Association between Optimism, Psychosocial Well Being and Oral Health: A Cross-Sectional Study

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Objective: *The aim of the study was to assess the association of optimism and psychosocial well being of school going children on their oral health status.* ***Study design:*** *The study included 12- to 15-year-old school going children (N = 2014) from Tamilnadu, India. Optimism was measured using the revised version of the Life Orientation Test (LOT-R). A questionnaire was sent to the parents regarding their child's psychosocial behavior which included shyness, feeling inferiority, unhappiness and friendliness. Clinical examination for each child was done to assess the DMFT score and OHI-S score. The data obtained were statistically analyzed using Pearson Chi-Square test, Mann-Whitney test and Kruskal-Wallis test with the aid of SPSS software (version 17). Odds Ratio (OR) was calculated with 95% Confidence Interval (CI). The p value ≤ 0.05 was considered statistically significant.* ***Results:*** *Boys with high optimism had significantly lesser DMFT score than the boys with low optimism (p=0.001). Girls with high optimism had significantly higher DMFT score (p=0.001). In psychosocial outcomes, inferiority (p=0.002) and friendliness (p=0.001) showed significant association with DMFT score. Among the boys, children who felt less inferior (p=0.001), less unhappy (p=0.029) and more friendly (p=0.001) had lesser DMFT score.* ***Conclusion:*** *Among the psychosocial outcomes assessed, inferiority and friendliness had significant association with oral health of the children and hence, can be used as a proxy measures oral health.*

Key-words: Optimism, Oral health, Psychosocial well being

INTRODUCTION

Oral health plays an imperative role in individual's general health and well-being. Dental caries and gingivitis are the two major global oral health problems. Prevalence and severity of dental caries is on declining mode in developed countries. A high prevalence has been documented in countries where effective community based preventive programs have not been established.[1] Despite massive improvements in the field of oral health, the threat still persist worldwide.[2] A good oral health allows the individuals to communicate effectively, to eat, to speak well, to enjoy a better quality of life.[3] The social and psychological dimensions of wellbeing and quality of life are intensely entangled. The relationship between children's psychosocial well being and oral health has been investigated in USA and it was concluded that there was larger association between dental problems and psychosocial outcomes.[4] Poor dental health also affected the emotional stability of children and prevented them from enrolling in social activities like playing.[5]

Optimism is one of the hallmarks of psychological health. Optimism is defined as the extent to which individuals expect desired outcomes to happen in future, and expect undesired outcomes not to happen. When individuals drop in their expectation of desired outcomes, they move from the positive pole, optimism, to negative pole, pessimism.[6] Optimism plays an important role in the self regulation of behavior. Literature reveals its relevant role in influencing adaptive behaviors and psychological adjustment during adolescence.[7] When compared to pessimists, more optimistic adolescents report higher levels of psychological and subjective well being [8, 9] and more adaptive health related behaviour.[10]

It has previously been found that optimism was associated with many positive health outcomes. Ylostalo *et al* reported that optimism was associated with dental health behavior and self-reported dental health. They concluded that optimism is a comprehensive determinant of health.[11] Research on optimism and psychosocial

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well being as proxy measures of oral health were scanty. Hence a study was planned to assess the association of optimism and psychosocial well being of school going children on their oral health status.

MATERIALS AND METHOD

This cross-sectional study was conducted from the Department of Pediatric and Preventive Dentistry, K.S.R Institute of Dental Science and Research (KSRIDSR). The study was strategized in association with various private schools in Tiruchengode, Western Tamilnadu in south India. The study design and protocol was analyzed and approved by the Institutional Review Board of KSRIDSR, Tiruchengode, Tamilnadu. The purpose of the study was explained to the school authorities and their approval was obtained. A written informed consent in native language (Tamil) was also obtained from the parents of the children who participated in the study.

