



## **Toothache Pain: A Comparison of Visits to Physicians, Emergency Departments and Dentists**

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*J Am Dent Assoc* 2008;139;1205-1216

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# Toothache pain

## A comparison of visits to physicians, emergency departments and dentists

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People who do not have access to private dental practices may turn to hospital emergency departments (EDs) and physicians' offices for the treatment of dental problems. Poor and minority patients are more likely to experience dental emergencies<sup>1-9</sup> and to use nonprivate dental practice settings for the treatment of these problems than are other segments of the population.<sup>10</sup> Although data regarding the use of EDs for the treatment of dental problems are limited, African-Americans and the poor have been found to be more likely than other groups to use EDs for medical visits.<sup>11</sup>

### VISITS TO EMERGENCY DEPARTMENTS AND PHYSICIANS' OFFICES

From 1992 through 1999, visits to EDs increased approximately 14 percent.<sup>12</sup> From 1997 through 2000, people made an average of 738,000 annual visits to EDs for dental pain or dental-related injuries, with diseases of the teeth and supporting structures accounting for 0.7 percent of all visits.<sup>13</sup> More recently, Burt and Schappert<sup>10</sup> reported that dental-related diseases accounted

## ABSTRACT

**Background.** Researchers' understanding of the use of emergency departments (EDs) and physicians' offices for the treatment of toothaches is limited. The authors conducted a study to explore their use by low-income and minority adults in comparison with the use of traditional dental services.

**Methods.** Participants included low-income white, African-American and Hispanic adults who had experienced a toothache during the previous 12 months. A stratified random sample of 4,200 households in Maryland participated in a cross-sectional telephone survey. Trained survey staff completed interviews with someone in 272 (68.3 percent) of 398 eligible households.

**Results.** Only 8.7 percent of respondents contacted an ED for toothache pain relief, while 20.1 percent contacted physicians. The majority of respondents who contacted an ED (80.5 percent) or a physician (82.6 percent) also contacted a dentist. Contacts with a dentist were reported by 58.6 percent of respondents. The authors conducted tabular analyses using  $\chi^2$  tests of statistical significance ( $P < .05$ ) and SUDAAN's multivariable logistic regression procedure (Research Triangle Institute, Research Triangle Park, N.C.) ( $P < .05$ ).

**Conclusions.** Respondents experiencing toothache pain ultimately sought definitive resolution of their pain from dentists while visiting EDs and physicians for temporary relief. Access to dentists' services was particularly problematic for Hispanics and was exacerbated by health literacy issues.

**Clinical Implications.** The elimination of oral health disparities must involve consideration of cultural influences on minority populations, as well as the responsibilities of the dental profession.

**Key Words.** Toothache pain; emergency departments; physicians' offices; dentists' offices; race/ethnicity.

*JADA 2008;139(9):1205-1216.*

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for 0.9 percent of all ED visits. National data from the 2001 Medical Expenditure Panel Survey revealed that 2.7 percent of all people who experienced a dental problem outside of the typical dental office–based delivery system received care in an ED.<sup>14</sup> Many EDs, however, lack readily available dental services, and, thus, often are not capable of providing definitive treatment for oral conditions.<sup>15</sup> Nevertheless, costs are incurred when patients are assessed standard charges for ED visits (facility and physicians' charges). The magnitude of this problem is unknown. Furthermore, only a few studies have described the services provided in EDs<sup>12,13</sup> or patient satisfaction with those services.

Although a number of authors have discussed the role of medical practitioners in addressing oral health problems,<sup>16-21</sup> studies examining adults' visits to physicians for the treatment of dental emergencies or other dental problems are limited. In 1995, approximately 700 million patient visits were made to physicians' offices nationwide, representing 81 percent of all ambulatory care visits in the United States. Only 0.2 percent of these visits involved a principal diagnosis relating to diseases of the teeth and supporting structures.<sup>22</sup> During 2002, approximately 890 million visits were made to office-based physicians.<sup>23</sup> During 1999-2000, visits for dental-related problems accounted for approximately 0.3 percent of all visits to physicians' offices.<sup>10</sup> In 2001, approximately 7 percent of people who experienced a dental problem outside of the typical dental office–based delivery system received care from a physician.<sup>14</sup> Data from Maryland found that approximately 6 percent of people older than 20 years reported seeing a physician for a dental problem sometime during the previous 12 months.<sup>24</sup> This is consistent with a survey of two family medicine practices that reported that 4.5 percent of patient visits were related to oral problems.<sup>25</sup>

Unfortunately, for those seeking dental treatment, physicians' offices and EDs are not the most appropriate settings to receive care. Physicians generally have received limited, if any, training in the treatment of dental problems.<sup>26-28</sup> Therefore, most patients receiving treatment for dental problems from physicians probably are not receiving definitive treatment and generally will need to visit a dentist for appropriate diagnosis and curative care. Approximately 36 percent of Maryland residents who saw a physician for a

dental-related problem during the previous 12 months required follow-up care from a dentist for the same problem.<sup>24</sup> As was the case with care provided in EDs, few or no data exist that describe the treatment provided by physicians, its effectiveness or, with rare exceptions,<sup>24</sup> patients' satisfaction with the care received.

