Original Research Article

Evaluation of the Reporting System of Chemical Poisoning and Drug Safety Program in the Governmental and Private Hospitals in Jeddah City, Saudi Arabia, A cross-sectional study

Abstract

Background: Chemical poisoning is a major health issue. This study aimed to assess and evaluate the reporting system of chemical poisoning and drug safety program in the governmental and private hospitals in Jeddah city, Saudi Arabia.

Methods: This descriptive and analytical cross-sectional study was conducted in Jeddah City, Saudi Arabia in the period from January to June 2022. We included 30 governmental and private hospitals that included more than 150 beds.To collect data, this study used a 17-item evaluation form that was approved and used by the Saudi Ministry of Health to evaluate the reporting systems in the hospitals in the country.

Results

Regarding the Reporting system in the public health departments, the Ministry of Health (MOH) memo for reporting cases of chemical and drug overdose is present in 80% of the hospitals, 30% reported that samples sent to the toxicology center are received. Regarding the Reporting system in the emergency department, 46.7% reported that death cases are immediately reported to the PHD. Regarding the Reporting system in hospital laboratory, 46.5% reported that chemical and drug overdose samples are sent to the Toxicology Center. Reporting system in the public health department and Reporting system in the emergency department were better in the Private hospitals (p =0.042 and p=0.045, respectively).

Comment [1]: What does PHD stand for?

Conclusion: Low adherence was found in the recruited hospitals. Less adherence was found in the governmental hospitals, particularly in the reporting system in the public health departments and the reporting system in the emergency departments. Some hospitals scored low in the three domains of the evaluation form.

Introduction

Exposure to any substance that causes the body to suffer harm or a functioning disruption is considered poisoning (Thundiyil et al., 2008). Globally, it was estimated that poisoning can lead to the loss of more than 7.4 million years of healthy life (disability adjusted life years, DALYs) (Kassebaum et al., 2017). The incidence of chemical poisoning varies by geographic region, socioeconomic status, and other factors (WHO 2008; Chala et al., 2015). Different studies have revealed factors that can influence the incidence of chemical poisoning, including age, nature, and amount of poison, route of administration, lifestyle, and socio-psychological pressures (WHO 2008; Chala et al., 2015). Mortality attributed to chemical poisoning differs according to socioeconomic status, the route of administration, and other factors (Chala et al., 2015; Oraie et al., 2017). Most incidents of chemical poisoning are unintentional, particularly in children, and many cases may largely be avoided by paying more attention to preventative measures (Oraie et al., 2017). A previous study at the Poison Control and Forensic Chemistry Center in Jeddah, Saudi Arabia found that most cases were accidental (92%), occurred at home (96%) and occurred in children under 5-years of age (78%). The route of poisoning was oral in the majority of incidents (94%). They reported that all poisoning reports were initiated by physicians and other healthcare professionals within one hour of the poisoning (Almuntashiri et al.,

Comment [2]: Maybe these sentences could be merged into one sentence.

2020).Another study, from Saudi Arabia, in 2017 found that more than half of the cases were males (55%), aged less than 5 years (56.6%), and about three-fourths of the cases occurred accidentally and through ingestion. Only 1.1% of cases received a poisoning specific antidote (Alzahrani et al., 2017).

A review of acute chemical poisoning in Al-Qassim Region, Saudi Arabia, between 1999–2003 reported that pesticides were the most common cause of poison and that ingestion was the most frequent route (Moazzam et al., 2009). A study was conducted to determine the outcomes and management of cases of poisoning in young children admitted to hospitals in Saudi Arabia, revealed that unintentional poisoning cases in children and adults were similar in different regions, and showed that there is a requirement of public understanding on how to storage the toxic materials and the need for an urgent hospitalization in case of accidental poisoning (Alanazi, et al., 2018). In Saudi Arabia, the cases are reported to the Chemical Safety Office of Environmental and Occupational Health Department of Public Health Department, Directorate of Jeddah Health Affairs, Ministry of Health (MOH). It is a part of a system of epidemiological surveillance that was developed in 2000 for chemical poisoning cases. The purpose of the system is to record the adverse effects of chemicals on humans and the surrounding environment. The reporting system is mandatory for each poisoning case by all health care providers (Alamri et al., 2017; MOH, 2022).

