*Original Research*

# Oral Health Knowledge among Pharmacists in Saudi Arabia

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**ABSTRACT:**
**Introduction:** As the most accessible health care practitioner, pharmacists do provide some health advices regarding general and oral health problems. In addition to the increased number of OTC products treating oral diseases, pharmacists' knowledge about oral problems might be limited. **Aim:** To evaluate the knowledge of pharmacists with regard to some oral problems, their causes and ways of prevention. **Methods:** A cross-sectional electronic survey was distributed to pharmacists in different sectors in Saudi Arabia. Data was analyzed using SPSS 25. Normality of data was tested by kolmogrv-Smirnov and Shapiro Wilk's tests. Data was analyzed using nonparametric tests (Mann-Whitney U and Kruskal-Wallis) considering CI of 95% ($p$-value ≤0.05). Correlation between general knowledge and demographic characteristic was assessed by Spearman's test. **Results:** The mean score for overall oral health knowledge 11.88±3.74, basic knowledge of oral health, knowledge of dental plaque and gum disease, and knowledge of dental caries were 4.48 ± 1.74, 3 ± 1.3, 4.4 ± 1.55, respectively.Non-Saudi pharmacists aging 40-49, with an experience of >20 years working in chain pharmacies show significantly higher mean higher mean basic knowledge. With regard to knowledge in dental plaque and gum disease, non-Saudi pharmacists with an experience of 16-20 years have a significant higher mean ranks. A significantly higher mean ranks are shown in non-Saudis pharmacists with a Ph.D. qualification and an experience of 16-20 years working in chain pharmacies regarding knowledge in dental caries. Spearman's correlation revealed a significant positive correlation with age (r=0.178 $p$=0.003), nationality (r=0.251 $p$=0.000), educational level (r=0.192 $p$=0.001), and experience (r=0.258 $p$=0.000) of the study participants. However, a significant negative correlation was found with the type of pharmacy and the overall oral health knowledge (r=-0.120 $p$=0.044). **Conclusion:** pharmacists need to improve their knowledge regarding oral health knowledge.
**Key words:** Pharmacist, knowledge, oral health, Saudi Arabia

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## INTRODUCTION

Pharmacists contribute to health care in most countries based on their knowledge and expertise acquired from their education and supervised training. They are the most accessible health professionals as per WHO report. Pharmacists play an important role in providing health care advice in a daily basis regarding different health problems. Their main purpose is to ensure optimum drug therapy through providing information and advice to whom is using the pharmaceutical product.[1, 2]
A review article published in 2018 mentioned that patients visit pharmacists between 1.5 and 10 timesmore frequently than visiting their primary care physician and suggests that 30 % of patients with chronic conditions will not, cannot, or do not see a family physician.Oral health problems are of those problems where patients tend to get help and information about their illness from community pharmacists and refrain from visiting dentists. Cost, fear and difficult access to dentists are the reasons why patients avoid visiting dentists to seek help in the first place (Freeman, 1999, American Dental Association, 2015).[2- 4]
OTC oral products compromise about 10-15 % of the total stock in pharmacies in Saudia arabia as per Omar Bawazir in his study in 2014. Pharmacists are the main personnel responsible for giving information about these products. but first they should have the knowledge about some oral problems, their causes and ways of prevention in order to be able to provide appropriate advices.[3- 6]

The aim of the study is to evaluate the oral health knowledge of pharmacists working in different sectors not only community and hospital pharmacists, and to use that information to help increase awareness and education of pharmacists if needed.

## METHODS AND MATERIALS:

This a cross-sectional electronic questionnaire that was established using surveymonkey website. The survey consists of 27 close-ended questions. In the first section, the questions aim to collect some demographic information about the participant including age, nationality, years of experience, and job. The second section of the survey is about general oral health problems, their causes and ways of prevention.

The self-administered questionnaire was distributed via email andwhats app application. 288 responses were collected over a period of 3 weeks during March 2019.

Normality of the data was checked by applying Kolmogrov Smirnov and Shapiro Wilk's tests, which showed significant p value ($p \leq 0.05$) suggesting non-normal distribution of the data. Descriptive statistics of frequency distribution, percentages and mean knowledge ranks were calculated and compared across different groups. The inferential statistics of non-parametric Mann-Whitney U and Kruskal-Wallis tests were applied to the data. Correlation between total oral health knowledge score and demographic variables was assessed by using Spearman's tests. A p value below ($p \leq 0.05$) is considered significant for all statistical purposes. All the data was analyzed by using statistical analysis software for social sciences (SPSS version 25).

