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RESEARCH

California Pharmacists' Opinions of the Interface Between Oral and Overall Health

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ABSTRACT
Objectives: The aim of the study is to investigate California pharmacists' knowledge of and opinions about the interface between oral and overall health and their suggestions for strengthening this interface.

Methods: 1,200 randomly selected licensed pharmacists in California were asked to complete a 28-item, self-administered paper survey consisting of scaled questions measuring pharmacists' opinions and knowledge on oral health and its interface with general health as well as pharmacists' demographic characteristics.

Results: A total of 136 pharmacists responded, a majority of whom were female (n=78, 58.6%), practiced in an urban area (n=69, 53.5%), and had 21.9 (SD=15.3) years of pharmacy practice experience. Most pharmacists (n=117, 86.7%) believed that little time was devoted to oral health topics in pharmacy education. A majority of the pharmacists agreed/strongly agreed that "Many pharmacists regard oral health as an important component of overall medical care" (n=71, 52.6%) and that there is segregation between dentistry and other health care disciplines (n=106, 78.5%). Most pharmacists (n=95, 70.4%) agreed/strongly agreed that oral health is considered less important than other health needs of patients.

Conclusion: Most pharmacists recognized the existence and importance of a link between oral health and general health but believed that there is segregation between dentistry and other health care disciplines in practice. Pharmacists recommended more interprofessional collaboration by all primary care providers in managing patients' oral and overall health as well as more oral health education and training for pharmacists and pharmacy students.

Introduction

The 2000 U.S. Surgeon General Report on Oral Health in America called dental disease a "silent epidemic."[1] Many people suffer from oral diseases including periodontal (gum) disease, dental caries (tooth decay), and other serious oral health problems. About 85% of adults aged 18 and older are affected by dental caries in their lifetime.[1] Oral conditions such as severe tooth loss, severe periodontitis, and untreated caries affect 3.9 billion people worldwide.[2]

Chronic oral diseases are linked to many systemic diseases and conditions.[3] Many studies and meta analyses have reported an association between periodontal diseases and several conditions including diabetes mellitus,[4,5] cardiovascular disease,[6,7] adverse pregnancy outcomes,[8] osteoporosis,[7] and HIV/AIDS,[9] among others.[10,11] Poor oral health has significant potential negative effects on the rest of the body.

Many medications used for treating systemic conditions have detrimental side effects on oral health. More than 400 medications list xerostomia or dry mouth as a side effect.[12-14] For example, many diuretics, calcium channel blockers, antihypertensives, angiotensin-converting enzyme inhibitors, sedatives, centrally acting analgesics, and antidepressants, among others, cause xerostomia. Xerostomia elevates patients' risk of dental caries and fungal infections.[15] The other main oral side effects of medications include gingival hyperplasia, dysgeusia, and stomatitis.[16,17]

All health care providers, including pharmacists, should collaborate in managing the medical and oral health care of their patients.[18] Pharmacies receive a wide range of inquiries regarding oral problems and diseases (e.g., bleeding gums, toothache, gum

disease, oral ulcers, trauma to teeth, and sensitive teeth, etc.).[19] Community pharmacists can play an important role in oral health promotion given their regular contact with the public, their extended opening hours, and their knowledge and skills.[20] Pharmacists can advise patients taking medications that can have oral side effects about these potential side effects and the measures they (patients) should take to mitigate these effects. Pharmacists can counsel patients taking immunosuppressive and cytotoxic pharmaceuticals and other related medications about the importance of maintaining dental health while taking these medications to avoid serious potential complications. Furthermore, pharmacists can facilitate the prevention, identification, and management of oral diseases through promoting healthy eating, providing information to patients pertaining to oral diseases, and encouraging patients to use dental services.[21] Many pharmacists acknowledge their role in promoting and improving patients' oral health,[20] many of whom do not have access to primary dental services. Pharmacists are willing to offer advice to patients regarding oral health problems and diseases.[19]

However, pharmacists are largely underutilized for oral health care for various reasons. Oral health care is often not integrated into primary care.[1] There is a lack of interdisciplinary collaboration in the provision of general and oral health care and services. The public, policymakers, and health care providers consider oral health and the need for care to be less important than other health needs.[1] Pharmacists' perceptions of oral health and its importance may also have a bearing on their practice. There is a need to understand pharmacists' opinions of the interface between oral and overall health and the importance of oral health.

