ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE OF COMMUNITY PHARMACIST ABOUT ANTIBIOTICS IN KALABURAGI

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ABSTRACT

Background: Pharmacists being the last contact to the patient, before taking antibiotics, thus can control the irrational use of medicines. Comprehensive and relevant education and training on the use of antibiotics and antimicrobial resistance (AMR) is essential. **Aim:** To assess the knowledge, attitude and practice (KAP) of community pharmacist (CP) regarding antibiotics in Kalaburagi. **Objectives**: To assess the KAP on antibiotics among CPs, to improve awareness of the legal requirements to dispense antibiotics and to improve awareness and understanding of AMR. **Materials and Methods:** A Prospective cross sectional study was conducted among selected CPs in Kalaburagi using a self-administered questionnaire. After a gap of 10 days followed by education post test scores were taken. Statistical data was analyzed by IBM SPSS 20.0 version software. **Results:** In this male pharmacist were 90% and females were 10%, maximum number pharmacist belongs to age group 31-40 years. The mean KAP scores of CPs in post-test was significantly more as compare to pre-test, the post-test KAP was increased by 27%, 27% and 29% respectively and knowledge score to improve awareness of the legal requirements to dispense antibiotics, awareness and understanding of AMR was significantly increased by 33% and 20.6% respectively. **Conclusion:** Even though the CPs showed good KAP towards antibiotics the interventions for the further improvement tailored to target the gaps underlined in this study. As it is conducted within 120 pharmacists further large scale studies are necessary to validate the findings of the present study by including a greater number of CPs.

KEYWORDS: Antibiotics, Community Pharmacist, Dispensing Practice, Cross-sectional study.

INTRODUCTION

Antimicrobial agents have transformed the health of the world and have saved millions of lives worldwide.[1] It is estimated that 20- 50% of global antibiotic use is inappropriate.[2] WHO has defined the rational use of antibiotics as 'the cost-effective use of antibiotics which maximizes clinical therapeutic effect while minimizing both drug-related toxicity and the development of antimicrobial resistance (AMR).Both appropriate and inappropriate use of antibiotics lead to AMR development.[8] Around 50% of all outpatient antibiotics dispensed in most parts of the world are not prescribed by physicians.[9] Community pharmacies are considered as a main source of antibiotics' distribution[12] Comprehensive and relevant education and training on the use of antibiotics and AMR is essential for pharmacists in order that they may take a leading role in changing behaviors regarding antibiotic consumption in all healthcare settings.[13]

It thus becomes essential to ascertain community pharmacists' knowledge of and attitudes to microbial resistances and antibiotic use, so that the pertinent educational interventions can be tailored to the task.[14]

Antibiotics, typically prescription-only medicines, can be purchased without prescription from various drug outlets and community pharmacies in a range of countries around the world[16] despite being illegal, over-the-counter sales of antibiotics occur frequently.

Antimicrobial resistance (AMR) is a global threat today.[4] It is estimated that by 2050 there will be more than ten million deaths per year attributed to AMR[19] According to the first objective of the WHO global action plan on AMR, avoiding overuse and misuse of antibiotics requires healthcare professional's awareness and understanding of AMR with effective communication, education and training. In this context, healthcare professionals have a key role to play to optimize the use of antibiotics in the community.[13]

In the very recent years there was a tremendous awareness in the health care team with the publication of ICMR treatment guidelines for antimicrobial use. Like many developed countries, now India also have their own treatment guidelines for antimicrobial use. On the other hand, among all the actions, the Schedule H1, red Line Campaign on Antibiotics, the

treatment guidelines for antimicrobial use and nationalaction plan are the most concerned areas for the pharmacist to involve for contribution in the battle against AMR.[6] Several investigations in different countries have assessed the knowledge, attitude and behavior of the general population and physician regarding antibiotic use, however relatively few have been conducted among pharmacist in India. To date there is a generalpaucity of information in the literature on thistopic among local community pharmacists inKalaburagi.[28]

MATERIALS AND METHODS

An institutional review board clearance was obtained.

