ORIGINAL ARTICLE

Clinical practice guidelines in dentistry: opinions of dental practitioners on their contribution to the quality of dental care

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Qual Saf Health Care 2003;12:107–111

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Accepted for publication
17 November 2002

Objectives: To assess the opinions of general dental practitioners regarding the development and importance of clinical practice guidelines and their contribution to the quality of dental care.

Methods: A questionnaire was sent to a representative sample of 1656 dentists in the Netherlands. Factor analysis was conducted to identify scales of variables, and a reliability analysis was conducted to verify the reliability of the identified scales. The effect of the independent variables is expressed as odds ratio per scale part (standard deviation, SD). Regression analyses were conducted to study determinants of the opinions on clinical guidelines.

Results: The response rate was 73%; 54% of the respondents supported the development of clinical practice guidelines for dentists. Most respondents indicated that clinical practice guidelines could be used as a checklist, as a support in daily clinical decision making, and as a basis for continuing dental education. The factor analyses yielded four scale factors—contribution of guidelines to effectiveness of care (OR 1.95/SD), contribution of guidelines to professional autonomy (OR 1.70/SD), contribution of guidelines to quality of care (OR 2.52/SD), and contribution of guidelines to collaboration (OR 1.49/SD)—which complied with the criterion of Cronbach's alpha >0.60. Multiple regression analysis with the four scale factors as dependent variables yielded only extremely low correlations for practice and dentist characteristics ($R^2=0.01-0.04$).

Conclusions: Only about 50% of dentists support the development and implementation of clinical guidelines. Guidelines are seen as helpful in the provision of continuing dental education and as a support in daily clinical decision making. The most important barrier to successful implementation of clinical practice guidelines is the fear of dental practitioners that guidelines will reduce their professional autonomy. Practice and dentist characteristics are unrelated to dentists' opinions on clinical practice guidelines.

During the last decade there has been an increasing interest in developing clinical practice guidelines in health care.¹⁻¹⁸ Clinical practice guidelines may help to improve and monitor the quality of care, and can be defined as systematically developed statements to assist the practitioner and the patient in making decisions concerning appropriate health care in specific clinical situations.¹ Practice guidelines have been designated as essential parts of professional quality systems in health care.⁴ Although difficult to demonstrate, recent reports suggest that diagnostic and treatment decisions based on practice guidelines may improve the quality of care provided to patients.^{4,12}

To date, practice guidelines have been implemented in health care with varying success. The first guidelines introduced in the area of general medicine were developed without active participation and involvement of the intended users (general practitioners) and were partially without a credible scientific basis.¹¹ This frequently resulted in guidelines which were not fully supported by the profession^{11,12} and, as a consequence, general practitioners tended to classify them as "unpractical".^{3,11} Professional organisations are currently involved in all stages of guideline development to increase the probability of acceptance by healthcare workers.^{11,12} Professional organisations for family medicine and medical specialists in the Netherlands have successfully developed and

implemented a significant number of clinical practice guidelines, all of which were well accepted.^{12,19,20}

In dentistry only a few attempts have been made to develop and implement clinical practice guidelines.^{5,21-25} Some initiatives resulted in the development of general dental practice guidelines pertaining to practice management and patient related aspects of dental treatment, and to appropriate communication between healthcare professionals.²⁶ In the Netherlands the government has transferred the responsibility for improving and maintaining the quality of dental care to the dental profession.⁵ The Dutch Dental Association has developed a quality assurance programme, of which the construction of nationwide clinical practice guidelines and inter-professional collaboration in dental peer groups, both on a voluntary basis, are essential parts. These guidelines should be based on sound and convincing evidence, the guideline development procedures should be clear and explicit, and the authorisation should be performed by a well accepted organisation.¹⁰ According to a 1997 survey, most of the existing dental clinical guidelines in the Netherlands did not fulfil these requirements²³ and may therefore complicate their acceptance. In addition, these guidelines were not systematically disseminated and implemented nationwide.

An important goal of evidence based dental clinical practice guidelines is to provide dentists with a professional standard and to serve as a basis for continuing dental education.²³

Box 1 Dental practice in the Netherlands

Dental practice: 65% of Dutch dentists work in single handed practices and 35% in group practices. Most dentists run their practice as a private enterprise.

