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Original Article

Influence of lifestyle factors on oral health status among 7-15 years visually impaired and sighted school children of Bangalore city

Arpan Debnath[1], B. K. Srivastava[1], Soumya Roy Chaudhuri[1], Santanu Sen Roy[1]

[1]Department of Public Health Dentistry, Guru Nanak Institute of Dental Sciences and Research, Kolkata, West Bengal, India.

***Corresponding author:**
Arpan Debnath,
Department of Public Health Dentistry, Guru Nanak Institute of Dental Sciences and Research, Kolkata, West Bengal, India.

arpan.dnath@gmail.com

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ABSTRACT

Objectives: The effects of daily lifestyle habits and practices on health have been seen specially on disabled population who are at increased risk of developing diseases due to various social challenges. The deep understanding of the lifestyle requires studying a person's attitude, values, practices, and cultural and social environment. This study is aimed to assess and evaluate the association between lifestyle factors and oral health status among 7–15 years visually impaired and sighted school children of Bangalore city.

Material and Methods: The study was conducted with self-administered lifestyle questionnaire consisting of 29 close-ended questions and a combined pro forma of World Health Organization oral health assessment and simplified oral hygiene index.

Results: The result showed a significant difference between normal and visually impaired children in mean lifestyle values with 6.85 and 5.64, respectively. There was also a significant difference between debris index simplified scores with 70.6% of normal children that have good debris scores compared to 56.5% of visually impaired children.

Conclusion: The study shows poor oral hygiene, gingival health, and lifestyle scores among visually impaired children. The knowledge to keep teeth sound and healthy was less among the visually impaired children than the normal sighted children. Furthermore, visually impaired children had a poor regular dental visits than their non-visually impaired counterparts. The fear of unknown was more among the visually impaired than the normal children which again were reflected on their dental visits timings. Less social interactions, poor motivations, and parental negligence might be the reasons for increased caries and gingivitis rates among visually impaired than normal school going children.

Keywords: School children, DMFT, Lifestyle, Oral hygiene, Visual impairment

INTRODUCTION

In this 21st century diseases, humanity is facing today which is deeply connected with more attractive and alluring lifestyle activities both within and outside the human entity with changing public sanitation, poor dietary habits, nutritional deficiency, personal hygiene, daily basic human habits, customs, and cultural practices.[1] Studies have shown that improper lifestyle was associated with a high dental caries and gum diseases. Numerous studies on the lifestyle and oral status of normal general population have been carried out in past.[2-4] However, literature on the association between lifestyle factors and various oral diseases such as dental caries, gingival diseases as well as oral pre-malignant and malignant lesions among children,

and adolescents and specially the visually impaired children in India is scanty.

At the present moment, the prevalence of blindness is as high as 1.5/1000 children in low-middle-income countries with India accounting for 0.8/1000 which reflects a major health problem.[5] The major causes for blindness include congenital eye anomalies, retinal degeneration, and Vitamin A deficiency. Most of the visually impaired children have social and motor delays. This study will help us understand if at all there are social setbacks, physical barriers, and cognitive awareness constrains among visually impaired children and if at all they are there how much it is different from a normal child and also how much is the oral disease burden among them.

MATERIAL AND METHODS

The present study is a cross-sectional, analytical study with an interview and clinical examination process. A total sample size of 760 children was calculated using the formulae.[6]

$$n=\left\{\frac{Z1\text{-}\alpha\sqrt{2P(1\text{-}P)}+Z1\text{-}\beta\sqrt{P1(1\text{-}P1+P2(1\text{-}P2)}^{2}}{(P1\text{-}P2)^{2}}\right\}$$

Multistage sampling technique was used where at first Bangalore zones were identified and randomly selected. In the second stage, through cluster sampling schools from each zone were selected and in the third stage through stratified random sampling normal school and visually impaired children were incorporated into the study. The calculated sample size was proportionately distributed between three age groups. Ethical clearance was taken from the Ethical Review Board of the institute and the required official permission to examine and to collect that the relevant data were obtained from the head of the institutionalized homes and Deputy Director of Public Instruction. Informed consent was taken from the guardian and children who were mentally unsound were excluded from the study.