## RESULTS:

A total of 283 pharmacists working in various sectors participated in the study. Majority of the pharmacists were Saudi nationals 192 (67.8%), females 198(70%), aged 30-39 years 159(56.1%), having bachelor level qualification 166(58.7%), with experience of 6-10 years (26.5%). More than half 146 (51.6%) of the pharmacists worked in the hospital-pharmacy set up while others worked in various type of pharmacies. Questionnaire items were divided into five parts, first part consisted of sociodemographic information, second part (9 items) elicited basic knowledge of oral health, third part (5 items) assessed the knowledge of dental plaque and gum diseases, fourth part (6 items) assessed the knowledge of dental caries amongst pharmacists, and the fifth part (1item) elicited the knowledge of oral cancer. Pharmacists showed a mean score of for the basic knowledge of oral health (4.48±1.74), knowledge of dental plaque and gum diseases (3±1.3), knowledge of dental caries (4.4±1.55) and overall oral health knowledge score of 11.88±3.74 on a scale of 0-20, as shown in (Table 1).

| Table1: Sociodemographic variables of the study participants (n=283) | | | |
|---|---|---|---|
| Variables | | n | % |
| Age (Years) | 20-29 | 61 | 21.6% |
| | 30-39 | 159 | 56.1% |
| | 40-49 | 47 | 16.6% |
| | Above 50 | 16 | 5.7% |
| Sex | Female | 198 | 70.0% |
| | Male | 85 | 30.0% |
| Nationality | Saudi | 192 | 67.8% |
| | Non-Saudi | 91 | 32.2% |
| Educational level | Diploma | 23 | 8.1% |
| | Bachelor | 166 | 58.7% |
| | Master | 71 | 25.1% |
| | Ph.D. | 23 | 8.1% |
| Experience (Years) | 0-5 | 70 | 24.7% |
| | 6-10 | 75 | 26.5% |
| | 11-15 | 65 | 23.0% |
| | 16-20 | 43 | 15.2% |
| | Above20 | 30 | 10.6% |
| Type of pharmacy | Independent | 12 | 4.2% |
| | Chain | 62 | 21.9% |
| | Hospital pharmacy | 146 | 51.6% |
| | Pharma. Company | 13 | 4.6% |
| | Others | 50 | 17.7% |
| Basic knowledge of oral health (Mean ± SD) | 4.48±1.74 (0-9) | | |
| Knowledge of plaque and gum diseases | 3.00±1.30 (0-5) | | |
| Knowledge of dental caries | 4.40±1.55 (0-6) | | |
| Overall oral health knowledge score | 11.88±3.74 (0-20) | | |

When enquired about the basic knowledge of the oral health, less than one-fourth 69 (24.4%) pharmacists correctly answered about the two sets of human dentitions. While 83 (29.3%) and 138 (48.9%) correctly answered about the number of milk and permanent teeth respectively. Most 228 (80.6%) of the pharmacists considered prevention of tooth decay is the main purpose of teeth brushing, while only 30 (10.6%) mentioned that the main purpose of tooth brushing is the cleaning of teeth. More than half of the participants 173 (61.1%) knew about the interval of changing teeth brush every 1-3 months. Nearly, 86 (3.0.4%) pharmacists acknowledged that gum disease is the reason for the tooth loss in elderly. High percentage 253 (89.4%) of pharmacists knew about the fact that health of the mouth affects the body health and 220 (77.7%) mentioned that teeth loss can affect speech. More than three-fourths 216(76.3%) of the pharmacists were knowledgeable about the possibility of moving irregularly placed tooth into a correct position, as shown in (Table 2).

