



UNIVERSITI PUTRA MALAYSIA

**RELATIONSHIP BETWEEN MILK FEEDING HABITS
AND NURSING BOTTLE SYNDROME AMONG
SELECTED PRESCHOOL CHILDREN IN
SERDANG, SELANGOR DARUL EHSAN**

DASRILSYAH BIN SYAHRIAL

FEM 1993 2 V

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**MASTER OF SCIENCE
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BY

DASRILSYAH BIN SYAHRIAL

**Thesis Submitted in Fulfilment of the Requirement
for the Degree of Master of Science in the
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Abstract of thesis presented to the senate of Universiti
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By

DASRILSYAH BIN SYAHRIAL

DECEMBER, 1993

Chairman: Zaitun Yassin, Ph.D.

Faculty: Human Ecology

The objectives of the study were: (1) to identify the prevalence of nursing bottle syndrome among preschool children; (2) to investigate the relationship between nursing bottle syndrome and dietary factors such as frequency of milk intake, number of sugar-related food consumed, the duration of bottle feeding and the amount of sugar added to bottle feeding; (3) to determine the relationship between parents' demographic and socio-economic characteristics such as education, income and number of children in the family and the prevalence of nursing bottle syndrome; (4) to determine the relationship between nursing bottle syndrome and parents' attitudes towards proper feeding and dental care.

Seven preschools consisted of five kindergartens, one nursery and one preschool laboratory were purposively selected for the study. Data were gathered through clinical screening of children and by interviewing



the parents using a set of questionnaire. A total of 153 out of 284 children examined were found to have nursing bottle syndrome.

About 52.0% of the subjects were females and the others were males. The average age was 5.1 years. About 81.0% of the respondents were mothers and 19.0% were fathers. The average age of the respondents was 36.0 years.

The relationship between nursing bottle syndrome and the independent variables of the study were tested using the Pearson product-moment correlation. Simple multiple regression analysis was also done to determine the predictor variables of nursing bottle syndrome and the total contribution of the independent variables to the dependent variable.

The findings revealed that the prevalence of nursing bottle syndrome was high (53.8%). The test of relationship indicated that the prevalence of nursing bottle syndrome was positively related to duration of bottle feeding ($r = 0.2263$; $P = 0.00.$), household income ($r = 0.3163$; $P = 0.00.$), number of children in the family ($r = 0.1287$; $P = 0.015$) and number of sugar-related food consumed ($r = 0.1280$; $P = 0.016$) but was negatively related to frequency of milk intake ($r = -0.1415$; $P = 0.008$), and parents' attitudes ($r = -0.1385$; $P = 0.010$).

The results of multiple regression analysis indicated that five variables namely, level of parents' education, duration of bottle feeding, household income, parents' attitudes and frequency of taking milk were

good predictors of nursing bottle syndrome and explained 23.3% of the variance in the incidence of nursing bottle syndrome.

To minimise the prevalence of nursing bottle syndrome, it is recommended that parents should be made aware of the problems of the disease. They also need to be educated on proper feeding habits and oral hygiene of their children. One way to achieve this is by conducting massive campaigns to disseminate child feeding and dental health information and to educate parents on the preventive methods of nursing bottle syndrome. The use of films, slides, posters, etc., can be effective in achieving this objective.

Abstrak tesis yang dikemukakan kepada senat Universiti Pertanian Malaysia sebagai memenuhi keperluan untuk Ijazah Master Sains.

**HUBUNGAN DI ANTARA AMALAN MEMBERI MAKANAN
DAN SINDROM BOTOL SUSU PADA KANAK-KANAK
PRASEKOLAH DI SERDANG, SELANGOR DARUL EHSAN**

Oleh

DASRILSYAH BIN SYAHRIAL

DISEMBER, 1993

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Objektif kajian ini adalah: (1) untuk mengenalpasti prevalens sindrom botol susu di kalangan kanak-kanak prasekolah; (2) untuk meneliti hubungan di antara sindrom botol susu dengan amalan pemakanan seperti kekerapan minum susu, pengambilan makanan mengandungi gula, tempoh penggunaan botol susu dan penambahan gula di dalam botol susu; (3) untuk menentukan perkaitan di antara faktor demografi dan ciri-ciri sosioekonomi ibu-bapa seperti tahap pendidikan, pendapatan dan bilangan anak dalam keluarga dengan sindrom botol susu; (4) untuk menentukan perkaitan di antara sindrom botol susu dengan sikap ibu-bapa terhadap pemberian makanan dan kesihatan gigi.