Practice routines: about 2500 patients attend their dentist at least once a year for a check up, which is free of charge for patients insured with "Sickfund", a health care insurance which is compulsory for people with a yearly income under €30 000. About 57% of the Dutch population is insured with "Sickfund" and 43% have private insurance. It covers full medical care but the coverage of dental treatment requires additional payment. Patients with a dental insurance generally pay 25% of the costs of the dental treatment themselves.

Continuing dental education (CDE) activities: CDE is on a voluntary basis. Over 50% of dentists attend CDE actively at least once a year. About 25% of all dentists participate in a dental study (peer) group.

The mean numbers of patients and dentists per practice, and mean and modal number of auxiliary staff per practice in the Netherlands are shown in table 1.

However, not much is known about the attitudes, expectations, and opinions of dentists towards the development and use of clinical practice guidelines. Much attention has been given to the scientific validity and reliability of guidelines, but research into factors that may be decisive for their use in clinical practice is still scarce.¹⁷ Before starting to develop guidelines it is valuable to understand the characteristics that make them effective.^{11, 17} Several studies have focused on the appropriate use of guidelines in daily practice.^{13-16, 27, 28} Confidence in the quality of the guideline and the credibility of the group that developed it are essential for the acceptance of a guideline.¹¹ Although many factors may be similar to those applicable to general physicians, there may also be considerable differences in medical and dental practice given the different funding and organisational structures (box 1).²⁴ Moreover, in dentistry a notable move towards a more profession centred approach has been observed.²⁹⁻³¹ A better insight into the opinions and preferences of dentists may be helpful in the implementation of future guidelines, thus increasing the acceptance by practitioners. This study assesses the opinions of general dental practitioners towards the development, use, and barriers of evidence based clinical practice guidelines and their contribution to the quality of dental care.

METHODS

As part of a national survey periodically performed by the Dutch Dental Association, a questionnaire on dental practice guidelines was written. Other questions concerned work and practice characteristics and experiences with a recently introduced treatment protocol on periodontology.

Participants

The questionnaire was sent to 1656 general dental practitioners randomly selected from a total of 5692 dental practitioners

practising in the Netherlands in 1998. The sample was carefully selected by the research department of the Dutch Dental Association in order to be representative, and was balanced for sex, age, year and university of graduation.³²

Questionnaire

The questionnaire comprised 29 items and was evaluated for appropriateness among a panel of five practising dentists and dental researchers. The questions were modified according to their comments. In an introductory section the constructs general and clinical practice guidelines were explained and some examples were given. In the questionnaire an evidence based clinical practice guideline was defined as "a guidance, based on evidence and on clinical expertise, to assist the practitioner in making decisions concerning appropriate health care". Six questions were related to characteristics of the dental surgery and personal education activities (number and insurance status of registered patients, number of dentists and auxiliaries, number of weekly working hours) and 23 questions concerned the dentist's opinions on the development and use of evidence based clinical practice guidelines and their contribution to the quality of dental care. These questions addressed the effectiveness of care, professional autonomy, quality of care, professional cooperation, and continuing dental education activities. In answering the questions, the participants were asked to indicate the level of their agreement with each of the items using the following ordinal scale: agree; neither agree nor disagree, don't know; disagree. The question "Do you consider it important that clinical practice guidelines should be developed to support dental general practitioners in clinical decision making?" could be answered with "yes" or "no". Those who were in favour of the development of clinical practice guidelines were asked to propose topics for future clinical practice guidelines and to justify their suggestions.

Procedure

The initial mailing included an introductory letter, a confidentially coded questionnaire, and a reply paid envelope. A reminder was sent after 1 month to those who did not respond. Two months after the initial mailing the non-respondents were reminded by telephone to return the questionnaire. Respondents who indicated that they were not general practitioners were excluded.

Statistical analysis

Modes were imputed for incidental missing observations. Factor analyses (principal component analysis with Varimax rotation) were conducted to identify scales (clusters) of variables. A reliability analysis was conducted to verify the reliability of the item sum of the identified scales. A scale factor was included in further statistical analysis at Cronbach's alpha >0.60. Logistic regression analyses using the response to the question "Do you consider it important that clinical practice guidelines should be developed to support dental general practitioners in clinical decision making?" as a dependent variable were conducted to test the effect of single and scaled factors (independent variables) on the decision to support the development of clinical practice guidelines. The

Table 1 Practice size, mean number of patients and dentists per practice, and mean and modal number of auxiliary staff per practice in the Netherlands