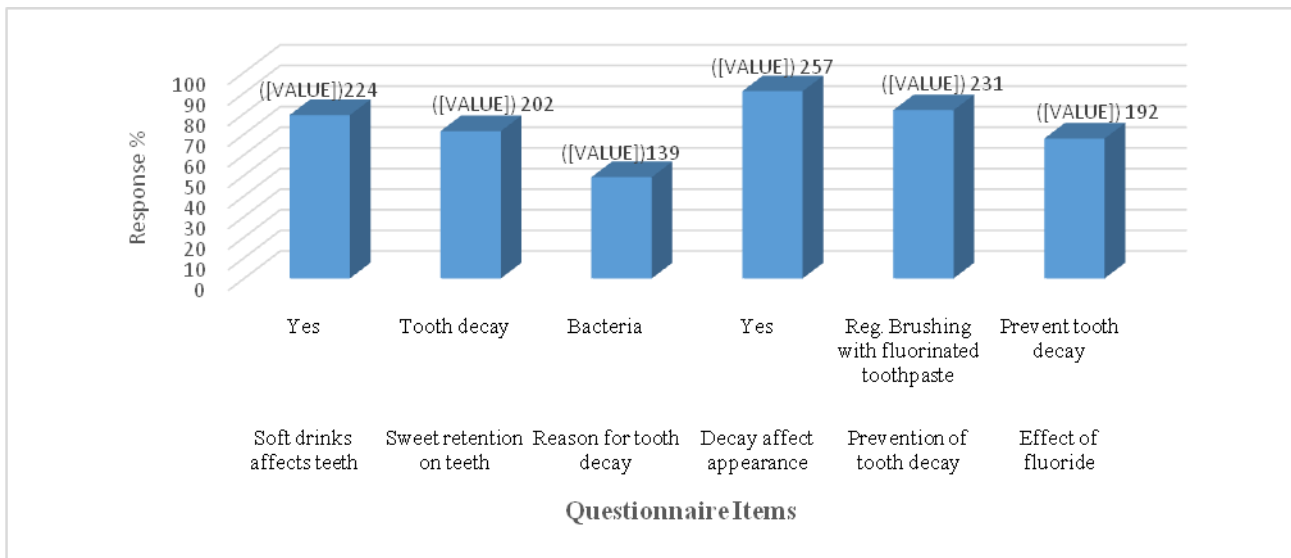| Table 2: Basic knowledge of oral health among pharmacists | | | |
|---|---|---|---|
| **Items** | **Responses** | **n** | **%** |
| **How many sets of dentitions** | 1 set | 13 | 4.6% |
| | 2 sets | 69 | 24.4% |
| | 3 sets | 18 | 6.4% |
| | 4 sets | 29 | 10.2% |
| | Don't know | 154 | 54.4% |
| **How many milk teeth do we have** | 10 teeth | 35 | 12.4% |
| | 16 teeth | 21 | 7.4% |
| | 20 teeth | 83 | 29.3% |
| | 32 teeth | 32 | 11.3% |
| | Don't know | 112 | 39.6% |
| **how many permanent teeth do we have** | 16 teeth | 33 | 11.7% |
| | 20 teeth | 8 | 2.8% |
| | 24 teeth | 26 | 9.2% |
| | 32 teeth | 138 | 48.9% |
| | Don't know | 77 | 27.3% |
| | Total | 282 | 100.0% |
| **what is the purpose of teeth brushing** | Clean teeth | 30 | 10.6% |
| | Reduce cost | 9 | 3.2% |
| | Prevent decay | 228 | 80.6% |
| | Prevent oral ulcer | 1 | 0.4% |
| | Don't know | 15 | 5.3% |
| **interval for changing teeth brush** | 1-3 Months | 173 | 61.1% |
| | 4-6 Months | 74 | 26.1% |
| | 7-12 Months | 10 | 3.5% |
| | More than a year | 9 | 3.2% |
| | Don't know | 17 | 6.0% |
| | Total | 283 | 100.0% |
| **what are the reasons for tooth loss in elderly** | Gum disease | 86 | 30.4% |
| | Tooth decay | 62 | 21.9% |
| | Old age | 71 | 25.1% |
| | Reduced dietary intake | 44 | 15.5% |
| | Don't know | 20 | 7.1% |
| **Does the health of the mouth affect body health** | No | 6 | 2.1% |
| | Yes | 253 | 89.4% |
| | Don't know | 24 | 8.5% |
| | Total | 283 | 100.0% |
| **Can teeth loss affect speech** | No | 36 | 12.7% |
| | Yes | 220 | 77.7% |
| | Don't know | 27 | 9.5% |
| **is it possible to move irregularly placed tooth to a correct position** | No | 30 | 10.6% |
| | Yes | 216 | 76.3% |
| | Don't know | 37 | 13.1% |