Adequate knowledge of patterns of chemical poisoning can help to detect risk factors, achieve an early diagnosis, and correctly manage the course of treatment, thereby decreasing rates of morbidity and mortality. This could occur if there is an adherence to the reporting system in the country. To our knowledge, This the first study that aimed to assess and evaluate the reporting

system of chemical poisoning and drug safety program in the governmental and private hospitals in Jeddah city, Saudi Arabia.

The main objective of this study was to evaluate the reporting system of chemical poisoning and drug safety program in the governmental and private hospitals in Jeddah City, Saudi Arabia. The secondary objectives included the followings: 1) assessment of adherence of hospitals to the guide for reporting cases of chemical and drug poisoning in health facilities by ministry of health, Saudi Arabia, 2) comparison of adherence between governmental and private hospital, 3) determining failure points in the reporting system.

Materials and Methods

This descriptive and analytical cross-sectional study was conducted in Jeddah city, Saudi Arabia in the period from January to June 2022. Out of 34 hospitals in the city, 30 hospitals were included in this study. Both General governmental hospitals andprivate sector hospitals were eligible if they included more than 150 beds. We excluded tertiary specialized hospitals, psychiatric hospitals, and hospitals smaller than 150 beds.

The researcher visited each hospital and asked for the permission from the personnel in charge to meet the head of department who is responsible for reporting of chemical poisoning or drug over dosage poisoning in the hospital (emergency department, public health department/infection control department and hospital laboratory). The questionnaire was administered in a paper form and was filled by interviewing the head of the relevant department. All participants were interviewed by the same investigator.

A structured questionnaire was used to interview the principals in the recruited hospitals. It included two parts; the first part included questions about the facility (for example governmental or private). The second part included the evaluation of the reporting system for Chemical

Poisoning or Drug over Dosage Poisoning (MOH, 2022). This evaluation form was approved and used by the Saudi Ministry of Health to evaluate the reporting systems in the hospitals in the country. The evaluation form consists of three parts; evaluation of reporting system in the emergency department (10 items), evaluation of reporting system in the public health department/ infection control department (17 items), and reporting system in the hospital laboratory (5 items). Each item was scored either 1 (yes) or zero (no). Total score was obtained for each domain and the percentage (%) was calculated (MOH, 2022).

Data analysis

Data was entered and subsequently managed by using SPSS version 25 (IBM Corp., Armonk, NY, USA). Percentage and frequency were obtained for the categorical variables while mean (SD) or median (interquartile range) was obtained for the continuous variables. The independent two-sample t-test was used to compare mean total score between the categorical variables. The accepted level of significance will be set below 0.05 ($p < 0.05$).

Ethical consideration

Ethical approval was obtained from Jeddah Research Committee Ethical and Scientific approval, Ministry of Health. Objectives of the study was explained orally to the head of the relevant departments. Informed consent was obtained from the participants.

Results

A total of 30 hospitals were included in this study, of which, five were governmental and 25 were private.

*Reporting system in the public health department*s

This checklist included 17 items (Table 1). The MOH memo for reporting cases of chemical and drug overdose is present in 80% of the hospitals, the notification form for reporting cases of chemical and drug overdose is present in 80%, and the educational materials on CSP have been received in 100% of the hospitals.

Comment [3]: What does CSP stand for?

Methanol cases, group cases, and death cases are immediately reported to the regional coordinator by 50% of the hospital. Only a third of the hospitals (30%) reported that samples sent to the toxicology center are being followed, reports sent from the toxicology center are received, and reports sent from the toxicology center are sent to the regional coordinator.

Reporting system in the emergency department

This checklist included 10 items (Table 2). About two thirds (66.7%) of the emergency departments in the hospitals reported that there is communication between emergency doctors and the toxicology center. Less than half (46.7%) reported that death cases are immediately reported to the PHD, methanol cases are immediately reported to PHD, and group of multi-poisoning cases are immediately reported to PHD. Slightly, more than half (53.3%) reported that a dedicated file for the cases of chemical and drug overdose is present on the ER, 56.7% reported that the MOH memo for reporting cases of chemical and drug overdose is present. Doctors are trained to notify chemical and drug overdose in 43.3% of the departments.