Although visits to EDs and physicians' offices for the treatment of dental problems are well-documented, researchers' and clinicians' understanding of these treatment patterns is limited.<sup>29</sup> We can assume that many people lacking access to traditional dental services will continue to seek care from EDs, physicians' offices or both. This issue will assume increasing importance as our population continues to age and becomes more diverse ethnically and racially; these groups face significant economic barriers in accessing private dental services.<sup>29,30</sup>

We undertook a study to identify the characteristics of low-income and minority adults who seek dental care at EDs and physicians' offices in comparison with those of adults who seek care from dentists, as well as to assess their level of satisfaction with the services received from all three provider types. In addition, we placed particular emphasis on including Hispanic respondents because few studies have included this ethnic group.

## SUBJECTS AND METHODS

**Conceptual models.** This study used a model developed by Locker<sup>31,32</sup> for measuring the association of toothache pain with quality of life and social well-being, as well as a behavioral model of health services utilization developed by Andersen and Newman<sup>33</sup> and Andersen.<sup>34</sup> The Locker<sup>31,32</sup> model identifies aspects of human experience in relation to illness and disease and links them in sequence, moving from biophysical to behavioral and social concerns. The model highlights qualitative differences in how people experience the social impact of a condition, as well as the interconnections between them.<sup>35</sup> In Andersen's model of health services utilization,<sup>33,34</sup> the characteristics of the external environment, the dental care delivery system and the users of services influence users' oral health behaviors. Health behaviors (oral health practices and dental services use) are intermediate dependent variables influencing oral health outcomes.

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**ABBREVIATION KEY.** EDs: Emergency departments.

**Study population.** We recruited participants from low-income non-Hispanic white, non-Hispanic black and Hispanic adults aged 21 years and older in Maryland who had experienced a toothache during the previous 12-month period. We defined low income as an annual family income of less than \$25,000. We included higher-income respondents for comparative purposes and to examine the relative impact of graded income levels on respondents' use of services. Toothache pain was defined by subjects as a positive response to the question, "Have you had a toothache at any time during the past 12 months?"

**Questionnaire development.** We used qualitative results from previous focus groups as the basis for developing questionnaire items.<sup>36</sup> Because it was necessary to conduct telephone screenings and interviews with Hispanic respondents who had limited English-language capability, the trained survey staff translated the screening and interview instruments into colloquial Spanish that could be understood by Spanish-speaking people with limited education.

**Sample selection.** We used 2000 U.S. Census data to identify block groups in Maryland according to the percentages of low-income people and non-Hispanic whites, Hispanics and non-Hispanic blacks within the groups. We drew a stratified random sample of 4,200 Maryland households with listed telephone numbers from the identified block groups that had an estimated annual income below \$25,000 and minority or white concentrations.

**Survey execution.** The trained survey staff programmed the survey instruments for use with computer-assisted telephone interviewing technology to screen, interview and monitor survey progress. To encourage participation, we offered eligible respondents a \$10 gift card for taking the time to complete the interview. Interviewers completed the toothache screener and interview in English or Spanish, on the basis of the respondent's needs.

Within the 4,200 households with listed telephone numbers, we found 3,231 numbers (76.9 percent) that were working and residential (not business). Residents in 1,009 (31.2 percent) of these 3,231 households told us whether anyone aged 21 years or older lived there. At least one

person aged 21 years or older resided in each of 953 households (94.4 percent). Among the households with an age-eligible adult, members in 903 (94.8 percent) told us whether an age-eligible person in the household had had a toothache at some time in the past. Of these 903 households, 667 contained an adult who, according to the respondent, ever had had a toothache. Of these households, 398 (59.7 percent) had at least one member who had experienced a toothache within the previous 12 months. Thus, 398 (44.1 percent) of the 903 successfully screened households included an adult who had experienced a toothache in the previous 12 months.

