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Dental Caries Among Preschool Children and the Impact of Behavioral Intervention on Caries Rate

Jianan Zhu

Guiyang Stomatological Hospital, Guiyang 550002, Guizhou, China

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Abstract: *Objective:* To statistically analyze the prevalence of dental caries among preschool children and explore the application effect of behavioral intervention. *Methods:* The study period was from May 2024 to May 2025. Preschool children with dental caries (n=114) admitted during this period were selected as the research subjects. They were divided into observation and control groups based on their admission number, with 57 cases in each group. Intervention indicators were compared between the groups. *Results:* Among all the children, the prevalence of dental caries at different age stages of preschool age (3–6 years old) showed that the caries rate increased with age, and there were significant differences in caries rates among different age groups ($P < 0.05$). The total treatment compliance rate in the observation group was higher than that in the control group ($P < 0.05$), and the new caries rate in the observation group was lower than that in the control group ($P < 0.05$). After intervention, all indicators of the SESS in the observation group were better than those in the control group ($P < 0.05$). *Conclusion:* The caries rate among preschool children is relatively high and increases with age. Active behavioral intervention facilitates better cooperation with clinical treatment among children with caries, significantly enhances self-efficacy, and significantly reduces the caries rate.

Keywords: Preschool children; Dental caries; Behavioral intervention; Caries rate

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1. Introduction

Dental caries is a common oral disease that mostly occurs in preschool children, causing damage to the hard tissue structure of their teeth due to bacterial corrosion [1]. As the disease progresses, children are prone to a series of complications such as pulpitis and swollen lymph nodes, which seriously affect their diet and quality of life [2]. During the clinical treatment of such children, root canal treatment can completely remove the damaged dental pulp. However, the role of self-care health behaviors still needs to be emphasized during nursing. Active behavioral intervention can enhance children's self-care efficacy and reduce the caries rate [3]. The following will focus on analyzing the prevalence of dental caries among preschool children and reducing the caries rate of children through behavioral intervention.

2. Materials and methods

2.1. Basic information

The subject included 114 preschool children with dental caries. They are divided into observation and control groups based on their admission number. The study started in May 2024 and is completed in May 2025. Among the 57 children in the control group, 35 are male and 22 are female, with an average age of (4.24 ± 1.13) years. In the observation group (n=57), the male to female ratio is 33:24, with a median age of (4.21 ± 1.11) years. The basic conditions of the two groups are similar, and there was no statistical significance ($P > 0.05$).

The inclusion criteria are: those who are not in the mixed dentition period; those aged between 3 and 6 years old; those who actively cooperate with the study. Meanwhile, the exclusion criteria include: those with incomplete clinical data; those who withdraw midway; those with a resistant attitude towards participation.

2.2. Methods

The control group received routine intervention, which involved organizing parents to participate in lectures on oral health education for young children. The lectures focused on promoting oral health among preschool children and their families, informing them of the key points and techniques of routine oral care, and raising awareness of the importance of oral health. The lectures are typically held every three months.

The observation group received behavioral intervention which includes:

(1) Strengthening health awareness

Nursing workers should focus on collecting and organizing information on the causes, manifestations, treatment plans, and nursing points of dental caries. Based on the data information base and expert guidance from the oral department, they should further optimize and improve the organized health education knowledge. The children need to receive explanations with their families, and the nursing workers can use pictures, videos, or cartoon animations to explain relevant health knowledge to the children in a graphic and textual form, attracting their attention. During the explanation, they can give demonic images to bacteria such as *Actinomyces* and *Streptococcus mutans,* vividly demonstrating their process of invading and damaging teeth, so that children can more clearly understand the process of tooth decay and the formation of caries. When teeth are being attacked, tense music can be selected to make children feel empathy, which is conducive to their systematic understanding of the causes of dental caries, treatment methods, and self-protection effects. At the same time, it can also stimulate their interest in learning and deepen their understanding and mastery of knowledge about dental caries.

