Review article

PATIENT CENTERED OUTCOME ASSESSMENT FOR PERIODONTAL THERAPY- A REVIEW

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ABSTRACT

Dental treatment has focused on assessment of treatment outcomes rather than patients experience of their disease. A better understanding from individual's point of view is needed for planning and evaluation of health interventions and allocation of resources. Patient assessments are important to understand the effects of the treatment. This assessment can be used to demonstrate the burden of periodontal disease on wellbeing of population and use resources to improve access to oral health care services. Over the last decade, patient-centered evaluation tools have been developed to assess patient's subjective oral health in terms of how it affects patient's daily activities, psychological well being and impact on individual's quality of life. Patient-centered outcome measures provide feasible and appropriate methods for addressing patients' concerns. This review discusses the various aspects of patient centered outcome assessment for periodontal therapy.

Introduction

Oral diseases have an impact on daily living and quality of life with physical, social and psychological influences. Among the oral diseases, periodontitis remains a major public health issue and the progression of the disease is linked to biological as well as social and behavioural factors. Research has known that periodontal disease negatively impacts on Oral Health Related Quality of Life (OHR-QOL). Dentistry has typically focused on the assessment of treatment outcomes rather than patients experience of their disease or their treatment received. Assessment of patient centred outcome is important in periodontal therapy as patients opinions may differ from traditional clinical endpoints.

END POINTS ASSESSMENT FOLLOWING PERIODONTAL THERAPY

Biological/ Clinical/Surrogate end points

Surrogate end point are objective measures which assess the clinicians perspective of disease or therapy such as reduced gingival bleeding on probing, gain in clinical attachment level, bone fill following periodontal therapy etc. Surrogate end points are intangible to patients mind.

Typical surrogate end points include:

- Anatomic measures (Eg: Probing depth)
- Measure of inflammation (Eg: Bleeding on probing)
- Anatomical measures (Eg: Tooth mobility)
- Immunological measures (Eg: Assessment of GCF biomarkers)
- Microbiological measures (Eg: Reduced periodontal microbiota before and after treatment)
- Psychological measures (Eg: Patient satisfaction)
- Economic measures (Eg: Cost of treatment)
- Patient satisfaction

Patient-based outcome / True End Points

Patient-Reported Outcome (PRO)—“any report of the status of a patient’s health condition that comes directly from the patient, without interpretation of the patient’s response by a clinician or anyone else.”

They are subjective measures which capture patient’s perspectives of disease or therapy such as reduced gingival bleeding, tooth mobility, pain, teeth sensitivity, bad breath and improved chewing efficiency following periodontal therapy. These outcome measures are also called as true end points as they are patient tangible (meaning capable of being precisely identified or realised by the mind). The true end points following periodontal therapy are mainly assessed by the subjective OHR-QOL indices.

Patients’ pre-treatment decisions and post treatment satisfaction may be strongly influenced by social, psychological and behavioural dimensions including knowledge, beliefs, attitudes, preferences and behaviours. Patients may know little about periodontal disease pathophysiology, but are likely to be highly sensitized to treatment-related fear, anxiety and pain; concerned about cost, and whether the treated tooth fulfills their functional and esthetic expectations. Although it can be argued that patient-centered outcomes may be less objective than clinician centered outcomes but may compliment surrogate end points. Patient-centered outcome measures provide feasible and appropriate methods for addressing patients' concerns.
SIGNIFICANCE OF ASSESSING PATIENT CENTRED OUTCOME IN PERIODONTAL THERAPY:

1. True end points provide tangible patient benefit and not tangible clinician benefit. For ex: Assessing aesthetic outcome of sub epithelial connective tissue graft, rather than assessing the percentage of root coverage.

2. The clinical significance following periodontal therapy is more meaningful with true end points than surrogate end points.

3. Assessing true end points are simpler (for ex: Questionnaire containing questions like Has gum bleeding reduced following periodontal therapy?) and less expensive than surrogate end points.

4. Patient based outcomes are now becoming an emerging tool in periodontal research.

5. In clinical trials, true end points should be assessed for better evidence on safety and to detect potential harms of periodontal interventions.

6. Patient centered outcome assessment following periodontal therapy is necessary to demonstrate the effect of treatment on the well being of the population and advocate further measures to educate and motivate the periodontal patients to improve their periodontal health related quality of life (PHR-QOL).

