A Comparison of the Impact of Information from a Clinician and Research-based Information on Patient Treatment Choice in Dentistry

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Abstract

***Objectives**: There is an imperative that clinicians should employ an evidence-based approach to both clinical care and treatment, and involve patients in the decision-making process. In Britain, public policy emphasizes the importance of patient involvement, participation and partnership in health care, however little is known of the effect of evidence-based information on this. This study compares treatment decisions made by dental patients on the basis of two sources of evidence: clinician and research. **Method**: Vignette method with the two sources of evidence as experimental variables. The study population was a convenience sample of dental patients recruited from a clinic waiting area at a Dental Hospital (n=100). Each participant read a vignette describing a visit to the dentist for treatment of severe toothache in a back tooth. The nature and purpose of the visit was identical in each vignette. The participants indicated their decision about possible treatment, based on the information they had been given in the vignette and rated their confidence in the decision on a three point Likert scale. Additionally participants' were asked to rate their own oral health. **Results**: Research evidence influences the confidence patients have in their in decision especially when it supports clinical judgement and where individuals value their oral health. Research evidence does not replace the confidence that patients have in the dentist's clinical judgement. **Conclusion**: Dental patients' willingness to engage in treatment is influenced by the dentist's clinical recommendation and the importance of oral health to the patient.*

Key Words: Evidence based dentistry, patient decision-making, patient choice

Introduction

The paradigm shift that the Evidence-Based Medical Working Group (1) described fourteen years ago is now well and truly established. Today, in all aspects of health care provision there is an emphasis that both clinical care and treatment should be underpinned by an evidence-based approach (2) and the concept of clinical decision making based upon expertise and experience alone is no longer convincing (3). Evidence-based practice has been defined as being about integrating individual clinical expertise and the best external evidence (2). The dentist practicing evidence-based health care is required to make decisions between a range of possible actions based upon relevant research evidence, professional knowledge and expertise and the values of the patient.

In contemporary literature there is an emphasis on the importance of collecting and analyzing clinically relevant research on a variety of dental treatments and interventions in order to disseminate research findings and inform clinical practice (4). The establishment of the Cochrane Collaboration in 1992 and the subsequent formation of the Oral Health Group in 1994 highlight the importance that the dental profession places upon the dissemination of current best practice based on the research evidence using systematic reviews and meta-analysis. The extent to which these important innovations have had a direct influence on clinical practice is debatable. In some instances there is evidence to suggest that changes in practice have followed the publication of evidence based guidelines, for example the extraction of non-impacted third molars (5), however in general it would appear that the adoption of evidence based practice by dental practitioners has been slow (6).

Concurrently, government policy has changed emphasis (7, 8, 9). The importance of patient and public involvement has been accentuated and there has been a cultural repositioning away from paternalistic health care towards patient involvement, partnership and empowerment (10, 11, 12). The implication of this is that the patient is now expected to want to have a greater involvement in decision making at all levels and to actively engage in the process. With the advent of electronic databases, the Internet and with computer literacy being the norm, lay people as well as health care professionals have access to vast amounts of information (10, 11). Patients are no longer regarded as passive recipients of health care (12; 8). The needs of the public are now seen as an important component within the quality agenda of the NHS and research into what the public desire from NHS dentistry has been set as one of the quality standards re-

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ported on by the Modernising NHS Dentistry Steering Committee (13).

These two perspectives of evidence-based medicine and patient involvement initially appear to converge and one supports the other. Clinicians are encouraged and expected to use high quality scientific evidence as a basis for treatment decision- making, and to involve patients in making decisions concerning their treatment. This situation is perhaps not as simple and seamless as it first appears. There is an underlying assumption that patient choice will coincide and be reinforced by the evidence provided by the clinician and that the patient will make the correct and most appropriate choice by choosing the course of action that the best evidence suggests. This may not be the case. These assumptions do, however, raise the issue of how patients and clinicians understand the best current knowledge and how dentists use this knowledge to guide patients with their treatment choices.

