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Research Article

ROLE OF GLOBAL TRIGGER TOOL IN TRACKING ADVERSE DRUG REACTIONS IN TERTIARY CARE HOSPITAL

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ABSTRACT

An adverse drug reaction (ADR) is a response that is noticeably unpleasant or damaging as a result ofusing a medication, and the Global Trigger Tool is used to efficiently identify these types of events. The Global Trigger Tool was used in this study to measure the prevalence of ADRs and evaluate the effectiveness of trigger mechanisms for their identification. Over five months, 300 randomly selected inpatient files were included in a retrospective observational study. Following these files went through to trigger identification, 116 (38.67%) of them included triggers. 20 (17.24%) of the triggered files had ADRs confirmed. The adverse drug reactions were divided into different categories: 60% had to do with the use of antiemetic medications, 10% had to do with procedures, 5% resulted from stopping medicine suddenly, 15% involved the use of chlorpheniramine, and 10% had to do with blood transfusion procedures. Further research on the occurrence of ADRs in other disciplines was conducted by the study. Cardiology saw a high incidence rate, with 66.7% of identified triggers leading to confirmed ADRs. The percentage in radiation oncology was significantly greater, with 87.5% of triggers leading to adverse drug reactions. Obstetrics and Gynecology (OBG) had a lower incidence at 10%, whereas Orthopaedics and Internal Medicine each had a trigger-to-ADR conversion rate of 16.7%. Nephrology had a single trigger that led to a confirmed ADR, signifying a 100% occurrence, while Surgical Neurology demonstrated a 66.7% trigger-to-ADR conversion. Based on the WHO UMC causality scale, 15 ADRs were categorized as "probable/likely," four as "possible," and two as "unlikely." The study shows how well the Global Trigger Tool works in a tertiary care setting to identify ADRs. The results highlight the significance of ongoing observation and reporting, and intervention to reduce the harm that medication-related problems cause to patients. In healthcare settings, the use of such tools and tactics may significantly enhance medication management and patient safety.

INTRODUCTION

"Any response to a drug which is noxious and unintended, and which occurs at doses used in man for prophylaxis, diagnosis, or treatment," according to the World Health Organization defines adverse drug reactions (ADRs). [1] Adverse medication reactions can impact a variety of organs, including the liver, skin, kidney, heart, and muscle. Some drugs may also cause more broad hypersensitivity reactions. The six categories of adverse medication reactions are as follows (mnemonics): withdrawal(end of use), therapeutic failure (failure), dose-related and time-related (chronic), non-dose-related (bizarre), withdrawal (augmented), and withdrawal (time-related).[2] The detection of ADR is critical in the management of any patient. Chart reviews, observational data, and event reports are examples of traditional methods utilised to measure harm. These techniques all have different restrictions. Staff members are known for underreporting incidents, possibly due to a fear of punishment.[3] The Global Trigger Tool (GTT) methodology involves a retrospective evaluation of a random sample of inpatienthospital records to identify "triggers" (or hints) for potential adverse outcomes. Many hospitals have

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utilized this technique to detect adverse events, estimate the extent of harm caused by each event, and determine if adverse occurrences are decreasing over time as a result of improvement initiatives.[4] It has been proposed that the IHI GTT is the best single technique for estimating rates of harm in healthcare settings.[5]