PATIENT CENTERED OUTCOME ASSESSMENT MEASURES

Patient-Reported Outcome Measure (PROM) – It is a validated paper-based or electronic psychometric questionnaire used to collect PRO data.

Individual Well Being –Quality of Life (QOL)

The term 'quality of life' is an important factor, which brings the patient and their view into the heart of consideration. 'Quality of life' is a multidimensional construct with no final definition. The World Health Organisation (WHO) defines quality of life “as an individual’s perception of their position in life in the context of the culture and value systems in which they live and relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person’s physical health, psychological state, level of independence, social relationship and their relationship to salient features of their environment’ (WHO 1997).

ORAL HEALTH RELATED QUALITY OF LIFE (OHR-QOL)

OHR-QOL is one patient based outcome and is recognised as an integral part of general health and well being. Research has shown that OHR-QOL measures can detect changes in the quality of life before and after periodontal therapy.

The OHQoL describes patients' subjective experience of oral health and delivers information to complement objective clinical parameters. A number of measuring instruments have been developed, in the form of questionnaires, for the assessment of OHQoL. Major aspects of OHQoL in these instruments are Functional Limitation, Orofacial Pain, Dentofacial Aesthetics and The Psychosocial Influence of oral health.

OHR-QOL ASSESSMENT

Most of the assessment indices or tools focus on frequency of oral problems related to oral health, that is; more the symptoms that are present the worse OHR-QOL.

1. General Oral Health Assessment Index (GOHAI) constructed to measure patient reported oral functional problems like Visual Analog Scale for pain assessment in EuroQOL.

2. OHRQOL-UK was constructed to capture the impact of oral health beyond the absence of disease. In this assessment, it is possible to report the effects of oral conditions and not just the frequency of problems. OHRQOL-UK has been used to study the correlation between OHR-QOL and periodontal disease.

3. Oral Health Impact profile (OHIP-14). This tool has a good reliability, validity and precision. It was introduced to measure social impact of oral diseases on the person’s well being. It works on seven dimensions-

   i. functional limitation (trouble pronouncing words and worsened taste),
   ii. physical pain (aching in mouth and discomfort eating foods),
   iii. psychological discomfort (feeling self-conscious and feeling tense),
   iv. physical disability (interrupted meals and unsatisfactory diet),
   v. psychological disability (difficulty relaxing and embarrassment),
   vi. social disability (irritability and difficulty in doing usual jobs) and
   vii. handicap (life less satisfying and inability to function).

   The OHIP-14 value is calculated by adding all the scores indicated by the patients. The minimum score is 0; by multiplying the maximum value that each impact can cause by the number of questions, a maximum score of 56 points is obtained.

4. EuroQOL-5 D. This tool assesses five dimensions namely; mobility, self care, usual activities, pain/discomfort and anxiety/depression.

In treating periodontal disease, oral health care provider cannot be limited to delivering only technical acts. The provider should be able to assist the patient to acquire the necessary preventive and therapeutic skills to control the problem and to guide the patient in the effective management of the condition, there by improve their periodontal health related quality of life (PHR-QOL).
The Dental Anxiety Scale (DAS) is the most frequently cited measure of dental anxiety in the literature. It asks subjects four questions about how they feel in different dental situations. The total score ranges from 4–20 with a score >13 indicating a person who is dentally anxious. It is a relatively easy scale to administer, but has limitations including its focus on only the cognitive dimension of anxiety, limited validity.

A variety of methods are available to manage dental anxiety or phobias that are used alone or in combination. These methods include pharmacological (ex: nitrous oxide, and conscious intravenous sedation), behavioural (ex: bio feedback), and psychological approaches (like hypnosis) etc. Reducing dental fear must come from the mutual efforts of both the patient and the dental practitioner to make the treatment proceed smoothly.

Patients undergoing periodontal surgery with these psychological factors will experience more postoperative pain and morbidity. So along with the periodontal treatment we should aim at psychological intervention which reduces anxiety, stress and depression. It is crucial to educate the periodontist to focus on coping mechanisms also which enhances the patient perceptions on positive outcomes to improve the quality of life of patients during treatment which helps in increasing treatment outcomes.