The study was carried out during the period August 2014 to December 2014. The study participants included 12- to 15-year-old school going children (N = 2014) from randomly chosen private schools in and around Tiruchengode, Tamilnadu. The sample included 1107 boys and 907 girls. Care was taken to include school children in same socioeconomic status. Children who expressed unwillingness to participate in the study were excluded.

A questionnaire was prepared for the study with the following components: (i) demographic data (ii) personal oral hygiene history (iii) Life Orientation Test-Revised (LOT-R) (iv) four questions to the parent regarding their psychosocial behavior.

The questionnaire was designed to be completed in 10-15 minutes. Children were asked to fill the questionnaire in their respective classrooms. The class instructor and primary investigator monitored the event. Any difficulties faced by the child in understanding the questions were clarified by the primary investigator. When a child was not able to understand a certain word, an analogy was provided. Children were asked to answer all the questions and were told that there were no correct or incorrect answers. Care was taken that the children answered the questions without discussing with friends.

Demographic data and oral hygiene history

Demographic data included name, age, gender, grade and class section. A unique identification number was given to each child, which was recorded in questionnaire filled by the children and their parents and in their oral health assessment form. Oral hygiene history included frequency of brushing teeth daily, materials used to clean the teeth and the frequency of dental visits.

Life Orientation Test – Revised (Scheier and Carver, 1994)

Optimism was measured using the revised version of the Life Orientation Test (LOT-R). The revised version has been found to correlate (r = 0.95) with the original version.[12] Of the 10 statements, six statements referred to the likelihood of good or bad outcomes and four served as fillers. Respondents rate each item on a five point scale: Strongly Disagree=0, Disagree=1, Neutral=2, Agree=3, Strongly Agree=4. The possible range of total score was 0-24. The children were grouped based on the median score. A higher score on this scale reflected high optimism.

Parent/Caregiver questionnaire

Four psychosocial behaviours[4] were included: (i) shyness; (ii) inferiority/feelings of worthlessness; (iii) unhappy; (iv) sociability/friendliness. All the four behaviors were measured on a 5 point Likert scale of never, rarely, sometimes, usually and always.

Clinical examination

Children were examined in the school under natural light and adequate illumination. No artificial light was used. Mouth mirror and explorer were used to assess DMFT, debris and calculus index (American Dental Association Type III examination).

Statistical analysis

The data obtained were statistically analyzed using SPSS software (Version 17, Chicago, IL). In assessing optimism, the median score was taken as the cut off value. Children who scored higher than the median value were considered as having high optimism and vice versa. OHI-S index score ranges from good, fair to poor. For statistical analysis, index dichotomization was done, i.e; fair and poor were clubbed together. In psychosocial outcomes: (i) for shyness, inferiority and unhappiness, the responses sometimes/usually/always were clubbed together and considered as presence of the behavior, (ii) for friendliness, never/rarely/sometimes were considered as absence of the behavior. To find the association between the independent and dependent variables, Pearson Chi-Square test was used and Odds Ratio (OR) was calculated with 95% Confidence Interval (CI). Mann-Whitney test was used to compare the mean between two groups and Kruskal-Wallis test was used to compare the mean of three groups. The p value ≤ 0.05 was considered statistically significant.

RESULTS

Table 1 shows the distribution of independent variables, optimism and psychosocial well being. Optimism was considered low for approximately 60% of the study population. Frequent (sometimes/usually/always) shyness, feeling inferior and unhappiness were relatively common at 23.6%, 16.07% and 28.16% respectively.

Optimism

Table 2 shows there was no significant association between optimism and DMFT/OHI-S score. When comparing the mean DMFT and OHI-S score between high optimism group (>16) and low optimism group (<16), the difference was not statistically significant (Table 3). Gender wise association was made between the independent variable (optimism) and dependent variables (DMFT score and OHI-S score). There was no significant association between optimism and OHI-S score in both the genders. However contrasting results were obtained when determining the association between the optimism and DMFT score. Girls with high optimism were 1.6 times at a higher risk of having dental caries, whereas boys with high optimism were less likely to have dental caries (OR=0.615). When comparing the mean DMFT and OHI-S scores between boys with high optimism level and low optimism level the difference was statistically significant (p=0.001, p=0.016) respectively. The mean DMFT score was significantly higher (p=0.001) in girls with high optimism level.