STUDY DESIGN: Prospective crosssectional study.

STUDY SITE: The study has been carried out in selected Community pharmacies in Kalaburagi city.

STUDY DURATION: 06 Months

INCLUSION CRITERIA

- Community pharmacist working in different pharmacies in Kalaburagi.
- Community pharmacist having more than 06 monthsof experience in dispensing.

EXCLUSION CRITERIA

- Community pharmacist whois not willing to participate in study.

SOURCE OF DATA

The data was collected by using data collection form consist of two parts;

- Socio-demographics data of the participants
- Predesigned questionnaires comprising of knowledge, attitude and practice based questions.

SAMPLE SIZE: 120 community pharmacist.

STUDY PROCEDURE

The study was initiated after getting approvalfrom institutional review board (IRB) andcarried out for a period of 06 months. All theparticipants were given Informed consent form (ICF) which are duly signed by them, after explaining the importance of the study. The participants data was collected in self- designed data collection form, questionnaires were given to participants which they filled by selecting the right answer or wrong answer. After the

completion of pre-test all the community pharmacist was educated by one to one interaction they are also providedwith information leaflet, regarding knowledge, attitude and practice of antibiotics and asked to read and understand the provided leaflet. After 10 days of pre - test again the same questionnaire was given to the community pharmacist to fill. The questionnaire was evaluated by providing marks that is for each correct answer 1 mark is given were as for wrong answer 0 mark. All the data collected were entered into the Microsoft excel sheet for the data analysis.

STATISTICAL ANALYSIS

Data were entered into Microsoft Excel, compiled and analysed using IBM SPSS 20.0version software. Then the Pre and Post intervention data were compared by using paired student's t-test for statistical significance. If P value is <0.05, it is considered as significant.

RESULTS

A total number of 120 community pharmacists are included in the study were analyzed for knowledge, attitude and practiceregarding antibiotics.

Table No: 1 depicting Age and sex wise distribution of community pharmacist.

Age in years	Males		Females		Total	
	No:	Per ($\square$)	No:	Per ($\square$)	No:	Per ($\square$)
21-30	44	40.7	7	58.3	51	42.5
31-40	50	46.3	4	33.3	54	45.0
41-50	14	13.0	1	8.4	15	12.5
Total	108	100.0	12	100.0	120	100.0
Mean	33.94 ± 6.72		31.91 ± 7.23		33.74 ± 6.76	

45.0% of pharmacist were belongs to the agegroup of 31-40 years, 42.5% of pharmacist were belongs to the age groups of 21- 30 years 12.5% were belongs to the age group of41-50 year. The mean age of males was 33.94years and the mean age of females was 31.91years (Figure 1). Male pharmacist were dominant in the study 90.0% and female pharmacist were 10.0% (figure 2).
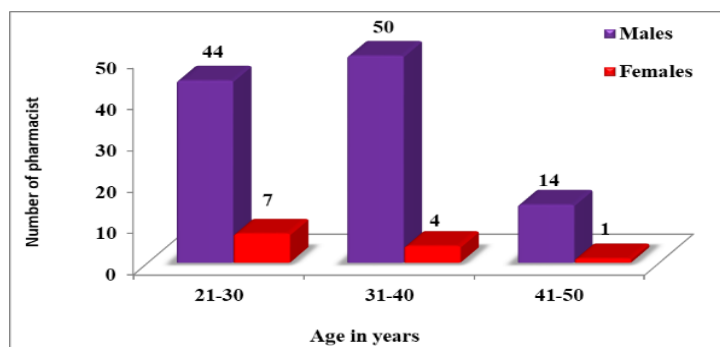
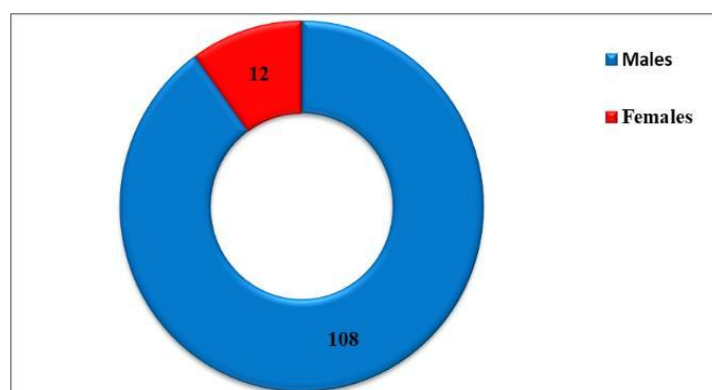**Figure no: 1 representing age wise distribution of community pharmacist.**