**STUDIES ON ANXIETY & FEAR TOWARDS PERIODONTAL THERAPY**

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<thead>
<tr>
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<tr>
<td>Santochi et al. 24</td>
<td>Pre- and post-treatment experiences of fear, anxiety, and pain among chronic periodontitis patients treated by scaling and root planing per quadrant versus one-stage full mouth dissection: a 6-month randomized controlled clinical trial.</td>
<td>In moderate chronic periodontitis patients, SRP-Q and FMD provided periodontal clinical improvements and similar experiences of fear, anxiety, and pain.</td>
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<td>Oystein &amp; Christopher 27</td>
<td>Impact of Anxiety on Pain Perception Associated With Periodontal and Implant Surgery in a Private Practice.</td>
<td>For periodontal surgery and implant treatments pain perception is affected by the level of presurgical anxiety.</td>
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**PAIN**

Pain is widely feared and disliked by the public. It is very rare to present with severe pain in periodontal patients except in cases of tooth hyper sensitivity before or after nonsurgical and/or surgical periodontal therapy, occlusal interferences, acute periodontal diseases such as infections like necrotising ulcerative gingivitis, herpetic gingivostomatitis, periornitis, gingival & periodontal abscess, ulcers, vesiculobullous lesions etc.

Dental pain can be as dull, intense, throbbing, piercing, miserable, and unbearable. Tooth pain has a profound behavioural impact affecting mood, ability to perform normal
activities, sleep, job and social activity. In addition to attending the dentist, a wide variety of self-care is used to address toothache and gum pain, including over the counter medicines, prescription medications (including those prescribed for others), a wide variety of home or folk remedies.

Cost, time availability, fear of dentists, fear of needles, fear of pain, and anxiety that a dentist may find other problems are all barriers to care of toothache. However, patients overwhelmingly identify receiving care from a dentist as the preferable option for pain relief. Hence, pain is an important patient centered parameter to be assessed along with other clinical endpoints.  

PAIN ASSESSMENT SCALES

1. Numerical rating scale

<table>
<thead>
<tr>
<th>Number</th>
<th>No Pain</th>
<th>Mild Pain</th>
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2. Verbal rating

3. Categorical scale

The survival of a treated tooth/ teeth following periodontal therapy is of obvious importance to the patient. It’s reasonable for the patient to expect a high probability for long term retention of their treated teeth. Studies indicate that tooth mortality and/ tooth survival is an intricate finding that has been assessed from both clinicians and patients perspective. Research has shown that both non surgical & surgical periodontal therapy reduces tooth mortality rate and improves patients overall satisfaction and quality of life in terms of functional, aesthetics & psychological factors.

STUDIES ON PAIN AND PERIODONTAL THERAPY

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<td>Genk &amp; Vard 16</td>
<td>Pain Experienced by Patients Undergoing Different Periodontal Therapies</td>
<td>All surgical procedures produced significantly more dentin hypersensitivity than did nonsurgical therapy. The analysis showed no statistically significant differences between male and female patients' discomfort during periodontal treatments. For all periodontal treatments, VAS scores decreased with increasing age.</td>
</tr>
<tr>
<td>Khalid Al Hamdan 38</td>
<td>Pain Perception Following Different Periodontal Procedures</td>
<td>Scaling and root planing had the least pain, swelling and discomfort scores as compared to implant and periodontal surgeries. Patients experienced mild pain with both surgical and non-surgical periodontal treatment.</td>
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TOOTH SURVIVAL

The effect of periodontal therapy on major disease endpoints such as tooth loss, edentulism, or quality of life Non-surgical periodontal therapy may be associated with a substantial reduction in tooth mortality rate by 50%.

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<td>The effect of periodontal therapy on the survival rate and incidence of complications of multirooted teeth with furcation involvement after an observation period of at least 5 years: A systematic review</td>
<td>Good long-term survival rates (up to 100%) of multirooted teeth with furcation involvement were obtained following various therapeutic approaches. Initial furcation involvement (Degree I) could be successfully managed by non-surgical mechanical debridement. Vertical root fractures and endodontic failures were the most frequent complications observed following regenerative procedures.</td>
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<td>Teeth have less risk of being lost if patients are more compliant with supportive periodontal therapy.</td>
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STUDY RELATED TO TOOTH SURVIVAL/ TOOTH LOSS

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ECONOMICS

Cost is a significant barrier to receiving dental care and a very important factor in patients’ treatment choices. The relevance of comparing costs and outcomes of periodontal treatment has repeatedly and increasingly been emphasized in the periodontal literature. 24

