
Assessment of Community Pharmacist's Knowledge Attitude and Practice towards Dispensing Errors in South Bangalore: A Prospective Cross Sectional Study

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Abstract: Background: Dispensing Error are preventable in community settings to ensure the patient safety and provide better health services addressing dispensing error often requires a multifaceted approach that include improved communication, training and education of healthcare professionals. **Aim of study** is to assess the community pharmacist's knowledge, attitude, and practice towards dispensing error in south Bangalore. **Objective of the study** is to determine the factors which cause dispensing error in community pharmacy and significant association between KAP with demographics. **Methods:** A prospective cross sectional face to face interview based study employing a self-designed questionnaire was conducted in a community pharmacy in south Bangalore. **Results:** A total of 369 pharmacist responded to the survey, of which men comprised 64.5%, while women made up to 35.5%. The bulk of responders (44.7%) were between the ages of 20 and 30, with those aged 51 to 65 accounting for 14.9%. The individuals' educational backgrounds revealed that the biggest percentage came from D-pharm (44.4%), B-pharm (37.1%), M-pharm (16.5%), and Pharm D (1.9%). 10.8% of respondents (15-20 years) have the least work experience, while 29% of subjects (over 20 years) have the most. The bulk of working hours (71%) are greater than 7 hours, rather than less than 7. Comparisons between demographic details and knowledge shows age and educational qualification shows significant ($p < 0.05$) in the study, and with the attitude educational qualification and working hours showed highly significant and with the practice age showed highly significant in the study. **Conclusion:** majority of subjects are men than women. The subjects had good knowledge and attitude towards dispensing error, but their practice was varied. Age and educational qualification were found to be highly significant factors in influencing knowledge and attitude, while age was also significant in influencing practice.

Keywords: Dispensing Error, Community Pharmacist, Knowledge, Attitude, Practice.

1. INTRODUCTION

The term error is defined as anything incorrectly done through ignorance or inadvertence; a mistake, e.g. in calculation, judgment, speech, writing, action, etc." or "the use of an incorrect plan of action to achieve a given aim, or the failure to complete a planned action as intended"^[1]. Medication error: The phrase "medication error" refers to any incident that might have been avoided, resulting in a patient receiving the incorrect prescription or dosage. The process starts with a doctor's prescription, then a chemist's evaluation, and finally the drug is administered to the patient by medical staff. Medication errors can occur during any of these three phases^[4]. Medication errors can lead to a range of problems, including decreased treatment efficacy, increased workload and financial burden, legal challenges, and, most importantly, negative effects for patients. As a result, the causes or circumstances surrounding these errors should be investigated in order to begin a successful therapy procedure while minimizing the patient's harm^[5]. medication error can happen at any stage, including dispensing, transcription, prescription, and administration. The use of computerized prescription has reduced medication error as compared to handwritten orders. Other global programmes, such as the World Health Organization's Medication without harm safety challenge, strive to reducing trivial medication mistakes. Between 2017 and 2022, the project intends to cut medication-related patient harms by half across all health systems.

The types of Medication errors include the following:

- Prescribing error
- Dispensing error
- Documentation error
- Administration error
- Transcription error

Dispensing Error

A divergence from an understandable written prescription or medication order, including written changes made by a pharmacist following consultation with the doctor or in accordance with pharmacy policy. Any divergence from professional or regulatory references, or norms governing dispensing practices, is also termed a dispensing error^[12]. The three most common mistakes made while dispensing medications include supplying the wrong medicine, dosage strength, or dosage form; mistaking the dose; and failing to notice drug interactions or contraindications^[13].

Factors contributing to dispensing error are:

- ✓ High workload: Community pharmacists often face a high workload due to large number of patients seeking prescription medication. This lead to hurried dispensing practices and a higher likelihood of errors.
- ✓ Lack of training: Inadequate training and continuing education for pharmacy staff can contribute to errors. Ensuring that pharmacists and the pharmacy technicians are well-trained and up-to-date with best practices.
- ✓ Limited use of technology: The use of technology, such as electronic prescription systems and barcoding, can help to reduce dispensing error.
- ✓ Communication gaps: Miscommunication between healthcare providers and pharmacists

can lead to errors. Clear and accurate communication is essential in preventing medication mistakes.