No known comprehensive study has investigated pharmacists' opinions on oral health and its interface with overall health. Little is known about pharmacists' opinions of the interface between oral and overall health. The aim of the study is to investigate California pharmacists' opinions of the oral and overall health interface. The specific objectives of the study were as follows:

a) Determine the surveyed pharmacists' perception of the interface between oral and overall health.

b) Determine the surveyed pharmacists' knowledge of oral health issues.

c) Determine the surveyed pharmacists' recommendations for strengthening the interface between oral and overall health.

Methodology

A study sample of 1,200 pharmacists was randomly drawn from a list of licensed California pharmacists provided by the California Department of Consumer Affairs. We included pharmacists who were registered and currently practicing pharmacy in California who consented to participate in the study.

The questionnaire was developed primarily from existing literature on oral-systemic health. Questionnaire items measured pharmacists' opinions of the interface between oral and overall health as well as their knowledge and demographic and practice characteristics. Responses to opinion items were measured using a 5-point Likert-type scale with a range from strongly disagree (1) to strongly agree (5).

Five (5) pharmacy researchers assessed the questionnaire for content and face validity. The developed questionnaire was then pretested with five (5) conveniently chosen pharmacists with community and institutional pharmacy practice experience, to assess the clarity and completeness of the instrument. Questionnaire items were modified based on the pretest results.

The questionnaire, along with a self-addressed postage-paid return envelope and a cover letter explaining the purpose of the project, was mailed to each of the selected pharmacists in February 2015. Pharmacists were asked to return the questionnaires in one (1) week. The estimated time required to fill the questionnaire was 10 minutes. Questionnaires were collected over a six (6)-week period. Pharmacists were offered a chance to enter into a drawing to win an iPad 2 or one of 10 Amazon gift cards worth $25.00 each, as an incentive to respond.

Data Analysis

Descriptive statistics (e.g., means, standard deviations, and frequency distributions) were computed for all study variables. All the data were inputted into Statistical Package for Social Sciences (SPSS) software for analysis. We collapsed disagree and strongly disagree as well as agree and strongly agree.

Results

Of the 1,200 surveys mailed out, a total of 124 surveys were returned to sender due to various reasons (e.g., insufficient address, forward expire, etc.). Of the 1,076 surveys that were presumed delivered, a total of 136 pharmacists responded, for a 12.6% response rate.

The majority of the respondents were female (n=78, 58.6%), practiced in an urban area (n=69, 53.5%), and had 21.9 (SD=15.3) years of pharmacy practice experience (Table 1).

A majority of the surveyed pharmacists agreed/strongly agreed that "Many pharmacists regard oral health as an important component of overall medical care" (n=71, 52.6%), and that there is segregation between dentistry and other health care disciplines (n=106, 78.5%; Table 2). Most of the surveyed pharmacists (n=95, 70.4%) agreed/strongly agreed that oral health was considered less important than other health needs of patients and that little time was devoted to oral health topics in pharmacy education (n=117, 86.7%) (Figure 1, Table 2).

Most of the surveyed pharmacists (n=115, 84.5%) thought that most medications with potential dry mouth side effects did not contain such information on their labels. A majority of the surveyed pharmacists (n=85, 62.5%) disagreed/strongly disagreed that patients taking medicines that can have xerostomic effects were adequately informed about the importance of maintaining oral health while taking the medications. Most of the surveyed pharmacists (n=88, 64.7%) agreed/strongly agreed that many medications are prescribed by physicians without consideration of their oral health ramifications (Table 2). Most of the surveyed pharmacists (n=101, 74.3%) believed that most Americans do not receive the basic dental care they

need and that "Poor dental health can compromise the ability of patients to achieve good medical outcomes" (n =127, 93.4%) (Table 3).