Comment [4]: What does PHD stand for?

Reporting system in hospital laboratory

Slightly more than half (53.3%) of the surveyed hospitals reported that the chemical and drug overdose samples are received from ED. Less than half (46.7%) reported that chemical and drug overdose samples are sent to the Toxicology Center, 36.7% reported that chemical and drug overdose results are received from the Toxicology Center. About one third (30.0%) reported that

training for taking and sending samples of chemical and drug overdose has been received (Table 3).

Descriptive statistics of the total score of the Reporting System of Chemical Poisoning and Drug Safety Program

Mean score of the Reporting system in the public health departments was 53.61% with a range of 0 to 94.12. Mean score of the Reporting system in the emergency departments was 53.33 with a range of 0 to 100. Mean score of the Reporting system in hospital laboratories was 40.66 with a range of 0 to 100 (Table 4).

Comparison of Reporting System of Chemical Poisoning and Drug Safety Program between private and Governmental hospitals

Mean score of the reporting system in the public health department is significantly higher in the Private hospitals compared to Governmental hospitals (57.35 vs 38.23, respectively, p =0.042). Reporting system in the emergency department is significantly higher in the Private hospitals compared to Governmental hospitals (58.75 vs 31.67, respectively, p=0.045) (Table 5).

Discussion

This exploratory study was conducted to evaluate the reporting system of chemical poisoning and drug safety program in the governmental and private hospitals in Jeddah city, Saudi Arabia. The reporting system of chemical poisoning and drug safety program in governmental and private hospitals is essential for ensuring the health and safety of patients. It involves the collection, analysis, and reporting of data related to incidents of chemical poisoning and adverse drug reactions. Regarding the reporting system in the public health departments of the recruited

hospitals, there was high adherence in two of the items, namely: ‘’the MOH memo for reporting cases of chemical and drug overdose is present’’ (80%), and ‘’ the notification form for reporting cases of chemical and drug overdose is present’’ (80%). However, we noticed failure in the action needed in the reporting system, for example, only 30% of the departments admitted that samples sent to the toxicology center are being followed, and 30% admitted that reports sent from the toxicology center are received, and 30% of the departments admitted thatreports sent from the toxicology center are sent to the regional coordinator. This very low adherence in the reporting system is below expectation and a reforming action is needed urgently.

Regarding the reporting system in the emergency departments of the recruited hospitals, we noticed that nearly two thirds of the hospitals admitted that there is communication between emergency doctors and the toxicology center, and 63.3% admitted that the notification form for reporting cases of chemical and drug overdose is present. However, the remaining items of the evaluation form scored slightly above 50% or even less than 50%. This low adherence is unacceptable, and further investigation is needed in those hospitals.

In regard to the reporting system in the hospital laboratories, only one item scored 50.3%, while all the other items scored below 50% with a range of 30.0% to 46.7%. This domain has the lowest adherence in comparison the previous two domains.

A very discouraging findings was that some hospitals scored low in all the three domains of the evaluation form that was used in this study. That hospitals need further qualitative in-depth studies to investigate the barriers behind that low adherence.

Private, compared to governmental hospitals, showed significant higher scores in the reporting system in the public health departments and the reporting system in the emergency departments. In that comparison, it was clear that the governmental hospitals scored less than 50% in all the

three domains. This indicate that the problem of low adherence is bigger in the governmental hospitals. The reasons behind that findings need more investigation. Normally, in governmental hospitals, the reporting system is often integrated into a larger public health surveillance system. This allows for the monitoring of chemical poisoning and drug safety on a broader scale, enabling the identification of potential outbreaks or systemic issues. The data collected through the reporting system can also be used for research purposes, to improve patient care, and to inform policy decisions.

A strength of this study is the inclusion of both governmental and private hospitals in Jedda city.

Limitations

This research was carried out right after the COVID-19 pandemic. The outcomes of the study could be affected by the timing, either positively or negatively.