Table 1: Weighted descriptive statistics for optimism and psychosocial well being

Variables	Percentage		
	Total sample % (n)	Girls % (n)	Boys % (n)
Optimism (median = 16)			
< 16	59.83 (1205)	56.67 (514)	62.42 (691)
> 16	40.17 (809)	43.33 (393)	37.58 (416)
Psychosocial well being			
Shy			
Never	59.93 (1207)	57.66 (523)	61.78 (684)
Rarely	16.43 (331)	19.29 (175)	14.09 (156)
Sometimes	20.25 (408)	19.29 (175)	21.04 (233)
Usually	1.83 (37)	2.09 (19)	1.62 (18)
Always	1.53 (31)	1.65 (15)	1.44 (16)
Inferior			
Never	67.97 (1369)	69.68 (632)	66.57 (737)
Rarely	15.93 (321)	15.21 (138)	16.53 (183)
Sometimes	13.55 (273)	12.89 (117)	14.09 (156)
Usually	1.68 (34)	1.54 (14)	1.80 (20)
Always	0.84 (17)	0.66 (6)	0.99 (11)
Unhappy			
Never	49.50 (997)	47.18 (427)	51.49 (570)
Rarely	23.03 (464)	26.90 (244)	19.87 (220)
Sometimes	24.08 (485)	23.15 (210)	24.84 (275)
Usually	1.68 (34)	1.54 (14)	1.80 (20)
Always	1.68 (34)	1.32 (12)	1.98 (22)
Friendly			
Never	3.82 (77)	3.52 (32)	4.06 (45)
Rarely	3.57 (72)	2.75 (25)	4.24 (47)
Sometimes	7.89 (159)	6.83 (62)	8.76 (97)
Usually	14.05 (283)	16.31 (148)	12.19 (135)
Always	70.65 (1423)	70.56 (640)	70.73 (783)

Table 2: Association between optimism and oral health

<16		Optimism		p* value	Odds ratio [CI]
		>16			
DMFT score	0	786	529	0.941	0.99 [0.82 – 1.19]
	≥1	419	280		
OHI-S score	Good	908	619	0.551	0.938 [0.76 – 1.15]
	Poor	297	190		

* Pearson Chi-Square test CI: 95% Confidence Interval

Psychosocial well-being

Table 4 shows the association between psychosocial outcomes and oral health. DMFT score was positively associated with two of the outcomes. Children who felt inferior were more likely to have higher DMFT score (OR= 1.47, CI: 1.15 – 1.87). Similarly more friendliness was associated with less DMFT score (OR= 0.653, CI: 0.51 – 0.83). There was no significant association between any of the psychosocial outcomes and the OHI-S score. Table 5 shows the comparison of mean DMFT and OHI-S scores with the measures of psychosocial well-being. The mean DMFT score was significantly higher in children who felt inferior (p=0.002) and unhappy (p=0.05). The mean DMFT score was significantly lower in children who showed more friendliness (p=0.001).

Table 6 shows the association between measures of psychosocial well being and oral health stratified by gender. There was no significant association between the psychosocial outcomes and DMFT score in girls. In boys, who felt inferior (OR=1.8) and unhappy (OR=1.3) were more likely to have dental caries. Similarly, boys who were more friendly had less likely to have dental caries (OR=0.56). There was no significant association between the psychosocial outcomes and OHI-S score in girls. In boys, who felt shy were 1.39 times more likely to have poor oral hygiene status (p=0.039). Table 7 shows the comparison of mean DMFT and OHI-S scores with the measures of psychosocial well being stratified by gender. The mean DMFT was higher in boys who felt inferior and unhappy and the difference was statistically significant (p=0.001 and p=0.019 respectively). The mean DMFT score was significantly lower in boys who were friendly (p=0.001). Similarly, the mean OHI-S score was significantly higher in boys who felt shy (p=0.004).