**Knowledge of dental plaque and gum diseases**

Pharmacists were knowledgeable about the dental plaque as a soft deposit on teeth 48 (17%) and it leads to tooth decay and gum diseases 172 (60.8%). Bleeding gum is an indication of gum disease 276(83.4%) and improper brushing 164(58%) is the reason for gum disease is known to the pharmacists. Nearly 228 (80.6%) pharmacists knew regular brushing and flossing are methods for the prevention of gum bleeding (Figure 1).
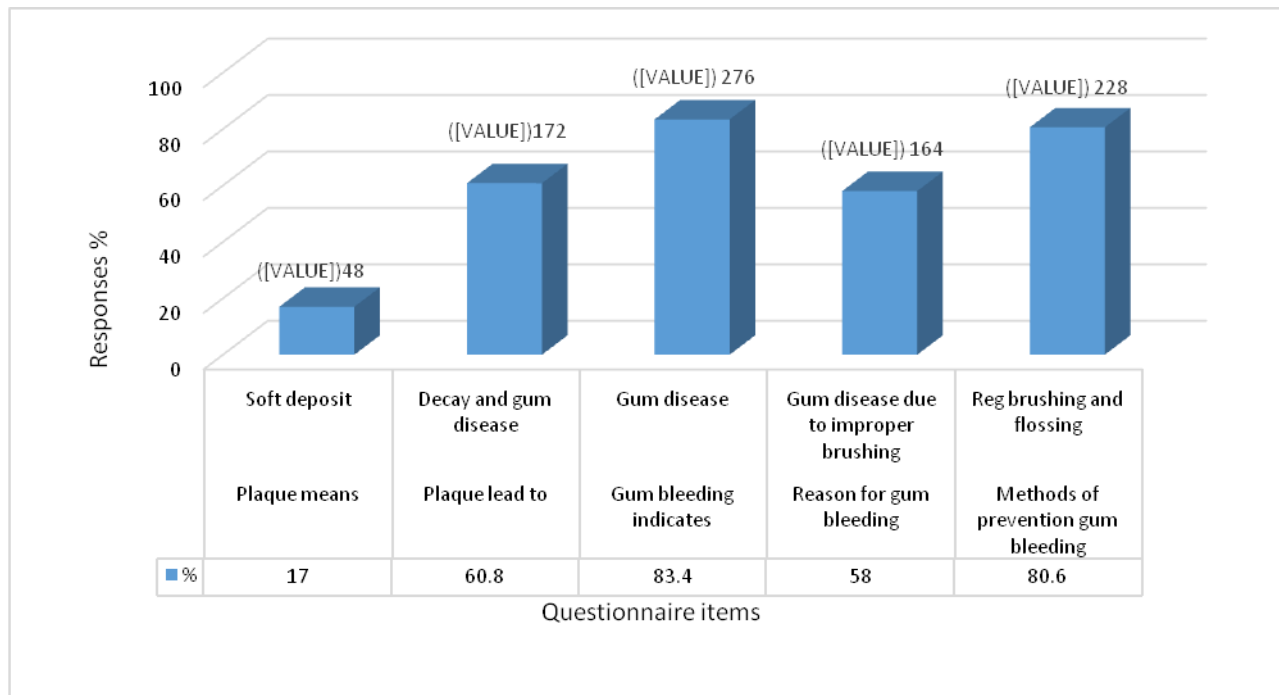


**Figure 1: Correct responses to dental plaque and gum diseases items among pharmacists (%)**

**Knowledge of dental caries**

Soft drinks affect teeth 224 (79.2%), sweet retention on teeth causes decay 202 (71.4%), bacteria is the reason for tooth decay 139(49.1%), decayed teeth affect appearance 257(90.8%), regular brushing with fluoridated tooth paste helps in prevention of tooth decay 231 (81.6%) and fluoride is effective in prevention of tooth decay 192 (67.8%) was known to the pharmacists (Figure 2).