We completed an interview in 272 (68.3 percent) of these 398 households (64 Hispanics, 67 whites and 141 blacks). We weighted the sample cases for analysis, which yielded the following target population distributions ( $n = 15,394$ ):

4,407 men and 10,987 women; 5,520 Hispanics, 2,472 whites and 7,402 blacks. The results generally showed no statistically significant associations between the respondents' age, sex, race/ethnicity and income; one exception was that a larger percentage of Hispanics were in the youngest age category ( $\chi^2 = 44.7$ ;  $df 6$ ;  $P < .001$ ). The University of Mary-

land, Baltimore, Office for Research Studies reviewed the research protocol and judged that it was exempt from institutional review board review. However, we did obtain oral informed consent from all participants.

**Data analysis.** The survey staff completed interviews with 272 respondents. We weighted the sample cases for analysis through several steps to adjust for sampling design; probability of selection; and unlisted, nonresidential and unanswered telephones, as well as for screening and interview nonrespondents. Weighting was necessary because we developed the sample design to achieve oversampling of low-income minority households (Hispanic and non-Hispanic black) in the state of Maryland. We used analysis weights in all analyses to restore proper representation to the study groups by adjusting for differences in sampling and nonresponse rates. Thus, the analysis is based on an estimate of the number of adults in low-income areas of Maryland who had a toothache in the previous year ( $n = 15,394$ ).

We measured pain intensity by asking respondents to rate the worst level of pain they felt with

**The authors used qualitative results from previous focus groups as the basis for developing questionnaire items.**

their most recent toothache; the scale ranged from 0 to 10 (where 0 stood for no pain and 10 was the greatest pain possible). We conducted a tabular analysis by using  $\chi^2$  tests of statistical significance and multivariable logistic regression procedures that accounted for stratification and weighting, including comparisons according to income level, age group, sex, race/ethnicity and other selected variables. We combined response categories when necessary because of small cell size. All statistical analyses used SUDAAN (Research Triangle Institute, Research Triangle Park, N.C.), an analytic package designed to handle clustered and weighted survey data.

**RESULTS**

**Toothache pain experience.** Almost one-half of the respondents (44.3 percent) reported having had more than five toothaches during the previous 10 years. The majority (66.3 percent) rated the pain of their most recent toothache in the 8 to 10 range, with 45.1 percent rating their toothache a 10 (greatest pain possible). Approximately one-fourth of respondents (22.5 percent) reported experiencing pain of less than one day's duration, while 41.4 percent reported experiencing pain that lasted one to three days, 23.4 percent four days to one month, and 12.7 percent more than one month. The respondent's demographic background was not associated with the number of toothaches experienced during the previous 10 years, pain intensity or pain duration.

**Overall use of professional services.** Table 1 shows subjects' contacts with formal health care services. Only 8.7 percent of respondents reported having contacted an ED for toothache pain relief. ED use was associated with the respondent's income ( $\chi^2 = 8.4$ ;  $df 3$ ;  $P = .04$ ), age ( $\chi^2 = 14.4$ ;  $df 3$ ;  $P = .003$ ) and race ( $\chi^2 = 9.1$ ;  $df 2$ ;  $P = .011$ ). Elderly, Hispanics and higher-income respondents were least likely to report having had ED

**TABLE 1**

Percentage of respondents reporting formal care strategies for pain relief for most recent toothache.							
DEMOGRAPHIC CHARACTERISTIC	OVERALL	AGE GROUP (YEARS)				SEX	
		21-34	35-49	50-64	≥ 65	Male	Female
Weighted Sample Size (n)*	15,394	6,234	4,897	2,962	1,301	4,407	10,987
<b>Formal Care Strategies</b>							
Did you call or go to a hospital emergency department because of your toothache pain?	8.7	5.3	14.1	10.4	0	8.8	8.6
Did you call or visit a physician's office or clinic because of your toothache pain?	20.1	17.2	20.8	29.5	9.4	18.3	20.8
Did you call or visit a dentist's office or clinic because of your toothache pain?	58.6	52.1	64.9	57.0	69.2	61.6	57.4
<i>(continued on next page)</i>							

contacts. The overwhelming majority of respondents (80.5 percent) who contacted an ED subsequently contacted a dentist for relief.

Contacts with a physician's office were more than twice as likely (20.1 percent) as those with EDs. Visits to physicians were not associated with respondents' demographic or socioeconomic characteristics. The overwhelming majority of respondents (82.6 percent) who contacted a physician subsequently contacted a dentist.

Overall, a majority of respondents (58.6 percent) reported having had contact with a dentist's office for toothache pain relief. Differences associated with respondents' demographic characteristics were surprisingly small, with the exception that higher-income people were more likely to have visited a dentist ( $\chi^2 = 4.1$ ;  $df 1$ ;  $P = .045$ ).

