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A cross-sectional study to assess the dental appointment attendance, reflecting the experiences, anticipations and behavioural intentions among 18-25 year olds

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Abstract
Purpose: To test a hypothetical model suggesting that patients pass through a 'psychological cycle' when undergoing a course of dental care: past appointment experiences influence their anticipations for future dental visits, which in turn affect behavioral intentions to attend appointments.
Materials and Methods: Self-administered questionnaires were given to 300 students from 5 different colleges in Bangalore city. The questionnaire assessed variables representing the various stages of the hypothesized model and other relevant variables (dental anxiety, general anxiety and subjective oral health rating)
Results: Sequential regression analysis showed that cognitive factors like negative past experiences (p=0.04) and, expectations and anticipation of future dental appointments ($p<0.001$) along with psychological factors like dental anxiety (p=0.05) and general anxiety (p=0.02) influenced behavioural intentions to attend future appointments. These findings were consistent with the hypothetical model.
Conclusion: The model explains dental appointment attendance behavior based on the contributions of cognitive factors such as expectation and anticipation of future appointments along with past dental experience and can be used to foster better utilization of dental care.

Keywords: Dental appointment attendance, experiences, anticipation, behavioural intentions

Introduction
Regular dental appointment attendance has always known to be associated with better individual oral self-care and complete oral health [22]. Missed healthcare appointments are costly and only partially remedied by reminders [12]. Despite the advantages of regular dental appointments, most of the times the appointments are postponed or totally missed, which gives way to expensive treatment, wastage of resources and underutilization of dental care [19].

Physical, social and mental factors are known causes for missed dental appointment. Physical factors like lack of access, or distance from the healthcare facility, social factors like socio-economic status [10, 16] and mental factors like dental anxiety play a key role in the appointment keeping behaviours of patients. However, despite compelling evidence, less is known about psychological factors and their contribution to oral health-related behaviors [7] Improved understanding of how dental patients' cognitions and feelings influence attendance should help to identify and use better behaviour management techniques so as to improve the dental appointment attendance and oral health in general [23].

There are many psychological models and theories which help in increasing our understanding of the determinants of health behaviours [10]. Multistage models like the Dynamic Well-Being Model gives detailed explanation of various stages of the decision making process. Such models account for the dynamic nature of recurring engagement with dental care providers. They explain the patterns of attendance behaviours to some extent, but do not take into account the cognitive factors [23].

The Dynamic Well-being Model offers a holistic approach to wellbeing, by defining links between peoples' experiences, recollections, anticipations, intentions, and behaviours. It therefore explains how psychological appraisals of one event can influence feelings and behaviours relating to a later one to some extent [23].

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The psychological cycle proposed by Schneider A *et al* (2016), gives a good overview of the stages that the patients go through at different points of time relative to their dental appointments. The cycle explains the inter-relationship of appointment keeping behaviour of patients with their past experience at the dental office and the anticipation they have for the future appointments [23].

Appointment outcomes (for example, type of treatment) and experiences are closely related to time. Planning an appointment (for example, booking it) is regarded as specific behaviour and evaluations of past appointment directly affect the future anticipations (for example, expecting treatment or feeling anxious) [23].

Despite consideration of the various factors affecting oral health related quality of life (physical, mental, social factors), there is limited research on the effect of psychological factors on oral health [23]. In 18-25 year old patients, appointment attendance may be influenced by a variety of factors like physical, mental and emotional stress, fear of dental treatment, lack of time, affordability etc. Thus, this study aimed to assess the dental appointment attendance by using the psychological cycle [23] that includes experiences, anticipations and behaviours in 18-25 year olds.

Materials & Methods

This analytical cross-sectional study was conducted on 18-25year old students attending 5 colleges in Bangalore City. The sample size was obtained by using nomogram with 90% power and 35% standard difference. The sample size obtained using this method was 300. [18] The required sample was recruited using a convenience sampling technique.

The study received formal review and approval by the institutional review board of the KLE Institute of Dental sciences, Bangalore. The study was conducted between July-August 2016. Data was collected using a self-administered questionnaire [23]. Informed consent was taken from the participants before administration of the questionnaire. Only those participants who gave informed consent and who had visited a dentist in the past were included in the study. The response rate for the study was 100%.

