Habit-breaking Methods Employed by Mothers of Children with Nonnutritive Sucking Habits Resident in Suburban Nigeria

Abstract
Context: Parents are often concerned about their children’s nonnutritive sucking (NNS) habits and may institute mechanisms to try to break them. Aim: The study identified various methods instituted by mothers resident in a suburban Nigeria to break NNS habits of children, reasons for wanting to break the habit, and the association between instituted methods and sociodemographic profile of the mothers. Materials and Methods: The data of 129 mothers of children aged 4 years to 12 years who had NNS habits at the time of conducting a household survey were analyzed. Statistical Analysis: Tests of associations were conducted to determine the association between maternal age and level of education and methods employed to break child’s NNS habits. Results: Eighty-four mothers (65.1%) made efforts to break the habit. Habit persisting to older age was the main concern. The most common method employed for breaking habits was punishing the child (54.8%). Only 7 (20.0%) mothers who were concerned about NNS habit(s) sought professional advice. A greater though insignificant percentage of mothers in the 25–34 years age group (57.2%; \(P = 0.48\)) and those with secondary school level of education (56.0%; \(P = 0.12\)) made efforts to break their children’s NNS habits. Conclusions: The majority of mothers were concerned about their children’s NNS habits. However, very few concerned mothers sought professional advice. Efforts need to be made to improve the public awareness about the availability of professional services for managing NNS habits and potential impact of employing nonprofessional methods to break habits.

Keywords: Habit-breaking methods, mothers, nonnutritive sucking habits

Introduction
Nonnutritive sucking (NNS) habits are habits which involve the sucking of objects that are not food.\(^1\) Fatigue, boredom, excitement, hunger, fear, physical, emotional stress, and insufficient satisfaction of sucking need in infancy are factors that could stimulate NNS habits.\(^2\) These habits can affect academic performance as a result of school absenteeism from infections contracted from the digit being sucked, limited writing and manipulative skills, and trance-like state during sucking that can distract the child in class.\(^3,4\) Sucking may also provide happiness and a sense of security during difficult times to children.\(^5,5\)

The prevalence of NNS habit varies between different populations. In Nigeria, the prevalence range between 9.9% and 34.1% among different age groups.\(^6,8\) Higher prevalence of NNS had been reported in children resident in Saudi Arabia (48.4%)\(^7\) and Spain (90.7%).\(^9\)

Prolonged NNS sucking is of significant importance due to the associated malocclusion.\(^10\) More than 50% of the children engaged in NNS habits develop malocclusion,\(^10,11\) with associated impact on speech, and physical and emotional development of the child.\(^1\)

A key influencer of the oral health of children is the child’s mother. Not only are they the immediate care givers for children\(^12\) but also their knowledge and beliefs influence the oral health and oral health outcomes of children.\(^13\) Multiple studies have demonstrated how mothers influence the caries preventive practices of children,\(^14,15\) affect access of children to dental care,\(^16\) and how maternal support helped in breaking NNS habits in children.\(^17\)

Not all parents are concerned and interested in breaking their children’s NNS habits.\(^18\) Concerned parents often employ professional and unprofessional methods.
to break these habits. Professional methods include using reminder techniques and provision of orthodontic appliances, while unprofessional methods employed include punishment, use of restraints, and topical application of bitter substance and pepper.\textsuperscript{[5,19]}

Most times, professional methods are not sought by caregivers\textsuperscript{[2]} despite the fact that the use of professional methods increases the success for achieving results when compared with the use of nonprofessional method.\textsuperscript{[20]} The low utilization of dental services, especially for preventive services in developing countries like Nigeria,\textsuperscript{[21]} further limits access of caregivers to professional advice on the management of NNS habits.

With the history of poor access of children to dental services and dental professionals in Nigeria,\textsuperscript{[22]} the high prevalence of NNS habits in children resident in the country,\textsuperscript{[6-8]} and the growing prevalence of malocclusion,\textsuperscript{[23]} it is important to identify how interceptive actions are taken to reduce the risk of developing malocclusion secondary to NNS habits in Nigeria. Specifically, this study assessed the various methods instituted by mothers resident in a suburban Nigerian community to break NNS habits of children, reasons for wanting to break the habit and the association between instituted methods for breaking habits, and age and level of education of the mothers.

