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Original article

Cost effectiveness of routine dental checkup and treatment

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ABSTRACT

Aim

To assess the cost effectiveness of routine dental checkup with treatment in Riyadh city, Kingdom of Saudi Arabia

Material and Methods

Retrospective data including age, gender, DMFT, PSR, and treatment cost was obtained from the dental records of the 86 randomly selected patient records from private clinics in Riyadh city, Kingdom of Saudi Arabia. Data were analyzed using Mann-Whitney U test and Spearman's rho correlation.

Results

The mean (±SD) cost of the treatment was SR 14091.52±9629.73, ranging from SR 2390-40290. The mean (±SD) treatment cost was found to be higher with female (SR 18008.18±10479.62). Statistically significant positive correlation was found between cost and DMFT.

Conclusion

The practice of encouraging six-monthly or any other specific frequency of dental check in adults and children is cost-effective.

Introduction

Oral health can be defined as a general state of well-being as a result of healthy and functioning mucosae, gingivae, and dentition. A routine dental check is defined as given by the NHS in its dental remuneration statement, as: "Clinical examination, advice, charting (including monitoring of periodontal status) and report". Six-monthly dental checks have been customary in the General Dental Service in the UK since the inception of the NHS and NHS regulations recognize this practice.1

Researchers have attempted to define an optimal (cost-effective) dental check recall frequency in caries based on: the bitewing radiological diagnosis of caries and modelling of average disease progression, dental practitioner performance, restoration therapy longevity, and the risk of caries. However, an optimal recall frequency for clinical examination for multiple types of oral disease, in primary and permanent dentition and taking into account the modifying factors for disease progression outlined above, has yet to be determined.2, 3

Disadvantages of lengthening recall intervals include moving away from a preventive approach, resulting in more serious sequelae of caries such as bigger restorations and an increased number of extractions, and a loss of opportunity to arrest the development of periodontal disease by encouraging improved personal oral hygiene and initiating appropriate treatment.4

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There was a predominance of studies reporting an increase in decay, a decrease in the number of teeth, and a decrease in fillings, with less frequent dental checks in permanent dentition. Only one study suggested a decrease in attachment level with a decrease in dental check frequency. However, it was statistically not significant.

Some studies suggested that dental check recall intervals of less than 12 months do not impact on tumor size at diagnosis and decreasing dental check frequencies (more than 12 months) may significantly increase the stage and size of tumors at diagnosis. Furthermore, another study demonstrated a significant association between increasing dental check frequency and the perception that oral health affects quality of life.1

One cost-effectiveness study reported an incremental cost of 73US$ per carious surface averted when comparing 12-monthly dental assessment to no assessment. Resource impact studies reported that less frequent dental checks (range 7-24 months) were associated with reduced assessment and treatment. The policy option of 6-monthly dental checks for both deciduous and permanent dentition to longer frequency policies (i.e. 12, 18, 24 and 36 months) demonstrated a consistent trend of an increase in dental decay experience relative to a saving in cost.1

The characteristics of economic evaluation such as cost-benefits, cost-effectiveness, and cost-utility analyses were first derived from the literature on health economy.5 On the basis of the data available on the effectiveness and cost of fluoridation, caries increment, and the cost and longevity of dental restorations, a study found that water fluoridation offers significant cost savings.6 Moreover, school dental screening was capable of stimulating dental attendance and may be used to decrease dental health inequalities.7

There is no existing high quality evidence to support or refute the practice of encouraging six-monthly dental checks in adults and children.1 However, a study reported positive effect of routine checkups for dental check-up on maintaining teeth. This effect was found to be the same for one year and two years or longer intervals between check-ups.8 The results of studies investigating the relationship between dental check frequency and caries in permanent dentition had conflicting results with respect to DMFT and measures of periodontal disease.

However, more consistent results with respect to decay experience (increase in decay with decrease in dental check frequency), filled teeth (decrease in filled teeth with decrease in dental check frequency), and number of teeth (decrease in number of teeth with decrease in dental check frequency) were reported. The idea underlying the current study is that routine dental checkups should alter the natural history of dental diseases for the better, eventually leading to cost-effectiveness. Hence, the aim of this study was to assess the cost effectiveness of routine dental checkup with treatment in Riyadh city, Kingdom of Saudi Arabia.

Methods

Retrospective data was obtained from the dental records of the 86 randomly selected patient records

Tables and Figure

Tables

Table 1. Descriptive statistics of D, M, F, DMFT, GI, PI, and PSR

	Mean	Median	Standard deviation	Range	Minimum	Maximum
D	9.40	9.00	4.59	18	1	19
M	1.42	1.00	1.95	8	0	8
F	4.37	3.00	4.35	15	0	15
DMFT	15.19	13.00	7.72	32	3	35
GI	1.78	2.00	0.42	1	1	2
PI	1.74	2.00	0.53	2	1	3
PSR	2.26	2.00	0.59	3	1	4

