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Original Article

Clinician's perspective towards implementing computerised prescriptions and computerized physician order entry (CPOE) in a tertiary care hospital

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ABSTRACT

The present study focuses on the clinician's perception towards implementing Computerized Physician Order Entry (CPOE) in a healthcare system. It's a Prospective observational Questionnaire based study and a total number of 156 clinicians participated in this study.Results were expressed in descriptive statistics. It was concluded that computerized prescriptions and CPOE can definitely bring down medication error in a developing country like India. Although synchronization among interdisciplinary professional is the key element for the success of digitization of the health care system.

Keywords: Clinician's Perspective, Computerised Prescriptions, Computerized Physician Order Entry (CPOE), Tertiary Care Hospital**.**

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INTRODUCTION

Medication management is a complex, many sided operation system which involves peoples from different modalities and various steps. Medication error can occur anywhere between prescription, transcription, dispensing and administration, so wise use of medications and minimizing medication errors will be the road to righteousness to the society [1]. So Prevention of medication errors has is a at most priority for patient safety and patient care worldwide. Preventable hospital medical error can be reduced drastically with the potential use of information technology (IT) modalities, such as computerized prescriptions, computerized physician order entry (CPOE), computerized medication charts are the key feasible strategies to prevent medication errors [2].

CPOE together with Clinical Decision Support can drastically reduce Adverse Drug Event (ADE) and medication errors by making sure that prescriptions are precise and doubtless, and indicate about possible problems such as drug interactions and unwarranted doses [3]. In ICMR bulletin for Dec 2010, has clearly recommended the need for the development of computerized prescriptions for avoiding medication error and also computerization of patient's documents [4].

Medication errors arising due to Illegibility from handwritten prescriptions is a preventable risk of medication errors while indirectly decreasing risks related to liability. Miscommunications between dispensing and administration are other core area that needs attention. Prevention of medication errors is the need of the hour worldwide. There substantiate evidence that hospital based systems that use information technology (IT) solutions like computerized physician order entry, bedside bar-coded medication administration, automated dispensing cabinets, and electronic medication reconciliation, are major players in prevent medication errors [5].

In the USA alone, medication errors related issues are estimated to cause morbidity at least 1.5 million patients per year, with about 400 000 mostly preventable adverse events [6].

CPOE is defined as '' a battery of computer-based validated systems that shares similar features of automating the medication ordering process that ensure standardized, legible, and most appropriate complete orders.'' [2,7] CPOE does the following (i) making sure that the order entry is complete and legible , including all vital information, such as dose, route, and dosage form; (ii) checking for specific problems such as drug allergies and drug–drug interactions; (iii) providing dosage adjustment calculations based on clinical features such as weight or renal function; (iv) checking for appropriate baseline laboratory results,(v) computing drug– laboratory interactions, (vi) updating the prescriber with the latest drug information, safety warnings, newer indications, reason for which it had been withdrawn by the manufacture [5].

This study is primarily focuses on the clinician's perception, understanding and their adaptability towards a uniform system like CPOE and also identifying the shortcomings in day to day usage [8]

MATERIALS AND METHODS

Study setting: This study was conducted at Saveetha Medical College Hospital, a super speciality tertiary care teaching hospital in Thandalam, Chennai. The approval for conducting this study was obtained from the Institutional Ethics Committee [021/07/2016/IEC/SU] prior to the study.

Study design: This was a prospective cross-sectional questionnaire-based study. The study participants consisted of all the practicing clinicians who consented themselves to be a part of this study. This study focuses on clinician's perspective and willingness towards implementing computerized prescriptions and computerized physician order entry (CPOE) to adopt a standardized digital interface based workable model to avoid preventable medication errors in improvising patient safety.

Study data collection: A total of 156 practicing clinicians participated in this cross sectional questionnaire based study. Ample time was given for the participants to understand and respond the questionnaire. Almost all prescribers were clinicians representing a broad range of over 14 sub-specialties and evenly distributed across senior and junior doctors.

Study Instrument questionnaire: The data was collected from a self-administered questionnaire prepared with eleven questions based on literature review on previous studies and content validation was done by senior professors of the Institution (Table 1). Questionnaire was designed based on the most commonly accepted attitude assessment scale, the 'Likert scale' which has 5 scaling ranges (SA – Strongly Agree, A – Agree, NS – Not Sure, D – Disagree, SD – Strongly Disagree).