Figure no: 2 representing sex wise distribution of community pharmacist.

Table no 2: representing the age wise comparison of knowledge, Attitude and Practice scores of community pharmacist on antibiotics.

Age	knowledge			Attitude			Practice		
	Pre-test (%)	Post-test (%)	Difference(%)	Pre-test (%)	Post-test (%)	Difference(%)	Pre-test (%)	Post-test (%)	Difference (%)
21-30yrs	62	83	21	65	93	28	65	93	28
31-40yrs	54	83	29	65	93	28	67	95	28
41-50yrs	72	95	23	77	95	18	80	96	16
Average			24			25			24

Study represents that, there was difference of mean Knowledge, Attitude, Practice scores in age between pre and post-test. The mean Knowledge, attitude, Practice scores of community pharmacist in post-test was more as compare to pre-test. The post-test knowledge, attitude, practice score was increased 24%, 25% and 24% respectively. The above Study reveals that higher (41-50 yrs.) age community pharmacist have more knowledge, attitude, practice scores than middle (31-40yrs) aged and young (21-30yrs) aged after the education.
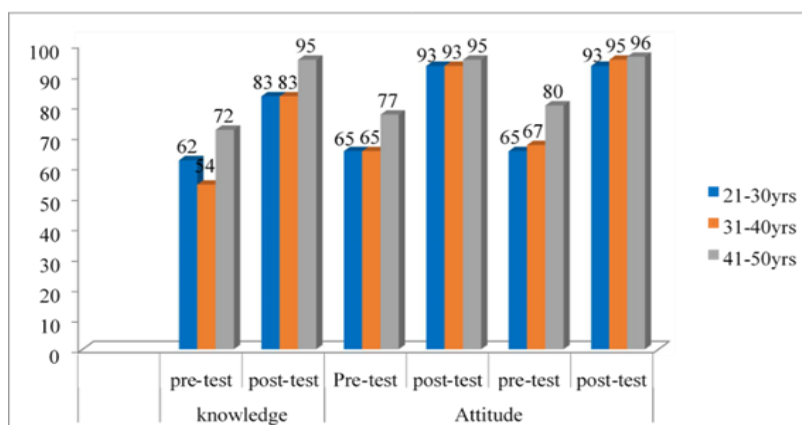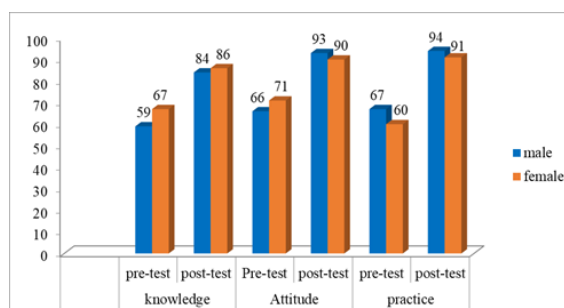
Figure no 3: representing the Age wise comparison of Knowledge, Attitude and Practice scores of community pharmacist on antibiotics.

Table No: 3 depicting the sex wise comparison of Knowledge, Attitude and Practice scores ofcommunity pharmacists on antibiotics.

