Analysis of Hospital Pharmacists' Interventions in a Covid -19 Isolation Centre of a Tertiary Hospital in Ghana

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Abstract

Coronavirus disease 2019 (Covid-19) is a global pandemic that was first identified in the city of Wuhan, China, and declared On January 30, 2020, by the World Health Organization (WHO) as a Public Health Emergency of International Concern. In Ghana, the Korle Bu Teaching Hospital became one of the designated sites for the management of Covid-19 patients, and the pharmacists were part of the task force. This study aims to analyze hospital pharmacists' interventions in a Covid-19 isolation center and to identify the evidence that supports the effect of such interventions. This was a retrospective study carried out by collecting and collating the interventions and recommendations made by the hospital pharmacists who worked at the isolation center from May 2020 to August 2020 at the peak of the pandemic. A total of 145 pharmacists' interventions (PIs) were captured from the medication reviews of 53 patients: resulting in an average PI rate of 3 interventions per patient. Women accounted for 58.5% (31/53) of positivity in the study. The mean (SD) for age was 47.1(17.9). Physicians' acceptance rate of PIs for Covid-19-positive patients was 95.2% (138/145). The most prevalent type of PIs was discharge counseling; 32.4 % (47/145), followed by untreated indication 10.3% (15/145), drug /dose omission 9% (13/145), and drug shortage/refill 9% (13/145) respectively. This study highlights the clinical relevance of pharmacists' interventions in the Covid-19 era and the importance of teamwork to prevent medication errors.

Keywords: Covid-19, Fevers Unit, Ghana, Korle bu Teaching Hospital, Medication errors, Pharmacists intervention, Prescription errors.

Introduction

Coronavirus disease 2019 (Covid-19) is a global pandemic that was first identified in the city of Wuhan, China, and on January 30th, 2020, the World Health Organization (WHO) declared the outbreak as a Public Health Emergency of International Concern [1]. Currently, the Covid-19 pandemic is a major public health problem worldwide, with 400 million cases of Covid-19 reported globally, more than 6 million deaths reported across 216 countries, and over 396,558,014 vaccine doses administered [2].

In Ghana, the first official cases of Covid-19 were reported on 12th March 2020. The two cases identified as people who had returned to the country from Norway and Turkey were announced by the health minister. These imported cases initiated the first contact tracing process in Ghana, helping detect several dozens

of cases in a short period. To help save lives during the pandemic, health workers were at the frontline against Covid-19 [3, 4].

The Korle Bu Teaching Hospital (KBTH) was one of the designated treatment sites for Covid-19 patients. The KBTH designated the Fevers unit and refurbished a 7-bed capacity site solely to treat Covid-19 patients. In May 2020, the unit became fully operational with different healthcare professionals posted there to manage Covid-19 patients. It became known as the isolation unit of Covid-19 patients at the hospital.

Pharmacists are considered one of the key players in the healthcare system, with other Health Care Professionals (HCPs) working in a multidisciplinary approach. Pharmacists' role in the optimization of drug therapy and medication management, from patient safety and quality of care point of view, is quantified by the number of interventions provided by pharmacists to prevent medication misadventures in addition to other services they provide [5]. Searching the literature showed a scoping review study that had eleven studies that addressed the nature of pharmacists' related interventions in Covid-19. The characteristics of the 11 studies included in this scoping review are summarized as follows: the majority of the studies described the workplace of the pharmacist as hospitals (n = 8), followed by ambulatory pharmacies (n = 4), community pharmacies (n = 2) and clinic (n = 1) [6].

In terms of medication and patient safety, for instance, some studies have reported that pharmacists can address about three quarters of prescription errors before reaching patients [7]. Published studies have recommended adaptations in pharmaceutical care plans during the Covid-19 pandemic [8]. Others have looked at the global contributions of pharmacists during the pandemic [9, 10]. Some studies expressed dilemmas of pharmacists' role [11], scoping reviews on the roles of pharmacists [12, 13] indicating various contributive roles from production to dispensing and availability,

accessibility, and affordability of medicines for the treatment of Covid-19 patients.