Table 1: Questionnaire on Clinicians Perspective on Computerised prescriptions & (CPOE)

S.no	Question
1	Doctors should be aware of Medication errors?
2	Does Medication errors are underreported in India?
3	Computerized prescriptions are better than hand written prescriptions
4	Is Medication error occurring more on the dispensing part?
5	Is Medication error occurring more on the prescribing aspect?
6	As a doctor do you think Legibility of hand written prescriptions needs to be focused?
7	Implementation of Computerized physician order entry (CPOE) will reduce error and improve patient safety
8	Adapting to computerized physician order entry (CPOE) system is feasible in a tertiary care hospital
9	'Computerized medication charts' is better cost effective alternative to computerized physician order entry (CPOE)
10	It is the responsibility of Government healthcare system to implement a uniform adaptable system in all hospitals in order to reduce the medication error related mortality?
11	Computerized prescriptions and Computerized physician order entry (CPOE) system will be the need of the future

Statistical analysis: The data from the answered questionnaire was entered and percentage wise distribution of various parameters employed in the study was analyzed by Statistical Package for Social Sciences (SPSS) version 22 software.

RESULTS & DISCUSSION

The study was carried out in Saveetha Medical College and Hospital, Thandalam, Chennai, a multi disciplinary tertiary care teaching hospital. It's a Prospective observational Questionnaire based study and a total number of 156 clinicians participated in this study with response rate of 100%. For the statements the percentage respondents agreeing (based on Likert scale) was calculated. Participants were asked to explore their in-depth knowledge and understanding, then document their observations related to these principles. Among the 156 total clinicians who took part in this study, 69% (107) were males and 31% (49) were females [Fig 1]. Table 2 summarizes the distribution of the clinicians based on the years of clinical experience. The departments involved in analyzing the study outcomes are General Surgery, General Medicine, Obstetrics and Gynaecology, Respiratory Medicine, Paediatrics, Orthopaedics, Dermatology, ENT, Ophthalmology, Emergency Medicine etc [Fig.2]. About 89.1 % (139) clinicians concurs to the fact that they have basic knowledge about medication errors in our study [Fig.3] which is similar to the study done by Sewal, R. K et al [9].Underreporting of medication errors is a matter of huge concern in the present healthcare scenario and for the question of underreporting of medication errors about 20.5 % (32) respondents strongly agreed and 66 % (104) agreed to the same [Fig.4]. A study done by Srinivasan et al [10] proves that the clinician's attitude is the key factor for the success of Adverse Drug Response (ADR) reporting under Pharmacovigilance. Hence applying the same model with due diligence can drastically brings down the medication errors. For the question whether Computerised prescriptions are better than handwritten prescriptions. 33.9% (53) clinicians strongly agree and 21.7% (34) agreed and 24.3% (38) weren't sure [Fig.5]. With regard to the legibility of hand written prescriptions, 66%(103) respondents strongly agree that handwriting plays a major role in medication error [Fig.6].This figures are slightly at the lower end when compared to a similar study done in a western by Lau G et al[16]. Concerning the question of implementation of CPOE will reduce error and improve patient safety about 55.7% (87) respondents strongly agreed to the fact [Fig.7]. This correlates with a systematic review done by Ammenwerth et al [12] which emphasised that CPOE implementation will definitely will bring done medication errors and regularise the medical systems. A study done by Shulman et al [11] on the computerised prescriptions showed that CPOE implementation resulted in moderate reduction in medication error in ICU set up.

For the question about the feasibility of adapting to CPOE in a tertiary care hospital nearly half of the clinicians strongly agreed 23.7% (37) or agreed 33.3% (52) [Fig.8]. Many studies have been done to understand the feasibility of adapting to a computer based prescription system, a study done by Pirnejad et al [13] clearly states that CPOE system can never be considered as a substitution for the current paper-based medication system since it cannot balance the practical interoperability issues between physicians and health care professionals like nurses. Lastly for the question whether CPOE will be the need of the future, nearly 53.8% (84) strongly agreed to the fact, 22.4% (35) respondents Agreed [Fig.9].