(2) Standardizing oral health behaviors

To further standardize the oral care and health behaviors of children and their families, nursing workers should focus on the correct methods, time, and intensity of tooth brushing during knowledge education. They can also conduct on-site demonstrations through the use of tooth models to ensure that children and their families perceive this behavior effectively. In this process, it is important to emphasize the importance of cleaning teeth and interdental spaces, so that children can focus on cleaning these areas during brushing to avoid the growth of more bacteria. During the actual explanation, nursing workers should actively organize the children and complete the situational demonstration work through the use of tooth models. Additionally, based on the children's oral condition, a dental care plan should be developed, requiring a brushing time of no less than 3 minutes each time. After brushing teeth in the evening, dental floss should be used to remove residual substances from the interdental spaces, and it is generally required

to brush teeth 2–3 times a day to ensure a clean and fresh mouth.

(3) Optimizing dietary structure

To avoid teeth being eroded by external factors, nursing workers need to ensure the rationality of dietary planning based on the children's dietary preferences. In terms of choosing food properties, it is recommended to reduce the intake of hard foods as much as possible, reduce the frequency of using affected teeth during chewing, and also reduce the degree of wear and tear to avoid problems such as tooth splitting. Additionally, the intake of high-sugar foods should be controlled, especially watermelons, milk candies, and fruit candies, and it is required to rinse the mouth immediately after eating to better wash away the sugar attached to the tooth surface. More foods rich in crude fiber can be consumed, and fruits and yogurt are not allowed before bedtime. Foods rich in protein and vitamins can also be consumed to enhance children's immunity and resistance.

2.3. Evaluation indicators

(1) Evaluate the caries rate, treatment compliance, and new caries rate among children of different age groups.

(2) Compare the changes in SESS indicator scores between the two groups.

2.4. Statistical analysis

Data processing: SPSS 21.0 statistical software; Data description: Count data is expressed as (n%), and measurement data is expressed as ($\bar{x}$±s); Difference test: Count data uses $\chi 2$, and measurement data uses t; $P < 0.05$ is the basis for expressing statistical differences.

3. Results

3.1. Analysis of caries rates among children of different age groups

The ages of preschool children with dental caries are 3, 4, 5, and 6 years old. The difference in caries rates among different age groups is statistically significant ($P < 0.05$). The lowest caries rate is at 3 years old, and the highest is at 6 years old. There is a positive correlation between the caries rate and age growth (**Table 1**).

Table 1. Study on the caries rate of preschool children with dental caries (n/%)

Age	n	Dental caries rate
3 years old	16	5(31.25)
4 years old	30	16(53.33)
5 years old	32	18(56.25)
6 years old	36	24(66.67)

3.2. Comparison of treatment compliance between the observation group and the control group

The total compliance rate of the observation group was higher than that of the control group, $P < 0.05$ (**Table 2**).

Table 2. Comparison of treatment compliance between the two groups of children (n/%)

Group	n	Complete compliance	Partial compliance	Non-compliance	Total compliance rate
Observation Group	57	28(49.12)	28(49.12)	1(1.75)	56(98.25)
Control Group	57	22(38.60)	27(47.37)	8(14.04)	49(85.96)
X^2					5.9111
P					0.0150

3.3. Study on the incidence of new dental caries in two groups of children

The incidence of new dental caries in the observation group was lower than that in the control group, $P < 0.05$ (**Table 3**).

Table 3. Analysis of the incidence of new dental caries in the observation group and the control group (n/%)

Group	n	New dental caries rate
Observation Group	57	2(3.51)
Control Group	57	9(15.79)
X^2		4.9303
P		0.0263

3.4. Comparison of SESS scores before and after intervention between the observation group and the control group

Before the intervention, there was no significant difference in the scores of each index between the groups, i.e., $P > 0.05$. After the intervention, the relevant indicators of the observation group were compared with the control group, $P < 0.05$ (**Table 4**).