DISCUSSION

Children are often the most important victims of dental diseases. In developing countries, especially in children, oral health is an ignored component of overall health and well being.[13] This fact heightened the search for indicators that identify those who were at greater risk of having the disease. In this study, respondents were recruited only from private schools to avoid the disparity in socioeconomic status. Considering their annual school fee structure, their socioeconomic status should be in the same level. This is in accordance with the study done by Piovesan *et al* (2011) who demonstrated that type of school could be used as an alternative measure of socioeconomic status when it is not feasible to collect data individually.[14]

Table 3: Comparison of mean DMFT and OHI-S score with optimism level

	Optimism	N	Mean±SD	Z	p* value
DMFT score	<16	1205	0.94±1.55	-0.08	0.933
	>16	809	0.94±1.54		
OHI-S score	<16	1205	0.78±0.83	-0.44	0.657
	>16	809	0.78±0.86		

* Mann-Whitney test SD: Standard Deviation

Optimism level and Oral health

Optimism, a common sense component of personality, has been shown to have beneficial effects on health.[15] The effects of optimism on physical well-being (Scheier and Carver, 1987), behavioral outcomes, and psychological well-being (Carver and Games, 1987) have all been reported.[16,17] One of the most frequently used measures of dispositional optimism is the revised Life Orientation Test (LOT-R). Several studies have documented the reliability and the validity of the scale, reporting adequate measures of internal consistency and test-retest reliability and construct and predictive validity.[18,19]

In the present study, there was no significant association between optimism and DMFT/OHI-S score as shown in table 2. When gender wise association was made, there was no significant association between optimism and OHI-S score in both the gender. However, contrasting results were obtained when determining the association between the optimism and DMFT score. Girls with high optimism were 1.6 times at a higher risk of having dental caries than girls with low optimism. In contrast, boys with high optimism had less dental caries compared to boys with low optimism. The mean DMFT score was also significantly higher in girls with high optimism. When comparing the mean DMFT and OHI-S score between boys with high optimism level and low optimism level the difference was statistically significant. In this study contradictory results were obtained between the boys and the girls. The boys with higher optimism showed better oral hygiene and had low caries experience. This could be because these optimistic individuals work towards achieving a desirable outcome and good oral hygiene could have been one of their desirable outcomes. Among the girls higher optimism could have lead to a higher egocentric concept of personal or invincibility fable. The egocentric idea of the personal fable is that one is unique, destined to have a heroic or legendary life. When they think they are invincible, they may be convinced that, they will not be hurt by certain risks or harms.[20] Hence, these adolescent girls might have neglected their oral hygiene (Invincibility fable)

Table 4: Association between measures of psychosocial well being and oral health

0		DMFT score		p* value	Odds ratio [CI] Good	OHI-S score		p* value	Odds ratio [CI]
		≥ 1				Poor			
Shy	No	1018	519	0.112	1.18 [0.96 – 1.47]	1175	362	0.237	1.15 [0.91 – 1.45]
	Yes	297	180			352	125		
Inferior	No	1128	562	**0.002**	1.47 [1.15 – 1.87]	1283	407	0.815	1.03 [0.78 – 1.36]
	Yes	187	137			244	80		
Unhappy	No	969	492	0.114	1.17 [0.96 – 1.44]	969	492	0.114	1.17 [0.73 – 1.16]
	Yes	346	207			346	207		
Friendly	No	175	133	**0.001**	0.65 [0.51 – 0.83]	241	67	0.28	1.17 [0.87 – 1.57]
	Yes	1140	566			1286	420		

Table 5: Comparison of mean DMFT and OHI-S score with the measures of psychosocial well being