Most of the surveyed pharmacists (n=93, 68.4%) agreed that drug labeling materials need to clarify that dental diseases are infections. Most of the surveyed pharmacists (n=126, 92.6%) believed that Medicare should cover medically essential dental care/services (Table 4).

Discussion

The study results showed that most of the surveyed pharmacists regarded oral health as an important component of overall medical care. The pharmacists also noted that "Poor dental health can compromise the ability of patients to achieve good medical outcomes" and "The oral cavity and its functions can be adversely affected by many medications used in treating systemic conditions." These findings imply that pharmacists recognize the oral-systemic link and the value of oral health in preventing disease and promoting systemic health. The scientific community has a similar understanding of the value of oral health.[5,22] Study findings suggest that pharmacists believe that oral health should be more closely regarded as an important component of overall medical care by all pharmacists.

We found that most of the surveyed pharmacists believed that there is segregation between dentistry and other health care disciplines and that this separation has grown over time. This finding is in line with previous research that showed that dentists rarely interact with other health care professionals and dental students rarely participate in interprofessional education.[23] According to the surveyed pharmacists, this separation manifests in practice in many ways:

Many medications are prescribed by physicians without consideration of their oral health ramifications.

- The drug labels of most medications that can have xerostomic effects (dry mouth) do not contain information potential effects on oral health.
- Physicians prescribing immunosuppressive and cytotoxic pharmaceuticals infrequently inquire about a patient's oral status.
- Medications that can have xerostomic effects are inadvertently prescribed, without consideration of their oral health implications.
- Patients taking medicines that can have xerostomic effects are inadequately informed about the importance of maintaining oral health while taking the medications.

These problems indicate that the scientific knowledge on the oral-systemic health link has not been fully translated in clinical practice. There is a need for more interprofessional care by primary care providers in managing the oral and overall health concerns of patients. Consistent with the 1995 Institute of Medicine (IOM) report, Dental Education at the Crossroads: Challenges and Change, dentists should collaborate more with their medical, pharmacy, and nursing counterparts as members of an interdisciplinary team.

Surveyed pharmacists noted that physicians prescribing immunosuppressive and cytotoxic pharmaceuticals rarely advise patients about the importance of maintaining dental health while taking these medications. This is problematic and may result in avoidable patient injury. Pharmacists can help solve this problem through counseling patients taking these and other related medications. Pharmacists can also be a great resource through referring patients with oral health problems to dentists and physicians for further attention, a role that they play effectively with many other conditions.[20]

Several strategies and steps can be taken to promote and encourage pharmacists' provision of effective oral health care to their patients. First, pharmacists could be more effective in providing oral health care if they have more education and training on the importance of oral health and its link with overall health. Many pharmacists in this study believed that little attention was paid to oral health in pharmacy education. Similarly, a preliminary survey of Canadian non-dental health care practitioners found that 93% of pharmacists believed that they do not have enough information on oral-systemic links.[22] Similarly, a study of California pharmacy students found that many (40.3%) students reported that oral health was not taught in any course of their pharmacy curriculum.[24] More needs to be done to boost oral health training and education for pharmacists (i.e., through continuing education) and pharmacy students (in pharmacy curricula). In line with Haughney and colleagues, all providers should "possess a basic understanding of the oral disease process, known causes, prevention and effective interventions."[18] Pharmacists have been reported to be interested in such training and education.[20]

Second, improving the oral health information on drug labeling materials utilized by pharmacists and patients could help pharmacists and other health care providers to be more effective in providing oral care. Many prescription medications can result in serious complications if taken by individuals with an active infection (e.g., dental caries and periodontal diseases) as warned on drug labeling materials. However, the drug labelling materials for most of these medications do not explicitly state that dental diseases are infections. Consequently, patients taking these medications and their health care providers rarely consider dental status potentially resulting in avoidable harm and complications. Drug labeling materials should clarify the nature of dental diseases as infections.

In this study, pharmacists recommended that Medicare should cover all medically essential dental care services. If implemented, this measure will increase access to and utilization of preventive services like cleaning, examination, tooth sealants, amalgam filling, composite filling, root canals, and extraction, thus could help further reduce complications experienced by many patients, especially the elderly and underprivileged.

