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Abstract: This study aimed to better understand how and why people choose dental school faculty members as their oral health care providers. Increasing financial constraints in U.S. dental schools have led their administrators to seek alternative funding sources, one of which can be revenues from dental school faculty practice. To effectively promote faculty practice, it is necessary to understand how and why one chooses a dental school faculty member as his or her oral health care provider. A survey of 1,150 dental school faculty practice patients who recently chose their dentist was conducted, and 221 responded. The information sources these respondents said they used and rated highly were other dentists, friends, family members, clinic website, the Internet, and the insurance directory. Dentist-related attributes that were perceived to be important were quality of care, professional competence of dentist, and explanation of treatment/patient participation in the treatment decision. Dental practice-related attributes perceived to be important were the ability to get appointments at convenient times, reasonable waiting time to get appointments, and attitude/helpfulness of staff. This study found that traditionally popular (family, friends) and newly emerging information sources (the Internet, clinic website, and insurance directory) were both used and perceived to be important by patients of the dental school faculty practice. Dental schools and dentists can use this study's findings to select appropriate communication channels to promote their practices and to focus on attributes that dental consumers value the most.

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Recent years have brought about many challenges to U.S. dental schools' finances. Historically, dental schools have depended on outside funding sources such as government appropriations. In 2008, thirty-six out of fifty-six U.S. dental schools received state support.[1] However, since 1991 state support has not increased sufficiently to keep up with inflation, which has led to a 45 percent purchasing power decrease; as a result, the proportion of total dental school revenue funded by states has declined from 60 percent to 24 to 25 percent.[1,2] The financial problems of dental schools have significant implications for education, operations, research, and patient care and have forced dental schools to find ways to become more financially independent, including establishment of alternative funding sources.[1,2] One potential funding source is revenue from patient care, which currently comprises an average of approximately 21 percent of total dental school revenue.[3] While student clinic expenses exceed revenues by at least 21 percent,[1] faculty practices consistently generate substantial

profits. Therefore, dental school administrators may want to explore ways to promote faculty practices.

Although the contribution of faculty practice to the academic mission of dental schools has not received attention in the literature, it is certain that a profitable faculty practice can contribute to a school's financial health. According to the American Dental Association's *2007–08 Survey of Dental Education*, the percentages of total revenue from patient care services averaged 20.8 percent in public schools and 22.8 percent in private schools.[4] Between 2004–05 and 2007–08, the percentage appeared to hold steady or be slightly increasing. In 2007–08, the percentages of total revenue from faculty practice alone averaged 7.0 percent in public schools and 5.9 percent in private schools. At the University of Iowa, where all faculty dentists participate in an intramural faculty practice, faculty practice revenue in FY 2010 comprised 23.7 percent of the total revenue, highest among all revenue sources.[5]

In most dental schools with an intramural faculty practice, the revenues from the faculty practice contribute to the dental school. In a survey of finance officers in twenty-five U.S. dental schools in 2010, 71 percent of the dental school faculty practices were found to belong to the dental school, and 92 percent of the responding dental schools reported that faculty practice revenues are used to augment faculty salary and/or to supplement dental school financing.[6]

To study dental consumers' choice of dentists, it is important to note that consumer decision making typically happens in sequenced stages. Kotler's five-stage model of the consumer buying process explains this staged sequence well (Figure 1).[7] The buying process starts with problem recognition, then passes through the stages of information search, evaluation of alternatives, purchase decision, and post-purchase behavior. During this process, a dental consumer narrows down his or her choice from total set (all dentists in the area) to choice set (a few dentists whom the consumer seriously considers). Figure 2 summarizes how Kotler's model can be applied to dentist selection process. In order to effectively promote faculty practices, dental school administrators need to understand how and why potential dental consumers choose dental school faculty for their oral care. *How* includes what information sources are available and are used to select a dentist before the patient's first visit. *Why* includes the evaluation criteria consumers use and the attributes they prefer.