	1 dental unit	2 dental units	≥3 dental units
Percentage of dental practices	42%	44%	14%
Mean no of dentists	1.1	1.4	1.8
Mean no of patients	2207	2620	3180
Mean (modus) no of dental assistants	1.6 (2)	2.3 (2)	3.5 (3)
Mean (modus) no of dental hygienists	0.1 (0)	0.6 (0)	1.1 (1)
Mean (modus) no of dental secretaries	1.2 (0)	0.9 (0)	1.2 (0)

Table 2 Identified factors (bold typeface) and responses (n=1 177) to items of the questionnaire concerning dentists' opinions about guidelines and the factor loading for each individual item

Question: "Clinical practice guidelines . . ."	Factor loading	Agree (%)	Neither agree nor disagree (%)	Don't know (%)	Disagree (%)
Contribution of guidelines to effective care ($\alpha=0.66$)					
• Are useful as checklist	0.58	89.6	6.6	1.7	2.2
• Are supportive in daily dental decision making	0.66	66.4	20.8	3.0	9.8
• Are essential for dental and continuing education	0.63	53.1	27.9	6.9	12.1
• Show others how dentists work	0.62	42.8	30.7	8.9	17.6
• Will neutralise large treatment variation between dentists	0.50	34.7	30.5	9.5	25.3
• Are useful for cost effective and efficient work	0.56	25.9	31.0	9.9	33.2
• Should be obligatory	0.41	8.9	23.3	2.4	65.4
Contribution of guidelines to professional autonomy ($\alpha=0.66$)					
• Will straitjacket the dentist	0.72	55.8	26.1	2.4	15.7
• Will affect professional autonomy	0.78	32.4	30.1	5.3	32.2
• Are rarely feasible and suitable in daily dental practice	0.63	19.3	39.7	9.1	31.9
• Are detrimental to good dental care	0.60	6.2	24.4	5.7	63.7

effect of the independent variables is expressed as odds ratio (OR) per scale part which, in accordance with the β coefficient in linear regression, was chosen to be one standard deviation (Z score of independent variables)—that is, OR/SD. Finally, a multiple regression analysis was conducted between the identified factors as dependent variables and several practice aspects (year of graduation, number and insurance status of registered patients, number of auxiliaries and dentists per practice, workload defined as the ratio of the number of patients and weekly working hours), and the dentist's continuing dental education activities (participation in study groups, peer groups and practice visitation).

RESULTS

After two reminders 1212 dentists returned the questionnaire (response rate 73%); 35 responses were excluded from further analysis as the dentists had retired leaving 1177 questionnaires for analysis. The respondents and non-respondents were similar in terms of year of graduation, sex, workload, number of auxiliaries, and participation in dental peer groups.

General aspects

The mean age of the respondents was 44.4 years (range 25–67) and the mean year of graduation was 1979 (range 1954–

1996). The majority (91.1%) worked as general dental practitioners in a private or community dental practice. The mean time spent on treatment or treatment related activities per week was 41 hours (range 4–75) and the mean number of patients registered with each dental practitioner was 2560 (range 100–12 000). A mean of 3.2 dental auxiliaries per dentist worked in the dental surgery. 30% of respondents participated in dental study groups, 25% participated in dental peer groups, and 13% took part in practice visitation activities. A comparison of the representativeness of the sample of respondents with the Dutch population of dentists in 1998³² and non-respondents revealed no significant differences with respect to sex, age, year and university of graduation.

Dentists' opinions about guidelines

The question "Do you consider it important that clinical practice guidelines should be developed to support dental general practitioners in clinical decision making?" was answered positively by 54% of respondents, who thus supported the development of clinical practice guidelines. The responses given to the items contained in the questionnaire are shown in tables 2 and 3. The respondents indicated that clinical practice guidelines could be used as a checklist (89.6%), as a support in daily clinical decision making (66.4%), and as a basis for continuing dental education (53.1%); 65.4% were of the opinion that conforming

Table 3 Identified factors (bold typeface) and responses (n=1 177) to items of the questionnaire concerning dentists' opinions about guidelines and the loading for each individual item