Consequences of dispensing error:

Individuals in healthcare may face serious penalties if dispensing errors occur, particularly in pharmacies.

The following are the results of dispensing errors:

- Patient injury
- Treatment failure,
- Regulatory scrutiny,
- Increased healthcare costs

When mistakes are acknowledged, it is critical to adopt preventative measures and commit to continuous improvement. To minimize the frequency of pharmaceutical errors and thereby enhance patient care, the healthcare community may endeavour to improve communication, address the underlying causes, and encourage a meticulous and proactive approach to medical treatment services.

2. RELATED WORK

Mohammad N Al-Arifi Et Al: The main objective of this study was to survey pharmacists' attitudes toward dispensing errors in community pharmacy settings in Saudi Arabia. It is a cross-sectional survey of community pharmacists in Riyadh region, Saudi Arabia was conducted over a period of 6 months from March through September 2012. A stratified random sample of eight hundred registered pharmacy practitioners was collected all over Riyadh region. Statistical analysis was done using SPSS version 19.0 for windows (SPSS Inc., Chicago, Illinois). The response rate was almost 82%. The majority of the respondents are young adults (90.2%). The median for years of registration of respondent pharmacists was 9 years (range 1-37 years). About 62% (407) of the respondents have a positive response while only 37.8% (n = 248) have a negative response in this respect. The major factors identified were pharmacist assistant (82.2%) and high workload (72.5%). The most appreciated factors that help reducing dispensing errors are improving doctors' hand writing and reducing work load of the pharmacist (82.9% and 82.8% respectively), having drug names that are distinctive (76.1%) and having more than one pharmacist in duty (75.5%). Conclusion it is concluded that majority of community pharmacists indicated that the risk of dispensing errors was increasing and most of them were aware of dispensing errors. It is obvious from the study results that dispensing errors is a big concern for community pharmacy practice in Saudi Arabia. Therefore, there is an urgent need for the professional organizations and Pharmacy Boards in Saudi Arabia to determine standards for the profession.

3. MATERIALS & METHODOLOGY

After obtaining approval from institutional ethics committee, a cross sectional questionnaire-based study was undertaken from April 2023 to October 2023. Including 369 pharmacist in south Bangalore. 400 samples were screened for the study by convenient sampling. A total of 31 subjects not included as they were not willing to participate or were closed at the time of



visit. The questionnaire was self-designed, it was then validated by expert panel and it was pretested on 41 subjects and Cronbach's alpha of 0.737 for knowledge and for attitude questionnaire 0.878, and for practice 0.704 was obtained. The questionnaire had three sections, knowledge, attitude, and practice with 12 and 9 and 5 questions respectively. The data was collected through face to face interview by obtaining prior consent form from subjects by describing the objectives of the study and participants were assured of confidentiality to elicit an unbiased response. The pre-validated paper version of questionnaire was administered to the pharmacist.

Inclusion & Exclusion Criteria

Inclusion Criteria:

- Community pharmacist or pharmacy assistant who are available and willing to participate.
- Registered pharmacist
- Exclusion Criteria:
- Subjects not willing to participate
- Chain of pharmacy
- Unregistered pharmacy
- Pharmacies run by non- professional.

Statistical Analysis:

The data collected in the form of completed questionnaires was categorized, coded, and analysed. Data were analysed using the statistical software SPSS v26.0 version was used for the analysis of the data. Descriptive statistics were performed for the demographics group to evaluate the frequency of distribution of the data. For categorical data, the chi-square test was employed to compare the demographics and knowledge attitude and practice group and $P < 0.05$ was considered statistically significant.