A commonly accepted categorization divides information sources into personal, commercial, and public information sources.[8] Personal information sources (i.e., word of mouth) include family, friends,

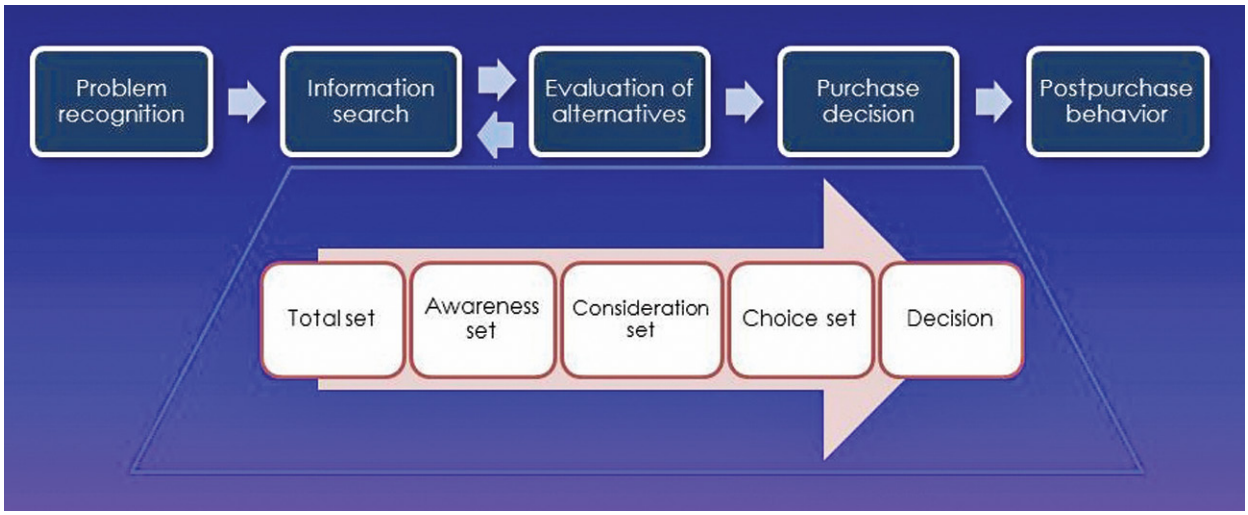


Figure 1. Conceptual framework for decision making: Kotler's five-stage model of the consumer buying process

Source: Adapted from Kotler P. Analyzing consumer markets and buyer behavior. In: Kotler P, ed. A framework for marketing management. New York: Prentice Hall, 2001:98.

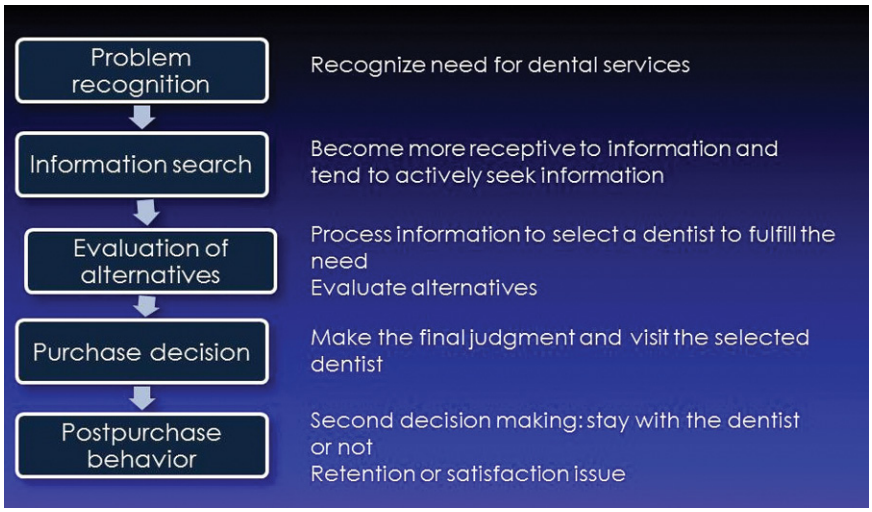


Figure 2. Application of Kotler's model to dentist selection process

and professional referrals—the most often cited information sources in selecting a dentist.[8,9] Word of mouth is often cited as the most powerful and influential information source. Commercial information sources include mass media advertisements such as newspaper ads, yellow pages, radio or TV commercials, and printed brochures or pamphlets. Commercial information sources can be readily available and accessible, and most consumers are aware of them.[8] However, commercial information sources are impersonal and targeted at the general public rather than individuals, which makes them less influential. An emerging form of commercial information source is the dental clinic website. Although the number of dentists who use a clinic website to provide information to patients seems to be increasing, few studies have examined their use and influence as related to consumer decision making.

