

## Caregiver's Sense of Coherence: A Predictor of Oral Health-Related Behaviors of Autistic Children in India

### Abstract

**Context:** Sense of coherence (SOC) is hypothesized to be an important psychological factor that enables people to cope with stressors and successfully maintain and improve health. **Aim:** This study was conducted with the aim to investigate the relationship between oral health-related behaviors of autistic children and SOC of their caregivers. **Settings and Design:** An Exploratory cross sectional study was conducted to investigate the association of oral health-related behaviors of autistic children and their primary caregiver's sense of coherence in Vadodara city, Gujarat. **Methods and Results:** A cross-sectional study was conducted on a sample of 58 autistic children and their caregivers. The Gujarati version of Antonovsky's SOC scale (13 items) was employed to assess the caregiver's SOC. The outcome variables were the child's oral health-related behaviors, including frequency of sugary snack intake, toothbrushing frequency, and utilization of dental service. **Statistical Analysis Used:** Multiple logistic regression was used to analyze the relationship between the variables. **Results:** Autistic children whose mothers (as caregivers) had higher SOC scores had a lower frequency of sugary snack intake and greater utilization of dental services compared with the children whose mothers had lower SOC scores. The other measures of oral health-related behaviors of the child were not significantly associated with the caregiver's SOC. **Conclusion:** Oral health-related behaviors of autistic children, namely sugary snack intake frequency, toothbrushing frequency, and utilization of dental services, were associated with the SOC of their mothers.

**Keywords:** Autism, caregiver, children, oral health-related behavior, sense of coherence

### Introduction

Autism is a developmental, neuropsychiatric disorder with its origin in early childhood.<sup>[1]</sup> Autistic spectrum disorder (ASD) is a psychiatric childhood disorder listed in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) under the section of pervasive developmental disorders.<sup>[2]</sup> Autism is described in three diagnostic behavioral domains: impairments in social interactions, impairments in communication and along with repetitive, stereotyped patterns of behavior, interests or activities.<sup>[1]</sup>

Children with autism have compromised oral care due to impaired ability to communicate and interact, which may lead to poor oral hygiene and health. This has been attributed to the lack of compliance with oral hygiene practices. Priority is to be given regarding lifestyle-related risk factors for poor oral health. Health-promoting lifestyles include infrequent sugar

consumption, effective toothbrushing, and regularly visiting a dentist to prevent and detect oral disease. Oral health knowledge and attitudes are also the determinants of oral health-related behaviors. Sense of coherence (SOC) is one of the psychological factors that affect an individual's propensity to execute health-promoting behaviors.<sup>[3]</sup>

SOC is at the center of the salutogenic model. According to the salutogenic model, it is important for people to focus on their resources and their capacity to generate health rather than on the causes of their disease.<sup>[3,4]</sup> Stronger SOC leads one to perceive the environment as less stressful, disturbing, and chaotic, and it facilitates the selection of efficacious health behaviors. Thus, it is suggested that SOC can promote a person's awareness of oral health and that people with stronger SOC usually have better oral health-related behaviors.<sup>[3,5]</sup>

A number of studies have established SOC as a health-promoting resource and have a significant influence on oral health

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behaviors. Adults or adolescents with stronger SOC were likely to have better oral hygiene practice.<sup>[6,7]</sup> Higher SOC score has been associated with healthier dietary patterns and regular dental visits.<sup>[8-10]</sup>

Parental behavior mould and shape the behavior of children to a large extent. It has been confirmed that caregivers influence their children's oral health and oral health-related behaviors through their own oral health-related behaviors, knowledge, and attitudes.<sup>[5,11]</sup> Mother's SOC has been shown to be an important psychological factor associated with children's oral health and oral health-related behaviors.<sup>[5]</sup>

A study by Freire *et al.*<sup>[9]</sup> found that children whose mothers scored higher on SOC scale had a lower level of dental caries and gingival bleeding than those whose mothers had a lower level of SOC.<sup>[10]</sup> Pisula and Kossakowska have reported that parents of children with autism have a lower level of the total SOC compared with controls.<sup>[11]</sup> These findings are suggestive of health-promoting role of SOC. In addition, little is known about the association between oral health-related behaviors of autistic children and their parent's SOC. Given this, the study was undertaken to investigate the association between oral health-related behaviors of autistic children and SOC of their primary caregivers.