Question: "Clinical practice guidelines are important for . . ."	Loading	Important (%)	Neither important nor unimportant (%)	Don't know (%)	Not important (%)
Contribution of guidelines to quality of care ($\alpha=0.77$)					
• Monitoring the quality of dental care	0.66	55.9	26.9	6.7	10.5
• Promoting expertise and continuing dental education	0.79	55.0	29.2	6.1	9.7
• Making complex treatment decisions in special situations	0.66	51.1	24.3	9.5	15.1
• Gathering knowledge	0.78	47.8	30.0	4.7	17.5
• Communication with patients	0.59	42.0	33.6	6.1	18.3
Contribution of guidelines to professional collaboration ($\alpha=0.64$)					
• Making agreements in group practice	0.70	61.5	20.9	10.2	7.4
• Peer review/practice visitation	0.69	45.6	29.7	9.1	15.6
• Cooperation with other healthcare providers	0.58	40.0	32.5	9.3	18.2
• Dealing with insurance companies	0.66	38.0	23.5	13.5	25.0

Table 4 Scale factors, odds ratios (OR), 95% confidence intervals (CI), p values and their influence on support for the development of clinical practice guidelines

Positive contribution of guidelines to:	OR/SD	95% CI	p value	Support for development of guidelines
Effective care	1.95	1.62 to 2.39	<0.00005	More support
Professional autonomy*	1.70	1.43 to 2.01	<0.00005	More support
Quality of care	2.52	2.05 to 3.06	<0.00005	More support
Collaboration	1.49	1.25 to 1.79	<0.00005	More support

*A high score indicates that respondents believe that clinical practice guidelines straitjacket dentists in their professional autonomy but that they are helpful in daily practice (table 2).

to clinical practice guidelines should not be obligatory, while 55.8% said they were afraid that clinical practice guidelines would severely limit the freedom of choice for dentists.

Statistical analysis

The “don’t know” category represented only a small proportion of the responses (5.9% on average) so the responses to the categories “neither agree nor disagree” and “don’t know” were combined in further statistical analyses. Modes were imputed for 51 (0.2%) missing observations. Factor analysis of the items concerning the importance of guidelines yielded two scale factors—“contribution of guidelines to effective care” ($\alpha=0.66$; table 2) and “contribution of guidelines to professional autonomy” ($\alpha=0.66$; table 2)—which together explained 41% of the variance. The second factor analysis of the items concerning the aims of guidelines also yielded two scale factors—“contribution of guidelines to quality of care” ($\alpha=0.77$; table 3) and “contribution of guidelines to collaboration” ($\alpha=0.64$; table 3)—which together explained 53% of the variance. Logistic regression analysis indicated that support for clinical practice guidelines was not significantly influenced by sex ($p=0.15$), year of graduation ($p=0.54$), number of auxiliaries ($p=0.07$), number of patients ($p=0.85$), or number of weekly working hours ($p=0.83$), but participation in continuing dental education activities resulted in more support for guidelines (OR 1.36/SD, 95% CI 1.20 to 1.54, $p<0.0005$). Logistic regression analysis further showed a statistically significant relationship between support for clinical guideline development and all four scale factors (table 4). Multiple regression analysis revealed that little variance within the scale factors could be explained by a cluster of regular practice related variables ($0.01 < R^2 < 0.04$).

DISCUSSION

The results from this first national survey of Dutch dentists on clinical practice guidelines indicate that only about 50% of dentists in the Netherlands support the development of clinical practice guidelines to facilitate clinical decision making and for monitoring the quality of dental care. Practice guidelines were also thought either to straitjacket the dental profession or to restrict the autonomy of dentists (table 2), and these views appear to be major barriers to their use. Acceptance of clinical practice guidelines by the dental profession therefore calls for well planned implementation strategies.

A response rate of 60–80% is generally obtained in surveys of professional groups.³³ The response rate of 73% in this study is well within this range. It has been shown that non-response bias may particularly affect the representativeness of the results from questionnaires on attitudes,³³ but the selection criteria showed no differences between the respondents and non-respondents in our study. We therefore feel that, as a result of careful selection and the large sample size (29% of all dentists), our study population is adequately representative of Dutch general dental practitioners.³²

Although the development of evidence based clinical practice guidelines does not require a majority vote by dentists or

patients, a positive attitude by the dental profession will facilitate their acceptance and implementation. Many dentists feel that guidelines could provide support in rendering appropriate dental care and that they are feasible and suitable in daily dental decision making, but they do not want them to become obligatory. In fact, 56% of the respondents expressed reluctance to the compulsory use of guidelines, fearing that these might limit their professional autonomy. This is in agreement with the findings of other studies where internal specialists and general practitioners expressed the same concerns.^{14 16 34} It is disappointing that only half the respondents felt that guidelines were appropriate for promoting expertise and continuing dental education and for making complex treatment decisions, as these are the main purposes of clinical practice guidelines.²³ Guideline implementation strategies should therefore take account of these issues.

