Can Questionnaires Replace Clinical Surveys to Assess Dental Treatment Needs of Adults?

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Abstract

Objective: *The purpose of this study was to ascertain whether questionnaires can be used to replace clinical surveys by comparing normative and perceived caries status and treatment needs in a sample of adults living in East London, UK.* ***Methods:*** *A cross-sectional study was conducted in two stages: a structured interview inquired about perceived dental caries status and treatment needs, and dental examinations were performed to determine oral health status and normative treatment needs. Perceived and normative assessments were compared for overall proportions, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV), using the dental examination as a gold standard.* ***Results:*** *Of 139 people examined, 122 were dentate. The PPVs for perceived caries and treatment need were 0.58 and 0.67, respectively. Overall agreement was 65.4 percent for the presence of caries and 64.7 percent for the presence of treatment need. However, no net error was found between the proportions of participants with decay, and a small net error (7.4%) was found between perceived and normative treatment need.* ***Conclusions:*** *Self-assessment is not useful to assess individual dental treatment need, but is of possible value in assessing the needs of adult communities. [J Public Health Dent 1998;58(3):250-3].*

Key Words: normative dental treatment needs, perceived dental treatment needs, questionnaires, dental caries, lay assessments.

Information on treatment needs can be used to evaluate outcomes of care by measuring reduction of need, to prioritize services according to the impact of need, and to plan services to best meet need. Needs assessment in dentistry has focused largely on normative, professionally defined need. Methods of normative assessment fall into four groups: indirect estimation of need from surveys of oral health status, direct measurement of treatment needs of individuals and groups using defined prescribing criteria, analysis of service and treatment records, and the use of the best judgment of expert panels making intuitive guesses (1,2).

Methods to estimate treatment needs from oral health status data are inaccurate and increasingly complex. Pickles' (3) conclusion that "practical inference about clinical care needs cannot be made from surveyed permanent teeth" has been supported by studies in which survey data were compared to treatment subsequently provided by dentists (4,5).

Normative need has been measured directly and the World Health Organization (WHO) advocates defining criteria for treatment needs (6,7). McGuire has suggested that this direct treatment planning approach often is not used because of the variation in prescribing between examiners (2). This variation calls into question the notion of normative need as an objective measure and demonstrates the necessity to increase prescriptive consistency.

Analysis of treatment records was used to provide a crude estimate of treatment needs of children in rural communities in the United States (8). This approach may be useful in areas of high unmet need, especially for children whose treatment options are limited; however, existing data are often incomplete. Results are often biased to reflect the needs of service users (1).

Questionnaire and interview data are useful measures of oral health status, particularly the number of teeth and the presence of dentures (9,10). Research has compared questionnaire data with normative treatment need, predominantly in older people (11-15). We undertook an investigation of treatment needs assessment that provided information on both perceived and normative treatment needs in an adult population. To investigate whether questionnaires might replace clinical surveys in the assessment of dental treatment needs of adults, we report a comparison of lay perceptions of dental treatment need with normative assessments by a dentist.

Methods

A cross-sectional study was conducted in two stages. First, a structured interview was used to inquire about perceived dental needs and impacts of oral health. A few weeks later, a dental examination was carried out on a subsample of those interviewed.

Multistage sampling was used to select approximately 1,000 addresses in the East London and City Health Authority. A piloted questionnaire consisting of 156 closed questions was used as a guide for structured interviews. This paper reports questions inquiring into the following areas: sociodemographic variables (sex, age, race, and employment); the state of the dentition; toothache experience; perceived need for dental treatment; and dental attendance (frequency, reason for attendance). The state of the denti-

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TABLE 1
Perceived and Normative Assessment of Presence of Dental Caries and Treatment Need among Dentate Participants Using Normative Need as a Gold Standard