## Methods

### Study population

A cross-sectional study was carried out on children with autism, enrolled in registered schools for special group and their primary caregivers in a metropolitan city of India. The list of registered institutions for special group children in the city was obtained from the District Social Welfare Officer. The list contained 53 schools for children requiring special care, of which only six institutions had autistic children. Of the six institutions approached, five institutes consented to participate in the study. The required sample size was determined based on the total population of autistic children in the city and the expected proportion of oral diseases found in autistic children. The total population of autistic children in Vadodara city is seventy. With the precision of 0.05 and prevalence of oral diseases as 0.77, the sample size was calculated.<sup>[4]</sup> The minimum sample size to satisfy the requirements was calculated to be 56 autistic children.

The study protocol was reviewed and approved by the institutional review board, and ethical approval was obtained from the ethics committee of the university. The sample consisted of primary caregivers of autistic children of the consenting five institutes. All the recruited participants were given a brief explanation about the study, and written informed consent to participate in the study was obtained.

### Instruments and measures

Data were collected by means of a questionnaire administered to the primary caregivers. The questionnaire consisted of five parts:(1) questions on the child's oral health-related behaviors (sugar intake habits, toothbrushing frequency, and use of dental services);(2) questions on the primary caregivers' oral health knowledge and attitudes; (3) SOC scale; (4) questions on the primary caregivers' oral health-related behaviors; and (5) questions on socioeconomic background.

A meeting was held with the primary caregivers of autistic children in their schools where they were given instructions regarding the filling up of the questionnaire. The questionnaire was distributed to the parents who then completed it at home and returned it back.

### Outcome variables

Three oral health-related behaviors of the autistic children were designated as outcome variables: frequency of sugar/sugary item intake, toothbrushing frequency, and having used dental services (yes vs. no).

### Independent variable

The caregiver's SOC was measured by the short version of the SOC scale (SOC-13) developed by Antonovsky. The scale consists of 13 items, each of which is scored on a Likert scale, ranging from 1 ("very often") to 7("very seldom or never"). The SOC scale measures three dimensions: comprehensibility (five items), manageability (four items), and meaningfulness (four items). After reversing the scores of the five negatively worded items (items 1, 2, 3, 8, and 13), the scores of the 13 items were added to obtain the overall SOC score. Thus, the SOC score ranged from 13 to 91, with higher scores indicating stronger SOC.<sup>[4]</sup>

The SOC-13 scale has been previously translated into many languages and extensively used in studies in many countries<sup>[4]</sup>. The Gujarati version of the SOC-13 scale was used in the present study. The Gujarati version of questionnaire was validated by a forward and back translation approach, where a bilingual expert translated the SOC into Gujarati from English. The reconciled Gujarati version was then back-translated by an English expert, not familiar with the original questionnaire. This back-translated version was compared with the original questionnaire by another language expert. The questionnaire was evaluated by three subject experts for its face validity. A cognitive debriefing process was also followed by the cultural adaptation of the questionnaire. This was done for content validity. The Gujarati version was administered to ten parents of autistic children. The Cronbach's alpha for internal consistency was 0.76.

### Controlling variables

Education and occupation of the parents, family income, and the primary caregiver's oral health-related behaviors

and oral health knowledge and attitudes conformed the controlling variables. The caregiver's oral health knowledge was measured by ten questions. Each correct answer to a question was given a score of 1, and incorrect answer was scored 0. A maximum of score 10 could be attained indicative of better knowledge on the given spectrum. Twelve statements were used to assess the attitude of the caregivers. Statements were pertinent to oral health beliefs and the importance of oral health, retaining natural teeth, and a score of 12 was the best a caregiver could score, zero being the least.

The Gujarati version of the questionnaire was used to measure both oral health knowledge and attitudes. The Gujarati version was administered to ten parents of autistic children. The Cronbach's alpha for internal consistency was 0.80. Test-retest reliability was found to be 0.89.

### Statistical analysis

Data analysis was carried out using SPSS for Windows (version 17.0 SPSS Inc., IBM, Chicago, Illinois, USA). The total SOC score was analyzed as a continuous variable. Associations between the SOC and the variables addressing oral health behavior were assessed by two-sample *t*-tests. Chi-square tests and *t*-tests were carried out to test the relationships between the controlling variables and the outcome variables (frequency of sugary snack intake, toothbrushing frequency, and having used dental services). Multiple logistic regression analysis was performed to examine the influence of the independent variable on the outcome variables adjusted for significant controlling variables. The level of significance for all statistical tests was set at 0.05.