Public information sources are defined as impersonal or neutral information sources.[10,11] This type of information source includes technical reports, magazine articles, professional organizations, government sources, the Internet, and reports written by knowledgeable third-party agencies such as *Consumer Reports* magazine.[10,11] In the dental services market, consumers' awareness and use of public information sources seem to be relatively low.[9]

A number of published studies have addressed the question of why patients choose a particular dentist—that is what attributes (preferences) of a dentist or dental office a patient weighs more heavily when he or she selects a dentist. Mangold et al. found that quality of work, dentist's concern for patients, price, personal appearance, office location, waiting time to see the dentist, and insurance form preparation were important factors in the decision making.[12] Book and Stockton concluded that referrals from friends and relatives and convenient office location were the two most important influencing factors.[13] Chakraborty et al. used conjoint analysis to determine tradeoffs among multiple attributes and found that sensitivity to the patient's concerns was the most important attribute followed by assigned dentist (being able to be seen by the same dentist) and dental office appearance.[14]

Little information is available regarding dental consumers' choice of dental school faculty practice. Therefore, the present study aimed to better understand how and why patients choose dental school faculty members as their oral health care providers. This study examined how and why new dental faculty practice patients of the University of Iowa College of Dentistry (UI COD) chose their dentist. The insights obtained from this study can benefit dental schools and dentists by helping them to reach out to the community more strategically and increase awareness of dental school clinics and services both by licensed practitioners and students. This will result

in increased revenues for the dental school to fulfill its mission more sustainably and more opportunities to learn for students.

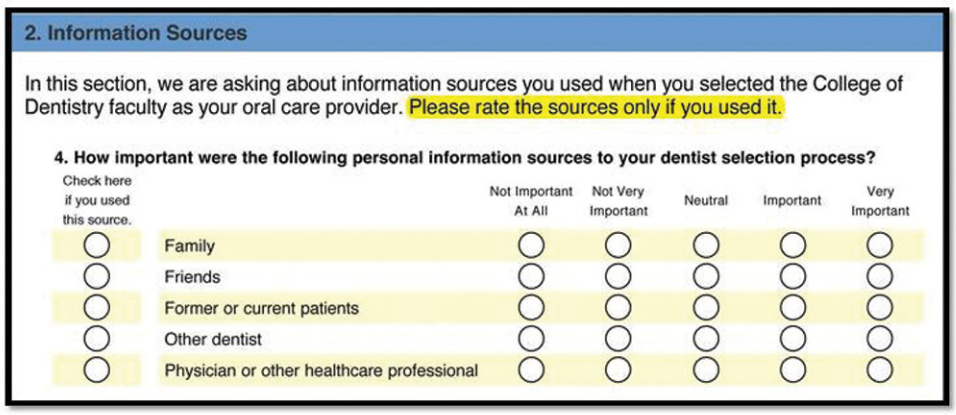
Methods

This study was an observational, descriptive study of the UI COD's new faculty practice patients who met the study's inclusion criteria. The study was approved by the University of Iowa Institutional Review Board (IRB) in August 2010. The paper-based questionnaire was mailed to the subjects, and data were collected in September and October 2010.

The study population consisted of patients who made their first visit to the COD faculty practice during calendar year 2009. Only patients aged eighteen years or older at the time of the first visit were included. Patients were verified as having been seen by a faculty provider at their first visit when their first visit was documented with the exam codes of D0140 Limited Oral Evaluation and/or D0150 Comprehensive Oral Evaluation. A total of 1,150 patients were identified using the COD's electronic medical record system, AxiUm.

The questionnaire consisted of four sections: general questions, information sources, dentist and dental practice attributes, and demographics. The first section included general questions such as whether the patient selected UI COD in general or a particular dentist first. The second section included questions regarding information sources. A list of sixteen information sources was generated from the previous literature. The sixteen information sources were classified into three categories: personal, commercial, and public information sources. For each information source listed, survey respondents were first asked whether they actually used the information source and then were asked to indicate how important the information source was in the selection process on a five-item, gradually ascending anchor scale: not important at all, not very important, neutral, important, and very important. The instructions in the heading of this section clearly stated, "Please rate the source only if you used it" (Figure 3). The third section was about dentist and dental practice attributes. The lists of twelve dentist-related attributes and thirteen dental practice-related attributes were generated from the previous literature. The survey respondent was asked to rate each attribute on a five-item, gradually ascending anchor scale: not important at all, not very important, neutral, important, and very important. The last section asked for demographic information such as gender, age, highest education level, health care-related profession, and if the respondent had dental insurance.

