Knowledge, Attitude and Practices of Mothers Regarding Weaning and Oral Health and its Co-relation with the Caries Status of their Children

Deshpande A¹, Pradhan N¹, Poonach KS¹, Bargale S⁴, Raol R², Khoja M⁶

1,3,4-Professor, K M Shah Dental College and Hospital, Waghodia Road, Piparia, Taluk Waghodia, Vadodara, Gujarat. 2,5,6-Consultant Paediatric dentist, K M Shah Dental College and Hospital, Waghodia Road, Piparia, Taluk Waghodia, Vadodara, Gujarat.

Correspondence to: Dr. Deshpande A, Professor, K M Shah Dental College and Hospital, Waghodia Road, Piparia, Taluk Waghodia, Vadodara, Gujarat.

ABSTRACT

**Aim:** To assess the knowledge, attitude, and practices followed by mothers of Vadodara city regarding weaning and oral hygiene maintenance of their children during infancy and its co-relation with the deft score of their children.

**Methodology:** A sample of 384 first time mothers having children between the age of 24months to 72 months have been selected from the out-patient departments of pediatricians of Vadodara city. All such selected mothers were provided with a questionnaire to fill to assess their knowledge, attitude, and practices. Simultaneously the deft index of their children was recorded. **Results:** The mean deft recorded was 3.38, the lowest score being 0 and the highest being 16. 100% of the mothers were knowledgeable about breast feeding practices, 82% were knowledgeable about weaning and 50 were knowledgeable about oral health practices. 100% showed the appropriate attitude towards breast feeding practices, 78% showed the appropriate attitude towards weaning and 41% showed the appropriate attitude towards oral health practices. 51% practiced correct breast feeding practices, 62% practiced correct weaning and 50% practiced correct oral hygiene practices. **Conclusion:** The mothers of Vadodara city were knowledgeable regarding breast feeding and weaning and had the appropriate attitude towards it but still followed less appropriate practices. The knowledge attitude and practices of the mothers of Vadodara city was low in oral hygiene practices. Thus motivational programmes are highly recommended for the young mothers in the city. The association of the knowledge attitude and practices of the mothers to the deft index of their children was not statistically significant, thus suggesting the investigation of other variables resulting in early childhood caries.

**KEYWORDS:** deft positive, deft negative, S-ECC, breast-feeding, weaning, complimentary food, infant oral hygiene, Gujarat, India

INTRODUCTION

Infant feeding, weaning and infant oral hygiene practices show a definite impact on the health and well-being of the child in the later ages. The introduction of supplementary food to the diet (weaning) is a critical and dynamic stage for infant’s survival, and is critically important for overall health and development of the child. But in the process of uplifting the general health, dental health often gets neglected.

At present, there is varied evidence regarding the association between breast feeding practice and dental caries.⁵ According to the recommendation and guidelines of the IAP (Indian Academy Of Pediatrics) regarding the infant and young child feeding, exclusive breastfeeding should be practiced from birth till end of six months (180 days) of the baby’s life with no supplementary diet should be provided to the infant below 6 months of age unless medically required. After completion of six months, with an introduction of optimal complementary feeding, breastfeeding should be continued for a minimum for 2 years and beyond depending on the choice of the mother and the baby. The frequency of breastfeeding should be 4-6 times in 24 hours during the second year of life including night feeds.⁶ Appropriately thick homogenous complementary foods made from locally available foods should be introduced at six completed months to all babies while continuing breastfeeding ad libitum.⁷ Each meal must be made energy dense by adding sugar/jaggery and ghee/butter/foil to address the issue of a small stomach size which can accommodate limited quantity at a time.⁸ These recommendations are made pertaining to the higher incidence of childhood malnutrition seen in a developing country like India, but not much importance to dental health is given. Also, India being a culturally unique nation, has its own unique beliefs and practices regarding breast feeding practices, weaning and infant oral health care on the parental front which may or may not always be ‘tooth friendly.’

As the presently available literature was insufficient to
provide the exact knowledge, attitude, and practices followed by Indian mothers during weaning and basic infant oral health and its possible association with the caries status of their children, the following study was undertaken.

It was hypothesized that the knowledge, attitude, and practices followed by mothers at the time of weaning of their children during infancy do not have any association with the caries status of these children later.

MATERIALS AND METHOD

The study was a cross sectional study undertaken at Vadodara district of Gujarat state, India. First-time mothers of children aged between 24 months to 72 months (children having all deciduous teeth present) reporting to the outpatient departments of the IMA registered Paediatricians of Vadodara city, and their respective children were chosen for the study. The study was conducted from 15th September 2016 to 25th April 2017.