SOME MEDICATIONS MODULE TRIGGERS ARE AS FOLLOWS	
Intra-Operative Administration of Epinephrine, Norepinephrine.	Examine the anaesthetic and surgical records to ascertain the rationale behind the administration. These drugs may be used to alleviate adverse outcomes such as hypotension brought on by excessive sedation or bleeding.
Diphenhydramine (Benadryl) Administration	In addition to being prescribed as a sleep aid, pre-operative or pre- procedure medication, or for seasonal allergies, diphenhydramine is commonly used for drug allergies. If the medication has been given, check the record to see if it was prescribed to treat signs of an allergic reaction to a medication or blood transfusion given either before or during the hospital stay; these are adverse events.
Romazicon (Flumazenil)Administration	Benzodiazepine medication's effects are reversed by romazicon. Find out why the medication was taken. Serious hypotension or noticeable, protracted sedation are two examples of adverse effects.
Naloxone Administration	Strong narcotic antagonist naloxone. When it comes to instances of drug addiction or self-inflicted overdose, usage probably indicates a negative outcome.
Anti-Emetic Administration	Both in non-surgical and surgical contexts, medication administration frequently results in nausea and vomiting. Antiemetics are frequently given. An unfavourable event is suggested by nausea and vomiting thatprevents you from eating, hinders your recuperation after surgery, or delays your release. Antiemetics used successfully in one or two sessionswould imply no adverse occurrence. In order to ascertain if injury occurred, reviewer judgment is required.
Transfusion of Blood or Use of Blood Products	Procedures can require intra-operative transfusion of blood products for replacement of estimated blood lost, but this has become less common with "bloodless surgery." Any transfusion of packed red blood cells or whole blood should be investigated for causation, including excessive bleeding (surgical or anticoagulant-related), unintentional trauma of a blood vessel, etc
Any Procedure Complication	Any procedure-related consequence is considered an unfavourable event. Keep an eye out for complications mentioned in coding, the discharge summary, or other progress notes as procedure notes often failto mention them, particularly if they arise hours or days after the procedure note has been written.
Over- edation/Hypotension	Examine the notes from the multidisciplinary, nurse, or physician progress to look for signs of fatigue and over sedation. Examine vital sign records or visuals for hypotensive episodes associated with sedative, analgesic, or muscle relaxant medication. Overdosing on purpose is not seen as an unfavourable event.
Vitamin K Administration	If vitamin K was administered in response to an extended INR, check the documentation for signs of bleeding. If laboratory findings show a decline in haematocrit or guaiac-positive faeces, an adverse event has probably happened. Look for proof of this in the progress notes. Adverse effects include things like severe bleeding, hematomas, haemorrhagic stroke, and extensive bruising.

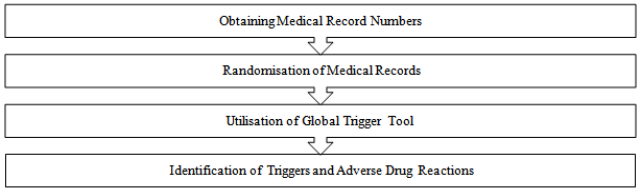
Methodology: Our study is a retrospective observational study design. Data was collectedretrospectively. The study had a sample size of 300 participants and lasted five months.

Inclusion Criteria:	Exclusion Criteria:
• Closed and completed medical recordsupon discharge. • Requires a minimum 24-hour stay andformal admission to the hospital. • Patients classed as inpatient. • Patients must be at least 18 years old.	• Patients attending outpatient clinics. • Inpatient psychiatric and rehabilitativepatients. • Patient under 18 years.

Study Approval

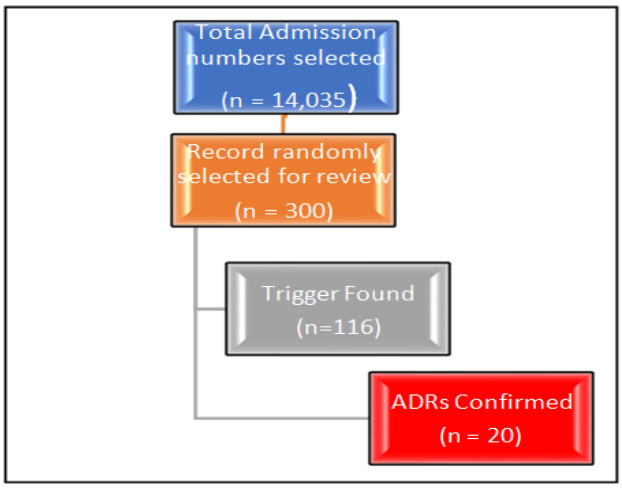
The study was initiated and carried out with consent from the Institutional Ethics Committee.

STUDY PROCEDURE



RESULTS

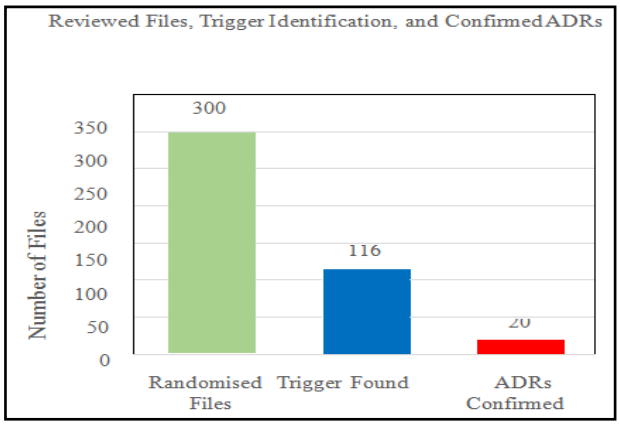
Evaluation of Medical Records



This study began by randomizing the files to guarantee an unbiased selection. Triggers were then found within the randomized files by carefully assessing clinical cues and patterns suggestive of adverse drug reactions (ADRs) linked with medication use. Following trigger identification, a thorough analysis was carried out to determine any potential ADRs in the triggered files. This step-by- step approach allowed for a thorough review of the data, ensuring a systematic and accurate assessment of ADR occurrence in the hospital context.