A pilot survey was conducted in a sub sample on both study groups. The questionnaire regarding lifestyle factors were distributed among the students. The reliability statistics was 0.916 for sighted children and the reliability statistics for visually impaired children was 0.70 using Cronbach's alpha co-efficient.

Questionnaire

The main study was started with self-administering questionnaire consisting of 29 close-ended questions given to both the visually impaired children through a Braille format and the sighted children in written printed format (both in English and local languages). Table 1 highlights the questionnaire used in the study.[7-10]

Table 1: Assessment of knowledge, attitude, dental health behavior, daily lifestyle practices, and dietary habits among normal and visually impaired children using lifestyle-related questionnaire.

Questionnaire
Dental health knowledge
1. How many sets of dentition do we have? One, two, don't know
2. Do you think decayed teeth or irregular teeth can affect your appearance? Yes, no, don't know
3. How frequently you visit dentist? 6–12 months, Last 1–5 years, Never
Attitude
4. Do you think maintaining teeth will help you? Strongly agree, agree, neutral, disagree, strongly disagree
5. Do you use any mouthwash, dental floss available in market? Yes, no
6. Are you anxious for dental appointments? Yes, no
7. If you are anxious of dental appointments, why? Afraid of needle, treatment time, others
8. Do you prefer listening music/watching T.V over playing outside? Yes, no
9. How many intimate friends you have? ≤3, ≥4
10. Do you think visiting dentist is necessary? Strongly agree, agree, neutral, disagree, strongly disagree
Dental health behavior
11. Are you dependent on your guardian for oral care needs? Yes, No
12. Do you brush your teeth daily? Yes, No
13. What is the material used for cleaning teeth? Tooth brush and tooth paste, tooth brush and tooth powder, finger
14. How many times a day do you brush your teeth? Once, twice, after every meal, don't clean every day
15. How often do you change your toothbrush? 1–3 months, 4–6 months, >6 months
16. What is the reason for changing toothbrush? Bristles frays, new toothbrush design available in market, don't know
17. Do you feel stress during medical check-ups? Yes, No
Dietary behavior
18.Do you use sweets, snacks or soft drinks? Daily, one or twice a week, occasionally or never
19. When were the sweets eaten? During meals, between meals, during and between meals
20. Is attention given to sugar intake? Always, rarely, never

(Contd...)

Table 1: *(Continued).*

Questionnaire
Daily lifestyle practices
21. Do you practice any exercise or workout? Regularly, yes, no
22. Do your school have any work out sessions? Yes, no
23. What type of exercise or workout do you practice? Walking, yoga, professional games
24. How many times do you exercise? Daily, once a week, never
25. Do you have any adverse habits such as smoking, drinking alcohol, anddrug abuse? Yes, no
26. Do you smoke, drink alcohol, take drugs now? No habit or quit habit, occasionally
27. Do you get enough sleep? Yes, no
28. Are you dependent on any medications for getting sound sleep? Yes, no
29. How many hours a day you sleep? 8–10 h, 6–8 h, <4 h
30. Do you engage in social activity? Yes, no

Oral health assessment

Clinical examination was conducted in the school premises under adequate natural light and maintaining proper infection control protocols. A combined pro forma of World Health Organization oral health assessment form 2013 for children as well as simplified oral hygiene index by Greene and Vermillion (1964) was used to record the clinical findings.[11,12]

Statistical analysis

The statistical software Statistical Package for the Social Sciences version 22.0 was used and the collected data on dental caries and oral hygiene status, and the associated variables were subjected to statistical analysis using Chi-square test, *t*-test, and analysis of variance.

RESULTS

The comparative study included 253 males and 247 females in the normal children group and 155 males with another 105 females were present in the visually impaired group. About 48.8% of the normal children were mostly from lower middle class whereas 55.8% of the visually impaired children were mostly from the upper lower class.

The mean dental knowledge values between normal and visually impaired children were 2.02 and 1.23, respectively. The mean attitude values between normal and visually impaired children were 4.40 and 3.63, respectively. The mean dental health behavior values between normal and visually impaired children were 5.43 and 4.57, respectively. Mean daily lifestyle values between normal and visually impaired children as 6.85 and 5.64, respectively. The mean dietary values between normal and visually impaired children were 3.62 and 3.16, respectively.

