JOURNAL OF DENTISTRY 43 (2015) 981–988

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.intl.elsevierhealth.com/journals/jden

Factors affecting patient valuations of caries prevention: Using and validating the willingness to pay method

Christopher R. Vernazza [a,b,*], John R. Wildman [b,c], Jimmy G. Steele [a,b], John M. Whitworth [a,b], Angus W.G. Walls [d], Ross Perry [e], Roger Matthews [f], Petra Hahn [g], Cam Donaldson [h]

[a] Centre for Oral Health Research and School of Dental Sciences, Newcastle University, Framlington Place, Newcastle upon Tyne NE2 4BW, UK
[b] Institute of Health and Society, Newcastle University, The Baddiley-Clark Building, Richardson Road, Newcastle upon Tyne NE2 4AX, UK
[c] Newcastle University Business School, 5 Barrack Road, Newcastle upon Tyne NE1 4SE, UK
[d] Edinburgh Dental Institute, 4th Floor, Lauriston Building, Lauriston Place, Edinburgh EH3 9HA, UK
[e] CHX Technologies Inc., 4800 Dundas Street West, Suite 105, Toronto, Ontario M9A 1B1, Canada
[f] Denplan Ltd., Denplan Court, Victoria Road, Winchester, Hampshire SO23 7RG, UK
[g] University Medical Center Freiburg, Dental School and Hospital, Department of Operative Dentistry and Periodontology, Hugstetter Strasse 55, 79104 Freiburg, Germany
[h] Yunus Centre for Social Business & Health, Institutes for Applied Health Research and Society & Social Justice Research, Glasgow Caledonian University, 3rd Floor, Buchanan House, Cowcaddens Road, Glasgow G4 0BA, UK

ARTICLE INFO

Article history:
Received 13 January 2015
Received in revised form
26 May 2015
Accepted 27 May 2015

Keywords:
Preference-based measures
Willingness to pay
Caries
Prevention

ABSTRACT

Objectives: Determining the value of, or strength of preference for health care interventions is useful for policy makers in planning health care services. Willingness to pay (WTP) is an established economic technique to determine the strength of preferences for interventions by eliciting monetary valuations from individuals in hypothetical situations. The objective of this study was to elicit WTP values for a dental preventive intervention and to analyze the factors affecting these as well as investigating the validity of the WTP method.

Methods: Patients aged 40 years plus attending dental practices in the UK and Germany were recruited on a consecutive basis over one month. Participants received information about a novel root caries prevention intervention. They then completed a questionnaire including a WTP task. Where the coating was indicated, patients were offered this for a payment and acceptance was recorded. Analysis included econometric modelling and comparison of expected (based on stated WTP) versus actual behaviour.

Results: The mean WTP for the coating was £96.41 (standard deviation 60.61). Econometric models showed that no demographic or dental history factors were significant predictors of WTP. 63% of the sample behaved as expected when using stated WTP to predict whether they would buy the coating. The remainder were split almost equally between those expected to pay but who did not and those who were expected to refuse but paid.

Conclusions: Values for a caries preventive intervention had a large and unpredictable variance. In comparing hypothetical versus real preferences both under- and over-valuation occurs.

Clinical significance: Wide and unpredictable variation in valuations for prevention may mean that there are difficult policy questions around what resource should be allocated to dental prevention and how to target this resource.

* *Corresponding author at*: Centre for Oral Health Research and School of Dental Sciences, Newcastle University, Framlington Place, Newcastle upon Tyne NE2 4BW, UK. Tel.: +44 0191 2088396.
E-mail address: c.r.vernazza@ncl.ac.uk (C.R. Vernazza).

http://dx.doi.org/10.1016/j.jdent.2015.05.009
0300-5712/

1. Introduction

Difficult decisions will always need to be taken about allocating the resources available in any dental service. One important input into the decision making process is the value patients and the public (in publicly funded systems) place on the services being considered. Economics has specific ways of measuring valuations and one technique, willingness to pay (WTP) has particular advantages for valuing dental interventions.[1,2] Studying an area where patients already pay (as is common in dentistry) also allows the investigation of actual behaviour compared to hypothetical, stated WTP values, important for the development of WTP methods themselves.