### Results

Fifty-eight caregivers (46 mothers and 12 fathers) returned completed questionnaires. The caregivers' total SOC scores ranged from 19 to 91, with a mean of  $53.83 \pm 5.84$ . The mean SOC scores of mothers and fathers were  $53.8 \pm 6.06$  and  $54 \pm 5.0$  respectively ( $P = 0.909$ ). The results showed that the caregiver's SOC was significantly associated with the child's frequency of sugar snack intake, toothbrushing frequency, and use of dental care [Table 1]. Children whose caregivers scored higher in SOC had a lower frequency of sugar snack intake, higher toothbrushing frequency, and more number of dental visits than children whose caregivers scored lower in SOC ( $P = 0.004$ ,  $P = 0.025$ , and  $P = 0.001$ , respectively).

Since the caregiver's SOC was associated with all the three outcome variables, further analysis was carried out. Their daily perceived health care need requires to be looked after by their caregivers.<sup>[12,13]</sup>

It was found that the controlling variable of caregiver's frequency of sugary snack intake was significantly associated with the child's frequency of sugary snack

**Table 1: Univariate analysis between the child's oral health-related behaviors and the caregiver's total sense of coherence**

Outcome variable	n (%)	Total SOC, mean (SD)	P
Frequency of sugar snack intake			0.004*
< Once/day	23 (39.65)	56.48 (6.222)	
≥ Once/day	35 (60.35)	52.09 (4.931)	
Toothbrushing frequency			0.025*
≤ Once/day	44 (75.86)	52.86 (5.147)	
≥ Twice/day	14 (24.14)	56.86 (7.004)	
Pattern of dental attendance			0.001*
Yes	41 (70.69)	52.20 (5.382)	
No	17 (29.31)	57.70 (5.093)	

\*Unpaired *t*-tests. SD: Standard deviation, SOC: Sense of coherence

intake. A significant association of child's toothbrushing frequency with caregiver's oral health attitudes, caregiver's occupation, caregiver's family income, and caregiver's toothbrushing frequency was found, whereas child's utilization of dental services was found to be associated with caregiver's oral health attitudes and caregiver's utilization [Table 2].

The above-controlling variables were adjusted in multiple logistic regressions which were separately done for all the three outcome variables as well as for both the caregivers (mothers and fathers). However, regression analysis for fathers could not be computed as the frequency of fathers as caregivers was very less.

Multiple logistic regression analysis between the mother's SOC score and the child's sugary snack intake showed that children to mothers with high SOC were less likely to have a sugary snack intake once or daily (confidence interval [CI] = 0.76–0.96,  $P = 0.008$ ) for increase in the SOC score [Table 3].

For toothbrushing behavior, children whose mothers had high SOC were more likely to have greater toothbrushing frequency (CI = 1.0–1.28,  $P = 0.035$ ) for increase in the SOC score. Furthermore, family income has odds of 8.43 (CI = 2.51–28.34,  $P = 0.001$ ), indicating that higher the family income, better will the frequency of toothbrushing [Table 4]. Children whose mothers had high SOC were more likely to have better utilization of dental services available [Table 5].

### Discussion

Children with autism have compromised oral care leading to poor oral health. Their daily perceived health care need requires to be looked after by their caregivers.<sup>[13]</sup> Autistic children present with high care demand which requires much time, effort, and patience.<sup>[14]</sup> This often leads to the development of a constellation of mental health problems

**Table 2: Univariate analysis between the control variables and the child's frequency of sugary snack intake, toothbrushing frequency, and utilization of dental services**