The oral debris and calculus scores differed significantly in between normal and visually challenged children which are given in Figure 1. A significant relationship was observed between attitude, daily lifestyle practices, and oral hygiene status simplified in both normal and visually impaired children. The attitude was high among the normal children with good oral hygiene (mean: 4.45) and low with fair and poor oral hygiene (mean: 4.06 and 4.00, respectively). The daily lifestyle practice was high among normal children with good oral hygiene (mean: 6.91) and low with fair and poor oral hygiene (mean: 6.50 in both the fair and poor oral hygiene groups). However, the attitude and daily lifestyle practices were low among the visually impaired group with good oral hygiene (mean: 3.54 and 5.52, respectively) compared to the fair oral hygiene (mean: 3.85 and 5.92, respectively).

Figure 2 shows the mean values of decayed, missing, and filled index (DMFT) among normal and blind children. A significant increase in the D component of DMFT was seen visually impaired children than normal sighted children. Normal children with good lifestyle were having better D component of the DMFT (mean: 0.30) than those who were having poor lifestyle with greater D component of the DMFT (mean: 0.36). Furthermore, normal children with good lifestyle were having better DMFT (mean: 0.33) than those who were having fair and poor lifestyle with greater DMFT (mean: 0.73 and 0.36, respectively).

There was a significant difference in gingival bleeding scores between normal and visually impaired groups with 71.8% and 47.7% of them having no gingival bleeding on probing. Dental erosive lesion and fractured teeth were higher among visually impaired compared to non-visually impaired children.

DISCUSSION

Health-related lifestyle is a multidimensional concept[13] as Wenzel's (1983) definition says "Lifestyle of an individual is the entirety of normative orientations and behavioral patterns that are developed through a process of socialization and includes attitudes and values in the concept of lifestyle."[14] Lifestyle always has a direct impact on health and, so in this study, we are looking for any such effect on oral health.[15]

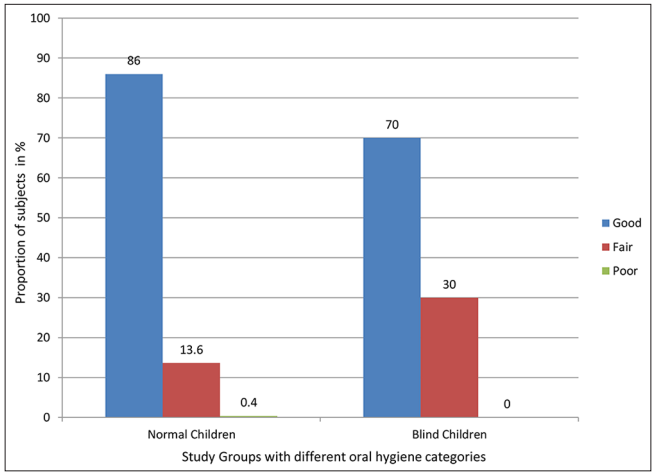

Figure 1: Distribution of study groups according to oral hygiene index simplified.

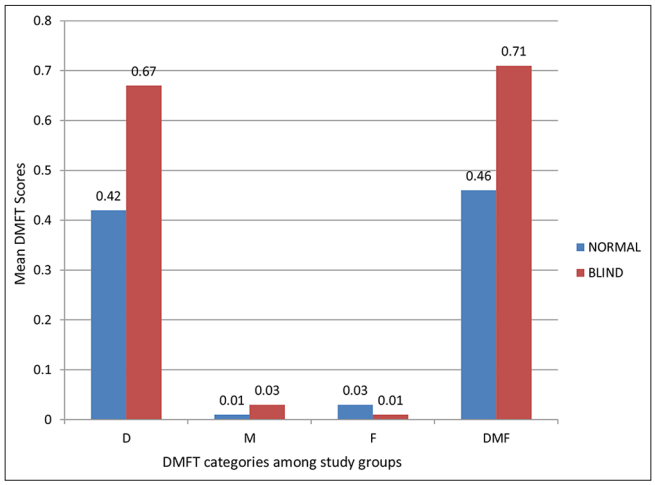

Figure 2: Distribution of study groups according decayed, missing, and filled index calculated from the oral health Assessment form (dentition status) for children, 2013.