**Materials and Methods**

**Study design**

This study is a secondary analysis of a data generated to determine the association between oral habits and caries prevalence in children aged 6 months to 12 years resident in Ife Central Local Government Area. Data were collected through a house hold survey. Parts of the data of the study had been published.\textsuperscript{[24]}

Study participants were recruited from Ife Central Local Government area, a semi-urban area of Osun State, Nigeria. The local government was chosen as the study location due to its proximity to the Obafemi Awolowo University and the Obafemi Awolowo University Teaching Hospitals Complex, the host institutions of the authors. The estimated population for the year 2004 is 138,818 with about 10% of the total population being children.

**Selection criteria**

Children and mothers at home at the time of data collection were eligible to participate in the study. The data of the pair of mother and children aged 4 years to 12 years who are currently practicing an NNS habit(s) was extracted for this study. NNS habits included finger sucking, tongue sucking, tongue thrusting, lip sucking, lip biting, nail-biting, object biting, bruxism, and use of pacifier.

**Sample size determination**

The sample size was determined using the sample size formula for estimation of single proportion when studying populations >10,000 as described by Araoye.\textsuperscript{[25]}

\[
n = \left( \frac{z}{d} \right)^2 \frac{pq}{1}
\]

where,

“\(n\)” is the desired sample size (when population is >10,000), “\(z\)” is the standard normal variate corresponding to confidence level; at 95% confidence level, “\(z\)” is the 1.96 for a two-tailed test, \(p = 3.4\%\) prevalence of NNS habit in a prior study,\textsuperscript{[26]} “\(q\)” is 1.0–\(P\) while “\(d\)” is the precision or degree of accuracy desired; this was set at 5% or 0.05.

Slotting these into the formula given:

\[
n = \left( \frac{1.96}{0.05} \right)^2 \frac{0.034 \times 0.966}{0.05} = 50.5
\]

This is the minimum number of participants required for this study. Data of 129 mothers who had children with NNS habits were retrieved for analysis for this study. This implies that the study is powered enough to determine its objective.

**Sampling technique**

The sampling procedure was a (three-level) multistage cluster sampling aimed at selecting eligible persons with known probability. Stage 1 involved the random selection of enumeration areas within the local government area. Stage 2 involved the selection of the household to be surveyed in the enumeration area. At the enumeration sites, every third household on each street was considered for study participant recruitment. Stage 3 involved the selection of actual respondents for interview and testing. Only one eligible child in each household selected to participate in the study. Alternative sexes and age range identified for study recruitment were selected to participate in each consecutive household. Recruitment continued in the enumeration sites until the study sample per data collector was reached.

**Data collection instrument**

Data were collected through personal interview using structured questionnaire.

The data collection tool contained questions that elicited the information on the age of the mother and the child, education level of mother, mothers concern about NNS habits, mothers’ opinion about the possible effect of the NNS habit, methods employed to try and break the NNS habit, whom they sought advice on how to break habits and NNS habit breaking efforts instituted that failed.
• Educational level of the mother was classified as primary/quranic level, secondary level, and tertiary level of education
• Mothers’ concern about NNS and the response was “yes” or “no”
• Mothers’ opinion about the possible effect of the NNS habit was obtained. Response options were: “the child might continue to old age,” “might affect shape of permanent teeth,” “affect appearance,” “affect academic performance,” “affect speech,” “affect feeding,” “make people assume that the child was not properly brought up,” “friends may tease the child”
• Information on methods employed to try and break the NNS habit was also sought. Response options included: “punishing the child for indulging in NNS,” “application of unpleasant flavored substances on the finger and pacifier,” “child broke habit voluntarily,” “gave reward for stopping the habit,” “wrapped the hand or tape application to the digits”
• Mothers were also asked about whom they sought advice on how to break habits from. Response options included: “from friends,” “counselors,” “religious leaders,” “medical doctors,” “dentists.” Counselors, dentists, and medical doctors were classified as professional advisers while friends, religious leaders, and others were classified as nonprofessional advisers
• Information on NNS habit breaking efforts instituted that failed was also obtained.