There have been global and countrywide strategies and even departmental strategies that have been recommended for pharmacists in this pandemic [14-18]. Globally there have been several publications about the roles that pharmacists have played and continue to play in this Covid-19 pandemic. There are studies from China [19], Nepal [20], Australia [21], Pakistan [22], the USA [23], and France [24], all describing various actions taken by pharmacists in their respective countries. However, only one study evaluated the outcomes associated with pharmacists' interventions [25].

There is also very limited published literature on pharmacists' clinical interventions in Covid-19 isolation centers across Africa and, for that matter, Ghana. This study, therefore, aims to analyze hospital pharmacists' interventions in a Covid-19 isolation center at The Korle Bu Teaching Hospital in Ghana to identify the effects of interventions made by hospital pharmacists.

Methods and Materials

This was a retrospective study carried out by collecting the intervened and recommended documentation of outcomes by hospital pharmacists who worked at the isolation center of the Fevers Unit of the Korle Bu Teaching Hospital from May 2020 to July 2020 at the peak of the pandemic in Ghana using the ministry of health's recommended data collection forms for pharmacists at all the Covid-19 centers in the country.

Data Collection Tools

To assess the characteristics of patients, a retrospective analysis of the documented medical records related to report prescription errors, medication errors, and recommendations. The standardized forms approved by the Ministry of Health and the pharmacist intervention book were used to collect data. All data pertaining to prescription

and medication errors, pharmacists' reported intervention, pharmacists' recommendations, intervention reports, and data related to medication use were extracted retrospectively from the standardized form. These reports were either done by the clinical pharmacist-in-charge or ward pharmacists assigned to the isolation center.

Categorization of Interventions

Pharmacists' interventions and comments were written on the prescriptions were used to revise each error and classified into various categories.

Pharmacists' Recommendations

We defined a recommendation as one made to a provider that involved the application of the pharmacist's knowledge to a specific patient or physician order. A recommendation was included if it was adequately recorded in the electronic system for documenting recommendations that occurred during the study period. In this study, acceptance rates for recommendations were determined by chart review. A recommendation was considered to have been accepted if it was implemented within 3 days after it was made.

Data Analysis

Data from the interventions were recorded and entered into an SPSS. Data were then reviewed, evaluated, analyzed, and categorized. Statistical analysis was mainly descriptive using IBM SPSS Statistics (Version 21, Corp, and Armonk, NY, USA). Frequencies and percentages of various medication errors were used to describe the categorical variables. Mean, and Standard deviation was used to describe continuous variables.

Ethical Approval

Administrative approval was granted by the Hospital for the research to be carried out.

Results

## Patients' Characteristics

A total of 56 patients were hospitalized at the COVID-19 isolation Unit (Fevers Unit) of the Korle bu Teaching Hospital during this study period from May 2020 to July 2020.

Data on three patients, including the pharmaceutical care analysis, could not be traced as they were discharged without any clinical pharmacist intervention. Overall, 53 patients were included in the study analysis. All patients were confirmed for Covid-19 infection positivity twice before admission. Women accounted for 58.5% (31/53) positivity of the patients during the study period. The mean (SD) age was 47.1(17.9) years.

Per the age distribution, the 60+ years age group accounted for 26.4% (14/53), which is the highest followed by 40-49 age group 22.6% (12/53), then 30-39 years group 18.9% (10/53). The rest of the characteristics on the various age groupings are shown in Figure 1.