**Hospital EDs.** Respondents' use of an ED for toothache pain relief was not associated with the duration of their pain or with the degree to which their pain interfered with everyday life and activities (that is, sleeping; eating; drinking; mood; general health; ability to socialize, talk, go to school, take care of a child or another person, work). However, ED use was associated with the severity of the pain experience ( $\chi^2 = 6.9$ ;  $df 2$ ;  $P = .033$ ). Only 3.0 percent of respondents who reported having mild pain had ED contacts compared with 5.2 percent of respondents who reported moderate pain and 14.1 percent of respondents who reported severe pain.

The interviewer then asked respondents for the most important reason they called or visited an

**TABLE 1 (CONTINUED)**

RACE/ETHNICITY			ANNUAL INCOME (IN THOUSANDS OF DOLLARS)			
Hispanic	White	African-American	< 25	25-35	36-50	> 50
5,520	2,472	7,402	9,667	2,016	1,432	1,428
Formal Care Strategies						
2.3	8.2	13.5	8.7	18.1	7.0	0.0
21.9	12.7	21.2	20.0	22.1	24.3	12.0
64.8	64.6	51.9	55.7	57.9	80.5	75.1
* Sample size estimates are based on the number of subjects responding to each question. For income, total n = 14,543.						

ED (Table 2). More than three-quarters of respondents reported that the most important reason for contacting an ED was a high level of pain. The reasons for contacting an ED did not vary on the basis of the respondents' demographic backgrounds. Although only a small number of Hispanic subjects reported having had contact with EDs, we should note that the only reason they gave for calling or visiting an ED was that the respondent did not know any dentists to contact.

Interviewers asked respondents who contacted an ED what the ED provider did or told them to do (Table 3). The majority of respondents reported that they were told to see a dentist. The results showed no differences in treatment associated with the respondents' demographic characteristics. Overwhelmingly, respondents reported that they complied with the ED provider's advice (92.3 percent). This high level of compliance was consistent across all demographic groups. Overall, the majority of respondents reported that the treatment or advice helped "a lot" (65.9 percent), while 24.3 percent reported that it helped "a little bit" and 9.8 percent reported that it helped "not at all." No differences in perceived effectiveness were associated with respondents' demographic characteristics.

**Physicians' offices.** Respondents' use of physicians' offices for toothache pain relief was not associated with the duration of pain. It was associated with the degree to which their pain interfered with everyday activities ( $\chi^2 = 10.7$ ;  $df\ 3$ ;  $P = .015$ ) and the severity of the pain ( $\chi^2 = 10.7$ ;  $df\ 2$ ;

$P = .005$ ). For example, among respondents who reported experiencing no interference with daily activities, only 4.5 percent reported having contacted a physician's office compared with 32.4 percent of respondents who reported experiencing interference with more than five daily activities. Similarly, only 7.1 percent of respondents who reported having mild pain had contact with physicians' offices compared with 15.2 percent of respondents who reported having moderate pain and 30.3 percent of respondents who reported having severe pain.

Interviewers asked respondents for the most important reason why they called or visited a physician's

office (Table 2). A majority reported that the most important reason was their high level of pain. We noted that differences in the reasons for contacting a physician were based on the respondent's family income ( $\chi^2 = 117.4$ ;  $df\ 15$ ;  $P = .001$ ) and race ( $\chi^2 = 24.5$ ;  $df\ 10$ ;  $P = .019$ ). Among respondents with annual family incomes of less than \$25,000, severe pain was cited as the most important reason for contacting a physician (51.2 percent), while 28.0 percent reported that they thought the physician could treat the pain, and 5.3 percent reported having medical complications. The comparable percentages for respondents with family incomes of more than \$50,000 were 100.0 percent, 0 percent and 0 percent, respectively.

Seventy-eight percent of Hispanic respondents reported that severe pain was the most important reason for contacting a physician, compared with 58.0 percent of white respondents and 31.4 percent of black respondents. Only 5.0 percent of Hispanics cited "thought physician could treat," compared with 12.2 percent of whites and 34.7 percent of blacks, while 16.9 percent of Hispanics cited medical complications, compared with 5.8 percent of whites and 5.3 percent of blacks.