**Figure 2: Correct responses to the dental caries related items (%)**

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**Comparison of mean knowledge among pharmacists**

The mean rank of Basic knowledge of oral health (153.98) was significantly higher among the pharmacists aged between 40-49 years as compared to the other age groups (*p*=0.035). Non-Saudi pharmacists (166.43) compared to the Saudi pharmacists (130.42) showed significantly higher mean ranks for basic knowledge of oral health (*p*=0.000). Pharmacists having experience of above 20 years demonstrated significantly higher mean ranks of basic knowledge of oral health (161.37) compared to others (*p*=0.002). While pharmacists working in chain pharmacies (179.47) showed significantly higher mean rank of basic oral health knowledge compared to the other type of pharmacies (*p*=0.000).

Non-Saudi pharmacists (158.38) demonstrated significantly higher mean ranks of knowledge of dental plaque and gum diseases compared to the Saudi pharmacists (134.24) (*p*=0.017). Similarly, pharmacists having 16-20 years of experience (170.49) showed significantly higher mean ranks of knowledge of dental plaque and gum disease compared to the other experience groups (*p*=0.003).

Non-Saudi pharmacists (169.28) showed significantly higher mean ranks compared to the Saudi counterpart (128.95) for the knowledge of dental caries (*p*=0.000). Similarly, pharmacists with Ph.D. qualification (158.07) demonstrated significantly higher mean ranks of knowledge of dental caries compared to other qualification groups (*p*=0.008). Similarly, pharmacists having 16-20 years of experience showed significantly higher mean ranks of knowledge of dental caries (173.52) compared to the other experience groups (*p*=0.037). Pharmacists working in chain pharmacies (166.37) exhibited significantly higher mean knowledge ranks of dental caries compared to others (*p*=0.042) (Table 3).

| Table 3: Comparison of mean knowledge ranks across sociodemographic variables | | | | |
|---|---|---|---|---|
| Variables | | Mean ranks | | |
| | | Basic | Gum disease | Dental caries |
| Age (Years) | 20-29 | 115.77 | 123.73 | 124.79 |
| | 30-39 | 148.64 | 141.98 | 142.62 |
| | 40-49 | 153.98 | 159.37 | 159.66 |
| | Above 50 | 140.78 | 160.78 | 149.56 |
| | *K-W* | *8.598* | *6.391* | 5.344 |
| | *P* | *0.035* | *0.094* | 0.148 |
| Gender | Female | 143.93 | 138.27 | 141.37 |
| | Male | 137.50 | 150.69 | 143.46 |
| | *M-W* | *8032.50* | 7676.0 | 8290.500 |
| | *p* | *0.538* | *0.227* | 0.839 |
| Nationality | Saudi | 130.42 | 134.24 | 128.95 |
| | Non-Saudi | 166.43 | 158.38 | 169.54 |
| | *M-W* | *6512.50* | *7245.5* | 6230.00 |
| | **P** | **0.000** | **0.017** | **0.000** |
| Education | Diploma | 116.63 | 117.13 | 90.46 |
| | Bachelor | 137.72 | 138.51 | 142.64 |
| | Master | 151.69 | 157.05 | 151.99 |
| | Ph.D. | 168.37 | 145.61 | 158.07 |
| | **K-W** | 6.247 | 5.188 | 11.762 |
| | **P** | 0.100 | 0.159 | **0.008** |
| Experience (Years) | 0-5 | 111.30 | 113.20 | 132.36 |
| | 6-10 | 138.54 | 141.77 | 128.34 |
| | 11-15 | 157.38 | 149.14 | 146.19 |
| | 16-20 | 161.24 | 170.49 | 173.52 |
| | Above 20 | 161.37 | 153.48 | 144.38 |
| | **K-W** | 16.876 | 15.938 | 10.232 |
| | **p** | **0.002** | **0.003** | **0.037** |
| Pharmacy Type | Independent | 143.25 | 142.29 | 124.25 |
| | Chain | 179.47 | 149.49 | **166.37** |
| | Hospital | 130.63 | 143.19 | 132.18 |
| | Company | 89.88 | 127.46 | 122.88 |
| | Others | 142.00 | 132.95 | 149.69 |
| | **K-W** | 21.783 | 1.674 | 9.892 |
| | **P** | **0.000** | 0.795 | **0.042** |
| **K-W=Krusakal-Wallis test, M-W=Mann-Whitney U test** | | | | |

**Knowledge of oral cancer among pharmacists**

When enquired about the oral cancer most of the pharmacists 225 (79.5%) knew about the smoking and tobacco chewing as the main reasons for oral cancer.

