Parental Barriers to Weaning Infants From the Bottle

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Background: Optimal bottle weaning should occur between 12 and 15 months of age. We hypothesized that high-risk populations have different parental attitudes, learned behaviors, and knowledge of weaning practices.

Objective: To determine whether high-risk populations are less likely to wean their children by 15 months of age than low-risk populations.

Methods: A cross-sectional survey using a convenience sample of parents was conducted at 3 community-based pediatric clinics. Spanish- and English-speaking parents with weaned and unweaned children 12 to 36 months of age were included in the study. A self-administered questionnaire was completed at a clinic visit. The questionnaire addressed aspects of parents' sociodemographic characteristics and included feeding history; weaning practices; sources of information about weaning; and parental behaviors, attitudes, and knowledge of age at which the child should be weaned.

Results: One hundred eighty questionnaires were completed. Marital status was related to weaning behavior. Seventy-six percent of single mothers had weaned their children in a timely manner, whereas 48% of married mothers had done so ($\chi^2 = 7.70; P = .008$). Parental education, race, and income were not significantly related to the timeliness of weaning. When respondents rated the helpfulness of multiple sources, only the health clinic was found to be significantly more important for the timely weaning group ($t = -2.13; P = .04$). Parents with timely weaned children stated that the mean ± SD optimal age for weaning is 13.6 ± 3.2 months. Parents with unweaned and late-weaned children stated that the mean ± SD optimal age is 19.9 ± 6.6 months. Bedtime bottle feedings were reported in more than 87% of the unweaned group. Sixty-nine percent reported poor dental development associated with delayed weaning.

Conclusions: Married parents are at risk of late weaning. Parents continue to allow their children to sleep with milk bottles in their mouths in bed at night. Parents are not aware of the medical problems associated with late weaning. Late-weaning parents are not knowledgeable about current weaning recommendations. Current approaches are not effective in altering set patterns of inappropriate weaning habits. Additional interventions and innovative parental education methods are needed to improve age-appropriate weaning practices.


Editor's Note: The outcome of this study surprised me—I’d thought that married mothers would have weaned earlier—but I’m not sure why. Basic bias. 

Catherine D. DeAngelis, MD

Nursing bottle caries have been described since 1862, and they continue to have an increased prevalence among dental diseases in infants and children. The parents of affected children are less likely to have attended college, often are of lower socioeconomic background, are obese, are overindulgent, and are unaware of when weaning should occur. Nursing bottle caries occur in association with well-described risk factors and inappropriate feeding habits, including regularly putting a child to bed with a bottle containing juice or milk as a means of pacification, falling asleep with a pacifier covered with a sweetener in the mouth, and using syrups and other liquids for therapeutic reasons during long-term or recurring illnesses. Faulty feeding habits and parental risk factors may be altered by physician or parental attitudes, behaviors, and knowledge.

Despite strong recommendations from the American Academy of Pediatrics to wean infants and children from the bottle to prevent caries, the literature contains contradictory information about when to wean. The American Academy of Pediatrics’ Guidelines for Health Supervision II recommends the introduction of the cup at 6 months of age and complete weaning by 15 to 18 months of age. Koranyi et al reported that 94% of pediatricians provide information to parents about weaning and that 80% recommend specific ages to begin and accomplish bottle weaning, 12 and 16 months, respectively. Others have specified that ages to achieve weaning vary from 12 to 18 months. Counseling and edu-
PARTICIPANTS AND METHODS

A cross-sectional survey using a convenience sample of parents was conducted from December 1996 to March 1997 at 3 community-based pediatric clinics associated with the Department of Pediatrics, University of Texas–Houston Medical School. The study sites were located in medically underserved areas in and around Houston.

PARTICIPANTS

The populations served at these sites are primarily of lower socioeconomic background and are predominantly Hispanic and African American. Spanish- and English-speaking parents with children 12 months to 3 years of age were included in the study. After giving verbal consent at a clinic visit, parents of 200 children independently and anonymously completed questionnaires. Parents of children younger than 12 months and older than 3 years were excluded.