Interviewers asked respondents who contacted a physician's office what the physician did or told them to do (Table 3). The majority of respondents reported that they were told to see a general dentist or an oral surgeon (66.7 percent). Treatment varied on the basis of the respondent's annual family income ( $\chi^2 = 17.2$ ;  $df\ 6$ ;  $P = .018$ ). The highest-income respondents (family income more

**TABLE 2**

Percentage distribution of most important reason for contacting emergency department or physician.		
REASON	EMERGENCY DEPARTMENT (n = 1,045)	PHYSICIAN (n = 2,660)
Severe Pain	78.6	52.2
No Insurance/No Money	9.8	8.2
Could Not Get Appointment/Did Not Know Dentist to Call	7.6	7.1
Thought Physician Could Treat	2.4	20.8
Thought I Could Get Medicine	1.7	0
Had Medical Complication	0	9.8
Afraid of Dentists	0	1.9

**TABLE 3**

Percentage distribution of treatments or instructions received from emergency department or physician.*		
TREATMENTS OR INSTRUCTIONS	EMERGENCY DEPARTMENT (n = 1,332)	PHYSICIAN (n = 2,219)
Told Me to See a Dentist	71.4	66.7
Gave Me a Prescription for Medicine	34.6	43.8
Told Me to Take Nonprescription Medicine	7.1	6.5
Obtained Radiograph of Tooth	4.3	0
Gave Me a Prescription Medicine Sample	4.1	2.9
Told Me to Call Insurance Company	3.8	0
Referred to Ear, Nose and Throat Physician	1.1	0
Drained Swelling	0	3.2

\* The numbers total more than 100 percent because respondents gave multiple reasons.

than \$50,000) were more likely to be given a prescription (100 percent) than were the lowest-income respondents (less than \$25,000) (46.1 percent were given a prescription, a sample or a nonprescription medicine), while those with the lowest income were most likely to be told to see a dentist (68.2 percent) compared with those with the highest income (0 percent).

More than three-quarters of respondents (83.9 percent) reported that they followed the physician's advice. This high level of compliance was consistent across all demographic groups. Treatment effectiveness generally mirrored that reported for ED contacts. Overall, 76.2 percent of respondents reported that the treatment or advice helped "a lot," while 20.2 percent reported that it helped "a little bit" and only 3.6 percent said it helped "not at all." The perceived effectiveness

was associated with race. White respondents were most likely to report that the treatment or advice provided helped "a lot" (100 percent), compared with 91.0 percent of Hispanic respondents and 59.8 percent of black respondents ( $\chi^2 = 11.0, df 4; P = .029$ ).

**Dentists' offices.** Respondents' use of a dentist's office for relief of toothache pain was not associated with the degree to which the pain interfered with everyday activities or the level of pain, but it was associated with the duration of the toothache ( $\chi^2 = 10.4; df 2; P = .006$ ). Only 31.7 percent of respondents who experienced toothaches of less than one day's duration reported having contacted a dentist,

compared with 59.3 percent of respondents who had toothaches of one to three days' duration and 71.0 percent of respondents who had toothaches of more than three days' duration.

The interviewers further questioned respondents who reported that they had called or visited a dentist's office because of toothache pain. They asked them how long after they had first felt the pain from the toothache they had con-

tacted a dentist. Approximately two-thirds (66.9 percent) reported that they had contacted a dentist within three days of the first pain symptoms. This early care-seeking was not associated with the degree to which the respondent's pain interfered with daily activities. Timely care-seeking also was not associated with respondents' demographic characteristics, but it was associated with their socioeconomic status. Respondents with higher incomes were more likely to have had early contacts. For example, 58.3 percent of respondents with an annual family income of less than \$25,000 had early contacts, compared with 92.0 percent of respondents with incomes of more than \$50,000 ( $\chi^2 = 10.0, df 3, P = .022$ ).

We considered respondents to be delayed-care seekers if they reported having contacted a dentist after experiencing toothache pain for more

**TABLE 4**

Percentage distribution of reasons for delay in seeking care (> 72 hours) from a dentist, by age, sex and race.										
REASON FOR DELAYING CARE	TOTAL (n = 3,051)	AGE (YEARS)				SEX		RACE*		
		21-34 (n = 1,442)	35-49 (n = 925)	50-64 (n = 471)	≥ 65 (n = 213)	Men (n = 874)	Women (n = 2,177)	Hispanics (n = 1,591)	Whites (n = 460)	African-Americans (n = 999)
Thought Physician Could Treat	26.0	35.1	10.9	14.7	55.9	16.3	30.0	26.3	11.5	32.3
Pain/Symptoms Not Severe	22.2	34.4	2.8	32.8	0	57.0	8.2	29.7	22.5	10.1
Could Not Get Dental Appointment/ Didn't Know a Dentist to Call	21.4	13.5	36.5	5.5	44.1	2.7	28.9	24.8	18.0	17.5
No Insurance Coverage/No Money	18.5	5.3	40.8	23.2	0	24.0	16.3	6.8	27.8	32.7
Had Medical Complication	16.8	35.6	0	0	0	0	23.6	32.3	0	0
Afraid of Dentists	8.5	1.8	13.0	23.8	0	0	11.9	1.6	28.2	10.2
		$\chi^2 = 79.8; df 15; P = .001$				$\chi^2 = 15.1; df 5; P = .018$		$\chi^2 = 24.4; df 10; P = .017$		

\* One respondent did not answer the question.

than three days. The interviewers asked them why they had delayed seeking care from a dentist (Table 4). The most frequently cited reason was that they thought a physician could treat their problem.