Fig. 1 Evaluation of Medical records

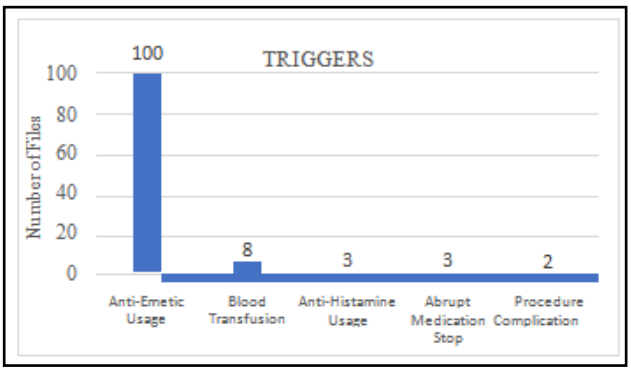
REVIEWED FILES, TRIGGER IDENTIFICATION AND CONFIRMED ADRs



In a review of 300 patient files, 38.67% of the files contained triggers suggesting adverse drug reactions (ADRs). These triggers identified possible ADRs based on patterns in the medical data. Further analysis revealed ADRs in 17.24% of the triggered cases, totalling 20 files. These confirmedADRs gave useful insights into medication- related concerns faced by hospitalized patients, helping to build a comprehensive understanding of medication-related adverse events in the hospital context.

Fig. 2 Reviewed Files, Trigger Identification, and Confirmed Adverse Drug Reactions (ADRs)

TRIGGERS



The Global Trigger Tool discovered 116 patient files with triggers, including 100 with anti-emetic use, 8 with blood transfusion, 4 with anti-histamine use, 3 with abrupt medication discontinuation, and 2 with procedure complications. Thesetriggers provide critical insights for healthcare providers to assess probable adverse events' severity and impact.

ADVERSE DRUG REACTIONS (ADRs)

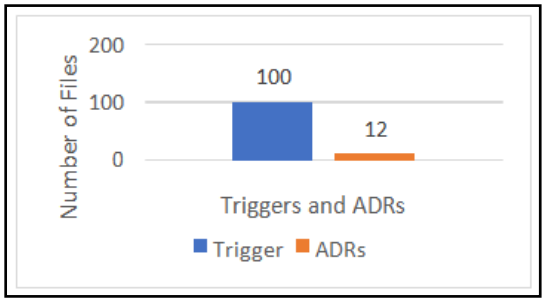
Table 1 Confirmed adverse drug reaction among triggers

S NO	CLASS	TRIGGERS	ADRs	REMARKS
1	Anti-Emetic	100	12	Ondansetron Usage
2	Procedure Complication	2	2	Heparin
3	Abrupt Medication stop	3	1	Morphine Stoppage
4	Blood Transfusion	8	2	Bleeding
5	Chlorpheniramine usage	3	3	Allergic Reaction
	Total	116	20	

Triggers and confirmed ADRs in different classes: Anti-Emetic (100 triggers, 12 ADRs), Procedure Complication (2 triggers, 2 ADRs), Abrupt Medication Stop (3 triggers, 1 ADR), Blood Transfusion (8 triggers, 2 ADRs), and Chlorpheniramine Usage (3 triggers, 3 ADRs). Provides insights into medication-related issues and ADR occurrences.

COMPARISON OF TRIGGERS AND CONFIRMED ADVERSE DRUGREACTIONS (ADRS) IN DIFFERENT CLASSES

Anti-emetics Trigger vs ADRs

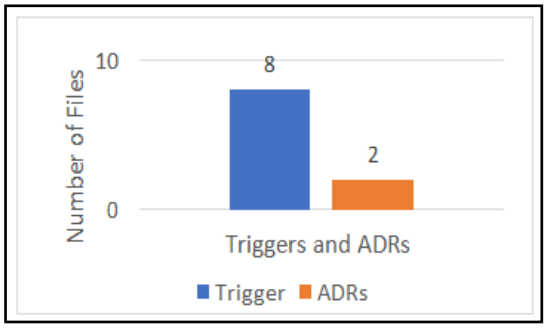


Anti-emetic usage:
Triggers: 100.Confirmed:12

In comparison, approximately 12% of patients with anti- emetic triggers developed ADRs, highlighting the importance of attentive pharmacovigilance.

