

# Relationship between Dental Caries Experience and Social Capital among Children – A Pilot Study

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## Abstract

**Background:** The effect of larger and distal environmental and societal factors on oral health is established and the concept of social capital (SC) is gaining importance. **Aim:** The aim of the study is to evaluate the association of dental caries (DC) experience of children with parental social SC. **Methods:** A cross-sectional survey was conducted among 200 pairs of 5–12-year-old children and their parents of Kaloor (65<sup>th</sup> division), Kerala. A 30-item self-administered neighborhood SC Index questionnaire. DC of children was assessed as per the WHO guidelines. **Results:** The final analysis included 186 pairs of children and parents, out of which 54.8% were boys. The mean caries experience of children was  $3.3 \pm 3.7$ . A significantly higher proportion of parents rated their children as “poor oral health” in caries experienced group than caries-free group ( $P = 0.006$ ). No other significant differences were found with total SC and demographic variables except for “frequency of having meal together.” Regression analysis showed that trust, control, and political domains were significant with carious status. On adjusting the confounders that were significant in bivariate analysis, only control domain of the SC remained significant. **Conclusion:** The social control domain (family members or neighbors actions that seek to correct deviant behavior) of SC was associated with caries experience of the children. Distal factors such as SC can influence the caries status of children.

**Keywords:** Children, dental caries, neighborhood, oral health, social capital

## INTRODUCTION

The effect of demographic and social characteristics of individuals on oral health disparities had already been established in literature. Recently, investigations have begun to identify the effect of larger and distal environmental and societal factors on oral health. Among various determinants of oral health, the concept of “social capital” (SC) is gaining interest.

Although no standard definition exists for SC, it can be defined as those features of social organizations, such as civic participation, norms of reciprocity, and trust in others, which facilitate cooperation for mutual benefit.<sup>[1]</sup> It was seen that people with high SC had lower premature mortality, were less violent, and have lower self-perception of poor health.<sup>[2,3]</sup> Numerous hypotheses were suggested by which SC may influence health, namely, the diffusion of knowledge about health promotion, maintenance of healthy behavioral norms, prevention of deviant health-related behaviors

through informal social control, promotion of access to local services and amenities, and psychosocial processes that provide effective support, build self-esteem, and foster mutual respect.<sup>[4]</sup>

A study reported that lower neighborhood SC and community empowerment were associated with higher dental injuries<sup>[5]</sup> and dental caries (DC).<sup>[6]</sup> SC in neighborhood is of relevance in children, as they learn many of their social skills and values. A study conducted in the US reported that the mothers with low SC were more likely to postpone preventive dental visits.<sup>[7]</sup> Bramlett *et al.* reported neighborhood cohesiveness

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and physical safety were related to parent-rated oral health status (OHS) among children.<sup>[8]</sup>

Uphoff *et al.* concluded that there was evidence for both a buffer and dependency effect of SC on socioeconomic inequalities in health.<sup>[9]</sup> Such association of SC with oral health, parental factors, and perceptions on child's oral health needs further research. Hence, we aimed to evaluate the association of DC of children with parental SC.

## METHODS

A cross-sectional survey was conducted in Kaloore (65<sup>th</sup> division), Kerala. Ethical approval from the institutional ethics committee was obtained. All households with children aged 5–12 years old were included and parents who were not able to read Malayalam and migrants were excluded. Prior informed consent from parent and verbal assent from the child was obtained. Sample size estimation was done based on the expected prevalence of caries (87%) with precision of 5% and 95% confidence interval which accounted for 174 child and parent pairs which was rounded to 200 to account for the nonresponders.

The selected houses were visited on weekends and visited once again if the house was locked or either child or parent not available. Each parent was given a self-administered questionnaire in Malayalam language followed by DC of their child. The questionnaire consists of three sections, namely, demographic details of parents (age, gender, occupation, income of family, education of head of family, religion) and child (age, gender and oral health behaviors of child), single item on self-perceived OHS of their child (SP-OHS), and neighborhood SC index.<sup>[5]</sup> The SC has thirty items grouped into five domains as social trust (nine items), social control (five items), empowerment (five items), political efficacy (four items), and neighborhood safety (seven items). The DC was evaluated by single-trained and calibrated investigator (YSK) as per the WHO criteria.

All the statistical analyses were done using SPSS version 20 (SPSS Inc., Chicago, IL, USA). Socioeconomic status of the parent was calculated using modified Kuppaswamy scale.<sup>[10]</sup> The negative questions with respect to SC questionnaire were reverse coded so that all questions ranged from low to high. Due to the diverse number of items in each domain, the final scores of each domain were standardized to create Z scores and a cumulative total SC was calculated as described previously.<sup>[5]</sup> Child's age was dichotomized by median split. Bivariate analysis was done to select significant predictor variables. Correlation of DC with Z-scores of domains and total SC was done using Spearman's rho. Poisson regression was done to identify the association of SC with child's DC. A  $P < 0.05$  was considered statistically significant.