In terms of patient employment status, only 7 of the patients admitted were healthcare professionals, accounting for only 13.2% (7/53) of the total number of patients admitted during the study period. See Table 1.
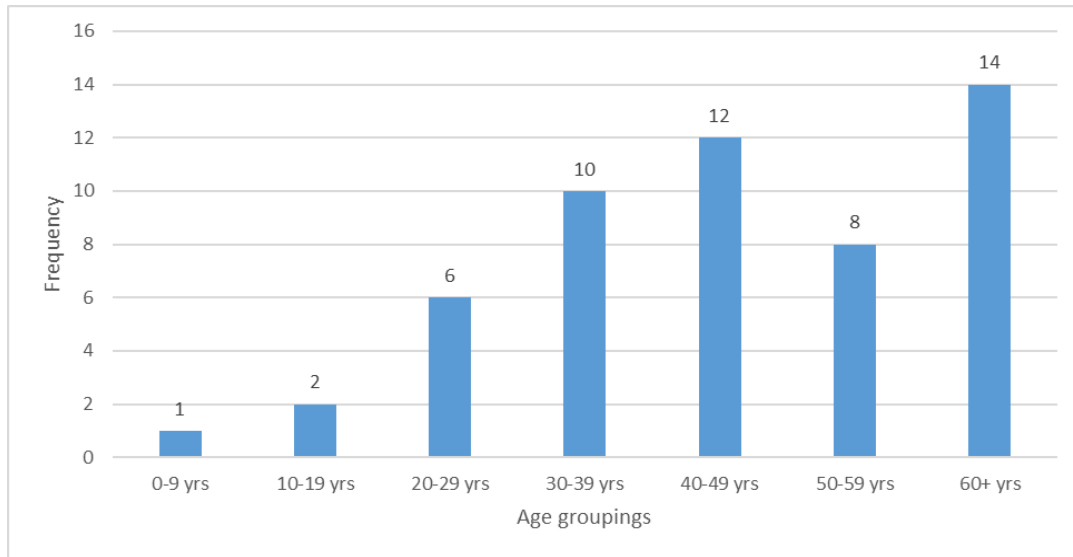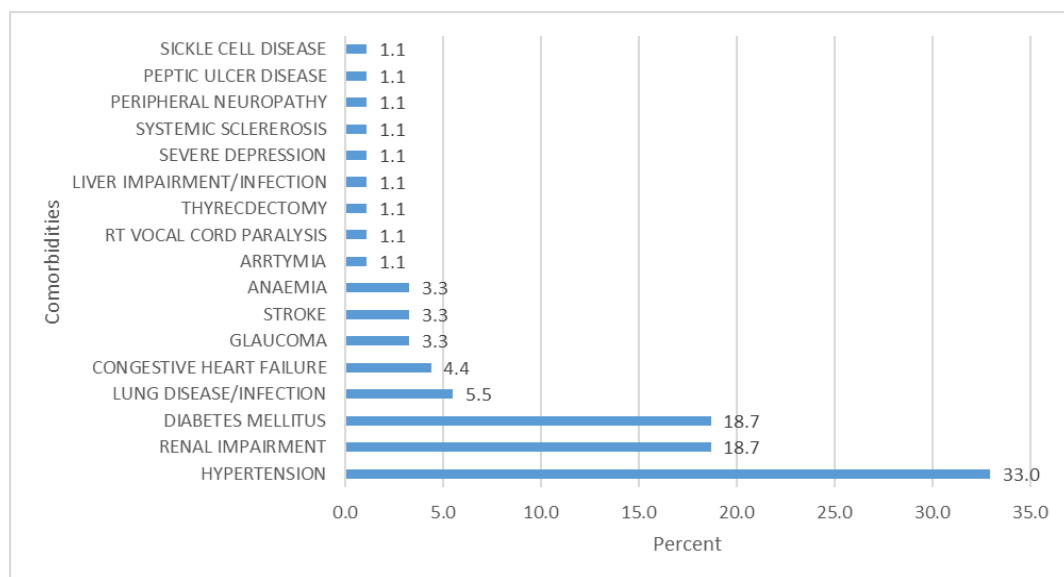
Figure 1. Age Distribution Patterns of Patients on Admission

Table 1. Employment Status

Employment Status	Frequency	Percent (%)
Non-Healthcare Professionals	41	77.3
Healthcare Professionals	7	13.3
Unemployed	5	9.4
Total	**53**	**100.0**

There were almost 21 various types of diseases or comorbidities recorded among the 53 patients. The highest number of comorbidities per patient was five (5) whilst the lowest was none. Impaired metabolic health, such as hypertension and diabetes, were very prevalent in this study. Hypertension was the most common cardiovascular disease, affecting more than 56% (30/53) of the patient population in the study. Renal impairment and diabetes, respectively, accounted for 32% (17/53) each. The rest of the characteristics of the various comorbidities recorded are shown in Figure 2.