	Perceived Assessment	Normative Assessment	SN	SP	PPV	NPV
Presence of decay (n=110 respondents)	40.9%	40.9%	0.58	0.71	0.58	0.71
Filling/extraction/prosthodontic need (n=122 respondents)	64.8%	57.4%	0.76	0.50	0.67	0.60

SN=sensitivity; SP=specificity; PPV=positive predictive value; NPV=negative predictive value.

tion and perceived need for dental treatment were assessed using two questions: "Do you think some of your teeth are decayed?" and "If you visited a dentist tomorrow, do you think you need any treatment like a filling, an extraction, a crown, or any work to your dentures?" Cluster samples of interviewed subjects consenting to a follow-up examination were contacted at least twice with the intention of examining at least 100 people. The subsample also included a quota of 30 people who reported toothache in the preceding four weeks.

Clinical examinations were conducted by one examiner (PR) using the protocol of the UK Adult Dental Health Survey and the treatment needs assessment protocol of the WHO (7,9). The examiner was masked to the interview responses of all participants, but was aware that the sample included a quota for those with toothache. The following information was recorded for each participant in the clinical examination: individual tooth status, restorative and exodontic treatment need of individual teeth, and prosthodontic treatment need.

To assess examiner reliability, 30 participants were reexamined between one and eight weeks after the initial examination. The kappa statistic for whether or not an individual tooth required filling was 0.515. Insufficient participants with other treatment needs were among those reexamined to permit calculation of intraexaminer reliability estimates for these determinations.

Perceived and normative caries status and restorative, exodontic, and prosthodontic need were compared for overall proportions, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) using the dental examination as a gold standard. Normative need was taken to comprise need for extractions, fillings, endodontic care, crowns, or bridges and dentures. The relationships between lay and professional diagnoses of caries and between perceived and normative need were assessed using the McNemar test.

Results

Of 1,029 addresses sampled, 874 were dwellings. Occupants could not be contacted or declined to participate in 218 of these; thus, 656 adults were interviewed between March 10 and April 27, 1995, a response rate of 75.1 percent.

One hundred and sixty-seven interviewees were approached, of whom seven could not be contacted, two had moved, one was in the hospital, and two had received dental treatment since the interview. Another 19 people declined to take part in this part of the study. The remaining 139 were examined, or 83 percent of the intended subsample.

The examined sample was 59 percent female, and 40 percent was in paid work. The two largest racial groups were white (63%) and Asian (19%). Thirty-eight percent were between 21 and 40 years of age, and 22 percent were older than 61 years of age. Sixty-seven percent reported that all their teeth were natural and 32 percent said they had some decayed teeth. Twenty-six percent self-reported attendance for regular check-ups, and 35 percent had attended for a dental check-up on their last visit. Sixty-five percent had visited the dentist in the last three years. Due to the quota for people with toothache, 22 percent who were examined clinically reported toothache in the preceding four weeks.

Of 122 dentate participants, 70 (57%) were judged by clinical examination to be in need of restorative treatment, extractions, or prosthetic treatment. Dental treatment needs were similar for both sexes and for age groups. More white people needed fillings than those of other racial groups (45% vs 27%, respectively) and more of those who reported never visiting the dentist required dental extractions than those who visited regularly (37% vs 6%, respectively).

Of the 110 dentate participants who responded to the question about the state of their dentition, 45 thought they had decayed teeth (Table 1). The normative assessment also identified 45 people with caries. Of the 45 who thought they had decay, 26 had one or more decayed teeth. Nineteen of 65 who did not think they had decay did. Self-assessed presence of caries was significantly associated with that professionally defined ($P \leq .001$, McNemar test).

All 122 dentate participants who were clinically examined answered the question about perceived need. Seventy-nine (65%) thought they needed treatment and 70 (57%) were deemed to need treatment at clinical examination (Table 1). Of the 79 with a perceived need, 53 had a normative need and 26 with no perceived need had no normative need. Perceived need was not associated with normative need (P=.225, McNemar test).