The questionnaire was mailed to patients' addresses obtained from the UI COD's patient registration file. Three weeks later, a follow-up letter was sent to those who had not returned the survey. A total of 1,150 questionnaires were distributed, and 221 responded, resulting in the response rate of 19 percent. The characteristics of the 221 respondents were compared to that of the overall study population using patient registration information. In general, age and gender distribution was similar for the respon-



2. Information Sources

In this section, we are asking about information sources you used when you selected the College of Dentistry faculty as your oral care provider. Please rate the sources only if you used it.

4. How important were the following personal information sources to your dentist selection process?

Check here if you used this source.		Not Important At All	Not Very Important	Neutral	Important	Very Important
○	Family	○	○	○	○	○
○	Friends	○	○	○	○	○
○	Former or current patients	○	○	○	○	○
○	Other dentist	○	○	○	○	○
○	Physician or other healthcare professional	○	○	○	○	○

Figure 3. Information sources section of the questionnaire

dents and the entire group. To measure perceived importance of information sources that were *actually* used, the respondents were asked to rate the information sources *only when* they indicated they used it. However, 33 to 43 percent of the ratings were not preceded with the indication of "used," which made the validity of the rating questionable: some respondents may have rated an information source although they did not use it. Since the intention of the information sources section was to find out how the new patients selected their dentist in an actual rather than hypothetical situation, we decided to discard ratings without the indication of "used," which resulted in the sample size of the information sources ratings decreasing significantly.

Results

Sixty-three percent of the survey respondents were female, and 37 percent were male. Twenty-nine percent were between eighteen and thirty years of age, while 21 percent were in the sixty and older age group. The mean age was forty-three, ranging from eighteen to ninety-one years. The vast majority of the respondents (80 percent combined) had a college or graduate degree: 34 percent college and 46 percent graduate degree (Table 1). Forty-two percent of the respondents said they had worked or were currently working in a health care-related field, and 71 percent reported having private dental insurance. Only 5 percent said they have Title XIX benefits (Medicaid of the state of Iowa). Seventy-two percent responded that they selected the COD in general, while 27 percent said they chose a specific dentist who practices in the COD.

Table 1. Characteristics of respondents in the study, by number and percentage of respondents in each category

Variable	Number	Valid Percentage
Gender (N=216)		
Female	136	63%
Male	80	37%
Age (N=212)		
18 to 29 years	61	29%
30 to 39 years	53	25%
40 to 49 years	26	12%
50 to 59 years	28	13%
60 years and over	44	21%
Education Level (N=216)		
Less than high school diploma	2	1%
High school diploma	42	19%
College degree	73	34%
Graduate degree	99	46%
Health Care-Related Profession (N=215)		
Yes	90	42%
No	125	59%
Dental Insurance (N=215)		
Private dental insurance	152	71%
Title XIX (Iowa Medicaid)	10	5%
No dental insurance	53	25%
Seeking Care from Specific Dentist or Dental School in General (N=217)		
Specific dentist who practices in the College of Dentistry	59	27%
College of Dentistry in general	158	72%

Note: Due to missing data, not all variables add up to the total sample size of 221. Percentages may not total 100 percent because of rounding.

We summarized the respondents' use of information sources in ranked order (Table 2). Among the personal information sources, the respondents rated other dentists, friends, and family the highest, at 27 percent, 24 percent, and 20 percent, respectively. Among the commercial information sources, the clinic website was ranked highest, with a percentage of use at 21 percent. In the category of public information sources, the Internet and insurance directory were said to be used most frequently, at 17 percent and 15 percent, respectively.

We combined the frequencies of ratings of "important" and "very important" only for the respondents who indicated they had used the information source (Table 2). In the category of personal information sources, the respondents rated other dentists, friends, and family "important" or "very important" by fifty-two, forty-four, and thirty-nine of the fifty-nine, fifty-two, and forty-three respondents, respectively. In the category of the commercial information sources, thirty-four respondents out of forty-five rated the clinic website as "important" or "very important." In the category of public information sources, the Internet and the insurance directory were rated "important" or "very important" by twenty-nine and twenty-nine out of thirty-seven and thirty-three respondents, respectively.