Conclusion

Low adherence was found in the recruited hospitals. Less adherence was found in the governmental hospitals, particularly in the reporting system in the public health departments and the reporting system in the emergency departments. Some hospitals scored low in the three domains of the evaluation form. The underreporting demonstrated in this study could be linked to the fact that this research was done right after the COVID pandemic.

Recommendations

Further qualitative research in the hospitals that were included in this study to investigate in-depth the reasons behind this low adherence to the guidelines in reporting system of chemical poisoning and drug safety program. Along with quality improvement projects to improve the adherence and the reporting process. A particular attention is should be directed toward the governmental hospitals. Overall, the reporting system of chemical poisoning and drug safety

program in governmental and private hospitals plays a crucial role in ensuring patient safety and improving the quality of healthcare. By promptly reporting and analyzing incidents, healthcare professionals can identify and address potential risks, ultimately leading to better surveillance systems and public health practices.

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Table 1: Reporting system in the public health departments

	N	%
The MOH memo for reporting cases of chemical and drug overdose is Present	24	80.0
The notification form for reporting cases of chemical and drug overdose is Present	24	80.0
A dedicated file of All cases of chemical and drug overdose is Present	18	60.0
The Public health department receives the notifications from ER Department	17	56.7
There is a dedicated employee responsible for data entry on HESN platform	23	76.7
Cases are being entered on HESN platform	19	63.3
Death cases are immediately reported to the regional coordinator	15	50.0
Group cases are immediately reported to the regional coordinator	15	50.0
Methanol cases are immediately reported to the regional coordinator	15	50.0

Samples sent to the toxicology center are being followed	9	30.0
Reports sent from the toxicology center are received	9	30.0
Reports sent from the toxicology center are sent to the regional coordinator	9	30.0
In case of incomplete 0tifications, the issue would be raised to the Medical Director / ER department head	23	76.7
feedback on the internal 0tification process is sent to the regional coordinator	16	53.3
A daily round to the ER department is being carried	21	70.0
Educational materials on CSP have been received	30	100.0
A workshop on how to report chemical and drug overdose cases has been carried out	16	53.3

Table 2: Reporting system in the emergency departments

	N	%
The MOH memo for reporting cases of chemical and drug overdose is Present	17	56.7
"The notification form for reporting cases of chemical and drug overdose is Present	19	63.3
"Reporting cases of chemical and drug overdose to public health department	17	56.7
"A dedicated file for the Cases of chemical and drug overdose is present on the ER	16	53.3
"There is communication between emergency doctors and the Toxicology center	20	66.7
"Deaths cases are immediately reported to the PHD	14	46.7
"Metha0l cases are immediately reported to PHD	14	46.7
"Group of multi-poisoning cases are immediately reported to PHD	14	46.7
"Metha0l treatment protocol is received	16	53.3
"Doctors are trained in chemical and drug overdose diagnosing, treatment, and 0tification	13	43.3

Table 3: Reporting system in the hospital laboratory

	N	%
Chemical and drug overdose samples are received from ED	16	53.3
Chemical and drug overdose samples are sent to the Toxicology Center	14	46.7
Chemical and drug overdose results are received from the Toxicology Center	11	36.
Chemical and drug overdose results are sent to PHD	11	36.7
Training for taking and sending samples of chemical and drug overdose has been received	9	30.0

Table 4: Descriptive statistics of the Reporting System of Chemical Poisoning and Drug Safety Program

	Mean	median	Minimum	Maximum
Reporting system in the public health department (17 items).	53.61	47.05	0	94.12

Reporting system in the emergency department (10 items).	53.33	50.00	0	100
Reporting system in hospital laboratory (5 items).	40.66	40.00	0	100
Overall score.	51.4583	53.12	0	96.88

Table 5: Comparison of Reporting System of Chemical Poisoning and Drug Safety Program between private and Governmental hospitals

	Private Mean (SD)	Governmental Mean (SD)	P value
Reporting system in the public health department	57.35 (32.13)	38.23 (14.28)	0.042
Reporting system in the emergency department	58.75 (37.9)	31.67 (24.01)	0.045
Reporting system in hospital laboratory	40.83 (20.4)	41.00 (19.3)	0.950
Overall score	55.2 (32.27)	36.45 (15.89)	0.059