A Medline search from 1966 to July 2005, using the following search terms: ('user involvement' OR 'consumer involvement' OR 'patient choice') AND ('dent$') located no studies in this area despite several discussions of the difficulties of involving patients in healthcare decisions in other settings, for example mental health (14,15,16) and oncology (17,18).

This research intends to establish the influence of two sources of information on patients' decisions about whether or not to have dental treatment. This study examines the choice patients make when faced with deciding between best available research evidence and information based upon the dentist's clinical judgement.

Method

In order to establish the strength of the effect of the scientific evidence and the strength of effect of clinical judgement on patient decision-making, the vignette method was used. The vignette method allows simplified, selective representations of the real world to be presented to the participants. This can help to separate out the complexities that exist in everyday life and can overcome the limitations of questionnaires when trying to elicit views from participants (19). The vignette, a written description of a scenario, can never fully embody all aspects of real life, but it can allow the independent variable to be manipulated and as a research tool, this can be beneficial. The advantage of using the vignette method is that it is very useful when studying difficult topics, especially in studies of perceptions, attitudes, beliefs and norms (20).

Participants. The study was a convenience sample comprised of 100 dental patients recruited from a clinic waiting area at King's College Dental Hospital, London. There were 53 men and 47 women. The age range of the participants was 18-88 years. The overall mean age of the study group was 51.1 years (males 53.3, females 48.7).

The primary outcome was decision to have dental treatment or not, and each independent variable had two levels. Given the usual assumptions of significance level and power, the sample size was determined to be 96. This sample size had 80% power to detect a medium- size effect of 0.35, using 3 degrees of freedom Chi-square Test, with a significance level of 5%. More specifically, the 96 cases, equally allocated to the four groups, gave the test approximately 76% power, at the 5% significance level, to detect a non-centrality parameter of 1.7 (df=3, 92), which corresponds to an anticipated pattern of proportions of 50% versus 40% versus 30% versus 20% in the four groups (Table 1) (21).

Procedure. The study took place in a clinic waiting area prior the participant's receiving dental treatment at King's College Dental Hospital, London. All participants were asked to give their consent to participating in a study examining patient decision-making about whether or not to have dental treatment carried out, when faced with information from two sources.

The experimental design was a two-factor independent group design. The two factors were the type of information given to patients, the clinician's judgement and the research evidence. Each factor had two levels: strong evidence for and strong evidence against. The participant was randomly assigned to one of the four combinations of the two variables. Participants were given a covering letter explaining the purpose of the study, demographic questions and a case vignette.

Apart from the manipulation of the independent variables, the scenario was identical in each vignette. Each vignette described a visit to their dentist for treatment of severe toothache in a back tooth. The nature and purpose of the visit was identical in each vignette. The first paragraph described the study. The second paragraph gave details about the context of the visit to the dentist. The next paragraph explained the strength of research evidence available. The fourth paragraph described the dentist's clinical judgement of the possible outcome. The two factors were manipulated to express two levels of each variable; the evidence strongly supports the intervention, the

TABLE 1
Patients' willingness to engage in treatment, shown by vignette, and source of evidence

Vignette			Patient willingness to engage in treatment (observed value and standardized residual)	
	Research Evidence	Dentist opinion	Yes n (Standardised residual)	No n (Standardised residual)
A	Strong	Weak	19 (-0.3)	6 (0.6)
B	Strong	Strong	24 (0.8)	1 (-1.7)
C	Weak	Weak	15 (-1.2)	10 (2.4)
D	Weak	Strong	23 (0.6)	2 (-1.3)

TABLE 2
Relationship of independent variables (gender, age and self-assessed oral health) on patients' willingness to engage in treatment across all four vignettes