A total sample of 384 was selected based on the formula
\[ N = \frac{Z^2 \times P \times Q}{E^2} \], Where, \( Z = z \)-value of normal table, \( P = \) Proportion of true knowledge, \( Q = 100-P \), \( E = \) Precision

To give an estimate about 20% knowledge regarding weaning and oral hygiene maintenance with 20% relative precision and 95% confidence.

The exclusion criteria comprised of 1)Parents not willing to give informed written consent. 2)Children who were uncooperative for the examination. 3)Children and/or mothers with any serious medical or psychological illness.

Written consent was undertaken from all the mothers. All the Selected mothers were given a structured and pre-validated questionnaire to fill. Content validation and concurrent validation of the questionnaires was done prior to the survey. Simultaneously the deft score (According to WHO criteria) of their children was evaluated. The data collected through the questionnaires included information regarding participating mothers’ demographics and knowledge, attitudes, and practices towards breastfeeding, weaning, and infant oral health practices.

Statistical methods: SPSS version 20.0 was used to calculate descriptive data and to perform Pearson correlation test for the analysis of data.

RESULTS

The mean deft score of the assessed children was 3.38. The maximum score recorded was 16 while the minimum is 0 (Figure 1). The standard deviation of the deft score was 4.48 (Table 1). The frequency of the deft score is given in figure 1, which shows that almost 50% of the children had 1 or more decayed, missing or filled deciduous tooth in their oral cavity. The mean deft in the deft positive group was 6.89 with a standard deviation of 4.9 (Table 2). Out of the deft positive children, 53% were females while 47% were males.

All the mothers (100%) who participated in our study knew the importance of breast feeding practices, and a majority (93%) advocated and practiced the same until 1 year. Most of them (60%) also believed in the introduction of water or any other clear fluid or solid food only after 6 months of exclusive breast feeding practices (Table 3).

The food opted by mothers as their baby’s first supplementary food showed variations (Table 4). It can be observed that the children showing carious lesions were given more of biscuits, bovine milk and porridge-like complimentary foods more in comparison to their deft negative counterparts.

Considering all the responses for the weaning food opted by the mothers, 40.6% of the children had consumed potentially cariogenic weaning diet while 59.4% of the children had consumed potentially non-cariogenic diet (Figure 5). But amongst the children having caries, 51.32% had consumed the potentially cariogenic diet while almost 70% of the caries-free children had consumed the potentially non-cariogenic diet. It was seen that the cariogenicity of the diet had a positive association and the results were statistically significant (p=0.003).

The form of the food chosen was majorly semi-solid (61%) followed by liquid (29%) and lastly solid (10%). This factor showed no significant difference between the two groups (p=0.100). Hence the form of food may not be a contributing factor in the occurrence of dental caries in young children (Table 5).

55.55% of the mothers in the deft negative group did not give their children additional sugar in food while only 19.58% mothers opted to avoid added sugar in food...
products in the deft positive group. These result had positive co-relation and was statistically significant (p=0.000). (Table 6; Figure 2) In the caries free-children, 53.57% of their mothers had stopped breast feeding practices after the age of 1 year, and amongst the ones who continued, no one breastfed their children more than 7 times a day (including night feeding). Children who showed carious lesions, had only 30% mothers stopping the breast feeding practices altogether by 1 year of age, while almost 10% gave feeds more than 7 times a day (including night feeding) (Table 7). All the children who participated showed tendencies of snacking in between meals and almost 57% of the total snacked for more than twice between 2 consecutive meals. These results also had a positive co-relation and were statistically significant (p=0.0001) (Table 8).

The measures opted to maintain the oral hygiene at various ages were enquired. There wasn’t much difference noted on the oral hygiene practices followed from birth till six months of age, amongst caries-free and