		Group	N	Mean±SD	Z	p*value
Shyness	DMFT score	No	1537	0.91±1.54	-1.689	0.091
		Yes	477	1.02±1.55		
	OHI-S score	No	1537	0.78±o.85	-1.007	0.314
		Yes	477	0.80±0.82		
Inferior	DMFT score	No	1690	0.90±1.52	-3.042	**0.002**
		Yes	324	1.16±1.69		
	OHI-S score	No	1690	0.78±0.85	-0.532	0.595
		Yes	324	0.79±0.82		
Unhappy	DMFT score	No	1461	0.89±1.48	-1.923	**0.05**
		Yes	553	1.08±1.69		
	OHI-S score	No	1461	0.80±0.86	-0.782	0.434
		Yes	553	0.75±0.80		
Friendliness	DMFT score	No	308	1.12±1.50	-3.326	**0.001**
		Yes	1706	0.91±1.55		
	OHI-S score	No	308	0.72±0.80	-1.262	0.207
		Yes	1706	0.79±0.85		

or might not have worked towards improving their oral hygiene (personal fable). The present study was the first of its kind to evaluate the association between optimism and the dental caries/oral hygiene status. Literature search showed that the optimism level had a negative correlation with dental anxiety and previous dental experience.[21]

Psychosocial well being and oral health

In this study, there was a significant association between caries status and two psychosocial outcomes: inferiority and friendliness. Children who felt inferior were 1.47 times more likely to have a higher DMFT score. The mean DMFT score of children who felt inferior was significantly different from children who did not feel inferior. Children who were friendly were less likely to have a higher DMFT score and their mean DMFT score was significantly lesser when compared to their counterparts. There was no significant association between psychosocial well being and oral hygiene status. Guarnizo [4] found that poor oral health was significantly associated with reduced school performance and psychosocial well being. They highlighted the importance of preventing and treating child dental problems not only for the direct clinical and somatic benefits such as reducing dental pain and improving dental functioning, but also for the likely extended benefits in educational achievement and psychosocial development. Honkala *et al* (2007)[22] found that children who did not feel happy, felt lonely often, felt that the other pupils did not accept him/her and felt that it was difficult to make friends were more prone to brush infrequently.

When gender wise association was made, inferiority, unhappiness and friendliness showed significant association with DMFT score in boys. With OHI-S score, only shyness showed significant association in boys. Boys who were shy were 1.39 times more likely to have poor oral hygiene. However, there was no significant association between psychosocial outcomes and oral health in girls. The exact reason for this difference was not known. It might be attributed to the difference in the maturity status, where girls mature faster in certain cognitive and emotional areas than boys during adolescence. Girls tend to optimize brain connections earlier than boys.[23] Since girls were more mature their oral hygiene and caries status might not have been influenced by the psychosocial factors. The social environment and peer pressure is also quite different in girls compared to the boys. The peer group plays an important part in influencing their behaviors and choices. Some friends may be more influential than others, and their influence may be greater in some domains than in other domains. To some extent, their vulnerability to peer influence depends on their level of emotional and cognitive development.[24] Hence, the peer influence and social environment of the girls in this study might have been the reason for the absence of any association between the psychosocial well being and oral hygiene and caries status.

Limitations of the study

No cause and effect relationships can be inferred from this cross sectional data. The outcomes of psychosocial well being were reported by the parents and might have led to information bias.

CONCLUSION

In the overall sample optimism was not significantly associated with oral health. However, optimism was positively associated with DMFT score in girls and vice versa in boys. Oral health was significantly associated with two of the psychosocial outcomes, viz. Inferiority and friendliness. Boys who felt inferior, unhappy and less friendly were more likely to have dental caries and who felt shy

Table 6: Association between measures of psychosocial well being and oral health stratified by gender