	Treatment		Chi-square
Gender	Yes (n)	No (n)	
Male	44	9	
Female	37	10	0.03
Age			
Up to 48years old	44	7	
49 years old and over	37	12	1.9
Self assessed Oral Health			
Good – Excellent	44	8	
Fair - Poor	37	11	0.9

TABLE 3
Patients' ratings of their confidence in their treatment decision, shown by vignette, and source of evidence

Vignette	Type of information source		Confidence about treatment decision (observed value and standardised residual).		
	Research Evidence	Dentist Opinion	Not at all confident n (Standardised residual)	Quite confident n (Standardised residual)	Very confident n (Standardised residual)
A	Strong	Weak	3 (-1.2)	17 (1.4)	5 (-0.8)
B	Strong	Strong	2 (-1.6)	12 (0.0)	11 (1.5)
C	Weak	Weak	12 (2.4)	8 (-1.2)	5 (-0.8)
D	Weak	Strong	7 (0.4)	11 (-0.3)	7 (0.0)

Table 4
Relationship of independent variables (gender, age and self-assessed oral health) on patients' confidence in their treatment decision across all four vignettes

	Confidence about treatment decision (observed value)			Chi-square
	Not at all confident (n)	Quite confident (n)	Very confident (n)	
Age				
Up to 48years old	12	27	12	
49 years old and over	12	21	16	1.3
Self assessed Oral Health				
Good – Excellent	12	22	18	
Fair - Poor	12	26	10	2.5
Self-assessed importance of Oral Health				
Very important	15	36	23	
Quite important	9	12	5	2.6
Gender				
Male	13	20	20	
Female	11	28	8	6.3 ($p<0.05$)

evidence strongly suggests no effect. The four vignettes corresponded with all four combinations of the two factors (See Figure 1). The vignettes were independently reviewed by a Professor of Conservative Dentistry, a Professor of Prosthetic Dentistry and a General Dental Practitioner who all agreed that the vignettes were representative of clinical situations.

The participants were initially asked to read their assigned vignette. After reading their particular vignette the participants were requested to indicate their decision about possible treatment based on the information they had been given in the vignette, and to rate their confidence in the decision on a three point Likert scale. Additionally, participants were asked to rate their own perceived oral health using a standardized scale (22), to test whether those who perceived their oral health as good were more likely to suggest that the treatment was adopted than patients with poor self-rated oral health.

Data analysis. The primary outcome variable was choice to undergo treatment (yes/no) and was binary categorical. The two independent variables were the strength of the dentist's clinical judgement and the strength of the research evidence, both categorical with two levels. Chi-square was used to test the hypothesis that the proportion of respondents choosing to accept treatment differed across the four vignettes. Similar analysis was performed with the secondary outcome, patients' confidence in their treatment decision (three levels: very confident, quite confident and not at all confident). In order to control for the influence of other independent variables, namely the participants' gender and the participants' rating of their oral health, logistic regression analysis was used. Clinician recommendation, evidence from the literature, gender, age, self assessed oral health status and the importance of oral health were entered stepwise as independent variables until there was no significant change in the model fit. For the logistic regression model only the outcome variable, the decision to undergo treatment, was used.

Results

1. The influence of the clinician and research evidence on patients' decision to undergo treatment. The bivariate analysis revealed differences between vignettes in patient's willingness to engage in treatment (Chi-square =13.19, df=3, $p<0.01$) as

shown in Table 1. The proportion of 'No' responses to vignette C is high as might be expected since both sources suggest the evidence for effectiveness is weak. The contrast between vignettes A and D reveals that where two sources are not in agreement, patients will tend to base decisions on the evidence from the dentist to a greater extent.

Bivariate analyses of patients' willingness to engage in treatment with gender, age, self-assessed oral health rating and the rating of the level of importance of oral health were all found to be non significant (Table 2).