Fig. 4 Anti-emetics Trigger vs ADRs

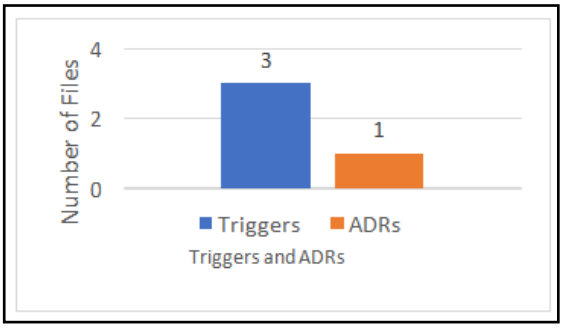
Blood Transfusion Trigger vs ADR



Blood transfusions:
Blood Transfusion Trigger vs ADR
Triggers: 8 Confirmed: 2
Comparison: ADRs were reported by approximately 25% of patients with blood transfusion triggers, demanding vigilant monitoring despite the decreasedprevalence.

Fig. 5 Blood Transfusion Trigger vs ADRs

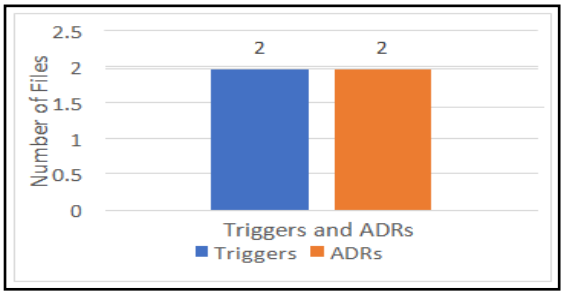
Abrupt Medication Stop Trigger vs ADRs



Trigger: 3/116
Confirmed ADR: 1/20
Comparison: Despite a low trigger percentage (2.59%), sudden drug discontinuation caused 5% of detected ADRs, emphasizing its relevance.

Fig. 6 Abrupt Medication Stop Trigger vs ADRs

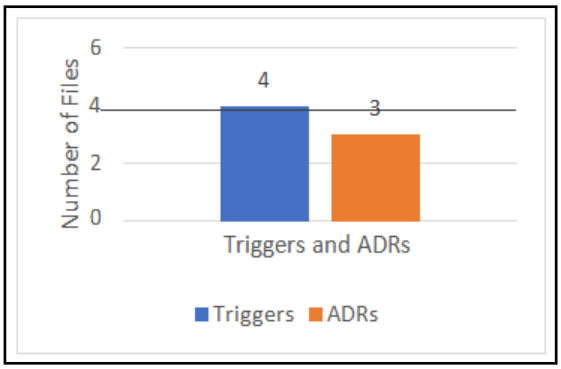
Procedure Complication Trigger vs ADRs



Procedure Complication
Trigger: 2/116
2/20 confirmed adverse drug reactions. Comparison: Despite a modest trigger percentage (1.72%), procedural difficulties accounted for 10% of the reported ADRs, emphasizing the significance of meticulous perioperative care.

Fig. 7 Procedure Complication Trigger vs ADRs

Anti-Histamine Usage Trigger vs ADRs



Triggers for Anti-Histamine Usage: 4 out of 116. Confirmed ADRs for Anti-Histamine Usage: 3 out of 20. Comparison: In the 116 patient files evaluated, "Anti-Histamine Usage" was identified as a trigger in four cases.