The questionnaire administered collected basic demographic data and used the psychological model given by Schneider A *et al*. [23] (Fig 1). This model assessed 3 principal domains-Experience, Anticipation and Behaviour. It assessed how the past experiences determine what the patients anticipate from the future dental visits and thus explaining the behavioural intentions of the patients to attend future dental appointments.
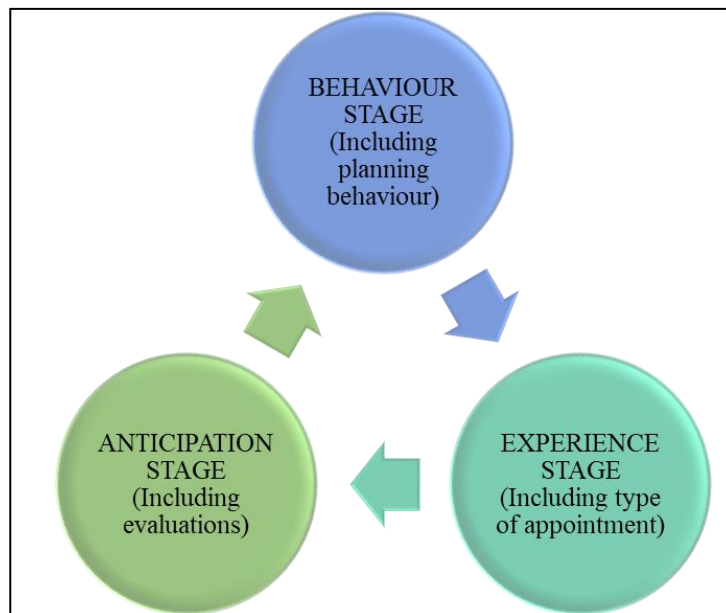

Fig 1: Model of the Psychological Dental Cycle

For assessment of the Experience domain, the participants were asked about the type of appointment (check-up, filling/root-canal, scaling, orthodontic treatment, extraction and prosthetic rehabilitation of teeth). Participants were asked to rate how uneasy and painful the appointment was on a 10-point likert scale (0- not at all, and 10- extreme).

For assessment of the Anticipation domain, the participants evaluated their most recent dental visit with numerical ratings of six satisfaction statements adapted from the SERVQUAL[17] questionnaire, a scale measuring consumer perception of service quality. Rating scales ranged from zero ('strong disagreement') to 10 ('strong agreement') assessing issues such as satisfaction, reliability, responsiveness, assurance, and empathy of the dentist and dental team [23].

To assess the Behavioural domain, the participants were asked if they have any plans to visit their dentist in the future, and how likely they were to postpone the appointment (0-not at all likely, 10-extremely likely). These questions gave the behavioural intentions of the participants towards dental appointment.

In addition to these, the participants answered a single question on their oral health which they rated as 0- worst imaginable to 10- best imaginable. They also answered the Modified Dental Anxiety Scale (MDAS) [14, 15] which is currently the most widely used scale for assessment of dental anxiety. It was proposed by Humphris *et al*. in 1995. It is a 5-item scale that covers questions on anxiety about the next dental appointment, anxiety in the waiting room, during drilling a tooth, during scaling and polishing and during anaesthetic injections. The responses are measured on a 5-point likert scale (1-not anxious, 2- slightly anxious, 3-fairly anxious, 4- very anxious and 5- extremely anxious). The 21-item Depression-Anxiety-Stress Scale (DASS) [13] assessed the general well-being of the participants. This short, validated version of the DASS assesses symptoms of general anxiety, depression, and stress on a scale from zero ('did not apply to me at all') to three ('applied to me very much') [23].

Statistical Analysis

Data was analysed using SPSS v.20. Descriptive statistics were computed first to summarize characteristics of the study population. Sequential logistic regression was employed to assess the appointment keeping behaviour. The stepwise approach allows for testing the hypothesized mediation effects with the cross-sectional data at hand, entering predictor variables into the regression model one at a time [4, 23] The outcome variable was "behavioural intention for future dental appointment. P-value was set at <0.05 for statistically significant results.

Results

A total of 300 students participated in the study. The response rate was 100%. Out of these, 225 (75%) were between 18-20 year old age group and 75 (25%) fell between 21-25 year old age group. The mean age of the participants was 19.67 (SD=1.59). The sample consisted of 177 (59%) females and 123 (41%) males. The sample was diverse and had students belonging to 5 different faculties- B.com, Pharmacy, B.Sc, Management and Law. 129 (43%) participants reported that the last time they visited a dentist was more than a year ago and only 87 (29%) participants said their last visit was less than 6months ago. 68 (22.7%) said that they postponed their previous dental appointment and out of these, 40 (58.82%) said that they postponed it due to fear (Table 1).

Sequential logistic regression was used to assess the influence of all variables on "behavioural intention" which was the outcome variable (Table 2). In the first stage, the MDAS, DASS and the self-rated oral health scores were added to the regression model to check for influences of these factors on the behavioural intentions. Only dental anxiety showed a significant influence on the behavioural intentions of the participants. Participants with high dental anxiety (MDAS) had 1.81 times higher chance of missing their future dental appointments than those with low dental anxiety.

In the second step, the variables in the experience stage were added. In this, both dental anxiety and negative past experience significantly influenced the behavioural intentions.

Participants with a negative past dental experience had 1.51 times higher odds of missing their future dental appointments than those without negative experience in the past.

In the third step, the anticipation stage was added. Among the variables in the SERVQUAL, "attention from the dental team" and "trust towards the dental team" showed statistically significant results. Lower the trust in the dental team, higher are the chances of missing future dental appointments. Expectation of uneasiness and pain also had higher chances of missing future dental appointments, which was statistically significant.