Table 1: Sociodemographic profile of the mothers (n=129)

| Variable                   | Frequency, n (%) |
|----------------------------|------------------|
| Mother’s age (years)       |                  |
| <25                       | 9 (7.0)          |
| 25-34                     | 72 (55.8)        |
| 35-44                     | 41 (31.8)        |
| 45 and above              | 7 (5.4)          |
| Mother’s education         |                  |
| Primary or quranic         | 20 (15.5)        |
| Secondary                 | 68 (52.7)        |
| Tertiary                  | 41 (31.8)        |

Table 2: Distribution of nonnutritive sucking by age of children

| Age of child (years) | Finger sucking, n (%) | Tongue sucking, n (%) | Tongue thrusting, n (%) | Lip sucking, n (%) | Nail biting, n (%) | Biting objects, n (%) | Bruxism, n (%) | Use of pacifier, n (%) | Total, n (%) |
|----------------------|-----------------------|-----------------------|-------------------------|-------------------|-------------------|---------------------|---------------|------------------------|--------------|
| <5                   | 35 (49.3)             | 5 (83.3)              | 6 (75.0)                | 3 (23.1)          | 1 (1.7)           | 6 (42.9)            | 8 (57.2)      | 4 (100.0)               | 68 (46.6)    |
| 5-8                  | 24 (33.8)             | 0                     | 2 (25.0)                | 6 (46.2)          | 11 (22.9)         | 6 (42.9)            | 4 (28.6)      | 0                      | 53 (36.3)    |
| 9-12                 | 12 (16.9)             | 1 (16.7)              | 0                       | 4 (30.8)          | 4 (18.2)          | 2 (14.3)            | 2 (14.3)      | 0                      | 25 (17.1)    |
| Total                | 71 (48.6)             | 6 (4.1)               | 8 (5.5)                 | 13 (8.9)          | 16 (19.6)         | 14 (9.6)            | 14 (9.6)      | 4 (2.7)                 | 146 (100.0)  |

P=0.04

Standardization of field workers

Field workers who had been engaged in past national surveys of this nature were recruited for the study. The field workers were trained centrally on the study protocol, the use of the data collection tools, sample selection (including household listing and selection), and all other aspects of fieldwork. Discussions and clarifications were made about the content of the questionnaire during training and field testing.

Study procedure

After due consideration of the ethical issues, the field workers interviewed the mothers that were eligible for the study. The field workers also had translations of habits in the local language of the environment. Every oral habit was adequately explained to the mothers before administering questionnaire to enable them identify the exact habit the child engaged in. The interviewers collected the information from the respondent and submitted the completed questionnaires to the survey supervisors who reviewed all filled questionnaires.

Statistical analysis

The child’s age was grouped into three: below 5 years, 5–8 years, and 9–12 years. The mother’s age was grouped into four: below 25 years, 25–34 years, 35–44 years, and 45 years and above.

Bivariate analysis was conducted to test the association between the age and educational level of mothers, efforts made at stopping the NNS habits and whether professional/nonprofessional advice was sought on how to break habits. In addition, the association between the age of child and type of NNS practiced was conducted. Statistical package of Social Science (SPSS) version 15 (IBM, Chicago, IL, USA) was used to analyze the data generated. The level of statistical significance was inferred at P < 0.05.

Ethical consideration

Ethical approval for the study was obtained from Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife Nigeria (ERC/2013/07/14). Permission for the conduct of the study was sought from the Ife Central Local Government Authority. Written informed consent was obtained from the mothers of children who participated in this study.
Results

Table 1 shows the sociodemographic profile of the 129 mothers whose children practiced one or more NNS habits. The mean age of the mothers was 32.4 ± 6.5 years, and the modal age was 30 years. The majority of mothers (52.7%) had secondary school education.