The reasons given for the delay in seeking care from a dentist were associated with the respondent's age, sex and race. The youngest group (aged 21-34 years) was most likely to state reasons associated with their belief that a physician was the most appropriate provider, while subjects aged 35 to 49 years most frequently cited access issues. The responses from those aged 50 to 64 years were fairly evenly split among low level of pain, financial barriers and fear of dentists. The oldest age group was most likely to have believed that a physician could treat their pain.

The majority of men cited "pain/symptoms not severe," compared with only 8.2 percent of women. Nearly one-third of Hispanics, but no whites or blacks, cited medical complications as a reason for delaying care. All of the medical concerns cited by Hispanic respondents were associated with pregnancy. Whites were least likely to cite "thought physician could treat" and most likely to cite a fear of dentists.

Respondents who had delayed seeking care for more than three days and those who had contacted a dentist within three days of first experiencing pain were asked why they decided to seek care from a dentist when they did (Table 5). Overwhelmingly, the most common reason given by both groups was that the pain was disabling. For both groups, reasons for seeking care were not associated with demographic or socioeconomic characteristics. Interviewers asked all respondents who called or visited a dentist about the effectiveness of the treatment received. Overall, 78.1 percent reported that the dental treatment relieved the pain "a lot," while 8.7 percent reported "a little bit" and 13.1 percent reported "not at all." No differences were associated with the respondents' demographic characteristics.

Previous analyses individually examined the association of the independent variables with making a dental visit. We then used SUDAAN's multivariable logistic regression procedure to assess the joint impact on making a dental visit. Whether a respondent reported having made a dental visit was regressed on the following categorical variables: sex, race/ethnicity, age group, household income, number of toothaches in the

**TABLE 5**

**Percentage distribution of most important reason for seeking care from a dentist after first experiencing pain.**

REASON FOR SEEKING CARE	TIME AFTER FIRST EXPERIENCING PAIN	
	> 72 hours (n = 3,403)	≤ 72 hours (n = 5,204)
Went Because the Pain Was Disabling	68.9	62.9
Went Because I Knew I Had a Dental Problem of Some Kind	25.4	13.5
Went When I Had the Money to Pay	4.0	2.7
Went as Soon as I Felt Pain	3.5	5.8
Went as Soon as the Dentist Would See Me	0.5	11.1
Went When Someone Suggested I Go	0	4.0

previous 10 years, pain severity of the most recent toothache, number of activities affected adversely by the toothache, and the duration of the toothache pain. We dichotomized all of the independent variables except for race/ethnicity in an effort to equalize the number of respondents in each category. Table 6 presents the results.

Three of the variables were significant at less than the .05 level. Sex, race/ethnicity, pain severity and the number of activities affected “a lot” by the toothache did not have a statistically significant effect on the odds of making a dental visit, according to the multivariable analysis. The variables that were significant were household income, number of toothaches in the previous 10 years and duration of toothache pain. Our analysis showed that while we simultaneously took into account the impact of all the variables, the odds that someone with a toothache from a household with an annual income of more than \$25,000 would go to a dentist were more than two and one-half times greater than the odds that someone from a household whose annual income was less than \$25,000 would do so.

The analysis then showed that respondents who had toothache pain of four days’ duration or longer had odds of visiting a dentist that were nearly two and one-half times greater than those for respondents whose pain lasted less than four days. In addition, this analysis found that respondents who reported having had fewer than five

toothaches in the previous 10 years had odds of making a dental visit that were more than twice the odds for those who reported having had more than five toothaches during that time.

**DISCUSSION**

A majority of respondents (58.6 percent) with toothache pain sought relief from dentists, while only 8.7 percent and 20.1 percent, respectively, contacted EDs or physicians’ offices. Moreover, more than 80 percent of respondents who contacted EDs or physicians’ offices also subsequently contacted dentists. The greater use of physicians’ offices than of EDs for toothache pain relief is consistent with other reports.<sup>14</sup> Also consistent with other reports, the results of this study showed that ED use was associated with respondents’ income and race, with low-income people and blacks most likely to report having had ED contacts.<sup>11</sup> As reported elsewhere,<sup>13</sup> pain was the predominant reason for ED contacts irrespective of demographic characteristics. Similarly, physician contacts were associated with toothache pain intensity.