INSTRUMENT

A 50-item questionnaire worded on a fifth- to sixth-grade reading level in English or Spanish was completed at a clinic visit. The first section of the questionnaire included questions about demographics: marital status, income, race or ethnicity, and sex and age of the parent and the child. In addition, information about the feeding history of the child was collected, and the person who primarily cared for the child was identified. In the next section, 24 Likert scale items were used to gather information about parental behavior, attitudes, and knowledge about weaning from milk and juice bottle feedings. Response categories ranged from 1 to 5, with 1 indicating strongly agree and 5 indicating strongly disagree.

An additional 9 Likert scale items were used to elicit the sources parents used for information about bottle weaning. Sources of information were scored from 1 to 4, with 1 indicating not helpful and 4 indicating very helpful. Open-ended questions were used to ask who told parents about weaning and to describe any problems or benefits that they knew were related to milk and juice bottle feeding beyond 12 months of age.

The last section included items directly related to active bottle weaning. Parents were asked to identify whether they were in the process of bottle weaning and at what age their child should be completely weaned from the milk and juice bottle (Table). The questionnaire was piloted in 3 different pediatric community clinics, and the results of the pilot are included in the final results.

DATA ANALYSIS

All respondents who reported having weaned their child between 12 and 18 months of age were categorized in the timely weaning group, and all respondents who reported weaning at 18 months or later or who reported that their child was older than 18 months and unweaned were included in the late-weaning group. The relationship between weaning behavior and the risk factors was evaluated by the $\chi^2$ test. An index was computed by adding up the 4 risk factors, where the presence of any 1 risk factor gave an index score of 1, the presence of 2 risk factors gave an index score of 2, the presence of 3 risk factors gave an index score of 3, and the presence of 4 risk factors gave an index score of 4. The helpfulness of several sources of information about weaning in the 2 groups was compared using independent group Student $t$ tests. The difference between ideal weaning age and the child’s present age or the age of weaning was calculated. For all analyses, $\alpha = .05$.

RESULTS

One hundred eighty questionnaires were completed; 24 in the timely weaning group and 13 in the late-weaning group were excluded because of incomplete data. A total of 143 questionnaires were completed and eligible for use by the closing date of the study, for a 79% response rate.

Only 1 demographic variable, marital status, was related to age at weaning. Seventy-six percent of single mothers had weaned in a timely manner, whereas only 48% of married mothers had done so ($\chi^2 = 7.01; P = .008$). Income ($\chi^2 = 3.04; P = .08$), parental education ($\chi^2 = 0.04; P = .83$), and race ($\chi^2 = 0.01; P = .94$) were not significantly related to the timeliness of weaning. The index scores for risk factors were not significant in predicting timely weaning vs late-weaning status ($\chi^2 = 1.58; P = .81$).

All of the respondents in the 2 groups rated the helpfulness of sources of parental information, including friends and neighbors, relatives, radio, newspapers, magazines, medical personnel, physician, television, and workplace. Only the health clinic was significantly more important for the timely weaning group ($t = -2.13; P = .04$).

Caregivers who had unweaned children aged 18 to 36 months answered questions about their knowledge and attitudes about weaning. Sixty-three percent of the group were uncertain or disagreed that bottle feeding can lead to anemia; only 15% were uncertain or disagreed that bottle feeding may cause tooth decay; 37% were uncertain or disagreed that bottle feeding could result in poor appetite; 100% were uncertain or disagreed that bottle feeding may cause obesity; 30% were uncertain or disagreed that bottle feeding may lead to ear infections; and 81% were uncertain or disagreed that bottle feeding makes infants gain weight.

Parents were asked the age at which they believed their child should be completely weaned from the milk and juice bottle. The mean ± SD age for the timely weaning group was 13.6 ± 3.2 months (median, 12 months; range, 12-24 months). In the late-weaning group, the mean ± SD preferred
age was 19.9 ± 6.6 months (median, 24 months; range, 12-36 months). Parents believed that their children were currently an average of 3.8 months past the ideal weaning age.