Tujuh prasekolah yang terdiri daripada lima taman didikan kanak-kanak, satu taman asuhan dan satu makmal taman prasekolah dipilih secara mudah untuk kajian. Data dikumpulkan melalui pemeriksaan secara klinikal ke atas kanak-kanak dan menemubual ibu-bapa

menggunakan borang soal selidik. Sejumlah 153 orang daripada 284 orang kanak-kanak yang diperiksa didapati mengalami sindrom botol susu.

Lebihkurang 52.0% daripada kanak-kanak yang diperiksa adalah perempuan dan selebihnya adalah kanak-kanak lelaki. Purata umur ialah 5.1 tahun. Lebihkurang 81.0% daripada responden adalah ibu dan 19.0% adalah ayah. Purata umur responden 36.0 tahun.

Hubungan di antara sindrom botol susu dengan pembolehubah bebas kajian diuji dengan menggunakan korelasi 'Pearson product-moment'. Analisis regresi mudah pelbagai juga dilakukan untuk mengenalpasti pembolehubah peramal kepada sindrom botol susu dan pengaruh pembolehubah tak bersandar terhadap pembolehubah bebas.

Hasil kajian mendapati bahawa prevalens sindrom botol susu adalah tinggi (53.8%). Ujian perkaitan menunjukkan bahawa prevalens sindrom botol susu mempunyai hubungan positif dengan tempoh penggunaan botol susu ($r = 0.2263$; $P = 0.00.$), pendapatan keluarga ($r = 0.3772$; $P = 0.00.$), bilangan anak dalam keluarga ($r = 0.1287$; $P = 0.015$) dan pengambilan makanan bergula ($r = 0.1280$; $P = 0.016$), tetapi perkaitan yang negatif dengan kekerapan minum susu ($r = -0.1415$; $P = 0.008$) dan sikap ibu bapa ($r = -0.1385$; $P = 0.010$).

Hasil analisis regresi pelbagai menunjukkan bahawa lima pembolehubah - tahap pendidikan ibu-bapa, tempoh menggunakan botol susu, pendapatan isirumah, sikap ibu-bapa dan kekerapan minum susu adalah peramal yang baik dan menerangkan 23.3% daripada varians dalam insiden sindrom botol susu.

Untuk mengurangi prevalens sindrom botol susu adalah dicadangkan agar ibu-bapa dimaklumkan tentang sindrom botol susu. Mereka perlu dinasihati untuk mengamalkan pemberian makanan dan kebersihan gigi yang baik. Satu cara untuk mencapai matlamat tersebut adalah dengan mengadakan kempen besar-besaran bagi mendidik ibu-bapa mengenai amalan pemakanan kanak-kanak dan kesihatan gigi untuk mencegah terjadinya sindrom botol susu. Filem, slaid, poster dan bahan-bahan lain boleh digunakan secara berkesan untuk mencapai objektif ini.

CHAPTER I

INTRODUCTION

By definition, nursing bottle syndrome is the early and rampant development of caries associated with prolonged bottle feeding beyond the usual time a child is weaned from the bottle (Johnsen and Raymer, 1989). A key feature of nursing bottle syndrome is the usual absence of decay of mandibular incisors, thus differentiating this condition from classical rampant caries (Ripa, 1988). There are several descriptions of nursing bottle syndrome. Several investigators based their judgement on the criteria that at least three maxillary incisors (Kelly and Bruerd, 1987) or a minimum of two (Winter *et al.*, 1966) or one tooth (Cleaton-Jones *et al.*, 1978) are carious, while others based their decision on the labial lingual pattern of decay that occurred (Richardson *et al.*, 1981).

Other terminologies that have been used to refer to nursing bottle syndrome are known as labial caries, nursing caries, nursing bottle caries, milk bottle syndrome, nursing bottle mouth syndrome, baby bottle tooth decay, bottle-in-the-cot or prolonged nursing habit caries. The term nursing bottle syndrome is more commonly used because nursing bottle habits, using either milk or sweetened liquids are the most frequent causes of this condition. The condition has also been reported in children who have been breast-fed and those using sweetened pacifier. The fact that so many names have been used to designate the same condition indicates dentistry's quandary in selecting the most suitable appellation (Ripa, 1988).



The recognition of nursing bottle syndrome that affects the primary teeth of young children is not new. Since the turn of this century, especially during the last twenty five years, global reports on nursing bottle syndrome have been appearing in the literature. Fass (1962) emphasised the possible cariogenic effect of milk fed from bottles to young children. Bottles are given to children in order to soothe them and encourage sleep during the day or to help them relax (Mackie and Blinkhorn, 1990). By doing so, milk may remain in the mouth and in contact with the teeth. During sleep, saliva flow ceases and swallowing is infrequent. The milk is metabolised by oral microorganism into organic acids that demineralises the teeth and when this happens, lesions can develop quickly (Brown *et al.*, 1985).