The study has some limitations. The first limitation is the small number of pharmacists who responded to the survey. Many pharmacists' addresses on the database provided by the California Department of Consumer Affairs were not up to date. Consequently, several surveys were returned to sender. The small sample size and low response rate made nonresponse bias a concern and may limit the generalizability of the study. Further

research using a larger sample is needed in order to confirm this study's results. Second, social desirability response bias cannot be completely ruled out for this study. While there was no apparent reason for pharmacists to be deceptive, it is possible that some pharmacists gave responses that made them look or feel good. Third, the study only included pharmacists from California and hence may not be generalizable to other pharmacists from other states or countries. Finally, many pharmacists neither agreed nor disagreed with some of the statements. This could be explained by their limited awareness and knowledge on oral health issues.

Conclusion

Most pharmacists recognized the existence of a close and dynamic relationship between oral health and general health but believed that there is segregation between dentistry and other health care disciplines in practice. Pharmacists recommended more interprofessional collaboration by all primary care providers in managing patients' oral and overall health as well as more oral health education and training for pharmacists and pharmacy students.

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Table 1. Demographic and Practice Characteristics of Pharmacists

Items	Frequency (%)
Gender (n=133)	
Male	55 (41.4)
Female	78 (58.6)
Race/Ethnicity (n=127)	
Caucasian/Non-Hispanic White	58 (45.7)
African American/Non-Hispanic Black	2 (1.6)
American Indian/Alaska Native	4 (3.1)
Asian American/Pacific Islander	51 (40.2)
Mexican American/Hispanic	4 (3.1)
Other	8 (6.3)
Type of practice setting at primary place of employment (n=133)	
Community – Independent	20 (15.0)
Community – Multiple/Chain (3 or more pharmacies under common ownership)	26 (19.5)
Hospital – Independent	25 (18.8)
Hospital – Multiple/Chain (3 or more pharmacies under common ownership)	24 (18.0)
Other	38 (28.6)
Current job title (n=133)	
Pharmacy Owner/Partner	7 (5.3)
Pharmacy Manager/Supervisor	23 (17.3)
Clinical Pharmacist	33 (24.8)
Staff Pharmacist	46 (34.6)
Relief Pharmacist	7 (5.3)
Other	17 (12.8)
Area/Setting of primary place of employment (n=129)	
Urban	69 (53.5)
Suburban	51 (39.5)
Rural	9 (7.0)
	Mean (SD)
Age (n=124)	50 (14.6)
Number of years practicing pharmacy (n=129)	21.9 (15.3)
Hours of work per week at primary place of employment (n=130)	36.8 (13.6)