The response category “neither important nor unimportant” was frequently chosen by respondents (tables 2 and 3), possibly because most dentists did not have any experience of evidence based clinical practice guidelines at the time of the study. If clinical practice guidelines were derived from well constructed clinical trials and systematic reviews and general dental practitioners had worked with them, they might have responded differently. It is a challenge to promote the use of evidence based guidelines to the dental profession and to inform a large proportion of Dutch dentists of their use and usefulness.

It is not known to what extent the experience with dentists in the Netherlands can be transferred to other countries. The Dutch government has transferred the responsibility for improving and maintaining the quality of dental care to the dental profession.³ It is evident that the dental profession will not advocate an obligatory use of guidelines, as is the case in most other Western European countries. The current feelings among Dutch dentists concerning the development and use of clinical practice guidelines may well reflect those among dentists in other Western European countries. Logistic regression showed that all identified factors significantly explained the variance in the responses to the question concerning the support for clinical practice guidelines. Apparently, dentists who support guideline development feel that guidelines have a positive effect on the effectiveness and quality of care, while the reverse is the case for those who oppose their use. In developing and implementing clinical practice guidelines the identified scale factors should play an important role as they indicate either positive or negative aspects. Positive aspects such as the contribution of guidelines to the maintenance and improvement of the quality of dental care should be emphasised in promoting them, and negative aspects such as the feared loss of professional autonomy should be taken into account by providing an acceptable band width of the proposed diagnostic and treatment strategies.

The variation in the identified scale factors could not be explained by regular practice and dentist variables. This suggests that the opinions of dentists on the subject of clinical practice guidelines are probably related to their personal views on the use of and misunderstandings about guidelines. This has already been shown for general practitioners.³³ The large

Key messages

- The development of evidence based clinical practice guidelines in dentistry is still in its infancy.
- A survey of 1656 dentists in the Netherlands found that dental clinical practice guidelines are seen as merely supportive to daily practice.
- Dentists' opinions on clinical practice guidelines were unrelated to practice and dentist variables.
- The greatest barrier to successful implementation of clinical practice guidelines is the fear of dentists that they would restrict their professional autonomy.

proportion of dentists who had not been exposed to evidence based guidelines at the time of the questionnaire may have contributed to this result, and this is supported by the high percentage of respondents in the "neither agree nor disagree" response category. To achieve successful implementation of clinical practice guidelines it will be necessary to discuss the advantages and disadvantages with dentists continuously, to emphasise the positive aspects, and to ascertain that the proposed diagnostic and treatment strategies contained in a guideline will decrease the occurrence of the reported negative aspects. Acceptance of guidelines may then increase.

Only 35% of respondents felt that clinical practice guidelines would reduce large variations in treatment between dentists (table 2), although other studies have shown that practice guidelines improved inter-practitioner reliability in clinical decision making.^{18 21 26} An important issue regarding the effect of clinical practice guidelines on the improvement of quality of care is their validity. Although half the Dutch dentists were confident that the quality of dental care would be improved by clinical practice guidelines (tables 2 and 3), no studies have been published in dentistry which indicate that clinical treatment is better or more effective, or that patients are more satisfied when guidelines are used. This also applies to medical care.^{13 14} Moreover, the availability of guidelines does not automatically assure that practice routines will be changed.^{18 35 36} For physicians it has been shown that barriers perceived for a specific guideline may not be present for other guidelines.³⁶ This may also apply to dental practitioners. The development of evidence based clinical practice guidelines in dentistry is still in its infancy,²⁴ whereas medical practitioners already have more than a decade of experience with guidelines. Most dental practitioners work in a single handed practice and have little contact with other medical specialists, whereas doctors more commonly work in teams. Whether or not this influences the acceptance of clinical practice guidelines in dentistry has yet to be investigated.

Well-planned implementation strategies should be conducted involving, for example, existing continuing dental education activities such as study groups and national meetings. Future research should therefore not only focus on the validity but also on methods to successfully implement guidelines.

ACKNOWLEDGEMENTS

We gratefully acknowledge the support by the Dutch Dental Association in the distribution of the questionnaire and in data collection.

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