Fig.1: Total participants in the study.

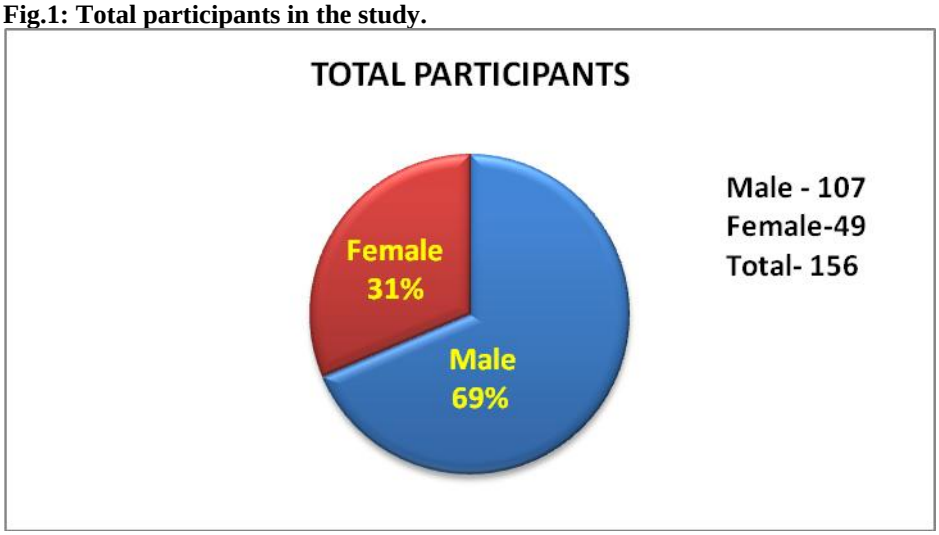


Table 2: Clinical experience of the participants

S.no	Years of Professional experience	No of participants
1	1-2 years	46
2	2-4 years	51
3	4-5 years	36
4	> 5 years	23
	Total	156