2. The impact of the vignettes on the patients' confidence in their decision to undergo treatment. The impact of the vignettes on patients' confidence in their treatment decision was expressed on a three point categorised outcome, not at all confident, quite confident, and very confident (Chi-square = 17.26, df =6, $p<0.01$) (Table 3). Where the two sources of evidence agree that the treatment is effective (Vignette B) participants were confident in their decision. Where the two sources agreed that treatment was not effective, a large proportion of patients were not confident about their decision. This may be the result of a large proportion of participants choosing to have the treatment despite evidence that it did not work. Contrasting vignettes A and D suggested that patients were more confident in their decision if the research evidence supported the treatment. This analysis was repeated for the male and female participants separately, collapsing the categories 'not at all confident' and 'quite confident' into one category and comparing it with 'very confident'. Neither analysis was significant (Chi^2 for males only=0.39 ns; Chi^2 for females only=2.31 ns).

The bivariate analyses of patients' confidence in their treatment decision with age, self-assessed oral health rating and the rating of the level of importance of oral health were all found not to be significant (Table 4).

There was, however, an effect on confidence about treatment choice when analysed by gender (Table 4). Men were more confident in their treatment decision than women (Chi-square =6.31, df=3, $p<0.05$).

3. Prediction of participant decision regarding treatment. The final logistic regression model is summarized in Table 5. The –2 log likelihood is 81.11. Overall 15% of the variation is explained by the model (Cox & Snell (R^2) = 0.15).

The odds ratios indicate that if the dentist recommends a type of treatment then the patient is between 2 -21 times more likely to have it (CI 1.91-21.40). Where the individual rates their oral health as either quite important or very important they were1-10 times (CI 1.07 – 10.11) more likely have the treatment offered. Interestingly the results show that evidence based information has no effect at all on treatment choice, when other variables are taken into account.

Discussion

Patients' willingness to engage in treatment is related to the dentist's clinical recommendation about the treatment and their concern over their dental health. The use of 'evidence' in a consultation has been found not to be a predictor of treatment choice. If the dentist recommends treatment then the patient was more likely to agree to the treatment. The results show that within a normal distribution, men express greater confidence than women in their treatment choice and this has implications for the type of information that ought to be given. It may be that women need additional information or a different type of information in order to feel confident about their treatment choice. The influence of how individuals rate the importance of their own oral health also has an impact upon the decision making process. The results of this study demonstrate that if oral health is deemed to be important by the individual then they were three times more likely to have the treatment.

These findings imply that dentists have an important role to play in patient choice. The significance of patient involvement in treatment choice has been promoted in recent UK government policy (7) and there has been a general move away from paternalistic dentistry towards patient involvement and empowerment (12, 23). There is a growing awareness that clinicians should consider the views of patients and consumers when planning and providing treatment (24). The underlying assumption that the patient will make the 'right choice' by choosing the treatment that the best evidence suggests has been challenged in this study. When faced with information from two sources the results show that evidence based information has no effect whatsoever on treatment choice. The key determinant about treatment choice appears to be the dentist's clinical judgement. This has implications for dental curricula and ongoing professional development. If the dentist has such a significant role to play in patient decision-making, then the information and clinical advice that dentists give to their patients needs to be clinically accurate, up to date and relevant to the dental problem. The importance of practicing evidence-based den-

TABLE 5
Logistic regression model predicting participant decision to undergo treatment

Independent Variable	Beta	SE of Beta	Wald Beta	Significance	Exp Beta	CI of Exp (Beta)
Dentist as an information source (base = weak support)	1.98	0.68	8.47	0.004	7.23	1.91 - 21.40
Importance of Oral Health	1.19	0.57	4.30	0.038	3.29	1.07 – 10.11
Constant	-0.03	0.48	0.005	0.945	0.967	

Figure I
Decision-making intervention test for experimental design

Introduction to Vignette (all participants):

We are carrying out a study looking at how people make decisions about whether or not to have dental treatment carried out. In particular we are looking at how people make decisions when they are faced with information from two sources. What we would like you to do is to read the information provided below. Imagine that you are in the situation described and then think about how you would act if you had to make the decision described. Try to make your decision as realistic as possible.