**Prescriptions.** Consistent with other physician-related dental care reports, higher-income respondents were more likely to have been given a prescription,<sup>14</sup> while lower-income respondents were more likely to have been told to visit a dentist. We could not determine if this difference was based on clinical need or was influenced by physicians’ attitudes or biases. It is possible that higher-income respondents already had initiated contacts with dentists and were seeking temporary relief until they could be seen. Alternatively, there has been increasing awareness of racial/ethnic disparities in health care. An Institute of Medicine report addressed the potential role of provider bias, discrimination or patient stereotyping in health disparities.<sup>37</sup>

The percentage of respondents who received prescriptions from EDs and physicians was considerably smaller than the percentages reported nationally for ED and physicians’ office visits (76.7 percent for EDs,<sup>38</sup> 70.5 percent for physicians<sup>39</sup>). This was particularly surprising given that the visits in our study were associated with toothache pain relief. The relatively lower prescription rates may reflect the fact that the providers did not want to encourage dental-related visits or were not comfortable treating dental-related problems. None of the respondents received definitive treatment from EDs or physi-

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cians; the majority of respondents were instructed to see a dentist. Given the lack of definitive treatment and the fact that only a minority of respondents were given a prescription or drug sample, we found it surprising that a majority reported that the treatment or advice provided by EDs and physicians helped “a lot.” This high level of perceived effectiveness paradoxically may reflect a high concordance of respondents’ expectations with the actual care received.<sup>40</sup>

**Dentist contacts.**

Unlike contacts with EDs or physicians’ offices in this study, or other reports involving dental visits,<sup>41,42</sup> contacts with dentists were not associated with pain levels but were associated with the duration of the toothache. Respondents with longer-lasting toothaches were more likely to have had dentist contacts. This may reflect a perception that a toothache of longer duration is more likely to represent a serious problem that requires care by a dentist rather than temporary treatment elsewhere. Similarly, a concern about the seriousness of the toothache may explain why respondents with fewer toothaches in the previous 10 years (that is, less experience with toothaches) were more likely to seek care from a dentist.

Furthermore, among respondents with dentist contacts, approximately two-thirds of the contacts occurred within three days of their first experiencing the toothache, and these early contacts were more frequent among higher-income respondents. Income, of course, has been linked consistently with better access to dental services.<sup>29</sup> These three variables—household income, number of toothaches in the previous 10 years and duration of toothache pain—were all significant in the multivariable analysis. Unlike find-

**TABLE 6**

**Results of multivariable logistic regression analysis of factors associated with a dental visit for toothache.**

INDEPENDENT VARIABLE	ODDS RATIO	LOWER 95% CONFIDENCE LIMIT	UPPER 95% CONFIDENCE LIMIT	P VALUE OF WALD F TEST OF SIGNIFICANCE
<b>Sex</b>				.37
Male	1.00			
Female	0.67	0.28	1.61	
<b>Race/Ethnicity</b>				.67
White	1.00			
Hispanic	1.11	0.30	4.15	
African-American	0.73	0.27	2.01	
<b>Age Group (Years)</b>				.10
50 - 65 and older	1.00			
21 - 49	0.53	0.25	1.14	
<b>Annual Household Income (Dollars)</b>				.02
< 25,000	1.00			
≥ 25,000	2.55	1.15	5.69	
<b>Number of Toothaches in Previous 10 Years</b>				.04
≥ 5	1.00			
< 5	2.32	1.06	5.07	
<b>Pain Severity</b>				.49
Severe	1.00			
Mild/moderate	1.36	0.57	3.24	
<b>Number of Activities Affected “A Lot”</b>				.39
< 3	1.00			
≥ 3	1.58	0.55	4.55	
<b>Duration of Toothache Pain (Days)</b>				.03
< 4	1.00			
≥ 4	2.46	1.08	5.63	

ings in other reports,<sup>6,29</sup> contacts with dentists in our study were not associated with the respondent’s sex or race. Thus, it appears that most people with toothache pain ultimately sought relief from dentists, but care frequently was delayed owing to cost or other barriers.

The reasons for delay in seeking care from a dentist were varied. The most common was related to traditional access issues.<sup>29</sup> Hispanics in particular reported an inability to make a dental appointment. The only reason given by Hispanic respondents for contacting EDs was that they did not know any dentists to contact. This access problem must be addressed if Hispanics’ oral health disparities are to be reduced.<sup>43</sup> More than one-quarter of respondents thought a physician could treat their problem. Of special note, 16.8 percent of Hispanic respondents delayed care owing to a perceived medical complication: pregnancy. Hispanics also were most likely to mention

medical complications as a reason for visiting a physician. Apparently, Hispanics may have misconceptions surrounding the appropriate use of dental services during pregnancy. The importance of health literacy in addressing health disparities has been gaining increasing recognition,<sup>44</sup> and improving dental health literacy, especially among minority groups, is an important goal.