Fig.2: Department wise distribution

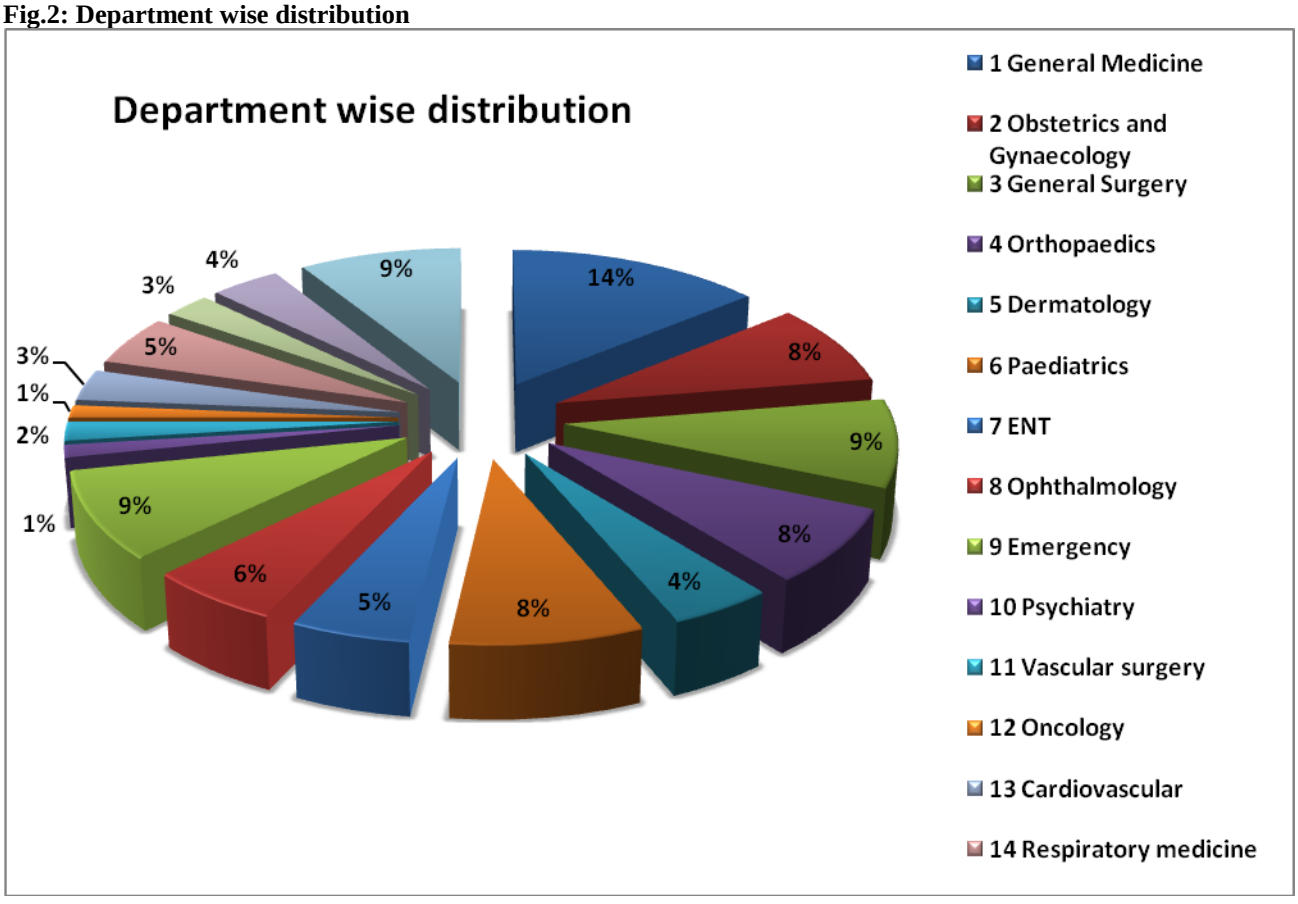


Fig.3: Awareness about medication errors

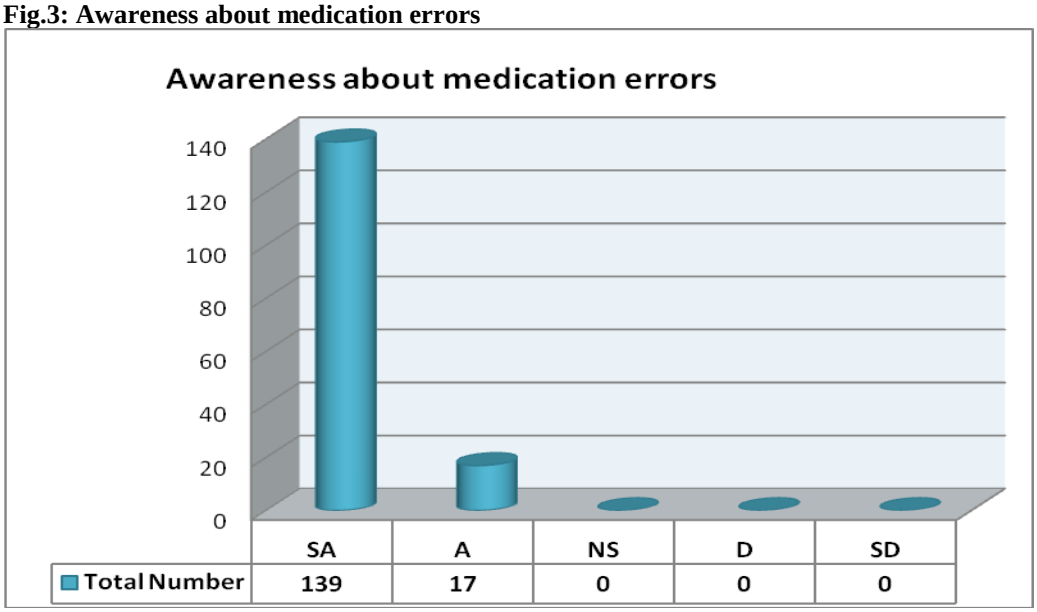


Fig.4: Underreporting of medication errors

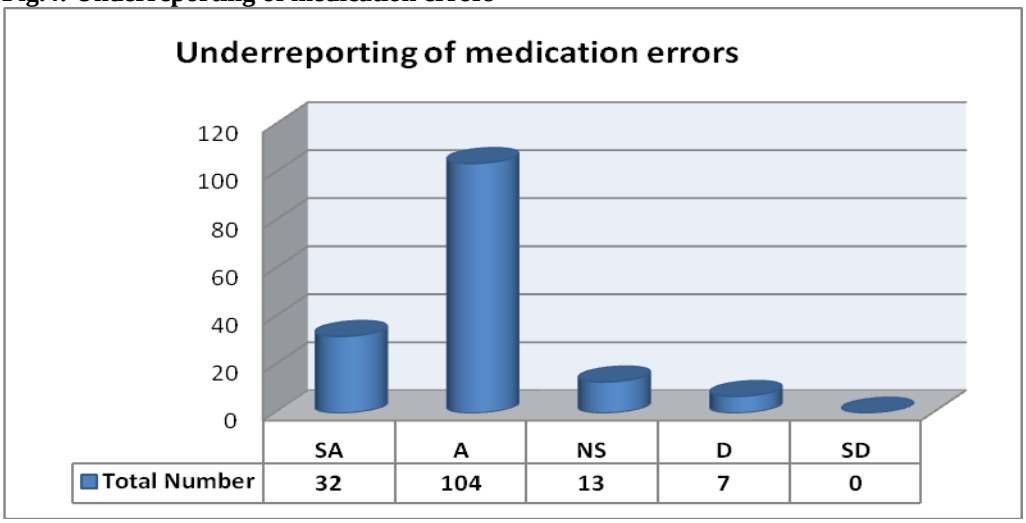


Fig.5: Computerised prescriptions are better than handwritten prescriptions

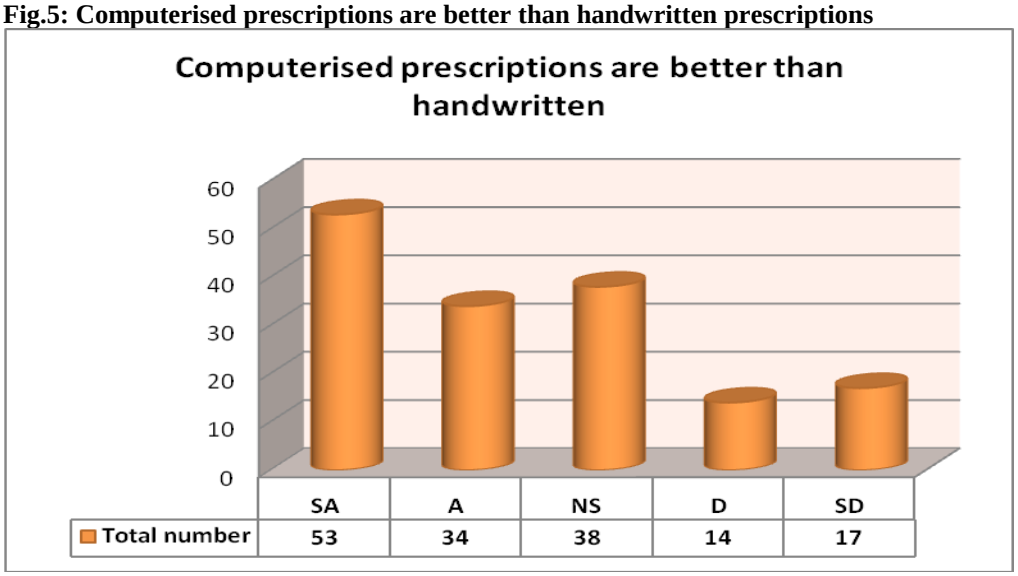


Fig.6: Legibility of handwritten prescriptions

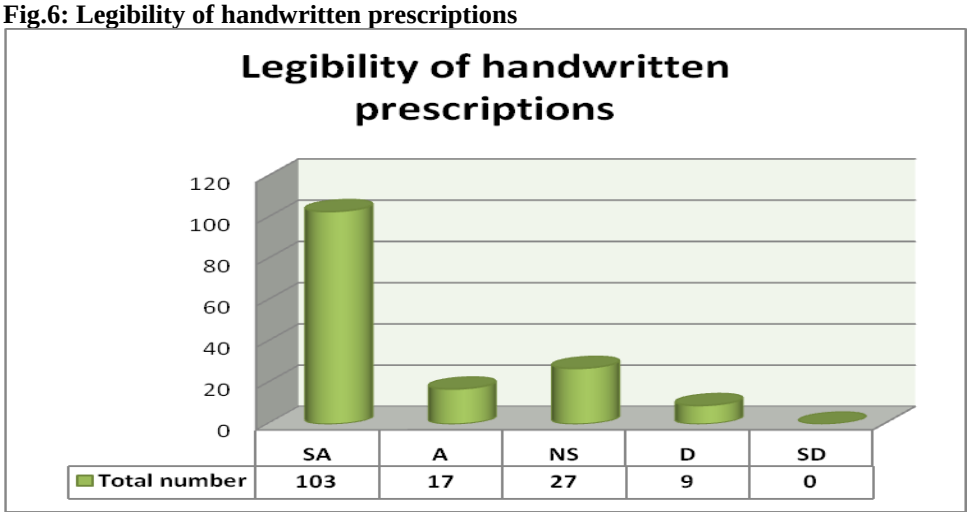