4. RESULTS AND DISCURSION

Distribution of Subjects According To Demographics:

Table 1 shows the distribution of the subjects by age, gender, educational level, employment history, and hours worked. Men made up 64.5% of the 369 subjects, with women making up 35.5%. The majority of the respondents were between the ages of 20 and 30 (44.7%), followed by those between the ages of 51 and 65 (14.9%). The subjects' educational backgrounds revealed that the highest percentage were from D-pharm (44.4%), B-pharm (37.1%), M-pharm (16.5%), and Pharm-D (1.9%). 10.8% of the respondents (15– 20 years) have the least work experience, while 29% of the subjects (more than 20 years) have the most work experience. The majority of working hours are longer than 7 hours (71%) than fewer than 7 hours.

Table No 1:

DEMOGRAPHICS		Frequency	Percentage
AGE	20 - 35 Years	165	44.7
	36 - 50 Years	149	40.4
	51 - 65 Years	55	14.9

GENDER	MALE	238	64.5
	FEMALE	131	35.5
QUALIFICATION	B-PHARM	137	37.1
	D-PHARM	164	44.4
	M-PHARM	61	16.5
	PHARM-D	7	1.9
WORK EXPERIENCE	0 - 4 Years	74	20.1
	5 - 9 Years	87	23.6
	10 - 14 Years	61	16.5
	15 - 20 Years	40	10.8
	> 20 Years	107	29.0
WORKING HOURS	< 7 Hours	107	29.0
	>7 Hours	262	71.0

Distribution of Subjects Based on the Knowledge:

Table 2 Illustrates frequency of distribution of subjects based on the knowledge and the subjects' overall mean knowledge score of 7.47+5.104. Table 3 compares demographic information with knowledge. Age and educational qualification were very significant at $p < 0.05$. Figure 1 shows that 139 participants had good knowledge, 132 subjects had excellent knowledge, and 98 individuals had inadequate understanding of dispensing errors.

Table No 2:

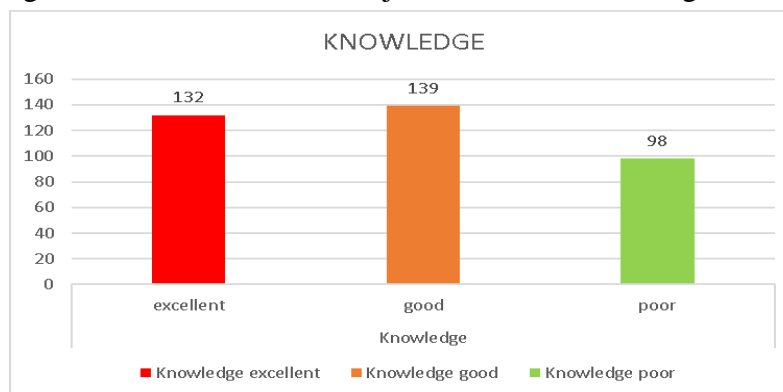
QUESTIONNAIRE	YES n (%)	NO n (%)
Are you aware of the term dispensing error?	341(92.4%)	28(7.6%)
Do you think that time constraints and a heavy workload are factors in dispensing error?	212(57.5 %)	157(42.5%)
Do you believe that unclear, Ambiguous, or confusing prescription are the primary source of errors in their dispensing?	236(64%)	133(36.0%)
Do you suspect that the main reason for dispensing error is Pharmacist incompetence?	180(48.8%)	189(51.2%)
Do you find that the most common cause for dispensing error is medicine names that are similar (sound and look alike)?	249(67.5%)	120(32.5%)
Do you think Short time for drug dispensing is the main cause of dispensing error?	193(52.3%)	176(47.7%)
Do you feel that you can recognize and stop errors in dispensing at your pharmacy?	245(66.4%)	124(33.6%)
Do you agree that Lack of attention or focus is factor affecting dispensing error in community pharmacy?	244(66.1%)	125(33.9%)
Do you concur that one of the reasons influencing dispensing error in community pharmacies is poor communication between pharmacy staff and patients?	260(70.5%)	109(29.5%)