Sex	Knowledge			Attitude			Practice		
	Pre-test (%)	Post-test (%)	Difference (%)	Pre-test (%)	Post-test (%)	Difference (%)	Pre-test (%)	Post-test (%)	Difference (%)
Male	59	84	25	66	93	27	67	94	27
Female	67	86	19	71	90	19	60	91	31
Average			22			23			42

Study represents that, according to sex wise, females had more mean knowledge score than males. The mean knowledge, attitude, Practice scores of community pharmacist in post-test was significantly more as compare to pre-test. The post-test knowledge, attitude,practice score was increased 22%, 23% and 42% respectively.
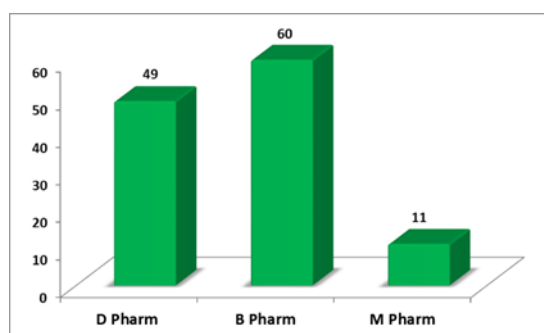

Figure no 4: representing the sex wise comparison of knowledge, Attitude and Practice scores of community pharmacist on antibiotics.

Table No: 4 depicting the qualificationwise distribution of community pharmacist.

Qualification	Number	Percentage
D Pharm	49	40.8
B Pharm	60	50.0
M Pharm	11	9.2
Total	120	100.0

Study observed that, out of 120 pharmacists 50.0% had B Pharm, 40.0% had D Pharm and 9.2% of pharmacist had M Pharm qualification.

Figure no: 5 representing qualification wisedistribution of community pharmacist.

Table No: 5 depicting the qualification wise comparison of knowledge, Attitude and Practice scores of community pharmacist on antibiotics.

Qualific ation	knowledge			Attitude			Practice		
	Pre-test (%)	Post -test (%)	Difference (%)	Pre-test (%)	Post -test (%)	Difference (%)	Pre-test (%)	Post -test (%)	Difference (%)
D Pharm	59	81	22	65	95	30	67	92	25
B Pharm	60	83	23	67	92	25	66	94	28
M Pharm	64	85	21	72	94	22	71	94	23
Average			22			26			25

According to qualification there was a difference in mean knowledge, Attitude, Practice scores between pre and post-test. The mean scores in post-test was significantly more. Comparing to pre-test thepost-test knowledge, attitude, practice score was increased to 22%, 26% and 25% respectively. It reveals that M pharm degree pharmacist have significantly better mean knowledge, attitude and practice scores as compare to B pharm and D pharm after the educational intervention.
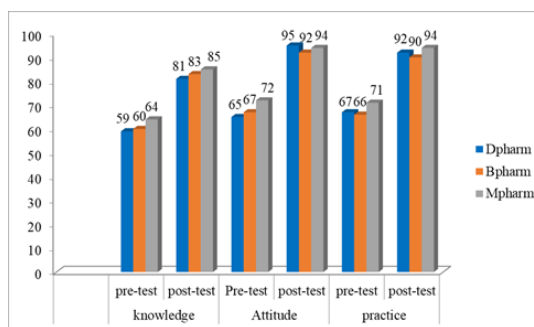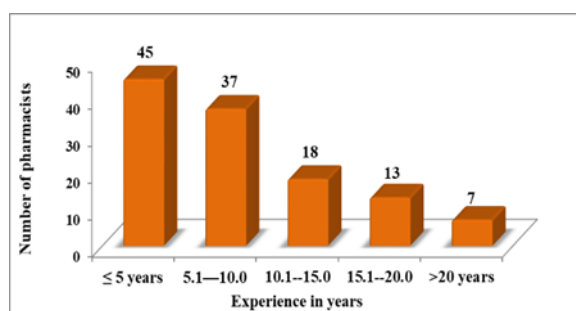
Figure no 6: representing the qualification wise comparison of Knowledge, Attitude and Practicescores of community pharmacist on antibiotics.

Table No: 6 depicting the experience wisedistribution of community pharmacist.