Fig. 8 Anti-histamine usage Trigger vs ADRs

TRIGGERS VS ADRs SPECIALITY WISE

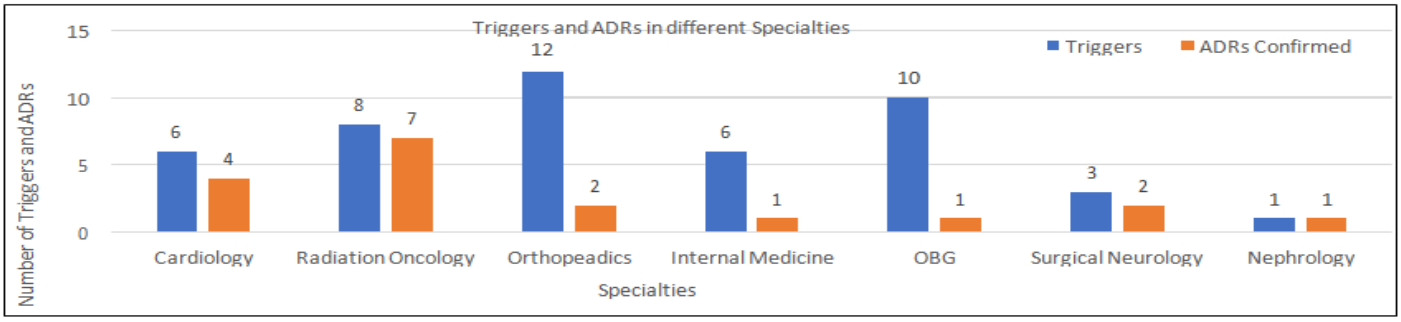


Fig. 9 ADRs in Specialties

The percentages of confirmed ADRs in different medical specialties provide valuable insights into trigger-ADR associations. Cardiology (66.7%) and Radiation Oncology (87.5%) showed relatively high rates, while Orthopaedics (16.7%) and Internal Medicine (16.7%) had lower rates. Obstetrics and Gynaecology (OBG) and Nephrology had 10% and 100% confirmed ADR rates respectively.

DISTRIBUTION OF ADRS WITH RESPECT TO INPATIENT DAYS ONMONTHLY BASIS

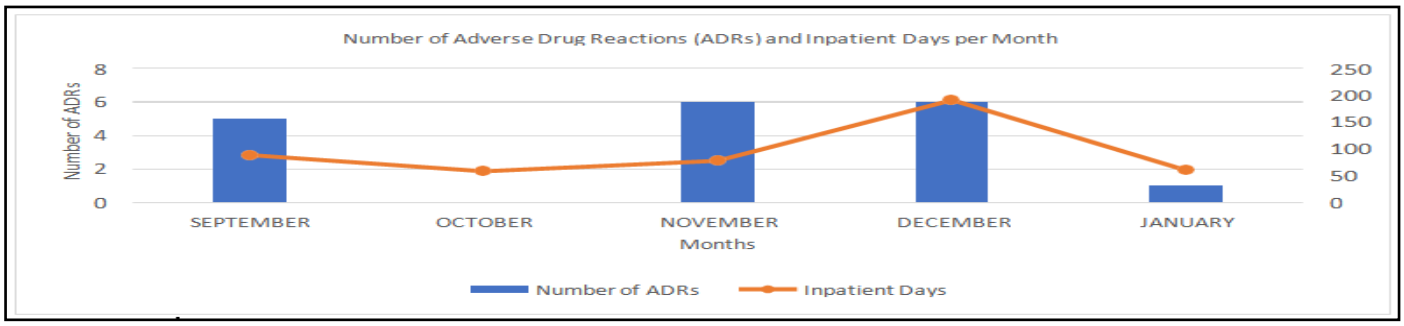


Fig. 10 Number of Adverse Drug Reactions (ADRs) and Inpatient Days per Month

The subsequent rise in ADRs to 6 in November was accompanied by an increase in inpatient days to 78, underscoring the hypothesis that ADRs may lead to prolonged hospitalization. This pattern continued in December, with 6 ADRs accounting for a significant 191 inpatient days, underscoring the potential influence of ADRs for extended hospital stays. Surprisingly, January saw a decrease in both ADRs (1) and inpatient days (60), showing a relationship between lower ADR incidence and shorter hospital stays.