### Table 3. Responses of mothers to various questions

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Question statements</th>
<th>Responses and their frequency in percentage n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Knowledge regarding importance of breast milk and breast feeding</td>
<td>Knowledgeable 385(100%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not knowledgeable (90%)</td>
</tr>
<tr>
<td>2.</td>
<td>Felt correct duration of breastfeeding babies</td>
<td>Up to 6 months of age 24(6.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Up to 1 year of age 208(54.02%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Up to 2 years of age 109(28.3%)</td>
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<tr>
<td></td>
<td></td>
<td>As long as the mother lactates 44(11.9%)</td>
</tr>
<tr>
<td>3.</td>
<td>Felt correct age to introduce water to infants</td>
<td>0-2 months 26(6.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-4 months 58(15.1%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-6 months 79(20.5%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After 6 months 222(57.7%)</td>
</tr>
<tr>
<td>4.</td>
<td>Age when water was introduced to infants</td>
<td>0-2 months 26(6.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-4 months 53(13.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-6 months 74(19.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After 6 months 232(60.3%)</td>
</tr>
<tr>
<td>5.</td>
<td>Felt correct age to introduce complementary food to children</td>
<td>2-4 months 17(4.4%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-6 months 60(15.6%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 month-1 year 289(75.1%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After 1 year 194(9.9%)</td>
</tr>
<tr>
<td>6.</td>
<td>Age of introduction of complementary liquid food</td>
<td>From birth 7(1.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-4 months 57(14.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-6 months 80(20.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After 6 months 241(62.6%)</td>
</tr>
<tr>
<td>7.</td>
<td>Age of introduction of complementary solid food</td>
<td>2-4 months 0(0%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-6 months 19(4.9%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 month-1 year 282(73.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After 1 year 84(21.9%)</td>
</tr>
</tbody>
</table>

### Table 4. Food opted by mothers as baby’s first complimentary food.

<table>
<thead>
<tr>
<th></th>
<th><em>Biscuits</em></th>
<th><em>Biscuits milk</em></th>
<th><em>Boone milk</em></th>
<th><em>Cereals/Oats/ Porridge</em></th>
<th><em>Formula Milk</em></th>
<th>#Fresh Fruit juice</th>
<th>#Fruits</th>
<th>Arthichal</th>
<th>#Vegetable Soup</th>
<th>#Oro Water</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gro up</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deft negative</td>
<td>0 (0%)</td>
<td>19 (9.69%)</td>
<td>12 (6.12%)</td>
<td>17 (8.67%)</td>
<td>12 (6.12%)</td>
<td>19 (9.69%)</td>
<td>12 (6.12%)</td>
<td>100 (1)</td>
<td>5 (2.55%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>(number, percentage)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deft positive</td>
<td>7 (3.7%)</td>
<td>12 (6.35%)</td>
<td>31 (16.40%)</td>
<td>40 (21.17%)</td>
<td>7 (3.7%)</td>
<td>15 (7.93%)</td>
<td>4 (2.11%)</td>
<td>61 (32.27%)</td>
<td>7 (3.7%)</td>
<td>5 (2.64%)</td>
</tr>
<tr>
<td>(number, percentage)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total (Percentage)</strong></td>
<td>7 (1.8%)</td>
<td>31 (8%)</td>
<td>43 (11.1%)</td>
<td>57 (14.8%)</td>
<td>19 (4.9%)</td>
<td>34 (8.8%)</td>
<td>16 (4.1%)</td>
<td>161 (42%)</td>
<td>12 (3.2%)</td>
<td>5 (1.3%)</td>
</tr>
<tr>
<td></td>
<td>385 (100%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>385 (100%)</td>
</tr>
</tbody>
</table>

*potentially cariogenic diet #potentially non-cariogenic diet

### Table 5. Form and consistency of weaning diet

<table>
<thead>
<tr>
<th></th>
<th>Liquids</th>
<th>Semi Solid</th>
<th>Solid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deft negative</td>
<td>48 (24.48%)</td>
<td>136 (69.38%)</td>
<td>12 (6.12 %)</td>
</tr>
<tr>
<td>(number, percentage)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deft Positive</td>
<td>65 (34.39%)</td>
<td>111 (59.78%)</td>
<td>11 (5.82 %)</td>
</tr>
<tr>
<td>(number, percentage)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total (Percentage)</strong></td>
<td>113 (29.3%)</td>
<td>249 (64.7 %)</td>
<td>23 (6 %)</td>
</tr>
<tr>
<td>Chi Sq. (P value)</td>
<td>4.600 (0.100)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 6. Additional amount of sugar added to the weaning diet.