Fig.7: Implementation of CPOE will reduce error & Improve patient safety

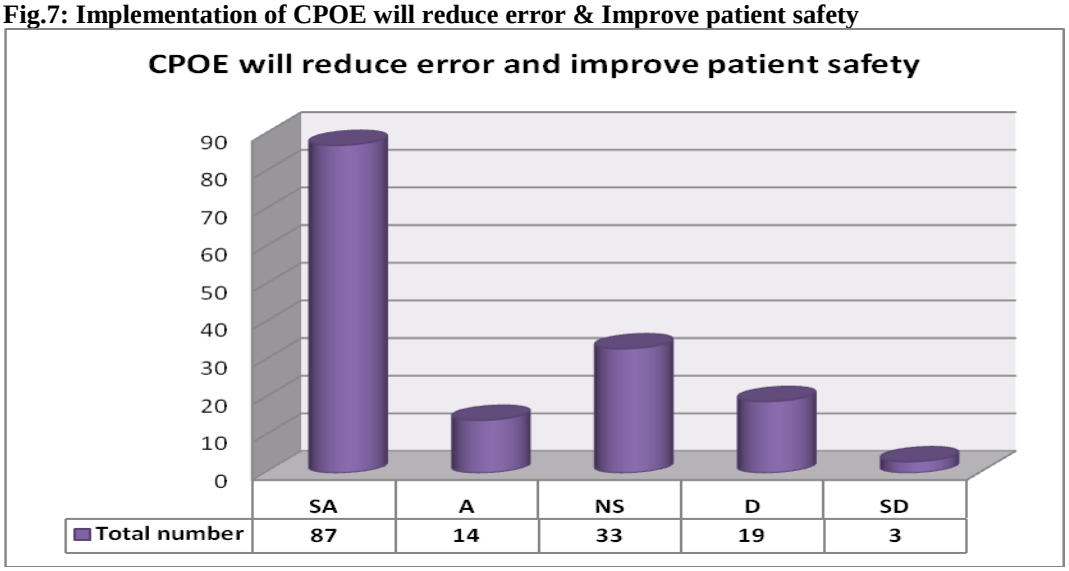


Fig.8: Adapting to CPOE is feasible in a tertiary care hospital

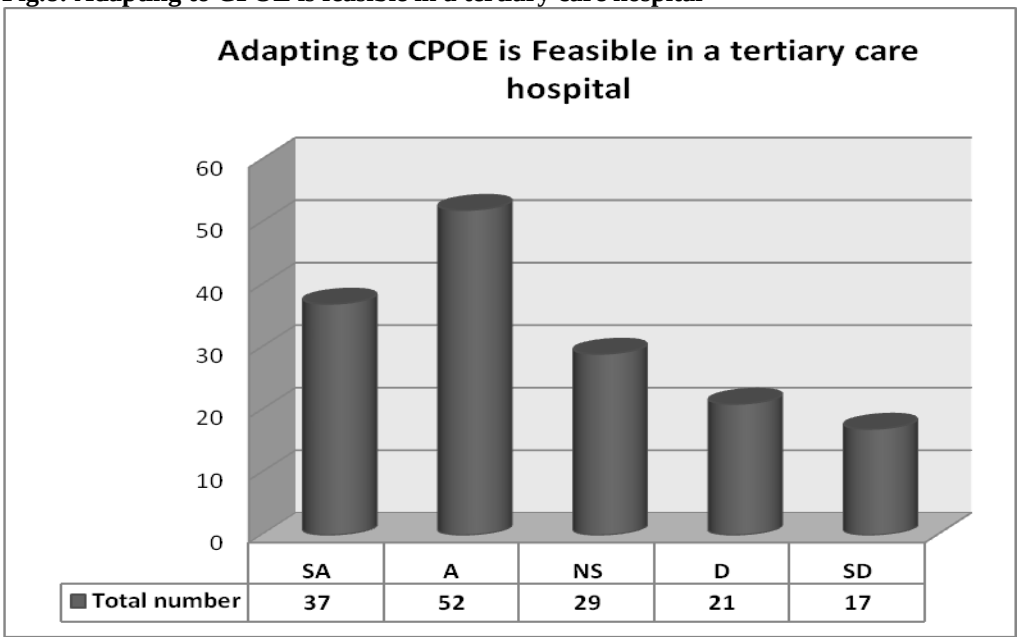
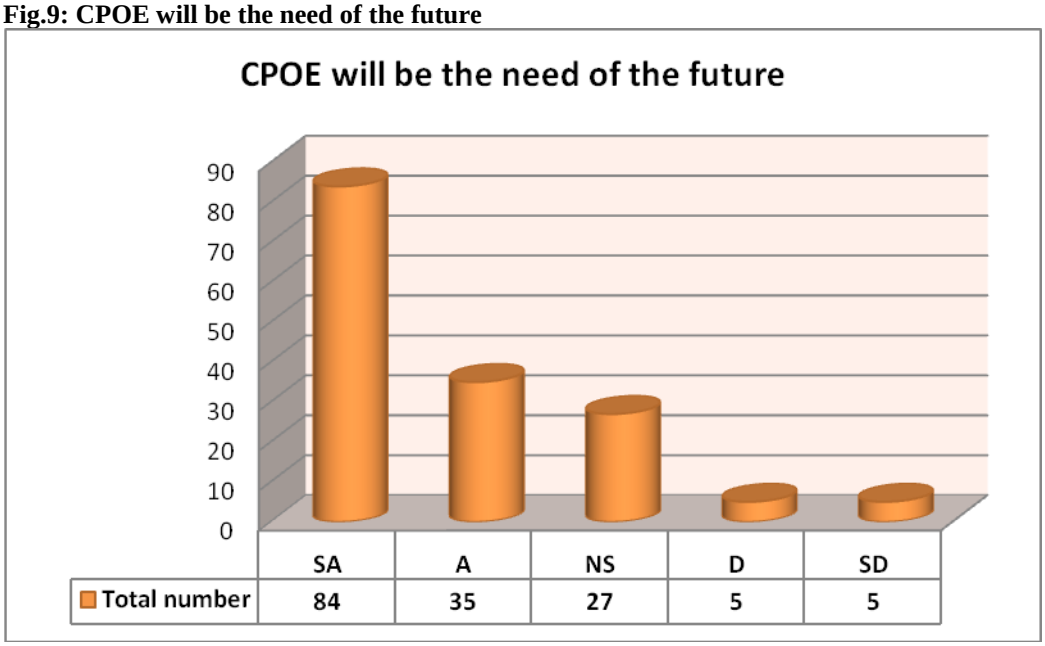


Fig.9: CPOE will be the need of the future



CONCLUSION

This study gave us a clear future perspective view of clinicians towards computerization of the present conventional medical management process in order to avoid medication errors in near future [16]. It also explored the practical difficulties of understanding and adopting a system like CPOE. CPOE will become a progressively an integral part of health care set up like tertiary care hospitals. Our study concludes that practising clinicians are concerned about the medication errors and showed their willingness to adapt to CPOE systems. Financial, quality of service and safety factors are driving CPOE adoption [2, 14]. India hospitals have to adapt themselves to a reliable uniform healthcare system like western countries and lessen the burden of medication errors [15]. Prospective studies in India should focus on longitudinal research in practising clinician attitudes regarding implementation of Electronic Health Records (EHR) and there implications in healthcare sector [17, 18].

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