## RESULTS

A total of 200 households with children between 5 and 12 years old were approached and five residents did not give consent. After excluding nine households (migrants), 186 households were included for final analysis. Only SP-OHS ( $P = 0.006$ ) showed a significant difference between caries-free and caries-experienced children [Table 1]. Comparison of mean domain level and total SC Z-scores with respect to sociodemographic variables was shown in Table 2. The mean caries experience of children was  $3.3 \pm 3.7$ . A weak-positive correlation was seen between control domain and caries scores [Table 3].

Domains such as social trust (relative risk [RR] = 1.12 [1.03–1.22]), social control (RR = 1.17 [1.07–1.27]), and political efficacy (RR = 0.91 [0.84–0.99]) were associated with caries experience of children. However, only social control domain (RR: 1.14 [1.04–1.25]) was found to be

**Table 1: Distribution of sociodemographic variables with child's caries experience**

	Caries free	Caries experienced
Gender		
Boy	37	65
Girl	22	62
Age		
5-8	33	60
9-12	26	67
SES		
Upper/upper-middle	19	62
Lower-middle	21	39
Upper-lower	19	26
Residential stay		
<1	7	12
2-5	28	67
6-10	12	29
>10	12	19
Past dental visit		
Yes	7	29
No	52	98
SP-OHS*		
Poor	5	35
Fair	23	49
Good	31	43
Brushing/day		
Once	45	104
Twice	14	23
Having meals together		
Some days	15	29
Most days	27	59
Every day	17	39
Religious activity or service		
Never/few times/year	15	35
Few times a month	20	55
Once a week or more	24	37

\*Statistical significance ( $P < 0.05$ ). SP-OHS: Self-perception of oral health status, SES: Socioeconomic status

**Table 2: Comparison of mean domain level and total social capital Z-scores with respect to sociodemographic variables**

	Social trust	Neighborhood safety	Social control	Empowerment	Political efficacy	Total
Age						
5-8	-0.20±1.06	-0.10±1.16	-0.08±1.07	0.06±1.15	0.10±1.02	-0.23±2.91
9-12	0.20±0.90	0.10±0.80	0.08±0.92	-0.06±0.83	-0.10±0.98	0.23±2.05
<i>P</i>	*			*		
Gender						
Boy	-0.01±0.91	-0.04±1.00	0.03±1.00	0.03±1.02	-0.04±1.02	-0.03±2.29
Girl	0.01±1.11	0.05±1.01	-0.04±1.00	-0.03±0.99	0.05±0.98	0.03±2.79
SES						
Upper/upper-middle	0.04±1.05	-0.08±1.16	0.15±1.06	-0.03±1.04	0.04±1.09	0.12±2.92
Lower-middle	-0.03±1.01	0.08±0.87	-0.07±0.95	-0.06±1.04	-0.16±0.95	-0.25±2.29
Upper-lower	-0.04±0.92	0.04±0.86	-0.17±0.94	0.13±0.87	0.15±0.88	0.11±2.02
<i>P</i>			*			
SP-OHS						
Poor	0.06±1.08	0.05±0.88	0.10±0.99	-0.18±0.66	-0.05±1.18	-0.01±2.25
Fair	0.03±1.10	-0.13±1.30	0.03±0.94	-0.16±1.15	-0.24±0.97	-0.48±2.90
Good	-0.06±0.85	0.10±0.66	-0.09±1.07	0.26±0.95	0.26±0.86	0.47±2.18
<i>P</i>				*	*	
Residential stay						
<1	-0.18±0.98	-0.17±1.20	-0.55±0.97	-0.13±1.01	0.05±0.98	-0.97±2.79
2-5	-0.24±1.07	-0.05±1.05	-0.05±1.08	0.10±1.11	0.11±0.99	-0.13±2.67
6-10	0.27±0.82	-0.02±1.08	0.19±0.88	-0.04±1.07	-0.13±1.02	0.27±2.66
>10	0.49±0.74	0.27±0.41	0.24±0.79	-0.17±0.36	-0.19±1.03	0.64±1.27
<i>P</i>	*					
Having meals together						
Some days	-0.75±1.20	0.04±0.99	-0.40±1.24	-0.03±1.03	0.26±1.03	-0.88±2.89
Most days	0.30±0.80	0.02±0.94	0.27±0.79	0.15±0.96	-0.17±0.95	0.57±2.03
Every day	0.13±0.81	-0.07±1.11	-0.10±0.97	-0.20±1.02	0.05±1.02	-0.19±2.72
<i>P</i>	*		*	*		*
Religious activity or service						
Never/few times a year	-0.38±1.33	0.03±0.91	-0.15±1.15	0.02±0.94	0.03±1.17	-0.45±2.74
Few times a month	0.08±0.78	-0.09±1.14	0.11±0.91	0.04±1.13	-0.05±0.85	0.08±2.38
Once a week or more	0.22±0.85	0.09±0.88	-0.01±0.98	-0.06±0.89	0.03±1.04	0.27±2.49