Figure 2. Distribution Patterns of Comorbidities

Pharmaceutical Care Activities and Drug-Related Problems

A total of 132 pharmacists' interventions (PIs) were captured on the medication prescriptions of 53 patients: resulting in an average PI rate of 3 PIs/patient.

Physicians' acceptance rate of PIs for Covid-19-positive patients was 95.2% (138/145, and only 4.82% of the pharmacists' interventions were rejected by the physicians at the Center. See Table 2.

Table 2. Intervention Analysis Table

Variables	Number of interventions
Total no. of patients who received intervention	42
Total no. of interventions	145
Mean of intervention per patient	3.14
Range of intervention per patient	1 to 6
Intervention Accepted by Physicians (%)	138(95.20)
Intervention Rejected by Physicians (%)	7(4.80)
Intervention with unknown Acceptance outcome (%)	NIL

The most prevalent type of PI was discharge counseling which accounted for 32.4% (47/145), followed by untreated indication 10.3% (15/145), drug /dose omission 9% (13/145), and drug shortage/refill 9% (13/145) respectively whilst the least prevalent type of PI identified was wrong dose and the wrong prescription accounting for less the 3% of the total number of medication errors identified. The rest of the characteristics of the various types of medication errors reported are shown in figure 3.
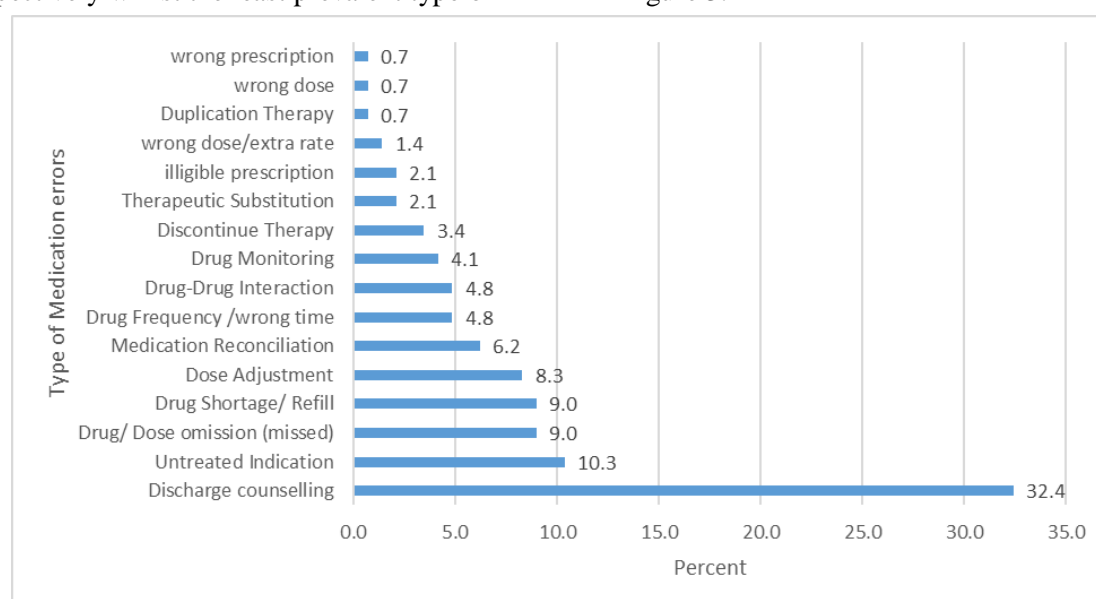

Figure 3. Types of Medication Errors Observed

A total of 32 recommendations were made to physicians as part of the pharmacists' interventions during the study period. "Start a new drug" was the most recommended by the pharmacists' team, together with medication selection recommendations. Both accounted for 25% (8/32) of the total number of PI. "Change in dose frequency" 15.6%, (5/32) and "change in drug dosing" 9.4% (3/32) were the second and third highest forms of recommendation made by the clinical pharmacists' team whilst "change medication order" and "Sub-