You have gone to visit a local dentist because you have a severe toothache. It has been quite painful for some time and has been affecting your concentration at work. The dentist has looked inside your mouth and taken some X-rays. The dentist tells you that one of your teeth has a lot of decay and that this is what is giving you pain.

Vignette A:

The dentist tells you that she could fill the tooth or extract it. She tells you that she recently read a scientific review of treatments for people with problems like yours and that the best evidence available suggests that if the tooth is filled then it should remain pain free and cause you no problems for a long time.

She also tells you that when she has filled the tooth in cases similar to yours then generally she finds that the problem comes back quite quickly, usually within 6 months.

Vignette B:

The dentist tells you that she could fill the tooth or extract it. She tells you that she recently read a scientific review of treatments for people with problems like yours and that the best evidence available suggests that if the tooth is filled then it should remain pain free and cause you no problems for a long time.

She also tells you that when she has filled the tooth in cases similar to yours then generally she finds that the outcome is good causing no problems for a long time.

Vignette C:

The dentist tells you that she could fill the tooth or extract it. She tells you that she recently read a scientific review of treatments for people with problems like yours and that the best evidence available suggests that if the tooth is filled then the problem will quickly come back and cause pain again, usually within 6 months.

She also tells you that when she has filled the tooth in cases similar to yours then generally she finds that the problem comes back quite quickly, usually within 6 months.

Vignette D:

The dentist tells you that she could fill the tooth or extract it. She tells you that she recently read a scientific review of treatments for people with problems like yours and that the best evidence available suggests that if the tooth is filled then the problem will quickly come back and cause pain again, usually within 6 months.

She also tells you that when she has filled the tooth in cases similar to yours then generally she finds that the outcome is good causing no problems for a long time.

Conclusion to Vignette (all participants):

The dentist asks what you want to do.

Would you agree to have the tooth filled? q Yes q No

How confident do you feel that the tooth would be pain free for 6 months?

❑ Not at all confident ❑ Quite confident ❑ Very confident

tistry is underlined, as poor clinical judgement can potentially lead to a diminished and flawed patient choice.

Limitations of the present study can be identified, and these offer directions for future research. The three point rating scale of the patients' willingness to engage in treatment is relatively insensitive and gives a ceiling effect. Similarly, the measure used for patients to rate their confidence in the treatment decision may have revealed more if a more sensitive measure or scale had been employed. The issue of external validity is another limitation. It is unknown whether the same results would have been found in a different population sample. This study was based in a UK dental school and the findings may vary if the study had been replicated in either private dental practices or N.H.S dental practices where cost implications would become a factor in treatment decision-making. The results may differ significantly in a population who do not, or may rarely visit a dentist and who are by definition more reluctant to undergo treatment.

It is worthy to note that the treatment described in the vignettes is restorative, not extraction. This study cannot assess whether different types of treatment offered would affect the findings. Comments made by study participants included that they would 'give it a go' as they could always have the affected tooth extracted at a later date if the treatment did not resolve the toothache. Further research is needed to explore whether the type of treatment affects patient choice. If the choice of treatment were between extraction and conservation then patient choice would be subject to other decision influences. Secondly, it is known that decision-making is subject to many influences and not all decisions appear to be rational (25). In order to understand more clearly how individuals decide on treatment choice and why dentists influence the decision-making process, future research needs to include the opinions of both patients and practitioners. The perceptions of practitioners regarding the use of 'evidence' to inform possible treatment options are likely to influence treatment planning. Finally, the manner in which treatment options are presented was not examined in this study. This might vary significantly from practitioner to practitioner, and as this study has found, the clinical opinions of the dentist is a significant factor in whether patients take up a particular form of treatment or not.