The combined frequencies of important and very important for each dentist attribute were also organized in rank order (Table 3). Quality of care, professional competence of dentist, and explanation of treatment were highly ranked, while personal ap-

Table 2. Use and perceived importance of information sources, by number and percentage of total respondents (N=218)

Information Source	"Used"	Combined Very Important and Important
Personal Information Source		
Other dentist	59 (27%)	52 (95%)
Friends	52 (24%)	44 (88%)
Family	43 (20%)	39 (93%)
Former/current patient	27 (12%)	27 (100%)
Physician or other health care professional	15 (7%)	15 (100%)
Commercial Information Source		
Clinic website	45 (21%)	34 (76%)
Yellow pages	6 (3%)	3 (50%)
Brochure/pamphlet	5 (2%)	5 (100%)
Magazine/newspaper advertisement	1 (1%)	0
Public Information Source		
Internet	37 (17%)	29 (81%)
Insurance directory	33 (15%)	29 (94%)
Others	15 (7%)	9 (60%)
Heard doctor speak	10 (5%)	7 (88%)
Dental associations	7 (3%)	5 (100%)
City or county health services	4 (2%)	2 (100%)
Magazine/newspaper article	2 (1%)	0

pearance of dentist, whether the dentist is a member of a dental association, and dental school attended were ranked low.

Finally, we combined the frequencies of "important" and "very important" for each dental practice attribute in rank order (Table 4). The ability to get appointments at convenient times, a reasonable waiting time to get appointments, and the attitude/helpfulness of staff were highly ranked, while parking, atmosphere/appearance of the office, and whether the dentist accepts credit cards or provides credit were ranked low.

Discussion

This study generated information about how and why patients chose a dental school faculty practice and faculty dentist as their oral health care provider, including the information sources used and their perceived importance (the second step in the five-stage consumer buying decision process; Figure 1) and the perceived importance of attributes of the dentist and the dental practice (the third step). To our knowledge, no previous studies have examined this issue. The ultimate intention of this study was to explore how and why patients choose a dentist in a dental school faculty practice clinic, to provide some descriptive information, and to develop a framework for future research. This study was not intended to provide a definitive model to explain dentist selection behavior or to develop a predictive model for future behavior.

The ideal population for this study would have been those who had recently selected a dentist but not yet made the first visit. If they made the choice a long time ago, they may not recall correctly how and why they selected a particular dentist, considering the recall bias. Since we limited the study population to new patients who had selected a dentist approximately within the past year, we believe that we were able to reduce recall bias to an extent compared to other studies that did not limit their study populations by when the respondents selected a dentist.

In studying human behavior, it is generally believed that information about what *actually* happened is more valid for predicting future behavior than information about what *would* happen in a hypothetical situation. This study was trying to gain information about what actually happened in the dentist selection process. For example, the information sources section of the questionnaire had two separate columns: the left column of each listed information source asked respondents to indicate if they used the particular

Table 3. Responses to question "Please indicate how important each [dentist] attribute listed below was in deciding to come to a faculty dentist at the College of Dentistry," by combined score and ranking

Dentist Attribute	Important	Very Important	Combined Important and Very Important
Quality of care (N=207)	45	145	190 (92%)
Professional competence of dentist (N=206)	43	143	186 (90%)
Explanation of treatment/you participate in the treatment decision (N=206)	63	114	177 (86%)
Dentist provides personal attention to diagnosis and aftercare (N=206)	78	94	172 (83%)
Dentist uses most up-to-date techniques	76	88	164 (81%)
Dentist's concern for patients/sensitivity (responds to your pain and fear) (N=201)	71	85	156 (78%)
Reputation of the dentist (recommendation) (N=201)	64	77	141 (70%)
The dentist is in my insurance network (N=202)	42	98	140 (69%)
Number of years in experience (N=197)	80	32	112 (57%)
Personal appearance of dentist (N=199)	59	22	81 (41%)
Whether the dentist is a member of a dental association (N=197)	41	19	60 (30%)
Dental school attended (N=197)	36	11	47 (24%)