Table 1: Baseline characteristics of participants

Baseline Characteristics	Frequency	Percentage
Faculty		
B.Com	61	20.3
Pharmacy	40	13.3
B.Sc	48	16.0
Management	29	9.7
Law	122	40.7
Age		
18-20 years	225	75
21-25 years	75	25
Gender		
Males	123	41
Females	177	59
Last Dental Visit		
When-		
< 6months	87	29
6months- 1 year	84	28
>1year	129	43
Purpose-		
Check-up	43	14.3
Complaint/Problem	70	23.3
Treatment	187	62.4
Postponement of appointment		
Yes	68	22.7
No	232	77.3
Reason for postponement		
Fear	40	58.82
Cost	28	41.18

Table 2: Sequential Logistic Regression assessing the effect of the psychological dental cycle on appointment keeping behaviours

Stages	B	SE B	p-value	EXP (B)
General Factors				
Dental Anxiety (MDAS)	0.594	0.174	0.001*	1.812
Oral health rating	-0.014	0.055	0.797	0.986
DASS 21-Stress	0.007	0.187	0.970	1.007
DASS 21- Anxiety	0.021	0.118	0.862	1.021
DASS21- Depression	0.200	0.159	0.208	1.221
General Factors+Experience				
Dental Anxiety (MDAS)	0.507	0.179	0.005*	1.660
Oral health rating	0.022	0.058	0.704	1.020
DASS 21-Stress	0.027	0.194	0.888	1.028
DASS 21- Anxiety	0.036	0.121	0.769	1.036
DASS21- Depression	0.057	0.169	0.750	1.055
Negative past experience	0.140	0.047	0.003*	1.150
General Factors+ Experience+ Anticipation				
Dental Anxiety (MDAS)	0.231	0.251	0.357	1.260
Oral health rating	0.029	0.082	0.727	1.029
DASS 21-Stress	-0.349	0.246	0.156	0.705
DASS 21- Anxiety	0.137	0.153	0.370	1.147
DASS21- Depression	-0.044	0.215	0.837	0.957
Negative past experience	0.138	0.066	0.038*	1.147
Past experience evaluation				
Attention from the dental team	0.254	0.095	0.007*	1.289
Trust towards the dental team	-0.345	0.103	0.001*	0.708
Future anticipation				
Expectation of uneasiness	0.424	0.065	0.0001*	1.527
Expectation of pain	0.127	0.062	0.042*	1.135

Discussion

Missed appointments or treatment discontinuation are adverse clinical outcomes at many healthcare facilities, and increase risk factors of recurrence of the symptoms which negatively affects patients health. Especially in dentistry, treatment discontinuation would largely determine the clinical outcome and its prognosis. This is because, in many cases, patients need to receive regular dental treatment for a relevantly long period of time [21].

This study tested the model of psychological dental cycle proposed by Schneider A *et al*. (2016) [23], and assessed the various influences on dental appointment keeping behaviours. This study demonstrated that dental anxiety was a predictor of appointment keeping behaviours alone and in conjunction with negative dental experiences in the past (experience). The evaluation of past dental experience and the expectation of pain and uneasiness in the future dental appointment (anticipation) significantly influenced the behavioural intentions of future dental appointments.

These findings are supported by previous study conducted by Schneider A *et al*. (2016) [23], which showed that dental anxiety is not the sole predictor of dental attendance and explains patients' experiences and behaviours at different stages of their dental appointment. This study stresses the importance of psychological factors in dentistry [3, 20, 24]. In line with theoretical predictions based on the dynamic wellbeing model (DWM), results are consistent with dental experiences following a characteristic cycle of sequential stages that integrates behavioural, cognitive, and emotional aspects [9, 23].

Dental anxiety was shown to be a significant predictor of dental appointment behaviour. This finding is supported by the studies conducted by Berggren U *et al*. (1984) [6]. and Armfield *et al*. (2007, 2013) [1, 2]. Negative past dental experiences was associated with missed appointments in studies conducted by Berggren U *et al*. (1984) [6] and Berge *et al*. (2016) [5]. Similar results were found in the present study, which indicates that a pleasant dental experience can foster more co-operative patients.

Deyo R.A *et al*. (1980) [8] suggested that the relationship between the patient and the therapist greatly influences the appointment keeping behaviour which is supported by this study where we found significant influence of evaluation of previous appointments on the behavioural intentions towards future appointments, which means that if the past dental appointments are unsatisfactory, the chances that the patient will miss the next appointments are high. In contrast, a study conducted by Gunter-Hunt G (1982) [11] suggested that the level of patient satisfaction influences the appointment keeping behaviours of the patients, although they did not find any correlation between the two.

Despite the substantial support of the literature, the study has limitations. Because of the cross-sectional nature of the study, only the intentions of appointment keeping behaviours could be assessed i.e, this study could not assess the actual behaviours of the participants. The present sample of participants is not representative because a convenience method of sampling was employed, which provides only partial generalizability. Memory bias could have affected the data on previous dental experiences. Longitudinal studies are recommended to establish causal relationships between the factors considered in the study and the appointment keeping behaviours.

Conclusion

This study successfully tests the model of psychological dental cycle which explains that negative past experiences lead to negative evaluations of previous dental visits which affects the anticipation of future appointments and thus influences the intention to attend future dental appointments.

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