Table 4. Comparison of changes in SESS scores between the two groups of children($\overline{x} \pm s$)

Group	n	SE-B score (points)		SE-DC score (points)	
		Before intervention	After intervention	Before intervention	After intervention
Observation group	57	17.48 ± 1.22	24.43 ± 1.18	15.89 ± 1.42	23.32 ± 1.33
Control group	57	17.51 ± 1.25	19.70 ± 1.42	15.86 ± 1.45	19.78 ± 1.29
T value		0.1297	19.3418	0.1116	14.4246
P value		0.8971	0.0000	0.9113	0.0000
Group	**n**	**SE-DH score (points)**		**SESS total score (points)**	
		Before intervention	**After intervention**	**Before intervention**	**After intervention**
Observation group	57	17.02 ± 1.13	24.42 ± 1.42	50.27 ± 1.42	68.85 ± 1.21
Control group	57	17.05 ± 1.11	20.08 ± 1.12	50.23 ± 1.46	59.98 ± 1.52
T value		0.1430	18.1176	0.1483	34.4692
P value		0.8866	0.0000	0.8824	0.0000

4. Discussion

In recent years, based on the accelerated pace of modern social and economic development, medical diagnosis and treatment technology, as well as information technology, have achieved ideal development results. More knowledge about medical professionals has been popularized to social production and life, which has greatly helped improve people's material quality of life, but it has also changed people's dietary structure [4]. Dental caries is currently a common oral disease with a high incidence in pediatrics. If treatment intervention is not timely, children will suffer from toothache for a long time, making it difficult to fully chew food. This not only affects digestion and absorption but also indirectly restricts children's growth and development. It can even cause many complications, seriously affecting their physical health [5]. Root canal filling and restoration surgery is an effective method for treating dental caries. After cleaning and removing the decayed tissue, it can better restore the function and shape of the affected tooth, so that the decayed area of the tooth will not expand, and the symptoms will be significantly improved [6]. However, the recovery effect after treatment is still difficult to match the expected standard. The reason is that children and their families lack systematic oral self-care knowledge, and their health awareness is weak. The impact of dental caries on oral aesthetics can even increase the psychological pressure on children [7]. Therefore, it is necessary to implement necessary nursing intervention for children with dental caries [8].

In the study, preschool children (aged 3–6) with dental caries were selected as the main subjects. Based on the analysis of caries rates among different age groups, it was found that the older the children were, the higher their caries rates were. The specific reason for this is that as children grow older, their dental arches expand and form physiological gaps, which cause the contact points between teeth to disappear, increasing the possibility of food impaction and making it easier for plaque to form [9]. The total compliance rate of the observation group was higher than that of the control group, while the incidence of new caries was lower than that of the control group ($P < 0.05$). This confirms that behavioral interventions implemented through information and communication technologies such as the internet can enable children and their families to gain a deeper understanding and mastery of disease-related knowledge, oral self-care practices, and other relevant information, thereby enhancing their awareness of the disease [10]. Additionally, to ensure that children and their families pay more attention to oral hygiene and healthcare, various forms such as pictures, videos, and animations are used to showcase disease-related knowledge and self-care essentials to children. This helps attract their attention, stimulates their interest in learning, further enhances their level of self-care awareness, and encourages them to actively cooperate with clinical treatment [11]. Based on the actual conditions of the children, nursing workers develop oral hygiene plans to provide necessary assistance to the children and help them develop good oral hygiene habits, which positively impacts the maintenance of affected teeth and significantly reduces the incidence of new caries [12]. Compared to the control group, the SESS scores of the observation group were significantly different ($P < 0.05$). This indicates that during the development of dietary plans, nursing staff comprehensively considered the causes of caries and prevention measures to ensure that children receive balanced nutrition while minimizing incorrect dietary behaviors that could corrode affected teeth [13, 14]].

5. Conclusion

Overall, for preschool children with dental caries, the caries rate increases with age. To effectively reduce the incidence of new caries, behavioral interventions should be actively implemented to encourage children's active cooperation in treatment. By enhancing their oral self-efficacy levels, the goal of reducing caries incidence can be achieved.

Disclosure statement

The author declares no conflict of interest.

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