Table 4. Responses to question "Please indicate how important each [dental practice] attribute listed below was in deciding to come to a faculty dentist at the College of Dentistry," by combined score and ranking

Dental Practice Attribute	Important	Very Important	Combined Important and Very Important
Ability to get appointments at convenient times (N=205)	100	68	168 (82%)
Reasonable waiting time to get appointments (N=201)	103	61	164 (82%)
Attitude/helpfulness of staff (N=200)	107	48	155 (78%)
Convenient office hours (N=201)	96	52	148 (74%)
Price (N=200)	73	73	146 (73%)
Convenient physical location (N=203)	93	52	145 (71%)
Assigned dentist (N=199)	73	67	140 (70%)
Dentist provides you estimates of fees (N=200)	78	59	137 (69%)
Time spent waiting in office (N=200)	94	43	137 (69%)
Whether the dentist's office will prepare insurance forms (N=197)	75	43	118 (60%)
Parking is convenient (N=201)	80	25	105 (52%)
Atmosphere/appearance of the office (N=199)	68	15	83 (42%)
Whether the dentist accepts credit cards or provides credit (N=200)	40	21	61 (31%)

information source, then the corresponding right column asked them to rate it only when they indicated they used it. By directing the respondents to limit their information source ratings to the ones they used, we expected to gain insight into what actually happened.

Patient Characteristics

The survey respondents' demographic characteristics are worth discussing further. The mean age of the respondents was forty-three years, and the median was thirty-eight years, indicating the respondents were relatively young. A vast majority of the respondents (81 percent) reported having a college or graduate level degree, which is different from the demographics of participants in other studies. This higher level of education may reflect the fact that the UI COD is located in a college town where many community residents have advanced degrees. In a similar sense, we expected that many of the respondents would be working in a health profession since the UI COD is located in a large health care complex. Overall, this expectation was realized, with over 40 percent of the respondents reporting that they work or have worked in a health care-related profession. In terms of dental insurance, the vast majority (71 percent) of the respondents said that they have private dental insurance, which certainly shows that the faculty practice patients differ from dental school clinic patients. Damiano and Warren's study, for example,

reported that only an average of 16 percent of clinic patients at six dental schools said they were planning to pay with private dental insurance.[15]

Seventy-two percent of our respondents indicated that they had selected the COD in general rather than a specific dentist who practices in the COD (Table 1). This could be explained partially by the fact that approximately 20 percent of new patients are University of Iowa employees or their dependents. University employees may have selected COD rather than a specific dentist due to convenience and visibility. In addition, it should be noted that the general reputation of the dental school may encourage potential dental consumers to choose a dental school faculty dentist. This situation would be different from private dental practices in which the reputation of a dentist and that of his or her dental practice are generally considered the same, especially for solo private practitioners.

Information Sources

Other dentists, friends, and family members (personal information sources) were used by about one-quarter of the respondents for selecting a dentist. This finding is somewhat different from the traditional belief and the findings of other studies that family or friends were the most frequently used and the predominant information source in dentist or physician selection. Mangold et al. reported 83.7 percent of new community residents surveyed said they used "friends or acquaintances" as guides to dentist selection, followed by 63.8 percent who used "members of family."[12] It is interesting to note that, in Mangold et al.'s study, 46.9 percent of the respondents said that they used the Yellow Pages compared to our finding of only 3 percent who used that source. One possible explanation of this discrepancy is that the Internet and clinic websites may have replaced Yellow Pages as sources of information. Mangold et al.'s study was published in 1986 when the Internet was not very widely available. In our study, 17 percent and 21 percent of the respondents indicated that they used the Internet and the clinic website, respectively.

Personal information sources such as other dentists, friends, and family were highly rated by the respondents who used them, similar to Book and Stockton's study in which 35.7 percent of the respondents reported that recommendations of friends or relatives were the most influential factor.[13] Prior to this study, we were not sure how many potential dental consumers would rely on web-based information sources for the dentist selection process because dental consumers have been believed to heavily rely on word of mouth from personal sources. Interestingly, our study found that dental consumers not only used the web-based information sources heavily but also perceived them to be important. In addition to the timing of this study, the high education level of this population may have led them to be more web-savvy and comfortable using a computer for significant decisions. It is also interesting to note that information sources with higher use were also given high ratings. We can interpret this as suggesting that dental consumers use information sources that they consider important.