**Correlation between overall oral health knowledge and demographic variables**

Overall oral health knowledge showed significant positive correlation with age (r=0.178, $p$=0.003), nationality (r=0.251, r=0.000), educational level (r=0.192, $p$=0.001) and experience (r=0.258, $p$=0.000) of the study participants. However, type of pharmacy showed significant negative correlations with the overall oral health knowledge scores (r= -0.120, $p$=0.044), as shown in (Table 4).

| Table 4: Spearman's correlations test between overall knowledge and demographics | | Overall knowledge score | Age | Gender | Nationality | Education | Experience | Pharmacy type |
|---|---|---|---|---|---|---|---|---|
| Overall knowledge score | CC | 1.000 | | | | | | |
| | p | . | | | | | | |
| Age | CC | 0.178[**] | 1.000 | | | | | |
| | p | 0.003 | . | | | | | |
| Gender | CC | 0.022 | -.152[*] | 1.000 | | | | |
| | p | 0.715 | .010 | . | | | | |
| Nationality | CC | 0.251[**] | .120[*] | -.154[**] | 1.000 | | | |
| | p | 0.000 | .043 | .009 | . | | | |
| Education | CC | 0.192[**] | .207[**] | .050 | -.053 | 1.000 | | |
| | p | 0.001 | .000 | .406 | .373 | . | | |
| Experience | CC | 0.258[**] | .706[**] | -.150[*] | .091 | .221[**] | 1.000 | |
| | p | 0.000 | .000 | .012 | .127 | .000 | . | |
| Pharmacy type | CC | -0.120[*] | -.036 | .233[**] | -.361[**] | .170[**] | -.050 | 1.000 |
| | p | 0.044 | .550 | .000 | .000 | .004 | .400 | . |
| CC=correlation coefficient, *Correlation is significant at the 0.01 level (2-tailed). **Correlation is significant at the 0.05 level (2-tailed). | | | | | | | | |

**DISCUSSION**

As the cost of oral heal problems is high and its time consuming, patients may seek alternative ways to treat these issues. Alternatives include the use of OTC products with some advices from pharmacists who are accessible and free of charge. But we should question the knowledge of pharmacists first about the oral health problems.

This study was conducted to assess the knowledge of pharmacists regarding some basic oral health problems in Riyadh, Saudi Arabia. We found that pharmacists have an average knowledge in this field. This could be due to multiple reasons. Lack of education in oral health, and low or no interaction between pharmacists and dentists, and low or no public awareness. Al-hassan 2009, found that pharmacists are an important source of information for public but limited sources of information is a barrier in effective counselling.[7-9]

It was found that Pharmacists within the age group 40-49 years and also pharmacists with more than 20 years old show higher basic knowledge of oral health which can be explained due to their interaction with more patients or facing more oral health problems themselves.

Non-Saudis pharmacists showhigher knowledge in basic, dental plaque and gum disease, and in dental caries. This may be due to receiving different education in colleges outside the Kingdom of Saudi Arabia.

Chain pharmacies are considered one of the community pharmacies which contain more OTC than the hospital based pharmacies. Participants working in this section show more knowledge in basic and dental cariesas most of them are non-saudis. In addition, pharmacists working in hospital based mainly dispense only doctors' prescription. Another reason for this may be because working in a chain pharmacy require some training at the beginning.

For pharmacists with an experience for 16-20 years, it is normal to have more knowledge in dental plaque, gum disease and dental caries. The reason might be personal experience or facing more problems during their life time. The same might apply for pharmacists with higher degree Ph.D. as they show more knowledge in dental caries causes and prevention. In addition, this group might read more articles concerning health knowledge. Finally, causes of cancer like smoking and tobacco chewing are well known nowadays due to increased awareness about hazards of smoking as the use of tobacco has been increased lately.[5, 10]

## CONCLUSION

As the founding of this study shows that Saudi pharmacists have lower mean score in oral health problems, whether basic or in the other aspects, the awareness of the oral health problems should be increased and The knowledge should be increased among pharmacists through education.

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