Are you involved in any research related to COVID-19? | 175 (44.8%) | 206 (52.7%) | 10 (2.5%) |

*NR = No response.

**Fig. 1.** (A) Overall satisfaction of pharmacists on management of the COVID-19 pandemic (n = 391). (B) In-patients pharmacists' satisfaction on the management of the COVID-19 pandemic (n = 388).

pharmacists require immediate attention. There is a need to create greater awareness of pharmacist-driven services and the benefits they can bring to patients in particular and to the healthcare system as a whole.

The responsibilities of HCPs can change due to unprecedented healthcare emergencies, of which one notable example is the ongoing pandemic (WHO, 2020). Pharmacists need to collaborate and work together to leverage their knowledge and skills, to actively participate in medical activities, and to maximize their value and responsibility in the fight against COVID-19. For example, the routine tasks of in-patient pharmacists, including hospital and clinical pharmacists, are to carry out medicine management activities, formulate work guidance and recommendations, and act as practitioners of pharmacy services. This makes them well-suited to provide medical advice to frontline medical staff and ensure the rational use of drugs during the pandemic.

Since hospital and clinical pharmacists have the potential and skills to contribute to direct patient care (Al-Jedai et al., 2016), we also assessed their roles in the management of COVID-19. The results revealed that only 43% of these pharmacists were involved in learning or awareness activities for HCPs or COVID-19 patients, and only 29% and 41% were respectively involved in either creating therapeutic plans or carrying out therapeutic mentoring for COVID-19 patients. Furthermore, in-patient pharmacists were underutilized as drug information resources by their parent institutions. Ultimately, only 33% of these pharmacists reported being satisfied with their role and contribution in the management of COVID-19, whereas a substantial percentage (50%) remained neutral.

From the above findings, it is evident that pharmacists are not being effectively utilized and involved in the management of COVID-19, and the reason behind their dissatisfaction is plainly evident. Possible reasons or barriers inhibiting the effective utilization of pharmacists could include administrative decision-making and non-acceptance of pharmacists as direct healthcare providers in the management of COVID-19. With pharmacists being the most accessible healthcare providers, consideration should be given to broadening their roles and involvement. The work strategies and professional roles of pharmacists need to be modified and realigned so that their contributions are maximized to match their potential. Pharmacists also need to update and innovate pharmaceutical services for the current situation so that benefits are maximized, and harm is reduced.

Notably, respondents' levels of satisfaction did not differ based on either hospital size or type, indicating that overall satisfaction of pharmacists does not depend on what hospitals they belong to. Similarly, the satisfaction distribution remained similar across different levels of experience; however, respondents with more than ten years of professional experience were more satisfied with their role than those having lesser experience.

In conclusion, the present study reveals that pharmacists are underutilized in the management of COVID-19 patients in Saudi Arabia and that underutilization has a negative impact on their satisfaction. As such, the findings emphasize the importance of
enhancing the role and contribution of pharmacists in patient care management across all hospitals and especially under healthcare crisis conditions. The establishment of a crisis standard-of-care guideline for all HCPs, including pharmacists, would help in improving overall care of patients under crisis conditions like the present COVID-19 pandemic. Lastly, further research is warranted to investigate potential roles for pharmacists that can enhance their involvement and corresponding job satisfaction.

Table 3
In-patients pharmacists' feedback on management of COVID-19 pandemic.

| Survey Question                                                                 | Response n = 288 |
|---------------------------------------------------------------------------------|------------------|
| 1. Is your hospital following Ministry of Health COVID-19 management protocol/guideline? | Yes       (247 (85.8%))  No (37 (12.8%))  NR (4 (1.4%)) |
| 2. Do you have your own institutional protocol/guideline for COVID-19 management? | Yes (187 (64.9%))  No (101 (35.1%))  NR (0 (0%)) |
| 3. Do you have your own pharmacy departmental protocol/guideline for COVID-19 management? | Yes (145 (50.3%))  No (140 (48.6%))  NR (3 (1%)) |
| 4. Are you involved in providing awareness activities about COVID-19 to Health Care Providers or common public? | Yes (124 (43.1%))  No (158 (54.9%))  NR (6 (2.4%)) |
| 5. Are you involved in evaluating and creating therapeutic plans for COVID-19 patients? | Yes (84 (29.2%))  No (197 (68.4%))  NR (7 (2.4%)) |
| 6. Are you involved in monitoring medications in COVID-19 patients? | Yes (117 (40.6%))  No (167 (58%))  NR (4 (1.4%)) |
| 7. Are you involved in medication dispensing and counselling to COVID-19 patients? | Yes (122 (42.4%))  No (160 (55.6%))  NR (6 (2.1%)) |
| 8. Are you being utilized as a drug information resource for health care providers or public in the management of COVID-19? | Yes (120 (41.7%))  No (160 (55.6%))  NR (8 (2.8%)) |
| 9. Are you involved in any research related to COVID-19? | Yes (69 (24%))  No (216 (75%))  NR (3 (1%)) |

*NR = No response.

Fig. 2. Satisfaction of in-patient pharmacists based on their hospital size.

Fig. 3. Satisfaction of in-patient pharmacists based on their hospital type.
Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Fig. 4. In-patient pharmacists’ satisfaction based on their experience with the management of the COVID-19 pandemic.

![Graph showing in-patient pharmacists' satisfaction based on their experience with the management of the COVID-19 pandemic.](image-url)