Experience in years	Number	Percentage
≤ 5 years	45	37.6
5.1—10.0	37	30.8
10.1-15.0	18	15.0
15.1-20.0	13	10.8
>20 years	7	5.8
Total	120	100.0

It is observed that, 37.5.0% communitypharmacist had the experience of ≤ 5 years, 30.8% pharmacist had the experience of 5.1- 10.0 years, 15.0% of pharmacist had the experience of 10.1-15.0 years, 10.8% of pharmacist had the experience of 15.1-20.0 years and 5.8% of pharmacist had theexperience of > 20 years.
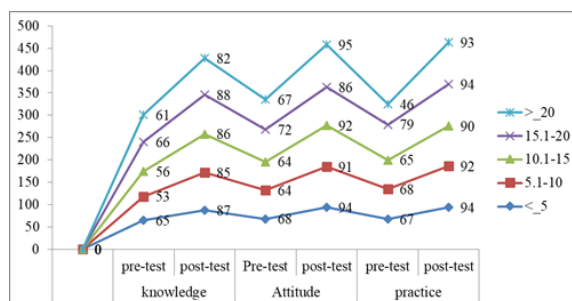

Figure no: 7 representing represents experience wise distribution of community pharmacist.

Table No: 7 depicting the experience wise comparison of knowledge, Attitude and Practice scores of community pharmacist on antibiotics.

Experience	knowledge			Attitude			Practice		
	Pre-test (%)	Post-test (%)	Difference (%)	Pre-test (%)	Post-test (%)	Difference (%)	pre-test	post-test	Difference (%)
<_5	65	87	22	68	94	26	67	94	27
5.1-10	53	84	31	64	92	24	68	94	26
10.1-15	56	86	30	69	92	24	65	94	29
15.1-20	66	88	22	72	86	14	79	94	15
>_20	61	82	21	67	95	30	46	93	43
Average			25			24			28

Study observed that, according to experiencethere was a difference between pre and post-test. Comparing to pre-test, knowledge,attitude, practice score of post-test was significantly more as 25%, 24% and 28% respectively. Study reveals that 15.1- 20.1 yrs. experienced community pharmacist had better mean knowledge, attitude, and practiceas compared to other experienced communitypharmacist after educational intervention.


Figure no 8: representing the experience wise comparison of Knowledge, Attitude and Practicescores of community pharmacist on antibiotics.

Table No: 8 depicting the improvement of awareness of the legal requirements to dispense antibiotics in community pharmacist.

Variables	Pre- test scores Mean ±SD	Post- test scores Mean ± SD	Difference score(%)	t – test value	P-value & significance
Awar eness	7.03 ± 0.86	8.86 ±0.68	1.83 (20.6%)	t = 9.28	P = 0.01, HS
Percentage Of scores	70.3%	88.6%	20.6		

Study reveals that, the mean pre-test knowledge scores of legal requirements to dispense antibiotics in community pharmacist was 70.0% and after intervention (by giving structured format heath education) the mean score were 88.6%. The knowledge score of legal

requirements to dispense antibiotics was increased 20.6%. This was shown statistically highly significant (P<0.01).
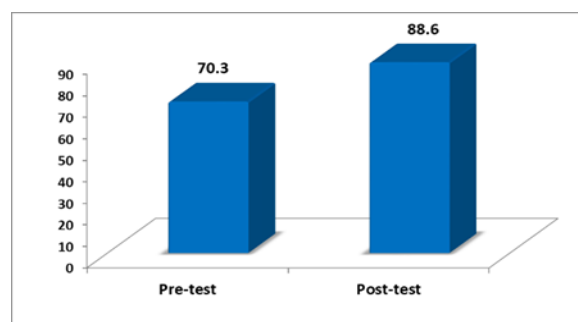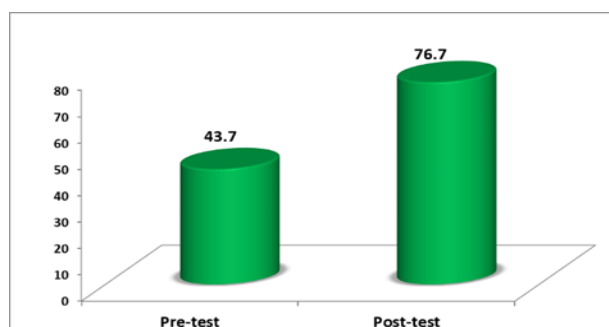

Figure no 9: representing the improvement of awareness of the legal requirements to dispense antibiotics in community pharmacist.