	0 ≥ 1		DMFT score		p* value	Odds ratio [CI]	OHI-S score		p* value	Odds ratio [CI]
			Good	Poor		Poor	Good	Poor		
Girls	Shy	No	443	255	0.739	1.056 [0.76 – 1.45]	508	190	0.692	0.93 [0.65 – 1.32]
		Yes	130	79			155	54		
Boys	Shy	No	575	264	0.059	1.317 [0.98 – 1.75]	667	172	**0.039**	1.398 [1.01 – 1.92]
		Yes	167	101			197	71		
Girls	Inferior	No	490	280	0.495	1.139 [0.78 – 1.65]	561	209	0.698	0.921 [0.60 – 1.39]
		Yes	83	54			102	35		
Boys	Inferior	No	638	282	**0.001**	1.806 [1.31 – 2.48]	722	198	0.444	1.156 [0.79 – 1.67]
		Yes	104	83			142	45		
Girls	Unhappy	No	424	247	0.988	1.002 [0.73 – 1.36]	486	185	0.444	0.876 [0.62 – 1.23]
		Yes	149	87			177	59		
Boys	Unhappy	No	545	245	**0.029**	1.355 [1.03 – 1.77]	616	174	0.925	0.985 [0.71 – 1.35]
		Yes	197	120			248	69		
Girls	Friendly	No	69	50	0.208	0.778 [0.52 – 1.15]	89	30	0.655	1.106 [0.71 – 1.72]
		Yes	504	284			574	214		
Boys	Friendly	No	106	83	**0.001**	0.566 [0.41 -0.78]	152	37	0.386	1.189 [0.80 – 1.75]
		Yes	636	282			712	206		

* Pearson Chi-Square test CI: 95% Confidence Interval

were more likely to have poor oral hygiene. There was no significant association between oral health and any of the psychosocial outcomes in girls.

In this study, it was found that the psychosocial behaviors had a definitive influence on the oral health of children. Hence, it is important for the pediatric dentist to consider the psychosocial outcomes not only for the oral health of the children but also for their holistic well being.

Table 7: Comparison of mean DMFT and OHI-S score with the measures of psychosocial well being stratified by gender

			Group	N	Mean±SD	Z value	p* value
Shyness	Girls	DMFT score	No	698	1.00±1.60	-0.585	0.558
			Yes	209	1.07±1.60		
		OHI-S score	No	698	0.86±0.88	-1.562	0.118
			Yes	209	0.76±0.84		
	Boys	DMFT score	No	839	0.84±1.50	-1.825	0.068
			Yes	268	0.99±1.52		
		OHI-S score	No	838	0.70±0.81	-2.848	**0.004**
			Yes	268	0.83±0.81		
Inferior	Girls	DMFT score	No	770	1.00±1.58	-0.605	0.545
			Yes	137	1.09±1.69		
		OHI-S score	No	770	0.85±0.89	-0.302	0.762
			Yes	137	0.80±0.81		
	Boys	DMFT score	No	920	0.81±1.45	-3.616	**0.001**
			Yes	187	1.21±1.69		
		OHI-S score	No	920	0.73±0.81	-1.041	0.298
			Yes	186	0.79±0.83		
Unhappy	Girls	DMFT score	No	671	0.99±1.57	-0.382	0.703
			Yes	236	1.08±1.69		
		OHI-S score	No	671	0.86±0.89	-1.247	0.212
			Yes	236	0.76±0.81		
	Boys	DMFT score	No	790	0.80±1.41	-2.35	**0.019**
			Yes	317	1.07±1.70		
		OHI-S score	No	790	0.74±0.82	-0.172	0.863
			Yes	316	0.73±0.80		
Friendliness	Girls	DMFT score	No	119	1.02±1.41	-0.846	0.397
			Yes	788	1.01±1.62		
		OHI-S score	No	119	0.83±0.87	-0.165	869
			Yes	788	0.84±0.88		
	Boys	DMFT score	No	189	1.19±1.56	-3.65	**0.001**
			Yes	918	0.82±1.48		
		OHI-S score	No	189	0.66±0.75	-1.299	0.19
			Yes	917	0.75±0.82		

* Mann-Whitney test SD: Standard Deviation

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