Table 2 shows the different types of NNS habits practiced by the children. The most common was digit sucking which occurred in 71 (48.6%) children while no child indulged in lip biting. There was a statistically significant association between the children’s age and NNS habit \( (P = 0.04) \): more children >5 years (46.6%) indulging in NNS habits.

Figure 1 highlights the concern proportion of mothers about NNS habits. Mothers were more concerned about the habits persisting to older age in their children (52.9%) and were least worried (3.0%) about the effect of NNS on facial appearance and speech.

Table 3 shows the distribution of mothers who made/ did not make an effort to eliminate NNS habits by age and level of education. Eighty-four mothers (65.1%) made efforts to break the habit. A greater though insignificant percentage of mothers in the 25–34 years age group (57.2%, \( P = 0.48 \)) and those with secondary level of education (56.0%, \( P = 0.12 \)) made the greatest effort to break their children’s habits.
Table 5: Distribution of mothers by form of advice sought

| Variable          | Professional | Nonprofessional | Total       | n (%)  | P   |
|-------------------|--------------|-----------------|-------------|--------|-----|
| Child’s age (years) |              |                 |             |        |     |
| <5                | 5 (71.4)     | 17 (60.7)       | 22 (62.9)   | 37 (39.4) | 59 (45.7) | 0.74 |
| 5-8               | 1 (14.3)     | 8 (28.6)        | 9 (25.7)    | 39 (41.5) | 48 (37.2) |
| 9-12              | 1 (14.3)     | 3 (10.7)        | 4 (11.4)    | 18 (19.1) | 22 (17.1) |
| Total             | 7 (100.0)    | 28 (100.0)      | 35 (100.0)  | 94 (100.0) | 129 (100.0) |

Table 4 shows the techniques employed by mothers to try and break their child’s NNS habit. Eight (9.5%) mothers made multiple efforts to break the habit. Punishing children for engaging in NNS habit (50.0%) was the most common method employed while a combination of wrapping the hand and rewarding the child (1.2%) was the least employed method.

Table 5 shows the distribution of children whose mothers’ sought advice on methods of breaking NNS habits. A total of 35 (27.1%) mothers sought professional and nonprofessional advice, the majority (62.9%) of who were mothers of children <5 years old. Only 7 (20.0%) mothers interviewed sought professional advice.

Discussion

The findings from this study showed that many mothers were concerned about the NNS habits of their children with the main concern being the possibility of the habit persisting to older age. There was little concern about habit affecting speech and the facial appearance of the child. Punishment was the most common method employed to break the habit. There was no significant association between age, educational level of mother, and the use of professional or nonprofessional methods to break NNS habits.

Many of the mothers were below 35 years indicating many were in the child-bearing age. Our observation that most of the mothers were concerned about the NNS habits persisting to older age had been earlier reported by Al-Johara, following a study conducted in Saudi Arabia. We feel mothers were actually concerned with being labeled as poor child trainers rather than being concerned about the possible malocclusion that could result from persistent habits. This reflects the fact that children indulging in NNS habits beyond childhood may not be socially acceptable and comes with some social stigma for both the parents of the child. There has been prior report on social stigma associated with older children indulging in NNS habits. Seeking professional advice for stopping the habit was minimally utilized in this population. Very few of mothers sought professional advice for the NNS habit of their children which is significantly lower than findings from a previous study. Where 38% sought the dentist’s advice. In another study, none of the mothers sought pediatrician advice, but a mother (0.6%) sought the dentist advice.

The low consultation of professional advice in the study area may be as a result of the poor oral health awareness as evidenced by the poor utilization of oral health-care services. This is an important reason for dentists to identify children with NNS habits, and institute measures to support professional NNS habit breaking. Such support could also relieve mothers of potential psychological distress.