Do you agree that Inadequate training or educations are one of the causes of occurrence of dispensing error?	218(59.1%)	151(40.9%)
Do you accept that interactions or distraction have an impact on dispensing error in community pharmacies?	198(53.7%)	171(46.3%)
Have you reported any dispensing error that has occurred in your pharmacy?	187(50.7%)	182(49.3%)
MEAN + SD	7.47+5.104	

Table No 3:

DEMOGRAPHICS		KNOWLEDGE			TOTAL	Chi-square	P value
		EXCELLENT	GOOD	POOR			
AGE	20 – 35 Years	77	56	32	165	22.350	0.000 *
	36 – 50 Years	33	65	51	149		
	51 – 65 Years	22	18	15	55		
GENDER	MALE	90	84	64	238	1.814	0.404
	FEMALE	42	55	34	131		
QUALIFICATION	B- PHARM	61	49	27	137	16.262	0.012 *
	D- PHARM	49	57	58	164		
	M- PHARM	20	29	12	61		
	PHARM-D	2	4	1	7		
WORK EXPERIENCE	0 - 4 Years	31	24	19	74	7.27	0.508
	5 - 9 Years	38	29	20	87		
	10 – 14 Years	17	25	19	61		
	15 – 20 Years	13	15	12	40		
	> 20 Years	33	46	28	107		
WORKING HOURS	< 7 Hours	29	44	34	107	5.188	0.075
	>7 Hours	103	95	64	262		

Figure 1: Classification of subjects based on knowledge



Distribution of Subjects Based on the Attitude:

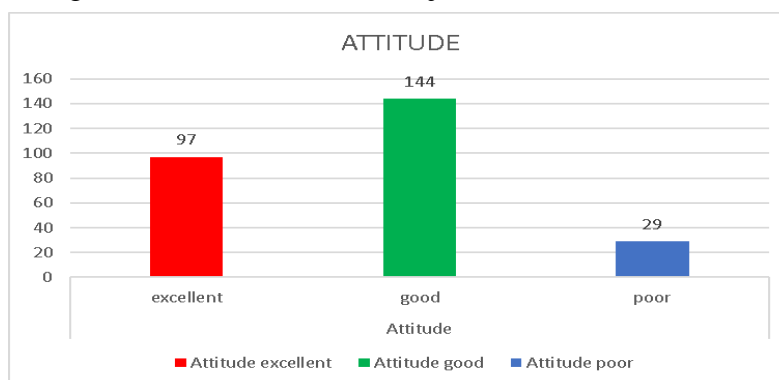
Table 4 shows frequency of distribution of subjects based on the attitude and the participants' overall mean score for Attitude is 33.08 + 10.01. Table 5 compares demographic statistics to Attitude. Educational qualifications and working hours were extremely significant ($p < 0.05$). Figure 2 depicts 144 respondents with a positive attitude, followed by 97 subjects with an outstanding attitude and 29 subjects with an unfavourable opinion regarding dispensing errors.

Table No 4:

QUESTIONNAIRE	Strongly disagree n (%)	Agree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
Do you agree that community pharmacists should take steps to reduce dispensing error?	10 (2.7%)	45 (12.1%)	58 (15.7%)	174 (47.1%)	82 (22.2%)
Do you accept that community pharmacies may face legal Consequences for dispensing errors?	21 (5.6%)	44 (11.9%)	70 (18.9%)	183 (49.5%)	51 (13.8%)
Do you also believe that mistake made during dispensing have an influence on Patient health outcomes?	7.0 (1.8%)	43 (11.6%)	59 (15.9%)	155 (42.0%)	105 (28%)
Do you agree that medication safety is important in your daily work?	7.0 (1.8%)	40 (10.8%)	58 (15.7%)	126 (34.1%)	138 (37%)
Do you agree that improved staff training and education can prevent	32 (8.6%)	58 (15.7%)	47 (12.7%)	165 (44.7%)	67 (18.2%)