Conclusions

Dental patients' willingness to engage in treatment is influenced by the dentist's clinical recommendation

about the treatment. The strength of the scientific evidence on the decision-making process is not a significant factor. The only variables that appear to have an effect on patient decision-making about treatment and their confidence in that decision are gender and the individual's rating of their oral health.

References

1. Evidence-Based Working Group. Evidence-based medicine. JAMA 1992; 268:2420-2450.
2. Gray JAM. Evidence-Based Healthcare. 2 ed. London: Churchill Livingstone, Harcourt Publishers Ltd., 2001.
3. Sackett DL, Rosenberg W, Gray JAM, Haynes RB, Richardson WS. Evidence-Based Medicine: What it is and what it isn't. BMJ 1996; 312:71-72.
4. McGlone P, Watt R, Sheiham A. Evidence-based dentistry:an overview of the challenges in a changing professional practice. British Dental Journal 2001; 190:636-639.
5. Mettes TG. Nienhuijs ME. van der Sanden WJ. Verdonschot EH. Plasschaert AJ. Interventions for treating asymptomatic impacted wisdom teeth in adolescents and adults. Cochrane Database of Systematic Reviews. 2005.
6. Crawford F. Value of research carried out in dental practice. British Dental Journal 2005; 199:155-160
7. Department of Health. NHS Dentistry: Options for Change. 2002. London, HMSO.
8. Department of Health. The NHS Improvement Plan. Putting People at the Heart of Public Services. 2004. London, HMSO.
9. Department of Health. Creating a Patient-led NHS. Delivering the NHS Improvement Plan. 2003. London, HMSO.
10. Freydberg B. Get with the net. J Am Dent Assoc 1997; 128:1654-1656.
11. Coiera E. The internet's challenge to health care provision. BMJ 1996; 312:3-4.
12. Department of Health. Patient's Charter. 1991. London, HMSO. 1991.
13. Modernising NHS Dentistry Steering Committee. Inequalities of Oral Healthcare. Department of Health, editor. 2002. London, Department of Health.
14. Tait L. Lester H. Encouraging user involvement in mental health services. Advances in Psychiatric Treatment. Vol. 11(3)(pp 168-175), 2005.
15. Diamond B. Parkin G. Morris K. Bettinis J. Bettesworth C. User involvement: Substance or spin? Journal of Mental Health. Vol. 12(6)(pp 613-626), 2003.
16. Pollock K. Grime J. Baker E. Mantala K. Meeting the information needs of psychiatric inpatients: Staff and patient perspectives. Journal of Mental Health. Vol. 13(4)(pp 389-401), 2004.
17. Charles C. Gafni A. Whelan T. Self-reported use of shared decision-making among breast cancer specialists and perceived barriers and facilitators to implementing this approach. Health Expectations. Vol. 7(4)(pp 338-348), 2004.
18. Lantz PM. Janz NK. Fagerlin A. Schwartz K. Liu L. Lakhani I. Salem B. Katz SJ. Satisfaction with surgery outcomes and the decision process in a population-based sample of women with breast cancer. Health Services Research. Vol. 40(3)(pp 745-767), 2005.
19. Gould D. Using vignettes to collect data for nursing research studies: how valid are the findings? Journal of Clinical Nursing 1996; 5:207-212.
20. Hughes R, Huby M. The application of vignettes in social and nursing research. Journal of Advanced Nursing 2002; 37(4):382-386.
21. Pearson ES, Hartley HO. Charts of the power function for analysis of variance tests. Biometrika, 38: 112-130; 1951.
22. Atchison KA, Gift S. Perceived oral health in a diverse sample. Advances in Dental Research 1997; 11:272-280.
23. Department of Health. A First Class Service. 1998. London, HMSO.
24. Newton J.T. Involving the "consumer" in the evaluation of dental care: a philosophy in search of data. British Dental Journal 2001; 191:650-653.
25. Kahneman D, Tversky A. A prospect theory: An analysis of decisions under risk. Econometria 1979; 47:263-291.