Table No: 9 depicting the awareness and understanding of Antimicrobial Resistance in community pharmacist.

Variables	Pre-test scores Mean ±SD	Post- test scores Mean± SD	Difference score(%)	t – test value	P- value & significance
Aware ness &understanding	4.37 ±0.91	7.67 ±0.95	3.3 (33.0%)	t = 29.5	P = 0.00 1, VHS
Percentage of scores	43.7%	76.7%	33.0%		

Study reveals that, the mean pre-test knowledge scores of awareness and understanding of antimicrobial resistance in community pharmacist were 4.37 (43.7%) and after intervention (by giving structured format heath education) the mean score was 7.67 (76.7%). The knowledge score of awareness and understanding of antimicrobial resistance in community pharmacists was increased 33.0%. This was shown statistically very highly significant (P<0.001).


Figure no 10: representing the awareness and understanding of Antimicrobial Resistance in Community Pharmacist.

Table No: 10 depicting the assessment of knowledge, attitude and practice scores on antibiotics in pre and post intervention.

Variables	Pre- test scores	Percentage	Post- test scores	Percentage
Knowledge	5.92 ±2.01	59.2	8.44 ±1.17	84.4
Attitude	5.37 ±1.69	67.2	7.41 ±0.82	92.6
Practice	5.32 ±1.69	66.5	7.52±0.89	94.0

In the study the knowledge score in the pre- test was 59.2% and in post-test 84.4%. The attitude score in the pre-test was 67.2%, in post-test 92.6%. The Practice score in the pre-test was 66.5%, in post-test 94.0%.
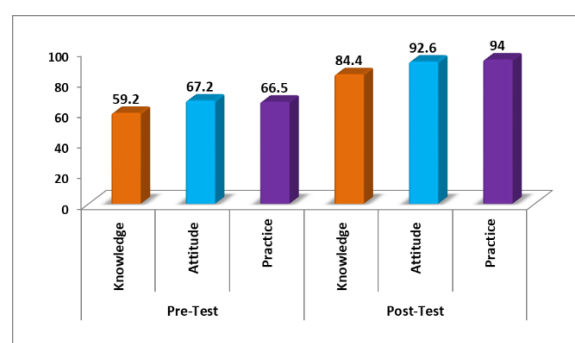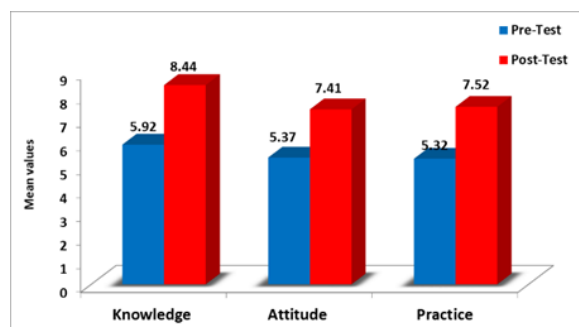

Figure no 11: representing the knowledge, attitude and practice scores on antibiotics in the pre and post intervention.

Table No: 11 depicting the comparison of knowledge, attitude and practice scores on antibiotics pre and post-test intervention.

Variables	Pre-testscores Mean ± SD	Post-test scores Mean ± SD	Difference score(%)	t –test value	P-value & significance
Know ledge	5.92 ±2.01	8.44 ±1.17	2.52 (27.8%)	t =16.36	P =0.000, VHS
Attitude	5.37 ±1.69	7.41 ±0.82	2.04 (27.5%)	t =13.41	P =0.000, VHS
Practice	5.32 ±1.69	7.52±0.89	2.2 (29.25%)	t =13.26	P =0.000, VHS

NS= not significant, S=significant,significant, VHS=very highly significant, HS=highly

Study reveals that, There was statistically very highly significant difference of mean knowledge, attitude and practice scores on antibiotics between pre and post-test (P<0.001). Comparing to pre-test, the post- test knowledge score was increased 27.8%. The mean attitude score was increased 27.5%. And the mean practice score wasincreased 29.25%. The intervention (health education) regarding antibiotics was given tothe community pharmacists was significantlyeffective.