One example of a difficult resource allocation decision would be the question of how much to invest in prevention versus treatment. Moving from treatment to prevention of oral disease has been recognized worldwide as an important aim for any dental healthcare system.[3] Increasing uptake and provision of prevention is a complex task as this relies on both professional and patient behaviour change. Influencing factors for any health behaviour change may include incentives for both clinicians and patients (usually through the healthcare system) as well as barriers to change.[4] Policy makers and service managers must also be convinced of the need and benefits in order to commit resources and design healthcare systems with favourable incentives.

Understanding patient values of prevention and factors influencing these would allow the development of strategies to change patient behaviour and may also influence the design of healthcare systems. Values elicited in a systematic and robust manner using established techniques from the discipline of economics can be incorporated into frameworks which facilitate policy makers in making resource allocation decisions.

In economics, values are based on the concept of utility, where utility theory states that when making a choice in the presence of uncertainty, which characterizes many health decisions, individuals should choose the option that maximizes their expected benefit or personal satisfaction. One approach (albeit not the most common in health) to eliciting utility is to determine a monetary valuation. The most accepted monetary valuation technique is willingness to pay (WTP),[5] where the respondent is presented with a hypothetical scenario in which a health care intervention or health state is to be valued and asked the maximum they would be willing to pay for the intervention or to improve their health state. WTP has been suggested as the most appropriate preference based measure in dentistry.[1,2] However, in dentistry, little work has been done looking at patient preferences and only a very limited number of studies have been reported applying WTP.[6]

Although the arguments for WTP outweigh the problems of other health state utility measures,[2,7] there are some criticisms of WTP. The principal problem raised is its link with ability to pay i.e. those who are able to pay more have a greater influence on WTP and so have a greater influence on decisions. However, methods have been developed to account for this.[8]

A further criticism is that, as the exercise is hypothetical, then stated WTP may overestimate true WTP.[9] There have been extensive experiments in artificial (“laboratory”) settings and in field settings in environmental economics where stated preference (i.e. WTP) is compared with revealed preference (i.e. actual spending of money) which generally support the hypothesis that stated preference overestimates revealed preference.[10] In health, two experiments have addressed revealed versus stated preference with mixed results.[11,12] Dentistry, often requiring some form of direct payment from the patient, is one of the areas of health where revealed preference can be easily observed and this study gives an opportunity to investigate revealed preference as well as stated preference.

The aim of this study was therefore to elicit values for a dental preventive intervention and to analyze the factors affecting these. Secondarily, the validity of the WTP method was investigated by comparing WTP values with revealed preference.

2. Methods

2.1. Context and setting

The context used in this study was dental care provided in the UK and Germany. In the UK, dentistry is offered both under a state system (NHS) and privately. The private provision is offered in several formats including out-of-pocket payments, based on fee per item scales or on time charges, insurance based schemes or capitation schemes where patients pay a regular fee to cover all treatment provided. In this study, UK participants were recruited from five primary care dental practices in the North East of England UK which all offered a variety of payment methods to patients.

In Germany, the vast majority of dental treatment is paid for on an insurance basis, either through state organized schemes (Bewertungsmaßstab zahnärztlicher Leistungen, BEMA) or through private insurance schemes (Geb?hrenordnung f?r Zahnärzte, GOZ). At the time of the study the BEMA scheme consisted of insurance payments being 50% employer funded and 50% self-funded with all dental care aside from some advanced treatments fully covered, with the exception of a €10 surcharge payable in each quarter in which there had been at least one dental visit. The private schemes varied in cover comprehensiveness, with patients choosing their own level of cover from a variety of providers. The four German dental practices, located in Freiburg, in South West Germany, all operated in this mixed market. No major differences in behaviour between the two countries were anticipated butthe split sample allowed this to be investigated.

2.2. The intervention

The intervention used as an exemplar in this study was a novel coating (Prevora, CHX Technologies) applied topically to teeth to reduce the risk of caries, in particular root caries. At the time of the study, the evidence relating to the effectiveness of the treatment showed that the reduction in root caries increment over 1 year was 41%.[13] The coating contains 10% chlorhexidine and is applied by a dental professional to all the teeth of patients who are at risk of dental caries[14] under a resin-based sealant. Although chlorhexidine has been used previously in caries prevention, at the time of the study, this intervention