DISTRIBUTION OF ADVERSE DRUG REACTIONS (ADRS) ACROSSCLINICAL CONDITIONS

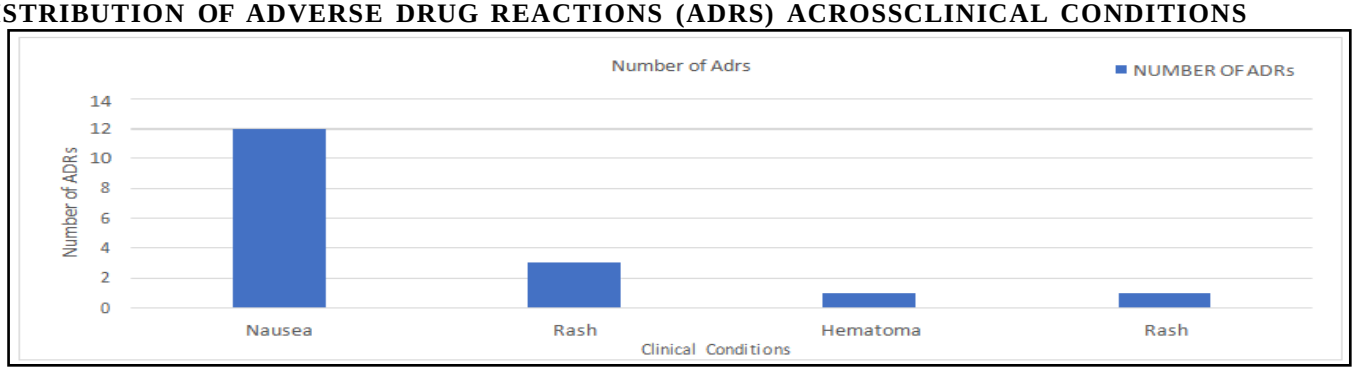
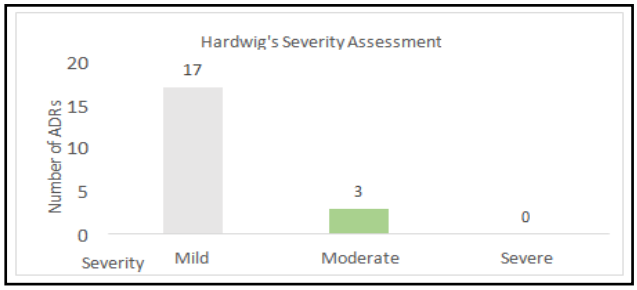


Fig. 11 Distribution of Adverse Drug Reactions (ADRs) Across Clinical Conditions

The bar diagram illustrates the distribution of Adverse Drug Reactions (ADRs) across various clinical conditions. Among the identified ADRs, Nausea had the highest frequency, accounting for12 cases. Haematuria and Hematoma each had one reported ADR, while Rash had a total of three occurrences.

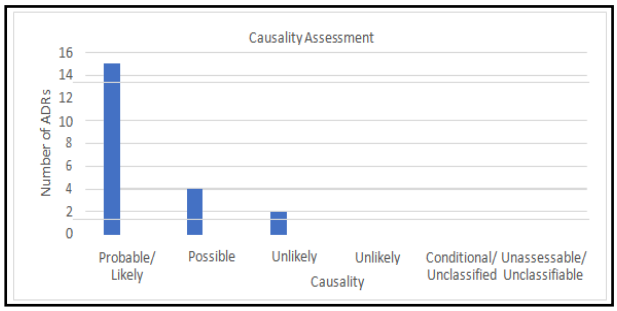
HARTWIG'S SEVERITY ASSESSMENT SCALE



The study findings using Hartwig's severity scale revealed 17 ADRs asmild, 3 as moderate, and none as severe. This scale provided valuableinsights into ADR impact, enhancing patient care and medication safety within the hospital

Fig. 12 Hartwig's Severity Assessment Scale

WHO-UMC CAUSALITY ASSESSMENT SCALE



The classification provided valuable insights into causal relationships between medications and adverse events:15 ADRs as "Probable/Likely," 4 as "Possible," and 2 as "Unlikely." No ADRs were categorized as "Certain," "Conditional/Unclassified," or"Unassessable/Unclassifiable.
Number of ADRs

Fig. 13 Who- Umc Ca usality Assessment Scale

CONCLUSION

The primary goal of determining the prevalence of ADRs in the tertiary care hospital was met satisfactorily. Furthermore, the secondary goals of understanding ADR patterns and using theIHI Global Trigger Tool for tracking, identifying, and reporting ADRs were achieved.

The Global Trigger Tool was found to be an effective methodology for identifying potential adverse drug reactions the presence of 20 ADRs among the triggered cases indicated that adverse drug events occurred within the hospital. The study's findings suggested that there wasroom for improvement in the hospital's reporting and documenting of adverse medication reactions.

A retrospective evaluation of medical records has been shown to be an effective method for identifying adverse medication reactions and triggers. This strategy allowed for the analysis ofprevious cases and provided insights into the occurrence and characteristics of ADRs, allowing healthcare providers to make more informed decisions about patient care and medication safety.

The study's findings highlighted the need of proactive pharmacovigilance and the need for ongoing monitoring of pharmaceutical safety.

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