Variable	Frequency of sugary snack intake (children)			Daily brushing frequency (children)			Children's utilization of dental services		
	< Once/day	≥ Once/day	P	≤ Once/day	≥ Twice/day	P	No	Yes	P
Gender									
Male	18 (78.3)	21 (60.0)	0.147*	32 (72.3)	7 (50.0)	0.189**	29 (70.7)	10 (58.8)	0.379*
Female	5 (21.7)	14 (40.0)		12 (27.7)	7 (50.0)		12 (29.3)	7 (41.2)	
Single child									
Yes	7 (30.4)	11 (31.4)	1.000**	14 (31.8)	4 (28.6)	1.000**	11 (26.8)	7 (41.2)	0.354*
No	16 (69.6)	24 (68.6)		30 (68.2)	10 (71.4)		30 (73.2)	10 (58.8)	
Caregiver									
Father	7 (30.4)	5 (14.3)	0.189**	9 (20.5)	3 (21.4)	1.000**	11 (26.8)	1 (5.9)	0.088**
Mother	16 (69.6)	30 (85.7)		35 (79.5)	11 (78.6)		30 (73.2)	16 (94.2)	
Care giver's frequency of sugary intake									
< Once/day	22	5	<0.001*	42 (95.5)	0 (0.0)	<0.001**	27	1 (5.9)	< 0.001*
≥ Once/day	1	30		2 (5.5)	14 (100.0)		(65.9)	16 (94.1)	
							14 (34.1)		
Marital status of caregiver									
Married	22 (95.7)	33 (94.3)	1.000**	41 (93.2)	14 (100.0)	1.000**	38 (92.7)	17 (100.0)	0.548**
Single	1 (4.3)	2 (5.7)		3 (6.8)	0 (0.0)		3 (7.3)	0 (0.0)	
Mother education									
≤ HSC	8 (50.0)	13 (43.3)	0.665*	18 (51.4)	3 (27.3)	0.161*	14 (46.7)	4 (43.8)	1.000*
≥ Graduation	8 (50.0)	17 (56.7)		17 (48.6)	8 (72.7)		16 (53.3)	9 (56.2)	
Father education									
≤ HSC	1 (14.3)	1 (20.0)	1.000**	2 (22.2)	0 (0.00)	1.000**	2 (18.2)	0 (0.00)	1.000**
≥ Graduation	6 (85.7)	4 (80.0)		7 (77.8)	3 (100.0)		9 (81.8)	1 (100.0)	
Caregiver occupation									
Unemployed	12 (52.2)	25 (71.4)	0.283*	31 (70.5)	6 (42.9)	0.043*	27 (65.9)	10 (58.8)	0.879
Employee	9 (39.1)	9 (25.7)		10 (22.7)	8 (52.7)		12 (29.3)	06 (35.3)	
Employer	2 (8.7)	1 (2.9)		3 (6.8)	00 (0.0)		02 (4.9)	01 (5.9)	
Family income									
≤180,000	10 (43.5)	20 (57.1)	0.476*	28 (63.6)	2 (14.3)	<0.001*	24 (58.5)	6 (35.3)	0.133*
>180,000 and<600,000	9 (39.1)	12 (34.3)		15 (34.1)	6 (42.9)		14 (34.1)	7 (41.2)	
≥600,000	4 (17.4)	3 (8.6)		1 (2.3)	6 (42.9)		3 (7.3)	4 (23.5)	
Caregiver's oral health knowledge score	6.35 (1.33)	6.06 (1.13)	0.395***	6.11 (1.04)	6.36 (1.55)	0.592***	6.17 (0.97)	6.18 (1.70)	0.990***
Caregiver's oral health attitude score	7.09 (1.65)	6.49 (1.07)	0.131***	6.39 (1.08)	7.79 (1.57)	0.007***	6.37 (1.02)	7.59 (1.66)	0.010***

\*Chi-square test; \*\*Fisher Exact Test; \*\*\*Unpaired t-test

**Table 3: Multiple logistic regression analysis between the mother's sense of coherence score and the child's frequency of sugary snack intake**

Variable	Frequency of sugary snack intake <once/day* versus ≥once/day Adjusted OR (95% CI)	P
Caregiver's frequency of sugary intake		
< once/day	0.008 (0.001-0.070)	0.001
≥ once/day		
SOC	0.857 (0.764-0.961)	0.008

\*In the multiple logistic regression analysis, "<once/day" was set as the reference category. SOC: Sense of coherence, CI: Confidence interval, OR: Odds ratio

in parents. The psychological construct of parents remains to have a major role in coping with their responsibilities. It is, therefore, imperative to measure the impact of SOC of caregivers with respect to oral health behaviors of these children.<sup>[14]</sup>

The study showed that the frequency of sugary snack intake, toothbrushing frequency, and utilization of dental services by the autistic children were significantly associated with caregiver's SOC in line with Qiu *et al.*<sup>[5]</sup> The frequency of sugar intake was lower among children whose mothers had stronger SOC. This result is in contrast with that of Freire *et al.*<sup>[9]</sup> where mother's SOC was not associated with an adolescent's daily frequency of sugar intake.<sup>[10]</sup> It has