Bedtime bottle feedings (ie, intermittent feedings throughout the night or sleeping with a bottle in the mouth) were reported in more than 87% of the unweaned group. Parents were asked to identify problems and benefits associated with delayed weaning. Sixty-nine percent reported poor dental development and dental caries. Thirty-six percent indicated that there were no benefits or justification for delaying weaning beyond 12 months of age.

It is apparent from multiple studies that the optimal age for weaning is between 12 and 15 months.\textsuperscript{4,13-15} Studies name education as the main route to timely weaning and prevention of the morbidity associated with nursing care.

The objective of this study was to learn more about the practice of prolonged bottle feeding or late weaning among populations with risk factors in medically underserved areas. Specifically, we addressed how marital status, race, socioeconomic status, and education are related to bottle weaning and which behaviors, beliefs, attitudes, and knowledge have affected weaning practices in these populations.

Our study results show that single mothers with infants 12 to 18 months of age had more timely bottle weaning habits compared with married mothers. This is in contrast to results of previous studies that suggested that single-parent households have an increased risk of late weaning practices.\textsuperscript{3,16-18} The data suggest that these single mothers may seek and receive advice more often from relatives and friends and medical personnel. Parental education and race were not related to timeliness of weaning, as shown in other studies.\textsuperscript{19,25} The data from this study revealed a trend that parents with an annual income below $15 000 per year weaned at 18 months of age or older in contrast to parents in higher income brackets.

In our study, married mothers in households with incomes less than $15 000 per year were at risk of delayed weaning. Possible explanations may include an increased number of siblings in the married households who are bottle-fed and spousal pressure to use the milk bottle as a pacifier, especially at night. Risk factors that this study did not explore include obesity and parental indulgence.\textsuperscript{4} Parental indulgence may explain the finding that 90% of the parents in the late-weaning group with children 18 to 36 months of age allowed their children to sleep with a bottle in their mouth in bed at night and during day nap times. Presumably, parents use bottle feedings to induce sleep at nap times and bedtimes.\textsuperscript{19,26-28}

Parents in the timely weaning group seemed to seek information more often from relatives, friends, and neighbors as well as from ancillary medical personnel. Par-

### Sample Questions Representative of the 50-Item Feeding Questionnaire

<table>
<thead>
<tr>
<th>Topics</th>
<th>Sample Questions</th>
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<tbody>
<tr>
<td>Section 1: Question 1, a-h</td>
<td>Sociodemographic information on marital status, income, race, and sex and age of parent and child</td>
</tr>
<tr>
<td>What is your marital status?</td>
<td></td>
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<tr>
<td>What is the family's annual income?</td>
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<tr>
<td>What grade level did you complete?</td>
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<tr>
<td>What is your racial background?</td>
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<tr>
<td>What is the birth date of the child being bottle fed?</td>
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<tr>
<td>Section 2: Questions 2-12</td>
<td>Feeding history of the child and identification of who cared for the child</td>
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<tr>
<td>How many milk or juice bottles does your child drink before bedtime?</td>
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<tr>
<td>How many milk or juice bottles does your child drink after bedtime?</td>
<td></td>
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<tr>
<td>Does your child take a milk bottle to bed at night?</td>
<td></td>
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<tr>
<td>Section 3: Questions 13-36</td>
<td>Twenty-four Likert scale items were used to ask parents about their behaviors, attitudes, and knowledge on weaning from milk bottle feeding</td>
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<tr>
<td>My child is too young to be taken off the bottle.</td>
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<td>My child grows better with bottle feedings.</td>
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<td>My child will only drink milk from a bottle.</td>
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<tr>
<td>My child cries for the milk bottle.</td>
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<tr>
<td>Baby bottles are an easy way of feeding.</td>
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<tr>
<td>Baby bottle feedings may cause tooth decay.</td>
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<td>Baby bottle weaning too early will cause emotional harm to my child.</td>
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<tr>
<td>I know how to wean my child from the bottle.</td>
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<td>Section 4: Questions 37-45</td>
<td>Nine Likert scale items were used to elicit the sources parents used for bottle weaning information</td>
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<tr>
<td>Which of the following do you use as sources of information for learning about bottle weaning?</td>
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<tr>
<td>Friends/neighbors</td>
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<td>Relatives</td>
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<td>Radio</td>
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<td>Newspaper</td>
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<td>Magazine</td>
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<td>Ancillary medical personnel</td>
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<td>Television</td>
<td></td>
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<td>My workplace</td>
<td></td>
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<tr>
<td>Section 5: Questions 46-50</td>
<td>Open-ended questions were used to ask parents to describe any problems or benefits they knew were related to milk bottle feeding beyond 12 months of age</td>
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<tr>
<td>Parents were asked to identify whether they were in the process of bottle weaning and at what age their child should be completely weaned from the milk bottle</td>
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<tr>
<td>Describe what your mother or grandmother told you about bottle weaning.</td>
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<tr>
<td>Describe any benefits related to milk bottle feeding after 12 months of age.</td>
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<tr>
<td>Describe any problems related to milk bottle feeding after 12 months of age.</td>
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<tr>
<td>What age should your child be off the bottle completely?</td>
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</table>
ents in the late-weaning and unweaned groups used
physicians as the most helpful sources for weaning
information. This is interesting and contradictory and may
represent a response bias within the questionnaire or an
indication of inadequate transfer of bottle weaning
information from medical personnel to parents.