One of the etiologies of nursing bottle syndrome is prolonged nursing by bottle or breast feeding (Koroluk, 1991). It is, however, unjustified to judge prolonged nursing habits alone as responsible for nursing bottle syndrome without an examination of the diet and other possible social factors (Delley *et al.*, 1980). A number of socio-economic and demographic factors have also been found to be associated with nursing bottle syndrome. It seems evident that social variables may indeed play a major role as predisposing physical and biological factors (Richards and Barmes, 1971). Socio-economic status such as parent's level of education and income, have been reported to be negatively associated with nursing bottle syndrome (Bailit *et al.*, 1968). Large family size was found to be positively correlated with nursing bottle syndrome, while the sex of the child did not show any association with caries experience for children of similar socio-economic levels (Johnsen *et al.*, 1980).

Winter *et al.* (1966) concluded that changes in the oral environment by the prolonged sucking of sweetened comforters such as feeding bottle seemed to be extremely significant. Similarly, Shelton *et al.* (1977) noted that prolonged use of sweetened bottle leads to nursing bottle syndrome among preschool children.

Nursing bottle syndrome is preventable. If it occurs and is left untreated for even a short period of time it can result in extensive destruction of the maxillary anterior teeth. If the decay process is not controlled, the affected teeth may have to be extracted, especially, if extensive periapical involvement is present. If allowed to progress to such an advanced state, nursing bottle syndrome can lead to pain, infection, tongue thrusting, abnormal swallowing habits and speech difficulties (Koroluk, 1991). Children are usually brought for professional attention because of the mother's concern over the discolouration of the teeth, local pain or infection (Bernick, 1971).

In Malaysia, limited studies have been done on nursing bottle syndrome. However, the few studies available have reported on the epidemiology of children's dental caries. One such study conducted by the Dental Division of the Ministry of Health (1972) showed that 88.9% of Malaysian children were affected by dental caries. Also, Nik Noriah and Rusmah (1985) in their study of 812 preschool children in Kuala Lumpur found a prevalence of 20.0% of rampant caries. Some of these caries may be related to nursing bottle syndrome.

Therefore, based on the above facts mentioned, a study to identify the problems related to nursing bottle syndrome is appropriate and neces-

sary so as to determine the prevalence of nursing bottle syndrome among preschool children. Because dental caries is generally, and nursing bottle syndrome specifically, a multifactorial disease, it is only reasonable to study whether there is a relationship between nursing bottle syndrome and other variables including frequency of taking milk, consumption of sugar-related food, addition of sugar, level of parents' education, household income, number of children in the family and parents' attitudes towards feeding and dental care.

Statement of the Problem

In identifying the problems of nursing bottle syndrome we are investigating some of the possible causes of carious lesions. The lesion appears to be covering widely divergent areas with the possible exception of the lower incisors. The enamel which remains intact is quite natural in appearance and the intact enamel also seems to be distributed throughout the mouth with little regard to calcification sequence. Therefore, from these observations, the carious lesion can be diagnosed as nursing bottle syndrome which attacks normal teeth without any clear evidence of systemic disease.

All carious lesions, including those associated with nursing bottle syndrome, result from the interaction among three variables: (1) pathogenic microorganisms in the mouth; (2) fermentable carbohydrates that are metabolised by microorganisms to organic acids; and (3) tooth surfaces that are susceptible to acid dissolution. In order for the lesions to progress and to be clinically diagnosed, these three variables must interact over a suitable period of time (Figure 1).

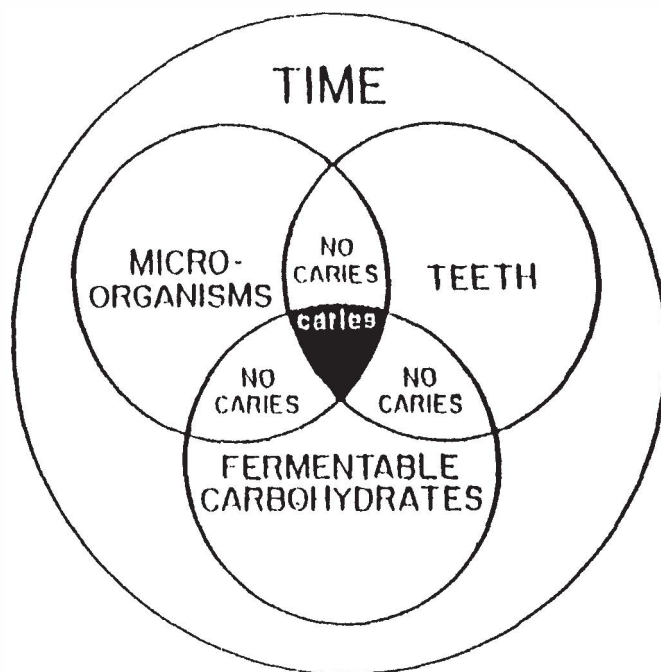


Figure 1

The Four Variables Necessary for Initiation and Progression of Caries (Nursing Bottle Syndrome)