<table>
<thead>
<tr>
<th></th>
<th>0 tsp</th>
<th>1 tsp</th>
<th>2 tsp</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deft negative</td>
<td>105 (55.55%)</td>
<td>67 (34.18%)</td>
<td>24 (12.25 %)</td>
</tr>
<tr>
<td>(number, percentage)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deft Positive</td>
<td>37 (19.58%)</td>
<td>123 (65.07 %)</td>
<td>29 (15.34 %)</td>
</tr>
<tr>
<td>(number, percentage)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total (Percentage)</strong></td>
<td>142 (36.88%)</td>
<td>190 (49.35 %)</td>
<td>53 (13.77 %)</td>
</tr>
<tr>
<td>Chi Sq. (P value)</td>
<td>49.429 (&lt;0.0001)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
caries prone group and almost 50% of the mothers did not practice any oral hygiene management for their children. It was found that only 2% of the mothers knew the appropriate oral hygiene practices need to be followed between the age of 2 years and 6 years. (Table 9, 10, 11).

Table 1. Oral hygiene measures adopted from 2 years onwards till 6 years of age.

Table 2. Frequency of snacking between meals of the children

Figure 2. Additional amount of sugar added to the weaning diet.

Figure 7. Additional amount of sugar added to the weaning diet.

Table 3. Frequency of snacking between meals of the children

Table 4. Oral hygiene measures adopted from 6 months to 1 year of age

Table 5. Oral hygiene measures adopted from 0 to 6 months of age

Table 6. Oral hygiene measures adopted from 4 to 6 months of age

Table 7. Oral hygiene measures adopted from 2 months to 4 months of age

Table 8. Frequency of snacking between meals of the children

Table 9. Oral hygiene measures adopted from birth to 6 months of age

Table 10. Oral hygiene measures adopted from 6 months to 1 year of age

Table 11. Oral hygiene measures adopted from 2 years onwards till 6 years of age.

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DISCUSSION

Proper feeding practices, weaning, and oral hygiene maintenance are major contributing factors towards infant and child oral health care. Early childhood caries (ECC) and severely early childhood caries (S-ECC) have become one of the most concerning and debilitating infectious conditions of the oral cavity in children worldwide and especially in developing countries like India. Hence it is essential to assess the knowledge, attitude, and practices of the primary care-givers, which most often are the mothers and see if it has any implications for their child’s oral health. This information will help us to implement appropriate programs and guidelines and make necessary changes in the present programs and guidelines to create a ‘tooth-friendly’ weaning regimen for children.

The true knowledge can only be assessed in individuals who have not had any prior experience in the problem. Hence first-time mothers were selected in our study to assess their knowledge attitude and practices regarding weaning and oral hygiene. Less information is available regarding the same in the population of Vadodara city.

The questionnaire tool used in the study was devised specifically for this study. The content validation of the same was done by two pediatricians and two pediatric dentist, and the final questionnaire after the modifications suggested by them was subjected to concurrent validation in a pilot study consisting of 20 mothers and their children.

The DMFT index introduced by Klein, Palmer and Knutson in 1938 and the criteria for deciduous teeth(Decay/missing/filled teeth) were given by Gruebbel AO in 1944. It is the most convenient index to know the caries experience of young children. Knowing the caries experience enables us to retrospectively co-relate the etiological factors associated with it.

Of the mother-child pairs evaluated, there was an almost similar number of male children and female children included in the study to avoid gender bias. 50% of the children evaluated, presented with one or more than one decayed, extracted or filled tooth in their oral cavity. Studies done to assess the prevalence of ECC in other parts of India have shown mixed results. Some studies showed relatively lesser caries experience in children of similar age group like 37.3% in children of lower socio-economic strata in Bangalore city (Priyadarshini et al., 2015)⁵, 27.51% in urban Bangalore population (Prakash P et al., 2012)¹⁰, 19.2% in Udupi (Tandon S, 1996)¹¹, 19.4% in Davangere (Tyagi R, 2008)¹². While some others showed caries experience similar to our results like 45.1% in rural Moradabad district (Gupta D et al. 2015)¹³, 44% in Kerala (Jose B, 2003).¹⁴

As the children in the study population got naturally divided into two parts, it was easier to do a comparative evaluation of the various practices followed by their respective mothers during weaning and regarding oral hygiene measures to find out and validate any associations. The mean deft score of children of age 24 months to 72 months studied in our study at Vadodara came out to be 3.38± 4.8 which was significantly higher than other groups. The deft scores recorded in other studies are 1.90 ± 3.38 for children of lower socio-economic strata in Bangalore (Priyadarshini et al. 2015)⁵, 0.854 for urban Bangalore population (Prakash P et al. 2012)¹⁰, 1.99±2.80 in Moradabad district (Gupta D et al. 2015)¹³ and that in Kerala was 1.84±2.87 (Jose B, 2003)¹⁴ all of which were lower than the scores that we obtained. The present study showed a high standard deviation similar to skewed distribution known for caries index. It may be due to the high deft scores with some children having a deft of 16 and their caries-free counterparts having zero deft. The mean deft of only caries positive children came out to be 6.89±4.9, again showing high values and high standard deviation.