therapeutic dose" or "duration starting" had the lowest recommendations. The rest of the characteristics of the various types of recommendations made by the pharmacists are shown in Figure 4.
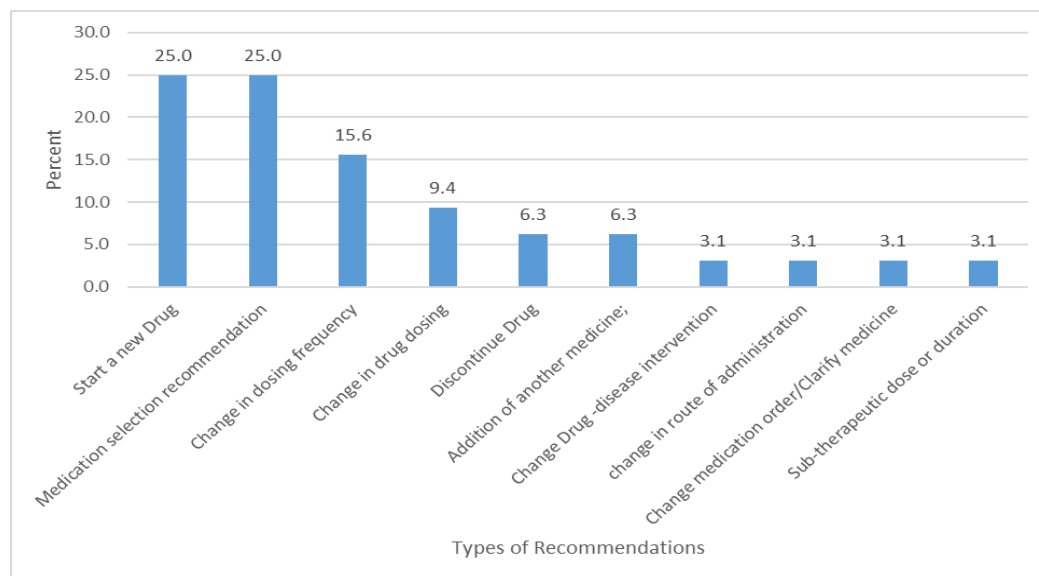
Figure 4. Types of Recommendations

The pharmacists' interventions and recommendations averted several adverse drug events (ADR) during the period of the study.

Discussion

This is the first study that estimates pharmacists' interventions in a Covid-19 isolation center in Ghana. Even though several studies in the literature have reported on the activities of healthcare workers at Covid-19 isolated centers, very few have published pharmacists' interventions in such isolation centers. Many studies have been conducted investigating the essential services delivered by pharmacists during the Covid-19 pandemic and concluded that pharmacists were likely to show a superior role during this pandemic in multiple aspects, such as providing drug information for healthcare providers, patient counseling, and provision of drug information to patients, ensuring the availability of all needed medications. [26].

The mean age of our study is in line with other published literature related to pharmacists' intervention in a Covid-19 scenario. [26]. Other pharmacists' intervention studies in Covid-19 settings had more males

than females [27], but other studies were quite similar to this study in terms of their mean age and percentage of females to males [28]. The Covid-19 pandemic has resulted in significant work force burdens globally. The risk of coronavirus infections among healthcare workers (HCW) was high globally during the pandemic, and it was not surprising that 13.3% of infections in this study were from various categories of health care providers across the country. Our figure is quite low compared to other studies globally concerning HCW admitted to Covid-19 wards [29, 30] but higher compared to other studies [31-33].

Hypertension was the most prevalent comorbidity in this study. This is in line with published literature suggesting that hypertension is a risk factor for Covid-19 morbidity and mortality [34-37]. Again, in a pharmacists' intervention study in Saudi Arabia [26], hypertension and diabetes were the most prevalent comorbidities which were diagnosed in 59.5% and 58% of the patients respectively, quite higher compared to 35% and 18.7% obtained in our study. Other pharmacists' intervention studies also showed hypertension,

diabetes, and renal impairment as most prevalent in a Covid-19 ward [38].

In our study, interventions accepted by the Physicians were 95.45%. This is comparable to other studies done in Europe and America, where acceptance rates varied between 52% and 100% [39] but lower compared to the 98% recorded from other Covid-19 pharmacist-led interventions in Jordan [40].

The high physicians' acceptance rate could be attributed to the high number of significant clinical pharmacists' interventions made and the fact that the Covid-19 clinical team had a very good appreciation of each member's role. This finding indicates that the pharmacists' medication recommendations satisfy the clinical needs.