dispensing error by community pharmacist					
Do you believe that better communication between medical professionals can help to avoid errors in Dispensing error?	28 (7.5%)	47 (12.7%)	71 (19.2%)	145 (39.2%)	78 (21%)
Do you concur that a prescription that is Readable or legible might help to Avoid errors while dispensing ?	31 (8.4%)	13(3.52 %)	31 (8.4%)	120 (32.5%)	173 (46%)
Do you consider that improved medication labelling and packaging can prevent dispensing error?	28 (7.5%)	68 (18.4%)	66 (17.8%)	124 (33.6%)	83 (22.4%)
Do you agree that Limited workload can prevent dispensing error in community pharmacists?	32(8.6%)	49 (13.2%)	64 (17.3%)	131 (35.5%)	93 (25.2%)

Figure 2: Classification of subjects based on the attitude



Distribution of Subjects Based on the Practice

Table 6 illustrates frequency of distribution of subjects based on the practice and the subject's overall mean Practice score is (14.94 + 5.87). Table 7 shows a comparison of demographic characteristics with Practice. Age was extremely significant ($p < 0.05$). Figure 3 shows that 180 respondents had good practice, 110 had poor practice, and 79 had outstanding practice towards dispensing errors.

Table No 5:

QUESTIONNAIRE	NEVER n (%)	RARELY n (%)	SOME TIMES n (%)	OFTEN n (%)	ALWA YS n (%)
Do you encounter issues related to illegible prescription or incomplete medication order?	51(13.8%)	97(26.3%)	148(40.1%)	58(15.7%)	15(4.1%)
Do you double check that the medication are dispensed accurately and safely?	9(2.4%)	60(16.3%)	92(24.9%)	76(20.6%)	132(35.8%)
How often do you ask for assistance or clarification from colleagues or superior when unsure about the correct way to dispense a medication?	29(7.9%)	80(21.7%)	115(31.2%)	100(27.4%)	45(12.2%)
How often do you report dispensing error, whether they were made by you or by someone else in the pharmacy?	87(23.6%)	77(20.9%)	86(23.3%)	92(24.9%)	27(7.3%)
How frequently does your pharmacy address dispensing-errors occurring in your pharmacy?	110(29.8%)	79(21.4%)	83(22.5%)	72(19.5%)	25(6.8%)
MEAN + SD	14.94 + 5.87				

Figure 3: Classification of subjects based on the practice

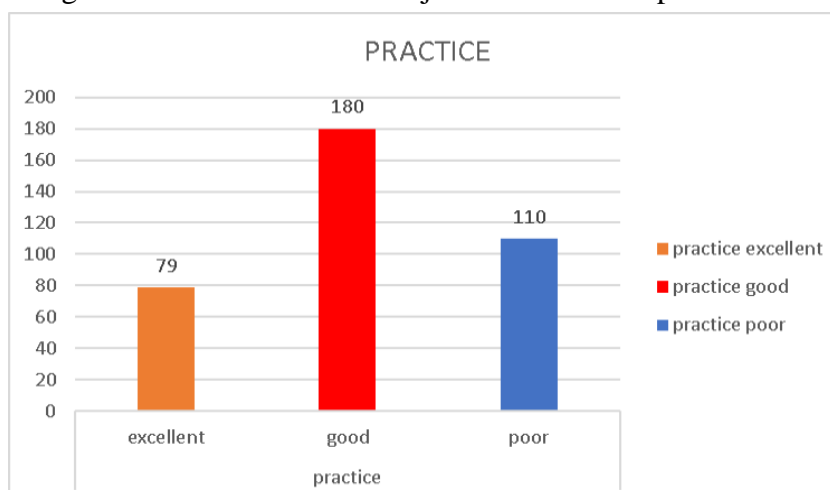




Table No 6:

DEMOGRAPHICS		ATTITUDE			TOTAL	Chi-square	P value
		EXCELLENT	GOOD	POOR			
AGE	20 -35Years	98	60	7	165	8.021	0.091
	36 – 50 Years	71	61	17	149		
	51 – 65 Years	27	23	5	55		
GENDER	MALE	129	86	23	238	4.362	0.113
	FEMALE	67	58	6	131		
QUALIFICATION	B-PHARM	81	54	2	137	20.659	0.002*
	D- PHARM	81	59	24	164		
	M-PHARM	30	28	3	61		
	PHARM-D	4	3	0	7		
WORK EXPERIENCE	0 - 4 Years	43	26	5	74	10.182	0.252
	5 - 9 Years	44	36	7	87		
	10 – 14 Years	30	21	10	61		
	15 – 20 Years	24	14	2	40		
	> 20 Years	55	47	5	107		
WORKING HOURS	< 7 Hours	49	55	3	107	12.338	0.002*
	>7 Hours	60	128	74	262		

Table No 7:

DEMOGRAPHICS		PRACTICE			TOTAL	Chi-square	P value
		EXCELLENT	GOOD	POOR			
AGE	20 - 35Years	47	78	40	165	13.642	0.009*
	36 – 50 Years	20	73	56	149		
	51 – 65 Years	12	29	14	55		
GENDER	MALE	52	116	70	238	.096 ^a	0.953
	FEMALE	27	64	40	131		
QUALIFICATION	B-PHARM	33	68	36	137	10.777 ^a	0.096
	D-PHARM	34	70	60	164		
	M-PHARM	10	39	12	61		
	PHARM-D	2	3	2	7		
WORK	0 - 4	21	35	18	74	12.127 ^a	0.146

EXPERIENCE	Years						
	5 - 9 Years	22	39	26	87		
	10 – 14 Years	10	27	24	61		
	15 – 20 Years	5	27	8	40		
	> 20 Years	21	52	34	107		
WORKING HOURS	< 7 Hours	19	52	36	107	1.683 ^a	0.431
	>7 Hours	60	128	74	262		

Discussion

In Bangalore, there is a dearth of information regarding the rates of dispensing errors in neighbourhood pharmacies, in addition to a lack of a reliable and widely accepted reporting mechanism to incentivize pharmacy employees to report errors. Since DEs have no known causes or origin, this study may be the first to examine how community pharmacists in south Bangalore perceive them, and identify the causes of dispensing error. In this study distribution of subjects was based on age, gender, education level, employment history, and hours worked. This study comprised 369 participants among which 64.5% of subjects were men and 35.5% were women. The majority of subjects 44.7% were between the ages of 20 and 30, with those aged 51 to 65 accounting for 14.9%. bulk of responders have D pharm as educational background and least being the pharm D 1.9%. And with more than 20 years of work experience accounts for 29%. Over seven hours (71%) make up the majority of working hours, compared to less than seven hours, similar to report conducted in Malaysia (*mamat. et. al*). The initial query posed to each pharmacist under evaluation was whether or not they were aware of the term “dispensing error”, 92.4% of respondents are aware of the term and the subjects agreed that heavy workload (57.5%), ambiguous, unclear prescription (64%), poor communication between pharmacist and patient (70.5%) and inadequate training and education (59.1%) are the main causes of dispensing error. 70.5% of respondents agreed that the community pharmacists' poor relationships with other healthcare providers and their perceived idea of withholding authority from those with less training also played a significant role similar to the reports of (*inamdard et al*). In attitude distribution of participants, it is shown that 97 subjects have excellent attitude and 29 subjects have poor attitude on dispensing error. It is shown that educational qualifications and working hours are highly significant with respect to dispensing error. According to this study, one of the main reasons for errors is improper writing. Errors in handwritten prescriptions may be misinterpreted by pharmacy staff, which might result in issues with drugs as stated in a prospective study in Sana'a, Yemen (*Al-Worafi et al*) which 46% of community pharmacists strongly agree with the above assertion. High workloads, which are defined as the ratio of high demands to low resources available to meet those demands, can cause stress and frustration in pharmacists, which can raise the risk of errors occurring during dispensing. 35.5% of respondents agree that limited workload can