Fifteen of the 17 edentulous participants responded to the question about perceived need. Ten (67%) thought they needed treatment and 11 (77%) had a normative need. Perceived need was not associated with normative need (P>.250, McNemar test), although the small number of edentulous participants lent little power to this analysis.

Discussion

These data suggest that self-reported interview data are not useful for assessing the oral health status and

treatment needs of individuals, but may be appropriate to estimate the same characteristics for adult populations. Self-assessment and professional assessment identified identical numbers of people with dental caries and similar numbers in need of treatment.

The discrepancy between lay and dentist assessments at an individual level is termed "gross error." Gross error is most relevant for diagnosis and treatment of individual patients. Its effect can be assessed as sensitivity, specificity, and predictive value. Used in this way, self-assessment would have failed to identify 42 percent of those with caries and 24 percent of those who needed treatment (i.e., 1 – sensitivity). Only 14 percent of the sample would have missed necessary treatment, had perceived need been used to identify individuals in need of treatment; 21 percent would have received unnecessary treatment.

However, this study aimed to assess the usefulness of questionnaires in the assessment of treatment needs at a population level where "net error" is more pertinent. Net error within a group is less if individual errors compensate for each other (9). With the use of questionnaire data, we found no net error for the number of people with decay, a small underestimate in the number of edentulous people needing treatment, and a small overestimate for the number of dentate people requiring treatment. The overestimate among the dentate participants may have been reduced with the use of radiographs to supplement the clinical examination. Their use might increase estimates of normative need by 2 percent over that found in the epidemiologic assessments survey (16).

Other research found moderate or substantial agreement between lay and professional assessment of the oral health status of individuals (9). In the 1988 UK Adult Dental Health Survey dentate participants reached 92 percent agreement with dental examiners about their number of teeth, 70 percent gave the correct range for their number of filled teeth, 72 percent agreed with the dentist that they had unsound fillings, and 64 percent agreed about the presence of decayed teeth. At the population level net error was low in a validation study done as part of that same survey. A group of volunteers had 102 total teeth and 97.5 filled teeth for every 100 of each recorded by the dentist. Likewise, low net error was found in a study of Australian adults whose perceived and normative needs for extractions or fillings were "virtually identical" (17).

One limitation of this study is that it is cross-sectional and does not determine whether perceived caries or need change in populations as normative levels of these parameters change. At an individual level, we found an association between lay and professional assessments of dental caries, but not between treatment need in either dentate or edentulous participants. Other research has shown that the discrepancy between normative and perceived need decreases with calibration of the examiners (15). While the finding in that study suggests a relationship between perceived and normative need, the correlation between the two should be investigated in populations with different levels of need.

Perception of need also may be related to other factors such as experience and expectations of dental care. Additional research is required to assess how these and other cultural factors might affect the relationship between lay and professional assessments of oral health status and need. For example, a cohort effect appears to exist so that the discrepancy between perceived and normative need is greater in older people (11-15). If questionnaire data are to be used to estimate treatment needs, these data may need to be adjusted for particular groups of people. Alternatively, specific items may be more sensitive in some groups. For example, responses to five questions regarding dental attendance and oral symptoms corresponded with normative need in older people (11).

At the time of data collection, the examiner was aware that participants with recent toothache were overrepresented in this study, which could have led to bias. If so, normative assessments would be inflated and would lead to a small decrease in net error. This effect could be reduced in subsequent studies by not including a quota of people with toothache and/or by masking the examiner to any quota sampling. The use of a quota for enrolling subjects into the study also means that the sample was not representative of the larger population, and the prevalence of dental caries and treatment need are not generalizable to the population. However, it is the aim of this paper to investigate the relationship between perceived and normative need, not to make population estimates. While the results of this study suggest that questionnaires are not useful for assessing the dental treatment needs of individuals, their use warrants further investigation as a method for assessing the needs of adult populations.

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