Children could also face psychological distress from the use of unprofessional methods such as punishment, the topical application of unpleasant lotion, to break the NNS habits, and the use of restraints. Afifi et al. were able to demonstrate that harsh physical punishment was associated with mental illness. While this study was not able to highlight the forms of punishment meted to children who engaged in NNS habits, the probability that some children may have to face harsh punishment cannot be ruled out. This is another reason to advocate for active professional education of parents in this community about NNS and how to find professional support for breaking these habits.

One limitation of the study was the small sample size which made it difficult to conduct robust subgroup analysis. However, the methodological strength of this study (adequate sample size and the use of a household survey to collect data) makes the finding of the study conclusive and generalizable to the study environment though the findings cannot be generalized to urban Nigeria where access to professional oral health care is easier and where awareness about oral health is better.

Conclusions

This study highlights the findings of both clinical and social importance: It highlights a critical challenge oral health-care professionals in the study environment needs to address: The need to create awareness about professional methods to break NNS habits and dissuade use of nonprofessional habits especially punishment.

Acknowledgment

We acknowledge all the field workers involved in this study and Mr Mobolaji for his input in analyzing the data.
References

1. Ngom PI, Diagne F, Samba Diouf J, Ndiaye A, Hennequin M. Prevalence and factors associated with non-nutritive sucking behavior. Cross sectional study among 5- to 6-year-old Senegalese children. Orthod Fr 2008;79:99-106.

2. Salah A. Mothers’ attitude toward digit sucking habits in children of United Arab Emirates. Int J Orofacial Myology 2007;33:37-46.

3. Green SE. Confirmational study: A positive-based thumb and finger sucking elimination program. Int J Orofacial Myology 2010;36:44-59.

4. Van Norman RA. Digit-sucking: A review of the literature, clinical observations and treatment recommendations. Int J Orofacial Myology 1997;23:14-34.

5. Al-Jobair A, Al-Emran SE. Attitudes of Saudi Arabian mothers towards the digit-sucking habit in children. Int J Paediatr Dent 2004;14:347-54.

6. Uwaezuoke SN, Ihechukwu GC, Okafor HU. Digit sucking habit of preschool children in Enugu, Eastern Nigeria. J Pediatr Neurol 2003;1:99-101.

7. Onyeaso CO. Oral habits among 7-10 year-old school children in Ibadan, Nigeria. East Afr Med J 2004;81:16-21.

8. Quashie-Williams R, daCosta OO, Isiekwe MC. Oral habits, prevalence and effects on occlusion of 4-15 year old school children in Lagos, Nigeria. Niger Postgrad Med J 2010;17:113-7.

9. Franco Varas V, Gorritxo Gil B, García Izquierdo F. The prevalence of childhood oral habits and their influence in primary dentition. Rev Pediatr Aten Prim 2012;14:13-20.

10. Katz CR, Rosenblatt A. Nonnutritive sucking habits and open bite in Brazilian children: A longitudinal study. Pediatr Dent 2005;27:369-73.

11. Heimer MV, Tornisiello Katz CR, Rosenblatt A. Non-nutritive sucking habits, dental malocclusions, and facial morphology in Brazilian children: A longitudinal study. Eur J Orthod 2008;30:580-5.

12. Suresh BS, Ravishankar TL, Chaitra TR, Mohapatra AK, Gupta V. Mother’s knowledge about pre-school child’s oral health. J Indian Soc Pedod Prev Dent 2010;28:282-7.

13. Abiola Adeniyi A, Eyiotope Ogunbode O, Sonny Jleboda O, Morenike Folayan O. Do maternal factors influence the dental health status of Nigerian pre-school children? Int J Paediatr Dent 2009;19:448-50.

14. Wigen TI, Wang NJ. Parental influences on dental caries development in preschool children: An overview with emphasis on recent Norwegian research. Norsk Epidemiologi 2012;22:13-9.

15. Folayan MO, Kolawole KA, Oyedele T, Chukwumah NM, Onyejaka N, Agbaje H, et al. Erratum: Association between knowledge of caries preventive practices, preventive oral health habits of parents and children and caries experience in children resident in sub-urban Nigeria. BMC Oral Health 2015;15:62.