reduce occurrence of dispensing errors in the pharmacy. Therefore the dispensing errors occurring in pharmacy have impact on patient health outcomes, 42% of participants agree that this might be the cause of dispensing error. Around 33.6% of subjects agree that improved labeling and packaging can help in reducing dispensing error. Optimizing labelling and packaging practices is essential for preventing dispensing errors in community pharmacies. By standardizing processes, leveraging technology, prioritizing patient education, maintaining quality assurance, and fostering collaborative communication, pharmacies in South Bangalore can significantly enhance medication safety and improve patient outcomes. These strategies not only reduce the risk of errors but also contribute to building trust and reliability in pharmacy services within the community healthcare system. In this study, among 369 participants' 180 subjects have good practice on dispensing error, 110 subjects have poor practice on dispensing error and 79 subjects have excellent practice on dispensing error. The study also demonstrates that age is a significant factor with respect to practice of dispensing error, Older pharmacists often have more years of experience, which can contribute to better decision-making and handling of complex situations. Experience typically leads to better recognition of potential errors and strategies to prevent them. Experienced pharmacists are more likely to have encountered a wider range of medications and patient scenarios, enabling them to identify potential errors before they occur. when pharmacist were questioned regarding how frequently they encounter with illegible and incomplete prescription, 40.1% of subjects responded that they come across these kinds of drug orders only sometimes. Double checking medications before dispensing is a critical safety practice in pharmacy settings. Double checking of medication also ensures accuracy and appropriateness, also checks for potential interactions with other medications the patient may be taking. 35.8% of participants responded that they double check the medication order before dispensing to patients. About 31.2% of the participants, acknowledged that they occasionally seek assistance or explanation from their superiors or coworkers when unclear about the proper technique to distribute a prescription. Reporting of dispensing error by community pharmacist is vital as it ensures patient safety, pharmacists duty to ensure accuracy and safety of medications they dispense, transparent reporting of errors demonstrates integrity and commitment to patient welfare. It helps maintain patient trust and confidence in the pharmacy and the healthcare system as a whole. Reporting errors fosters communication and collaboration among healthcare professionals. It has been observed that relatively few community pharmacists 6.8% report dispensing errors and take steps to prevent them from arising again. Our study showed that main cause of dispensing error is mainly due to ambiguous prescription, miscommunication between pharmacist and patient, look alike sound alike drugs and inadequate training.

5. CONCLUSION

In conclusion, the study found that the majority of the subjects were men, aged between 20 and 30, with a background in D-pharm and B-pharm. The subjects had good knowledge and attitude towards dispensing error, but their practice was varied. Age and educational qualification were found to be highly significant factors in influencing knowledge and attitude, while age was also significant in influencing practice. And it defines the causes of dispensing error, and our study showed that main factors which causes the dispensing error is mainly due to incomplete



prescription, ambiguous prescription, miscommunication between pharmacist and patient, inadequate training and look alike and sound alike drugs. And community pharmacist has positive attitude on dispensing error. And subjects stated that improved staff training and education and medication labelling, proper packaging can prevent error in pharmacy. In this study pharmacist reported that practising of double checking the medication order can prevent the error in pharmacy. By resolving the highlighted difficulties, the community pharmacy sector may play a critical role in improving patient safety and the overall efficacy of medical services in South Bangalore.

Limitations and Future Perspective:

This is a survey based-cross sectional study which is subject to the standard limitations of questionnaire-based studies, these limitations include recall bias of participants, social desirability bias and communication barrier between investigator and participants may have yielded imprecise data. Results of this study cannot be completely generalized to the whole population because the sample was restricted to only south Bengaluru location.

And the future study can be carried out with expanding the study group to wider region to produce more comprehensive findings about the dispensing error and by including the more centers and more participants from different cities in various parts of country. And other study can be carried out to compare the KAP of dispensing error with high work experience with low work experience pharmacist.

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Conflicts of Interest

There are no conflict of interest.

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