**Table 4: Multiple logistic regression analysis between the mother's sense of coherence score and the child's daily toothbrushing frequency**

Variable	Daily brushing frequency of children Once and less* versus twice and more Adjusted OR (95% CI)	P
Caregiver's daily toothbrushing frequency		
Once and less	-	-
Twice and more	-	-
Caregiver's oral health attitude score	1.150 (0.404-3.274)	0.793
Caregiver occupation		
Unemployed	1.755 (0.664-4.638)	0.257
Employee		
Employer		
Family income		
≤1,80,000	8.433 (2.509-28.345)	0.001
>1,80,000 and <600,000		
≥600,000		
SOC	1.134 (1.009-1.275)	0.035

\*In the multiple logistic regression analysis, "once and less" was set as the reference category. SOC: Sense of coherence, CI: Confidence interval, OR: Odds ratio

**Table 5: Multiple logistic regression analysis between the mother's sense of coherence score and the child's utilization of dental services**

Variable	Utilization of dental services Yes versus No* Adjusted OR (95% CI)	P
Caregiver's utilization of dental services		
No	1	0.005
Yes	0.046 (0.005-0.393)	
Caregiver's oral health attitude score	1.720 (0.969-3.051)	0.064
SOC	1.227 (1.070-1.407)	0.003

\*In the multiple logistic regression analysis, "No" was set as the reference category. SOC: Sense of coherence, CI: Confidence interval, OR: Odds ratio

also been reported previously that individuals with higher SOC scores had a higher intake of fruits but a lower intake of saturated fat, sucrose, and energy foods, which indicates that individuals with a higher SOC score were better in healthy dietary choices.<sup>[9]</sup> The oral hygiene behavior in children was also found to be significantly associated with mother's SOC. Children to mothers with higher SOC were at 1.13 odds of toothbrushing twice or more daily compared to children whose mothers had lower SOC. Various studies conducted by Mohinderpal Chadha *et al.*, Weil, and Inglehart and Campanaro *et al.* have presented reduced daily toothbrushing frequency in autistic children

when compared with normal children.<sup>[15-17]</sup> Campanaro *et al.* suggested time pressures, the child's noncompliance, the child's level of fatigue, chaotic routine, small size of the child's mouth, and having only one caregiver available to carry out this task as the common barriers in reduced frequency of toothbrushing habit among autistic children.<sup>[17]</sup>

It was found that mother's SOC score was significantly associated with the child's utilization of dental services, with better utilization of dental services among children whose mothers had stronger SOC. These findings were in accordance with studies conducted by Friere *et al.* and da Silva *et al.* where they found a similar association between mother's SOC and utilization of dental services by their children.<sup>[10,18]</sup> India is a fast developing nation, with consequential growth in health-care services. However, the distribution of services remains to be skewed which is more exaggerated for special care groups. In our study, only 29.3% of the autistic children had utilized dental care services. The study result suggests that most caregivers to autistic children neglect their child's oral health.

Special care group has not been researched upon much with respect to SOC and oral health behaviors. There is a serious dearth of research on this special care group in India. No study was retrieved that has addressed SOC and oral health-related behaviors of this high-risk group in India. Thus, the manner in which SOC influences health behaviors demands further research. However, we should observe that the frequency of autistic children using dental services (29.3%) and brushing their teeth twice a day or more (24.13%) was relatively low.

It is one of the scattering studies to evaluate the relation of oral health-related behaviors of autistic children and their primary caregiver's SOC though it has its limitations. The study relied on the caregivers' reporting of the children's oral health-related behaviors resulting in possible reporting bias. Furthermore, the study was conducted on autistic children and their caregivers in a city with small sample. Hence, further research with a bigger sample is advocated. In addition, the study was cross-sectional, which impedes drawing any inference about causal relationships between the caregiver's SOC and the child's oral health behaviors. Longitudinal studies are required to prove the causal relation if any as also suggested in previous study.<sup>[4]</sup>

Further research on autistic children and their parent's SOC is warranted. The study helps in building the capacity to gain an accurate and better understanding of parental psychology and their coping behavior which has a significant influence on their child's oral health.

### Conclusion

To conclude, current study found that autistic children's oral health related behaviors viz. sugary snack intake frequency, daily tooth brushing frequency was associated

with stronger SOC of mothers. Utilization of dental services improved with improved utilization of services of caregivers and stronger SOC.

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### Conflicts of interest

There are no conflicts of interest.

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