When dental-related knowledge was assessed, a statistical significant difference was seen in the blind children (41.5%) responding to the correct answer regarding the number of dentition humans have compared to that of normal sighted children (69.4%) which were in accordance with the study done by Fantaye *et al.*[16] Indicating that their elementary knowledge about oral cavity was lesser due to improper perception about their external environment or it may be due to existing poor health education system in those institutions where they reside.

In this study, many blind children had broken anterior teeth but were unaware of their physical appearance. In the personal interview session, it was also seen that blind children say that physical appearance matters little in their life as well as due to limited dental treatment facility timely oral care remain a problem.[17]

It was found in our study that the frequency of dental visits among the visually impaired children was significantly lower compared to that of normal children. About 53.8% of the normal children strongly agreed to visit a dentist which was necessary for a healthy mouth while only 39.6% of visually challenged children strongly agreed to visit a dentist which was in accordance with the study done by Chang and Shih.[7] The relatively less frequent visits of visual impaired children to a dentist can be explained by multiple reasons like inaccessibility to a dental clinic by their own, and moreover, it has been seen that major dental problems such as dental caries or periodontal disease are not a priority of the disable student's families.[18] The present study also found that the visually impaired children (57.3%) were significantly more dependent on their guardians for their oral care needs than the normal sighted children (43.6%).

In the present study, it is seen 52.5% of the normal children uses mouthwash and dental floss compared to that of 16.5% of the visually impaired children which were in accordance to the study done by Sharififad *et al.*, where none of the visually impaired were using floss and interdental aids.[19] This may perhaps be due to low dental visits which lesser their chance to know about newer cleaning aids. Also cost, availability issue or its alien cultural origin might be some other factors adding to this problem. It was also seen 76% of the normal children brushed their teeth twice daily while only 32.7% of visually impaired children brushed twice daily. It can due to the fact of poor attitude toward oral health or less awareness or lack of manual dexterity among disabled individuals which may lead to poor oral hygiene maintenance.[20]

The present study shows that there was very minimum cariogenic diet intake among both normal and visually impaired children. However, in the present study, most of the sweets were eaten during meals among the normal children (50.6%) than the visually impaired children who took most of the sweets in between meals (48.8%) which can attribute to a moderately high caries among blind children which were in accordance to the study done by Darshana *et al.*[21]

In the present study, it was seen that there was a significant amount of anxiety among the blind children (69.2%) compared to that of normal children (32%) for dental appointments. The reason of anxiety was found to be mostly due to fear of pain from the needle (normal: 46.3%; blind: 58.5%) and next to that was the treatment time (normal: 35%; blind: 35%) and rest was for other reasons such as fear of the doctor or fear of the unknown (normal: 18.8%; blind: 6.6%).

About 92.4% of normal children practiced exercise and workouts while only 74.2% visually impaired practiced workouts. It has been seen that exercise is vital for maintaining mental fitness, as it can reduce stress. This can, in turn, built a level of confidence where the children can fight against odd situations. Not only reducing stress the

advantage of exercise can be seen in reducing obesity which, in turn, affects the oral periodontium.[22,23]

Limitations

In the present study, it was seen that most of the visually impaired children were residents in the special schools and individuals from normal schools were day scholars. Hence, these two kinds of settings might influence their lifestyle to a little extent. However, selection of students based on equal socioeconomic strata reduces the chances of wide variation in their lifestyle.

CONCLUSION

The study revealed that the visually impaired children of Bangalore city had less overall lesser lifestyle practices and behavior than their sighted peers and, hence, had poor oral hygiene. Therefore, it is important to increase awareness and oral health care delivery accessible affordable achievable for these underprivileged physically challenged children.