Table 2. Comparison of treatment cost (SR) with gender

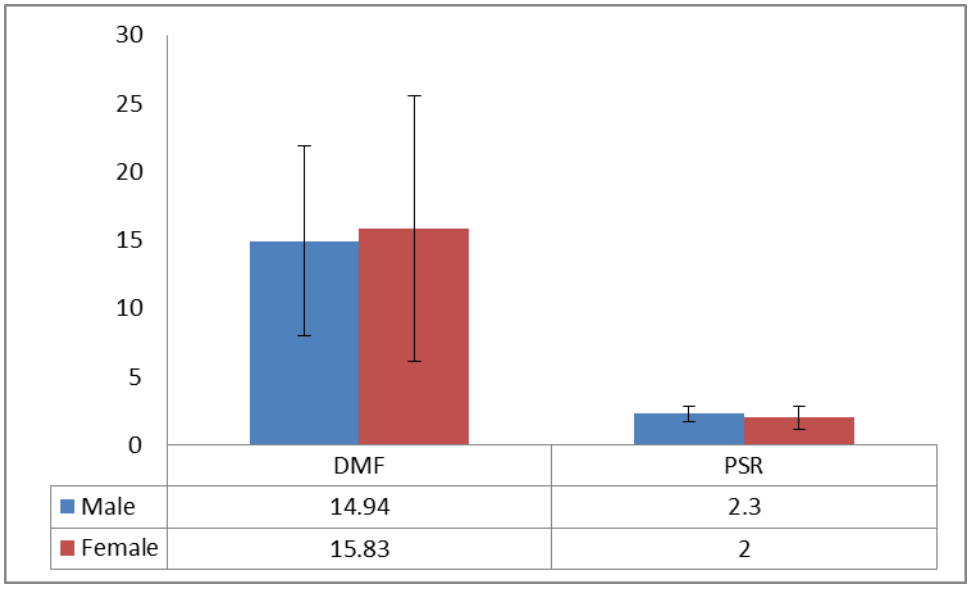
	Mean	Median	Standard deviation	Range	Minimum	Maximum
Male	12701.74	10690.00	8992.909	36700	3090	39790
Female	18008.18	12740.00	10479.624	37900	2390	40290
Total	14091.52	12140.00	9629.728	37900	2390	40290

Table 3. Correlation of cost with age, DMFT, and PSR

		Cost	Age	DMFT	PSR
Cost	*Correlation Coefficient*	1.000	.100	.457*	.055
	Sig. (2-tailed)	.	.365	.000	.695
Age	*Correlation Coefficient*	.100	1.000	.421*	.488*
	Sig. (2-tailed)	.365	.	.000	.000
DMFT	*Correlation Coefficient*	.457*	.421*	1.000	.311*
	Sig. (2-tailed)	.000	.000	.	.022
PSR	*Correlation Coefficient*	.055	.488*	.311*	1.000
	Sig. (2-tailed)	.695	.000	.022	.

**indicates statistical significance*

Figure



from private clinics in Riyadh city, Kingdom of Saudi Arabia. Potential confounding variables of the association between routine dental checkups and treatment cost were age, gender, DMFT, and PSR. Written informed consent was obtained from all participants. Ethical approval was obtained from the Ethical Committee of the Riyadh Colleges of Dentistry and Pharmacy (RCsDP).

Data were entered into the computer and analyzed using Statistical Package for Social Sciences (IBM SPSS, Windows 20.0). Descriptive analysis was undertaken to present an overview of the findings from this sample using mean and standard deviation. Mann-Whitney U test and Spearman's rho correlation was used as tests of statistical significance. A p value of 0.05 or less was considered to indicate statistical significance.

Results

The patients ranged from 13-52 years with a mean (±SD) age of 28.47±8.61 years. The majority of the patients were male (72%). Table 1 shows the descriptive statistics of D, M, F, DMFT, GI, PI, and PSR. The mean (±SD) cost of the treatment was SR 14091.52±9629.73, ranging from SR 2390-40290. The mean (±SD) treatment cost was found to be higher with female patients (SR 18008.18±10479.62) (Table 2). However, it was statistically not significant ($p>0.05$). The mean (±SD) DMFT was higher in female (15.83±9.69) and PSR was higher in male (2.30±0.56) (Figure 1).

Table 3 shows a statistically significant positive correlation between age and DMFT ($p<0.05$). Statistically significant positive correlation was also found between age and PSR ($p<0.05$); and between PSR and DMFT ($p<0.05$). However, the correlation between cost and PSR; and cost and age was not statistically significant ($p>0.05$). Statistically significant positive correlation was found only between cost and DMFT ($p<0.05$).

Discussion

This study aimed to assess the cost effectiveness of routine dental checkup with treatment in Riyadh city, Kingdom of Saudi Arabia. This was a retrospective study and data (age, gender, DMFT, PSR, and cost) was obtained from the dental records with approved treatment plan of 86 randomly selected patient records from private clinics in Riyadh city. The cost of the treatment was applied to the treatment plan and the severity of cases was assessed according to the DMFT and PSR.

The study found that the mean (±SD) cost of the treatment was SR 14091.52±9629.73, ranging from SR 2390-40290. Patients' age ranged from 13-52 years with a mean (±SD) age of 28.47±8.61 years. The majority of the patients were male (72%, n=31). There was a positive correlation between cost and age, DMFT, and PSR. The DMFT and PSR were to assess the severity dental caries and periodontal diseases. Past studies reported that routine dental checkups were associated with significant reductions in children's subsequent non-routine dental checkups and related expenditures, appearing to benefit their oral health.9

Previous studies have reported a significant increase in DMFT with a decrease in dental check frequency. Moreover, they also demonstrated a significant

increase in probing depth with a decrease in dental check frequency.10 The results of the non-routine dental checkups show that treatments are expensive. Hence, it is recommended that the patient checkup the dentist for a routine dental check every six months as suggested by the NHS.

Conclusion

On the basis of the results from this study it can be concluded that the practice of encouraging six-monthly or any other specific frequency of dental check in adults and children is cost-effective. However, further research is required in order to assess the relative effectiveness of different frequencies of dental check in terms of the separate impact on dental caries and periodontal disease.

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