The reasons given for seeking care from a dentist were quite similar for delayed-care seekers and those who contacted a dentist within 72 hours. Both groups overwhelmingly stated that they contacted a dentist because of pain intensity. Pain consistently has been identified as a primary determinant of care-seeking behaviors.<sup>41,45</sup> More than three-quarters of respondents rated dentists' treatment as helping "a lot." We might have assumed that because care given by a dentist was more likely to be definitive, it would have received the highest ratings for effectiveness. However, ratings for dentists generally were consistent with those reported for EDs and physicians. As discussed earlier, these dentist ratings may reflect the fact that respondents had higher expectations for pain relief from dentists than they did from other care providers.<sup>40</sup>

**Study limitations.** All cross-sectional surveys are limited because they ask questions about the past that depend on the respondent's memory. This limitation possibly was diminished in this survey because dental pain probably is not quickly forgotten. Furthermore, the time frame was limited to the previous 12 months. Also, we did not ask respondents what they would do about a hypothetical toothache experience, as predictions of future behavior may be unreliable; instead, we asked respondents about actual pain experiences. Another potential area of concern is that the study did not measure pain directly, but relied on the respondent's assessment. This should not be a significant problem, because research suggests that self-reported pain is a more useful measure of care-seeking behavior than are actual clinical findings,<sup>41,45,46</sup> and it is likely to be recalled more accurately.<sup>47</sup>

**Telephone surveys.** One potential drawback to telephone surveys is the amount of noncoverage of the target population. In this study, it amounted to the risk that a disproportionate number of low-income households did not have a

listed telephone number. The 2000 U.S. Census reported that only 1.6 percent of Maryland households did not have telephone service in 1999,<sup>48</sup> and only 7.9 percent of households with incomes below the poverty guidelines did not have telephone service. More recent data from the National Health Interview Survey (July through December 2007) indicate that the percentage of U.S. households with only wireless service has increased to 15.8 percent.<sup>49</sup> Nevertheless, research has shown that this is not a significant source of bias.

Estimates from the 2004 and 2005 National Health Interview Survey of the use of health care services by adults with land-line telephones showed relatively small differences from those for all adults.<sup>50</sup> Face-to-face surveys and telephone surveys generally have found few statistically significant differences and even fewer differences of practical significance.<sup>51</sup> Thus, noncoverage bias is

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**The reasons given for seeking care from a dentist were quite similar for delayed-care seekers and those who contacted a dentist within 72 hours.**  
 .....

not now a reason to discontinue general population telephone surveys that help guide public health policy and program decisions.<sup>50</sup> Finally, although the findings are representative of low-income black, Hispanic and white Maryland residents with recent toothache pain, clinicians and others should use caution when generalizing the results to other populations.

**Disadvantaged groups.** Minorities and the poor experience a disproportionate number of dental problems.<sup>52</sup> Disadvantaged people are more likely to have untreated oral health problems and associated pain, and they are more likely to forego dental care even when in pain.<sup>6</sup> This is consistent with reports showing that people with the greatest need are among the least likely to receive care.<sup>53</sup> In addition, minorities experience greater impact from dental pain and practice higher levels of self-medication.<sup>54</sup> For the poor, reduced access to care undoubtedly increases the likelihood of poor outcomes,<sup>43</sup> because dental diseases are, in general, not self-limiting. Untreated dental disease and associated pain adversely affect well-being and quality of life.<sup>41,55</sup> The need to eliminate these health care disparities continues to receive national attention.<sup>29,56</sup>

**CONCLUSION**

In this study, respondents with toothache pain ultimately sought definitive pain relief from den-

tists, while relying on ED and physician contacts for temporary relief. Access to dental services was particularly problematic for Hispanics and was exacerbated by health literacy issues. There has been an increasing awareness of the importance of cultural issues in health care delivery.<sup>57</sup> Attempts to eliminate health care disparities must take into consideration not only cultural influences on minority populations, but also the responsibilities of health care professionals who provide services directed at eliminating disparities.<sup>58</sup> In this context, given the changing demographic composition of the U.S. population, the issue of dental workforce diversity is likely to gain increasing importance.<sup>59</sup> ■

**Disclosure.** The authors did not report any disclosures.

This research was supported by grant 1 R21 DE016444-1 from the National Institute of Dental and Craniofacial Research, National Institutes of Health, Bethesda, Md.

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