Figure no 12: representing the comparison of knowledge, attitude and practice scores on antibiotics pre and post-test.

DISCUSSION

This is the first study that aimed to assess the knowledge attitude and practice of community pharmacists regarding antibiotics in Kalaburagi as irrational use of antibiotics and weak regulatory enforcement of drug sales are serious issues in developing countries that contribute significantly to bacterial resistance.[13]

➤ Considering the details provided by Drug Control Department (DCD) of Kalaburagi, 120 pharmacists where selected for the participation. In our study, male pharmacist were preeminent 90% (n=108) than females 10% (n=12), maximum number pharmacist belongs to age group 31-40 years, 45 (37.5%) of the participants had the experience of <5 years. This is similar to the study conducted by **Zawahir S et al., in 2010** were males are preeminent than females and maximum number of community pharmacists belongs to age group 31-40 years.[4]

➤ In this study the majority of the participants were B pharm graduates which is similar to the study conducted by **Sarwar et al., 2018** in Punjab, Pakistan. Where the maximum number of participants are B pharm.[14]

➤ After the education of community pharmacist. Higher aged community pharmacist had increase in knowledge, Attitude and Practice scores. Females had more mean knowledge score than males, but, mean attitude and practice scores of males was more than females. M. pharm degree pharmacist have significantly better mean knowledge attitude and practice scores as compare to D. Pharm and B. pharm. 15.1-20.1yrs experienced community pharmacist had significantly better mean knowledge, attitude, and practice scores as compared to other experienced community pharmacist. In contrast to a study that conducted by **Sarwar et al., 2018** where median knowledge scores of individual variables (age, gender, qualification and experience) was found as lower than our study.[14]

➢ Our results showed that the practicing CPs were less confident about their roles and knowledge regarding antibiotics. Knowledge on antibiotics was measured in this study with ten questions. By considering the pre-testscore the majority of respondents hada low level of theoretical knowledge regarding antibiotics and resistance that is, 59.2% of our interviewed pharmacist was having good knowledge regarding antibiotics., after the intervention by giving structured format of health education (leaflet and face to face discussions) the approach of CPs towards antibiotics was improved and it reflects in post-test by increasing their knowledge to 84.4%. A similar study conducted by **Apisarnthanarak et al., 2008** in Thai found that around 24% of pharmacists had inadequate knowledge about antibiotics.[33] Good knowledge of antibiotic use and resistance prevents CPs from irrational dispensing of antibiotics and this is the progress in the fight against antibiotic resistance. On the other hand, insufficient knowledge results in CPs dispensing antibiotics irrationally thereby exacerbating antibiotic resistance.[23]

➢ Our study found after the intervention the attitude of pharmacists towards antibiotics are increased from 67.2% to 92.6 %. Our findings are encouraging because the positive attitude of CPs may influence them to not to dispense antibiotics without a prescription. This results are in contrast to a study conducted by **Mansour O et al.,2017** in Syria, the majority of CPs had negative attitude towards antibiotic use and resistance the negative attitude influences CPs to dispense antibiotics without aprescription.[16]

➢ An improved preventive attitude was related to a better practical attitude in general.[7] In this study by assessing the practice of CPs the majority (94.0%) of CPs had good practice towards antibiotics. It shows a significant improvement when compare to the pre-test results (66.5 %). This is in contrast with the study conducted by Mudenda S et al., 2020 in Lusaka, Zambia revealed that majority (75.5%) of CPs had a poor practice regarding antibiotics.[34]