Among preschool children, the rampant nature of decay as seen in nursing bottle syndrome is caused by fermentable carbohydrates or food containing fermentable carbohydrates. The common source of fermentable carbohydrate for this age group is milk either from breast milk, bottle feeding or/with other sweetened liquids (Castano, 1972).

Through clinical experience, it was found that cases of nursing bottle syndrome are quite common among Malaysian children. As a multifactorial disease, there are several factors that can cause nursing bottle syndrome. Milk bottle feeding habits of the children has been found to be a major cause of nursing bottle syndrome in other parts of the world (Derkson and Ponti, 1982; Fass, 1962; Johnsen and Raymer, 1989). However, very limited studies have been carried out in Malaysia to ascertain the actual causes of nursing bottle syndrome. There is a need therefore, to investigate the prevalence and possible causes of nursing bottle syndrome among preschool children in Malaysia. To this end these questions have to be addressed. What are the possible causes? To what extent does the duration of bottle feeding influence the development of nursing bottle syndrome? To what extent does frequency of milk intake, number of sugar-related food consumed and addition of table sugar in bottle feeding account for development of nursing bottle syndrome? What are the socio-economic and demographic characteristics of parents who have children with nursing bottle syndrome? Is there any relationship between nursing bottle syndrome and parents' attitudes towards feeding and dental care?

Objectives of the Study

The general objective of this study is to determine the relationship between milk bottle feeding habits and nursing bottle syndrome among preschool children from Universiti Pertanian Malaysia (UPM) preschool laboratory, Malaysian Agricultural Research and Development Institute (MARDI) Nursery and five other kindergartens located in the vicinity of Universiti Pertanian Malaysia.

The specific objectives of this study are:

1. To identify the prevalence of nursing bottle syndrome among preschool children.
2. To investigate the relationship between nursing bottle syndrome and dietary factors such as frequency of milk intake, number of sugar-related food consumed, the duration of bottle feeding and amount of sugar added to bottle feeding.
3. To determine the relationship between parents' demographic and socio-economic characteristics such as education, household income and number of children in the family and the prevalence of nursing bottle syndrome.
4. To determine the relationship between nursing bottle syndrome and parents' attitudes towards proper feeding and dental care.

Hypotheses

Based on the literature reviewed and the conceptual framework and objectives of the study, the following null hypotheses were formulated for testing:

1. There is no relationship between nursing bottle syndrome and frequency of milk intake.
2. There is no relationship between nursing bottle syndrome and consumption of sugar-related food.
3. There is no relationship between nursing bottle syndrome and the duration of bottle feeding.
4. There is no relationship between nursing bottle syndrome and amount of sugar added to bottle feeding.
5. There is no relationship between nursing bottle syndrome and level of parents' education.
6. There is no relationship between nursing bottle syndrome and household income.
7. There is no relationship between nursing bottle syndrome and number of children in the family.
8. There is no relationship between nursing bottle syndrome and parents' attitudes towards feeding and dental care.

Significance of the Study

The findings of the study will determine the prevalence of nursing bottle syndrome among preschool children, identification of the syndrome's characteristics, associated socio-economic and demographic factors, parents' attitudes and related feeding habits of children.

The Malaysian government has spent a lot of effort and resources in improving the general health and dental care of the people. Therefore, this study, it is hoped, will provide some useful information from which dental health promotion and preventive measures of children's dental diseases can be formulated.

Specifically, the knowledge and information gained from this study will further facilitate the understanding of nursing bottle syndrome and will hopefully assist in the development of efficient treatment methods for those children at risk. The study will be relevant in helping the government to initiate new dental health services for preschool children. The findings of this study may also be used by dentists, nutritionists, health educators, preschool teachers, academicians, policy makers and others in their efforts towards providing better oral health for the children.

This kind of study has not been carried out so far in Malaysia. The findings will therefore constitute an important source of literature on nursing bottle syndrome in the country. Also, the results of the study will serve as a useful source of information for further studies on nursing bottle syndrome.