The most prevailing pharmacists' intervention (PI) documented in our study was discharge counseling. This is essential looking at how novel the disease was. Reassurance around newly prescribed medication was an important aspect of the pharmacy consultation. Helping patients understand their medicines can help address the anxiety related to Covid-19 recovery. This is important to consider since studies have shown that people who have been seriously ill and hospitalized owing to Covid-19 were particularly vulnerable to mental health problems during the weeks and months of their recovery [41] and hence will need proper discharge counseling as demonstrated in our study.

Drug shortage /drug refill accounted for 9% percent of medication errors detected in our study. This is quite low compared to a similar study that had a drug shortage of 40% [26]. Additionally, a study assessing the role of clinical pharmacy services showed that 26.6%, 21.5%, and 10.3% of pharmacist's interventions were related to drug discontinuation, drug dosing adjustments, and therapeutic drug monitoring, respectively [42]. These are higher compared to 6.3%, 8.3%, and 4.1%, respectively in this study. This explanation could be attributed to the fact that clinicians who were key decision-makers were not readily within reach. The lower drug shortage and drug refill recorded in this study compared to others could be related to the constant availability of medical house officers at the center and the readiness of patient relatives to purchase all medications prescribed in the midst of their desires for early discharge. Additionally, most medications were supplied without cost to the patient by the pharmacy, on government's instructions, in full quantities. Some ward rounds were done with pharmacists, and this could contribute to the lower need for medication discontinuation in this study since the pharmacists were sometimes primarily involved in the initial medication selection. The proximity of other satellite pharmacies within the teaching hospital made it easier and more convenient for patient relatives to quickly purchase almost finished medications when prescriptions are issued to them, leading to low drug shortage and drug refill needs.

Medication recommendations were generated with the explicit, conscientious, and judicious use of the best available evidence. Based on that experience, the pharmacists' team recommended a forceful and extensive on-ward participation of clinical pharmacists in managing critically ill patients. That also contributed to the high acceptance rate by the physicians. Only one study conducted in a pharmacist intervention Covid-19 patients in China investigating medication errors captured drug discontinuation was the most common recommendation accounting for 31.5% [43] This is contrary to our study that had "start a new drug" and "medication selection" as the most recommended accounting for 25% each for the pharmacists' recommendations to physicians.

Limitations

This study had several limitations. The study population was limited to a single center with a limited sample size which nevertheless cannot be said to be representative of the country but

limited to only the Fevers Unit of the Korle bu Teaching Hospital. The study period lasted only 3 months (between May 2020 to August 2020) but we were able to quickly analyze and document pharmacists' interventions at the first peak of the Covid-19 Pandemic.

Conclusion

The integration of clinical pharmacy services resulted in drug-specific interventions in this Covid-19 isolation ward; a key breaking point in the fight against Covid-19 by pharmacists in the hospital is to take up the challenge. The clinical interventions by pharmacists at the covid center must be encouraged and enhanced since it seems to have an impact on patients' disease outcomes by the optimization of their treatments through effective drug monitoring and the rational use of medicines. Good patient discharge counseling also contributed to the improvement of treatment outcomes and the generation of confidence in patients for their treatment options and outcomes.

This study highlights the positive clinical relevance of pharmacists' interventions in Covid-19 and the importance of teamwork and effective collaboration among health care workers to prevent or minimize medication errors and improve patient outcomes.

Recommendations

The provision of clinical pharmacy service by pharmacists in a Covid-19 facility has been shown to be beneficial, and thus, the provision of such service could be extended to all Covid-19 isolation centers across the country. Since Covid-19 disease and its isolation strategies have a lot of impact on the mental state of the patients, it is also recommended that every discharged patient should have a proper discharge counseling consultation with the pharmacist before leaving for the house. Such patients become good advocates for the covid protocols and the need to stay away from the disease and for that matter its associated complications and all possible adverse effects. These recommendations, when implemented will have a positive impact on the level of pharmaceutical care provided during any pandemic.

Conflict of Interest

All authors declare no conflict of interest.

Acknowledgement

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