Ethical approval: IRB at K.L.E Society's Institute of Dental Sciences Bangalore Number KIDS/IEC/11-2014/29 DATED: 26.11.2014
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REFERENCES

1. Singh A, Banerjee P, Anas M, Singh N, Qamar I. Traditional nutritional and health practices targeting lifestyle behavioral changes in humans. J Lifestyle Med 2020;10:67-73.
2. Locker D, Jokovic A, Payne B. Life circumstances, lifestyles and oral health among older Canadians. Community Dent Health 1997;14:214-20.
3. Zeng L, Zeng Y, Zhou Y, Wen J, Wan L, Ou X, *et al*. Diet and lifestyle habits associated with caries in deciduous teeth among 3- to-5 year-old preschool children in Jiangxi province, China. BMC Oral Health 2018;18:224.
4. Singla N, Acharya S, Singla R, Nayak P. The impact of lifestyles on dental caries of adult patients in Udupi district: A cross-sectional study. J Int Soc Prev Community Dent 2020;10:189-95.
5. Wadhwani M, Vashist P, Singh SS, Gupta V, Gupta N, Saxena R. Prevalence and causes of childhood blindness in India: A systematic review. Indian J Opthalmol 2020;68:311-5.
6. Suresh K, Chandrashekhara S. Sample size estimation and power analysis for clinical research studies. J Hum Reprod Sci 2012;5:7-13.
7. Chang CH, Shih YH. Knowledge of dental health and oral hygiene practices of Taiwanese visually impaired and sighted students. J Vis Impair Blind 2004;98:289-303.
8. Gardens SJ, Krishna M, Vellappally S, Alzoman H, Halawany HS, Abraham NB, *et al*. Oral health survey of 6-12-year-old children with disabilities attending special schools in Chennai, India. Int J Paediatr Dent 2014;24:424-33.
9. Vashisth S, Devi A. Oral hygiene practices among visually impaired school-going individuals in Bengaluru city, Karnataka, India. J Cranio Max Dis 2015;4:39-41.
10. Tiwari BS, Ankola AV, Jalihal S, Patil P, Sankeswari RM, Kashyap BR. Effectiveness of different oral health education interventions in visually impaired school children. Spec Care Dentist 2019;39:97-107.
11. Greene JC, Vermillion JR. The Simplified Oral Hygiene Index. J Am Dent Assoc 1964;68:7-13.
12. World Health Organization. Oral health surveys: Basic methods. Vol. 5. Geneva: World Health Organization; 2013. p. 85.
13. Steele J, McBroom WH. Conceptual and empirical dimensions of health behavior. J Health Soc Behav 1972;13:382-92.
14. Erben R, Franzkowiak P, Wenzel E. Assessment of the outcomes of health intervention. Soc. Sci. Med 1992;35:359-65.
15. Norlén P, Johansson I, Birkhed D. Impact of medical and life-style factors on number of teeth in 68-year-old men in southern Sweden. Acta Odontol Scand 1996;54:66-74.
16. Fantaye W, Nur A, Kifle G, Engida F. Oral health knowledge and oral hygiene practice among visually impaired subjects in Addis Ababa, Ethiopia. BMC Oral Health 2022;22:167.
17. Mehta V, Selvaraj S, Tripathy S, Mishra N, Negi S, Mathur A, *et al*. Oral health disorders among visually impaired children in South Asian countries: A systematic review. Front Oral Health 2025;6:1501120.
18. Gladstone M, McLinden M, Douglas G, Jolley E, Schmidt E, Chimoyo J, *et al*. 'Maybe I will give some help. Maybe not to help the eyes but different help': An analysis of care and support of children with visual impairment in community settings in Malawi. Child Care Health Dev 2017;43:608-20.
19. Sharififad N Sargeran K, Katayoun K. Oral health status and related factors in children with visual impairment aged 7-11 years: A cross-sectional study. Front Dent 2022;19:13.
20. Gordon SM, Dionne RA, Snyder J. Dental fear and anxiety as a barrier to accessing oral health care among patients with special health care needs. Spec Care Dent 1998;18:88-92.
21. Bennadi D, Mythri H, Bharteesh JV. Dental negligence among visually impaired children - a call for attention. J Dent Sci 2013;5:20-4.
22. Ylostalo P, Suominen-Taipale L, Reunanen A, Knuuttila M. Association between body weight and periodontal infection. J Clin Periodontol 2008;35:297-304.
23. Grover V, Malhotra R, Kaur H. Exploring association between sleep deprivation and chronic periodontitis: A pilot study. J Indian Soc Periodontol 2015;19:304-7.

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