\*Statistical significance ( $P<0.05$ ). SES: Socioeconomic status, SP-OHS: Self-perception of oral health status

**Table 3: Correlation of caries scores with Z-scores of domains and total social capital**

	Social trust	Neighborhood safety	Social control	Empowerment	Political efficacy	Total
Caries score (dft)						
Spearman's rho	0.116	0.108	0.166*	-0.077	-0.053	0.057
<i>P</i>	0.115	0.141	0.023	0.297	0.472	0.439

\*Statistical significance ( $P<0.05$ )

significantly associated with caries experience after adjusting for variables [Table 4].

## DISCUSSION

We explored the possible relationship between the parent's SC and their child's DC. Our study has shown association of SP-OHS with domains of SC (empowerment and political efficacy) and DC. Higher levels of social support, social trust, and civic participation were the factors that influenced the best self-rated health after adjustment of other confounders.<sup>[11]</sup> Khawaja *et al.*<sup>[12]</sup> and Boyce *et al.*<sup>[13]</sup> also found similar finding that individuals with low levels of SC were more likely to

report poor health. Although a direct comparison of our results with previous studies was not possible, we can infer that individuals with high scores of SC have better oral health outcomes.

Our study showed that only social control domain was associated with caries after adjusting for other variables which were similar to Pattussi *et al.*,<sup>[6]</sup> where neighborhood with higher empowerment levels had lower levels of DC. Furthermore, among Brazilian adolescents, it was seen that a higher level of empowerment was associated with a lowered risk of dental injuries.<sup>[5]</sup> These results represent actions taken by neighbors to improve their neighborhood health status.

**Table 4: Multiple Poisson regression with dependent variable as caries scores and independent variables as Z-scores of domains and total social capital index**

Parameter	Unadjusted		Adjusted	
	P	RR (95% CI)	P	RR (95% CI)
Social trust	0.007	1.12 (1.03-1.22)	0.242	1.06 (0.96-1.17) <sup>†</sup>
Neighborhood safety	0.859	1.01 (0.93-1.09)	-	-
Social control	0.001	1.17 (1.07-1.27)	0.005	1.14 (1.04-1.25) <sup>‡</sup>
Empowerment	0.101	0.94 (0.87-1.01)	-	-
Political efficacy	0.022	0.91 (0.84-0.99)	0.068	0.93 (0.87-1.01) <sup>††</sup>
Total	0.344	1.02 (0.98-1.05)	-	-

<sup>†</sup>Adjusted for age, residential stay, having meal together,

<sup>‡</sup>Adjusted for SES, having meal together, <sup>††</sup>Adjusted for SP-OHS.

SP-OHS: Self-perception of oral health status, SES: Socioeconomic status, RR: Rate ratio, CI: Confidence interval

Our study showed a significant relation of the frequency of having meals together and social trust, social control, and empowerment domains, indicating that the family SC may contribute to neighborhood SC. A US survey<sup>[7]</sup> showed mothers with the lowest SC were more likely to report unmet dental care needs for their children and postpone preventive dental visits. Reynolds *et al.*<sup>[14]</sup> showed significant positive associations between child OHS and neighborhood SC and family frequency of eating meals together, after adjusting for covariates.

Previous studies have shown the influence of SC with oral health, caries, dental injuries, unmet dental care, and postpone preventive dental visits in children and adolescents. These studies have used various questionnaires that evaluated SC with patients from different sociodemographic backgrounds, race and ethnicity, and varied age groups. Hence, a direct comparison of our results is not possible with previous studies. Nevertheless, our study was an initial attempt to explore the possibility to evaluate the role of SC on DC.

There were limitations with our study being cross-sectional, which makes it challenging to identify any causal pathways. Furthermore, we were unable to assess the influence of social cohesion factors beyond the neighborhood level like parents may have social relationships and support networks for children outside their local neighborhoods. The possibility of social desirability bias cannot be ruled out. The results may not be generalizable but provide initial evidence about the relation between SC and DC.

## CONCLUSION

Dentistry should be directed to distal factors such as SC, to gain a better understanding of oral health being linked

to social determinants. SC can be an important tool in the implementation of effective public health policies.

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## Conflicts of interest

There are no conflicts of interest.

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