Dentist and Dental Practice Attributes

In our study, dentist attributes such as quality of care, professional competence of the dentist, and explanation of treatment were rated high in the combined frequency of "important" and "very important." Dental practice attributes such as ability to get appointments at convenient times, reasonable waiting time to get appointments, and attitude/helpfulness of staff were highly rated in the combined frequency of "important" and "very important." Our findings are similar to previous studies' findings with some variations. A number of studies found the attribute of quality of care to be the most important,[12,16,17] although the definition of quality can vary greatly. Professional competence[17] and explanation of treatment[14,17] were also found to be important in other studies. In terms of dental practice attributes, the ability to get an appointment at convenient times was found to be important in Manski's study,[17] as was a reasonable waiting time in Mangold et al.'s study.[12] The attribute of attitude/helpfulness of staff was found to be important in our study, but it was not highly rated in Chakraborty et al.'s conjoint analysis, in which it was ranked eighth of twenty-four attributes.[14]

It is interesting to note that some attributes other studies found important were not rated highly in our study. The attribute of dentist's concern for patients/sensitivity, for example, was rated very highly in other studies,[12,14] but was ranked sixth of twelve dentist attributes in our study. The attribute of reputation of the dentist was also highly rated in other studies,[13,16,17] but was ranked seventh of twelve dentist attributes in our study. The latter can be explained by the fact that 72 percent of the respondents in our study had selected the COD in general rather than a

specific dentist, so it was the reputation of the COD as a whole that mattered to them in the initial decision rather than that of any particular practitioner.

There are some limitations of this study that should be taken into consideration when applying its findings. First, the study respondents had recently chosen a dentist but had had various levels of post-selection experience with their chosen dentist. Information obtained from the direct post-selection experience would not be available to potential dental consumers who are in the dentist selection process and thus constitute the target group for a dental school or dentist who wants to attract new patients. Future studies could examine those who have recently selected a particular dentist but not yet visited the chosen dentist in order to gain more understanding about the initial dentist selection process.

Second, this study was conducted with a paper-based questionnaire that did not allow incorporating complex skip patterns. In the information sources section, 33 to 43 percent of the ratings were not accompanied by the corresponding indication of "used it" although respondents were supposed to rate only the ones they used. Apparently some respondents rated ones they did not use or, at least, did not indicate "use." We discarded those responses in our analysis because there was no way to determine if those respondents had indeed used the source even if they did not indicate they had. Omitting those responses thus helped us maintain the internal validity of the study. An online survey's skip pattern would require the respondents to rate only the ones they indicated use, but unfortunately we could not conduct an online survey because only 20 percent of the study population had an e-mail address in their records. On a similar point, data in the dentist and dental practice attributes section could be biased to a certain extent. The introductory paragraph stated "We are seeking information . . . that you might have considered . . . BEFORE your first visit" with the intention of directing respondents to rate attributes that they *actually* considered *before* they made the first visit. However, it is possible that the respondents rated all attributes regardless of whether they had actually considered those attributes. Future studies would ideally take advantage of electronic questionnaires to obtain cleaner data.

Third, to be more representative, we decided to study the entire new patient pool of the UI COD faculty practice in CY 2009 instead of sampling. However, the 19 percent response rate makes it harder to exclude non-respondent bias and to consider the respondents as being truly representative of the UI COD 2009 new patients. Finally, although this study's findings are applicable to many dental school faculty practices and to private practices to a certain extent, a dental school or dentist that wants to promote a practice may want to consider examining their own target group to obtain information directly relevant to their situation. In the present study, the study population was mainly college town residents who tend to be highly educated and have higher income and may not be representatives of dental practice patients in general.

Conclusions

The main findings of this study can be summarized as follows. The UI COD's new patients used both traditional and recently emerging information sources. Highly used information sources included friends, other dentists (traditional), the clinic website, the Internet, and insurance directory (recently emerging). These highly used information sources were also perceived by the respondents to be important. In terms of *why* they chose a UI COD faculty dentist, a number of dentist and dental practice attributes were considered important to these new patients. These attributes included quality of care, professional competence of dentist, ability to get appointments at convenient times, and reasonable waiting time to get appointments. A dental school or dentist who wants to promote a practice can better communicate with potential new patients and improve attributes that are important to them using this study's findings.

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