With rapid advance of research & development in clinical periodontology, there has been development of effective treatment options, which often involves new resources & higher costs than the existing therapeutic approaches. Hence, the decision is not simply concerned with the choice between the new treatment and the existing treatment. The question is whether the improvement in treatment outcome of the new treatment option justifies its higher cost in comparison with currently existing treatment standards. Hence, economic evaluation is necessary for the periodontal patients in research and in clinical practice which ensure that “the value of what is gained from an activity (treatment) outweighs the value of what is sacrificed”. 25

Economic evaluations
A treatment that is cost-effective is one for which the benefits of that treatment exceed the costs. The benefits of dental treatment in general include the improved or retained functionality and aesthetics of the natural dentition and the discomfort of treatment (a limitation) as valued by the patient. 26

Economic evaluations are concerned with comparing inputs with outcomes, or costs with benefits.

There are four major types of economic evaluation:

A. Cost-Minimization Analysis- is used when comparing treatments of equal effectiveness.

B. Cost-Effectiveness Analysis- in this analysis, benefits is measured in natural units such as days free from a particular condition or disease (compare outcomes on an appropriate quantitave scale).

C. Cost-Utility Analysis- uses a quality of life measure such as Quality Adjusted Life Year (QALY).

The Quality Adjusted Life Year (QALY) is a utility measure – it quantifies changes in health according to years of life that patients would trade to achieve the health improvement. The Quality Adjusted Life Year provides a measure of health output that incorporates reductions in morbidity and mortality on one scale. For Ex: in terms of utility, patient preference for health state and life (or tooth) years gained.

D. Cost- Benefit Analysis- uses monetary value to the benefits.

For any economic evaluation, it is crucial to recognize that all relevant costs should be included whenever possible. These costs will depend not only upon the periodontal treatments that are being evaluated, but also, in the longer term, on the methods for restorative tooth replacements for hopelessly involved teeth or teeth that fail to respond to treatment. This is particularly relevant when the costs for replacing a single missing tooth (for example) may range from those for an acrylic partial denture to those for an implant-retained crown. 27

Braegger et al. 28 in 2005 in a study applied all three units of economic evaluation (cost benefit, cost effectiveness and cost utility analysis) for periodontitis prevention and concluded as follows:

1. An economic benefit from intensive programmes aimed at prevention of periodontal disease in a general population group could not be found.

2. An economic advantage from the use of adjunctive genetic/and or microbiological testing for managing periodontal disease could not be demonstrated.

3. Statistical modelling suggests that non-surgical periodontal procedures are more economical compared with surgical interventions to “control” periodontal disease.

4. An economic advantage of the use of local delivery devices as an adjunct to Sc/RP could not be demonstrated.

5. Economic assessments and actual costs charged and billed to patients are not generally available in the literature.

Incremental cost:
A common mistake in dentistry and other areas of healthcare provision is to make the assumption that the benefits of treatment are simply the costs averted by that treatment. The costs averted by a treatment should always be included, but as a negative cost. The importance of assigning costs correctly in an economic analysis has been discussed previously (Birch & Donaldson 1987) 29, with an emphasis on the need to determine the incremental cost of treatment, which is determined as:

[All of the costs arising from and following treatment] minus [All of the costs arising from and following the alternative intervention]

In clinical periodontology, the incremental cost of SPT is all of the costs associated with treating a patient minus all of the costs in the absence of treatment. The main incremental benefit is likely to be the benefit of retaining all or part of the dentition. While there may be some limitations of SPT such as sensitivity of retained teeth, still the outcomes for the patient after SPT are demonstrably superior to outcomes in the absence of SPT; the incremental benefits are clearly positive. 30

It is necessary for exploration of the issues in applying economic analysis techniques to periodontology that will lead to powerful evaluations of periodontal interventions and there by assess patient based outcomes.

CONCLUSION

Though clinical periodontal outcomes remain pivotal in determining the effectiveness of periodontal therapy, evidence suggest that the treatment strategies that may be delivered by specialists, general dentists and dental care professionals need to
also consider patient based outcomes to assess the true end points of the therapy. As patient-based outcomes and economic evaluations are now becoming an important focus for clinical researchers, for those who hold the budgets for clinical research and for periodontal healthcare services, it is an important intricate tool that may help to improve the overall patients general & oral health related quality of life.

The oral health care provider should be able to assist the patient to acquire the necessary preventive and therapeutic skills to control the problem and to guide the patient in the effective management of the condition, thus by improve their periodontal health related quality of life (PHR-QOL).

References


