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

W J M van der Sanden, D G Mettes, A J M Plasschaert, M A van’t Hof, R P T M Grol, E H Verdonschot

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 (R²=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. 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. Practice guidelines have been designated as essential parts of professional quality systems in health care. 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.

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. This frequently resulted in guidelines which were not fully supported by the profession and, as a consequence, general practitioners tended to classify them as “unpractical.” Professional organisations are currently involved in all stages of guideline development to increase the probability of acceptance by healthcare workers. 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.

In dentistry only a few attempts have been made to develop and implement clinical practice guidelines. 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. In the Netherlands the government has transferred the responsibility for improving and maintaining the quality of dental care to the dental profession. The Dutch Dental Association has developed a quality assurance programme, of which the construction of nationwide clinical practice guidelines and interprofessional 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. According to a 1997 survey, most of the existing dental clinical guidelines in the Netherlands did not fulfil these requirements 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.
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.11 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.16–20 23–26 Confidence in the quality of the guideline and the credibility of the group that developed it are essential for the acceptance of a guideline.21 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).

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.

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

<table>
<thead>
<tr>
<th></th>
<th>1 dental unit</th>
<th>2 dental units</th>
<th>&gt;3 dental units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of dental practices</td>
<td>42%</td>
<td>44%</td>
<td>14%</td>
</tr>
<tr>
<td>Mean no of dentists</td>
<td>1.1</td>
<td>1.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Mean no of patients</td>
<td>2207</td>
<td>2620</td>
<td>3180</td>
</tr>
<tr>
<td>Mean (modus) no of dental assistants</td>
<td>1.6 (2)</td>
<td>2.3 (2)</td>
<td>3.5 (3)</td>
</tr>
<tr>
<td>Mean (modus) no of dental hygienists</td>
<td>0.1 (0)</td>
<td>0.6 (0)</td>
<td>1.1 (1)</td>
</tr>
<tr>
<td>Mean (modus) no of dental secretaries</td>
<td>1.2 (0)</td>
<td>0.9 (0)</td>
<td>1.2 (0)</td>
</tr>
</tbody>
</table>

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 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.22

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 guideline, 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.

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.
effect of the independent variables is expressed as odds ratio (OR) per scale part which, in accordance with the \( \beta \) 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 1998
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 2 | Identified factors (bold typeface) and responses (n=1177) to items of the questionnaire concerning dentists’ opinions about guidelines and the factor loading for each individual item

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

Table 3 | Identified factors (bold typeface) and responses (n=1177) to items of the questionnaire concerning dentists’ opinions about guidelines and the loading for each individual item

<table>
<thead>
<tr>
<th>Question: “Clinical practice guidelines are important for . . .”</th>
<th>Loading</th>
<th>Important (%)</th>
<th>Neither important nor unimportant (%)</th>
<th>Don’t know (%)</th>
<th>Not important (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribution of guidelines to quality of care (( \alpha =0.77 ))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring the quality of dental care</td>
<td>0.66</td>
<td>55.9</td>
<td>26.9</td>
<td>6.7</td>
<td>10.5</td>
</tr>
<tr>
<td>Promoting expertise and continuing dental education</td>
<td>0.79</td>
<td>55.0</td>
<td>29.2</td>
<td>6.1</td>
<td>9.7</td>
</tr>
<tr>
<td>Making complex treatment decisions in special situations</td>
<td>0.66</td>
<td>51.1</td>
<td>24.3</td>
<td>9.5</td>
<td>15.1</td>
</tr>
<tr>
<td>Gathering knowledge</td>
<td>0.78</td>
<td>47.8</td>
<td>30.0</td>
<td>4.7</td>
<td>17.5</td>
</tr>
<tr>
<td>Communication with patients</td>
<td>0.59</td>
<td>42.0</td>
<td>33.6</td>
<td>6.1</td>
<td>18.3</td>
</tr>
<tr>
<td>Contribution of guidelines to professional collaboration (( \alpha =0.64 ))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Making agreements in group practice</td>
<td>0.70</td>
<td>61.5</td>
<td>20.9</td>
<td>10.2</td>
<td>7.4</td>
</tr>
<tr>
<td>Peer review/practice visitation</td>
<td>0.69</td>
<td>45.6</td>
<td>29.7</td>
<td>9.1</td>
<td>15.6</td>
</tr>
<tr>
<td>Cooperation with other healthcare providers</td>
<td>0.58</td>
<td>40.0</td>
<td>32.5</td>
<td>9.3</td>
<td>18.2</td>
</tr>
<tr>
<td>Dealing with insurance companies</td>
<td>0.66</td>
<td>38.0</td>
<td>23.5</td>
<td>13.5</td>
<td>25.0</td>
</tr>
</tbody>
</table>
bias may particularly affect the representativeness of the
dentists), our study population is adequately representative of
result of careful selection and the large sample size (29% of all
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 appro-
appropriate dental care and that they are feasible and suitable in
daily dental decision making, but they do not want them to
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
conscerns. 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. 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 practi-
tioners had worked with them, they might have responded dif-
derently. 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. 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 den-
tsists in other Western European countries. Logistic regression
analysis showed that all identified factors significantly explained
the variance in the responses to the question concerning the sup-
port 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. The large

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

*A high score indicates that respondents believe that clinical practice guidelines strain jacket dentists in their professional autonomy but that they are helpful in daily practice (table 2).
The development of evidence based clinical practice guidelines in dentistry is still in its infancy.
A survey of 1566 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.\(^ 34\)\(^ 35\)\(^ 36\) Moreover, the availability of guidelines does not automatically assure that practice routines will be changed.\(^ 18\)\(^ 21\)\(^ 26\) For physicians it has been shown that barriers perceived for a specific guideline may decrease the occurrence of the reported negative aspects. Acceptance of guidelines may then increase.

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
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References