Table 2. Pharmacists' Perception of Oral Health Issues

Item (n=135)	Mean* (SD)	Strongly Disagree/ Disagree N (%)	Neutral N (%)	Agree/ Strongly Agree N (%)
a. Dentists have adequate knowledge of the interaction between oral health and treatment/ management of many systemic diseases.	3.24 (1.0)	36 (26.7)	41 (30.4)	58 (43.0)
b. Many primary care providers are aware of the relationship between oral health and the treatment/ management of many non-oral diseases.	3.17 (0.9)	36 (26.7)	44 (32.6)	55 (40.7)
c. Oral health is often regarded as less important than other health needs of patients.	3.60 (1.0)	23 (17.0)	17 (12.6)	95 (70.4)
d. Dental cavities and periodontal diseases are generally thought of as infections by physicians. (n=134)	3.13 (1.1)	47 (35.1)	22 (16.4)	65 (48.5)
e. Little time is devoted to oral health topics in pharmacy education.	4.08 (0.7)	4 (2.9)	14 (10.4)	117 (86.7)
f. The dental discipline remains relatively segregated from other health care disciplines.	3.90 (0.8)	8 (5.9)	21 (15.6)	106 (78.5)
g. The separation of dental and other primary health care disciplines has grown over time.	3.30 (0.9)	24 (17.8)	58 (43.0)	53 (39.3)
h. Many pharmacists regard oral health as an important component of overall medical care.	3.40 (1.0)	29 (21.5)	35 (25.9)	71 (52.6)
i. I always warn patients that their oral health can be compromised by certain medications. (n=133)	3.26 (1.0)	37 (27.9)	35 (26.3)	61 (45.8)
j. Dentists rarely consider the medical ramifications of the oral health care they provide.	2.58 (1.0)	71 (52.6)	35 (25.9)	29 (21.5)
k. Many medications are prescribed by physicians without consideration of their oral health ramifications.	3.65 (0.8)	11 (8.1)	37 (27.2)	88 (64.7)
l. The drug labels of most medications that can have xerostomic effects (dry mouth) do not contain information on their potential effects on oral health. (n=136)	3.89	9 (6.6)	12 (8.8)	115 (84.5)
m. The inadvertent prescribing of medications that can have xerostomic effects without consideration of oral health implications is a major problem. (n=136)	3.44 (0.8)	13 (9.5)	57 (41.9)	66 (48.5)
n. Patients taking medicines that can have xerostomic effects are adequately informed about the importance of maintaining oral health while taking the medications. (n=136)	2.46 (0.9)	85 (62.5)	35 (25.7)	16 (11.7)
o. Physicians prescribing immunosuppressive and cytotoxic pharmaceuticals infrequently inquire about a patient's oral status. (n=136)	3.28 (1.0)	28 (20.5)	49 (36.0)	59 (43.4)
p. Physicians prescribing immunosuppressive and cytotoxic pharmaceuticals rarely advise patients about the importance of maintaining dental health while taking the medications. (n=136)	3.29 (0.9)	25 (18.4)	52 (38.2)	59 (43.4)
q. Pharmacists are a great resource for counseling patients on medications with oral health's untoward effects. (n=136)	4.07 (0.8)	7 (5.1)	16 (11.8)	113 (83.1)

Table 3. Pharmacists' Perceptions of Oral Health

Item (n=136)	True N (%)	False N (%)	Don't Know N (%)
a. The use of many medications among individuals with dental infections poses an increased risk of medical complications. (n=135)	93 (68.9)	7 (5.2)	35 (25.9)
b. Most Americans receive the basic dental care that they need.	19 (14.0)	101 (74.3)	16 (11.8)
c. The risk of medical complications from bacterial dental infections increases among individuals who are immunocompromised by diseases or medications. (n=135)	130 (96.3)	1 (0.7)	4 (3.0)
d. Dental cavities and periodontal diseases are infections. (n=134)	102 (76.1)	17 (12.7)	15 (11.2)
e. The oral cavity and its functions can be adversely affected by many medications used in treating systemic conditions.	124 (91.2)	3 (2.2)	9 (6.6)
f. Poor dental health can compromise the ability of patients to achieve good medical outcomes.	127 (93.4)	4 (2.9)	5 (3.7)

Table 4. Pharmacists' Suggestions for Improving Oral Care and Drug Labeling

Item (n=136)	Mean* (SD)	Strongly Disagree/ Disagree N (%)	Neutral N (%)	Agree/ Strongly Agree N (%)
a. Oral health should be more closely regarded as an important component of overall medical care. (n=135)	4.21 (0.62)	2 (1.5)	9 (6.7)	124 (91.9)
b. Drug labelling materials need to clarify that dental diseases are infections.	3.81 (0.77)	6 (4.4)	37 (27.2)	93 (68.4)
c. Medicare should cover medically essential dental care/ services.	4.29 (0.73)	3 (2.2)	7 (5.1)	126 (92.6)
d. Drug labels should be modified as necessary to improve patients' understanding of the relationship between oral disease and risk of medical implications. (n=135)	4.10 (0.69)	5 (3.7)	11 (8.1)	119 (88.1)
e. There is a need for more interprofessional care by primary care providers in managing the oral and overall health concerns of patients. (n=135)	4.16 (0.65)	1 (0.7)	13 (9.6)	121 (89.6)

*Scale ranged from 1 (strongly disagree) to 5 (strongly agree)

Figure 1. Little time is devoted to oral health topics in pharmacy education (n=135)