Results of the study by Koranyi et al.10 stated that most
physicians recommended a specific age for both onset and
accomplishment of bottle weaning. Pediatricians (72.2%)
provided multiple reasons for stopping bottle feedings, and
73% recommended a specific method for bottle weaning.

There seems to be a missing link between parents and the
medical establishment in improving parental behaviors to
extinguish prolonged bottle feeding beyond 12 months of
age. Weaning in this population can be a challenge. These
parents are often emotionally ill equipped to cope with the
demands and distresses of a toddler crying for a bottle con-
taining milk or juice. This act may distract parents and pro-
mote delayed or prolonged weaning.

Results of this study show that parents in the late-
weaning group who had unweaned children 18 to 36
months of age were unaware that delayed weaning was
related to anemia, poor weight gain, and obesity. Fif-
ten percent were uncertain or disagreed that bottle feed-
ing may cause tooth decay. These results reinforce the
importance of education in explaining the risks associ-
ated with delayed weaning to change parental beliefs and
to modify behaviors and attitudes of parents with chil-
dren beyond 12 months of age who are bottle-fed.

Parents in this study were asked to select a specific
age at which their child should be completely weaned
from the bottle, whether they had timely weaned or de-
layed weaning their children. The data indicated that par-
ents with timely weaned children established an accept-
able age, with a mean ± SD of 13.6 ± 3.2 months. This age
lies well within the recommended age for completion of
weaning. Parents of late-weaning children reflected a
mean ± SD of 19.9 ± 6.6 months, indicating that parents of
late-weaning children are not knowledgeable about cur-
rent weaning recommendations. It is clear that previous
and current approaches in these high-risk populations
are not effective in altering set patterns of inappropriate
habits or in improving preventive behaviors. Additional
methods to modify behavior may be necessary.

As members of the health profession and fre-
quently the first medical contact for a mother of a new-
born, pediatricians are in a favorable position to teach
and direct parents on the methods of weaning. Early nu-
tritional counseling, introduction of bottle weaning
information, and discussion of cup use at the 4- and 6-
month well-child visits may facilitate parental interest and
motivation for weaning.

Ancillary medical personnel such as clinic nurses, nu-
tritionists, or other medical extenders who have contact with
the mother during a clinic visit can also reinforce positive
and appropriate feeding practices. Stressing continuity of
care in this population is key to allowing consistent flow of
information. Our data suggest that there is a vast opportu-
nity through the previously mentioned methods to improve
timely weaning practices and to prevent or decrease the pub-
lic health problem of nursing caries, the financial burden to
parents for dental restorative procedures, and the seen or
unforeseen pain and misery to the child associated with poor
dental hygiene. This information may provide further study
to review the pediatric anticipatory guidelines in residency
programs. Also, it may provide an impetus to establish writ-
ten standardized recommendations on bottle weaning meth-
ods that can provide parents with guidelines for successful,
timely bottle weaning practices.

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