Most of the mothers knew the importance and the correct breast feeding practices and followed the same. This is a positive sign for a developing country like India, where a lot of age-old traditions are still followed in all dimensions of life under the name of customs. 58% of the mothers had stopped breast-feeding till the time their child was a year old, but the other 42% continued even beyond 2 years. Also the ones who continued to breastfeed almost 50% of the mothers gave feeds more than 5 times a day along with the weaning diet. ECC and SECC have been frequently associated with prolonged breast feeding practice in children,¹⁵⁻¹⁷ but according to the guidelines of the Indian Association of Pediatrics, mothers are asked to breastfeed for longer durations and more frequently.¹⁸ This study emphasizes the need for the pediatricians and the pediatric dentists to come to a consensus regarding the same and advice parents in the best possible way, so as to maintain the baby’s general and dental health in optimal conditions.

The age at which the babies start to wean off from the breast corresponds to age of the eruption of the teeth. These newly erupted teeth are more prone to carious attack due to lack of complete mineralization.²⁰ Hence, the type of weaning diet selected, the form and consistency of it may aid in the carious process along with other factors. The commercially available baby foods are more cariogenic than home-made weaning foods. In our study, we found out that, khichdi (a common Indian rice preparation) was the favorite amongst mothers as the initial weaning diet followed by “Cerelac”/ “Farex” (Infant cereals) and other commercially available porridge-like baby foods. A majority of the mothers who participated showed preference of feeding potentially non-cariogenic weaning diet in the total sample. However, when we see the results of the caries positive children, it is clear to us that they were fed more of potentially cariogenic food. Thus weaning diet may have an implication on the occurrence of dental caries in young children.²¹⁻²³

Sucrose was termed as the ‘arch criminal’ by Newbrun and has been long associated with the develop-
ment of dental caries. D T Zero²⁵ (2004) suggested the concept of ‘sugars’ being the arch criminals and not just sucrose. However, restricting naturally occurring sugars in food is not practically possible, but extra additions of table sugar (sucrose) can definitely be followed. In our study, we found that 55.55% of the mothers in the caries free children did not give additional sugar in food while only 19.58% mothers of children having cavities opted to avoid added sugar in food. Thus additional sugar intake can be associated with the occurrence of dental caries in our study too.²⁶

All the mothers that were interviewed consented to their children snacking between 2 meals, the number of times they snacked varied between once between every two meals to 3-5 times between two consecutive meals. The exact nature of the snack time food was not asked. We may understand that the actual content of the food might be playing a bigger role in the caries activity than the frequency.²⁷⁻²⁹ Better insights can be obtained in this aspect if we enquire about the exact nature of the snack that the children consume between two meals.³⁰,³¹

Most basic and simple method to avoid dental caries is maintaining good oral hygiene. When children are young, this becomes a responsibility of the parents. When asked about the various oral hygiene methods adopted to the mothers, it was found out that there is definite lack of knowledge and awareness regarding the correct oral hygiene maintenance methods age appropriate to the child and thus their practices regarding the same also suffered. Improper oral hygiene often leads to dental caries.³²,³³ Preventive programmes focussing on the basics of oral hygiene like proper tooth brushing/cleaning of the oral cavity should be should be initiated to increase the awareness regarding the same in the general population.

CONCLUSION

The present study was carried out in urban areas of Vadodara city, to assess the knowledge, attitude, and practices of mothers regarding weaning and oral health and its association with the caries status of their children. Present study concludes following remarks:

- It was found out that the mothers had adequate knowledge regarding weaning of babies, they had the correct attitude and most of them followed good practices during weaning.
- The deft scores of children in Vadodara city were 3.38 ± 4.48, which was quite high and it was also seen that almost 50% of the children evaluated had a positive caries experience.
- Knowledge and practice regarding age appropriate oral hygiene methods was lacking in the mothers, which shows the great necessity of health care education programmes focusing on this particular population.
- Since the sample naturally got split into two groups, it was easier to evaluate the possible association of practices followed during weaning to the occurrence of dental caries, and the factors that emerged in having a possible association include

REFERENCES


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