➢ In our study the knowledge scores of legal requirements in CPs during the pretest was 7.03 (70%) and after the intervention in posttest it wasincreased to 8.86 (88.6%), it shows that most of the pharmacists are aware of the legal complications in Kalaburagi for the illegal antibiotics sale. These results are in line with other studies conducted in some Middle Eastern countries such as Iran, turkey, United Arab Emirates, Kuwait, Oman, Yemen, Jordan,Syria, Lebanon which reported that nonprescription sale of antibiotics is common and almost all pharmacists were willing to sell antibiotics without a prescription.[19] Our results are in contrast with a cross sectional study undertaken by **Hadi AM et al.,** 2016 in Saudi Arabia revealed that more than two-thirds (70%) of the

pharmacists participating in the study were not aware of the fact that dispensing antibiotics without prescription (DAwP) is illegal.[31] Therefore strong regulatory enforcement to prohibit the sale of antibiotics over the counter at the pharmacies should be promoted.it is necessary to develop surveillance on sale of antibiotics in community pharmacies and establish a penaltysystem.[15]

➢ Our study reveals the awareness and understanding of CPs regarding antimicrobial resistance (AMR) were 4.37(43.7%) in pre-test and the interventions changes the percentage to 7.67(76.7%). The present study's outcomes were contrast to the study conducted by **Waseem H et al., 2019** in Pakistan that targeted the community pharmacists, pharmacy owners and physicians in Pakistan and reported that CPs had insufficient awareness about antimicrobial resistance.[18] Eventhough interviewees in this study were aware of the causes of AMR, this was not reflected in their practice to rationalize the antimicrobial therapy.[19] According to our results, self-perceived knowledgeon ABs did not seem to be a good indicator of appropriate theoretical,practical or preventive attitude. Thosewho can realize their gaps in knowledge may have a good attitude towards proper AB use. An improvedtheoretical attitude was correlated to better practical and preventive attitude, and, vice versa, better preventive attitude was related to improved practical attitude. Even so, within the theoretical domain, getting acquainted with current and new ABswas the strongest influencer of a better practical attitude, which indirectly indicates that proper knowledge is indispensable for good attitude.[20]

➢ There is limited literature available onoptimizing the use of antibiotics. There is a need for further studies for identification of antibiotics dispensed by CPs routinely. Knowledge about incentives is crucial, not merely for avoiding inappropriate dispensing practices regarding antibiotics but also for designing new intervention strategies.[21]

➢ Even though the present study revealed positive KAP of CPs towards Antibiotics the findings of this study strengthen the preceding work indicating the growing role of pharmacists in curbing the injudicious use of antibiotics.[22]

➢ So here a quick intervention right after the pretest makes more significance in our study therefore,educational intervention programs with regards to antibiotic use and resistance should be periodically focused.

CONCLUSION

Our study has highlighted the level of knowledge, attitude and practice of community pharmacist regarding antibiotics.

This study showed a lack of theoretical knowledge regarding antibiotic use and resistance among community pharmacists practicing in Kalaburagi during the pretest and there was a significant increase in post- test after a quick intervention done by one to one interaction and by providing information leaflet that shows a successful improvement in there KAP. In the study females have more knowledge than males but poor at their practice compared to male, M pharm degree pharmacist have more knowledge, attitude and practice as compared to D pharm and B pharm, Therefore it is necessary to sensitize them.so the educational intervention programs with regard to antibiotic use and resistance should be periodically focused on community pharmacy practice ,even though the cps showed good practice and attitude towards antibiotics the interventions for the further improvement tailored to target the gaps underlined in this study.

As it is the first study conducted in Kalaburagi within a small number of pharmacists (n=120) further large scale studies are necessary to validate the findings of the present study by including a greater number of community pharmacists in Kalaburagi.

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CONFLICT OF INTEREST

There is no conflict of interest between the authors.

ABBREVATIONS

AB	Antibiotic
AMR	Antimicrobial Resistance
CP	Community Pharmacists
WHO	World Health Organization
SPSS	Statistical Package for the Social Sciences
DCD	Drug Control Department

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