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The knowledge and behaviors of mothers with children 0–3 aged about pacifier use – a cross-sectional study

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ABSTRACT

Introduction and aim. The use of pacifier is a very common practice in the early childhood period in the world. In recent years, the harms of pacifiers have been discussed rather than their benefits. We aimed to determine the knowledge and behaviors of mothers with children aged 0-3 about the use of pacifiers.

Material and methods. A cross-sectional study was conducted with 363 mothers between January 10th and November 31st, 2020 in Zonguldak, Turkey. The data were collected with a web-based questionnaire. This article was prepared following STROBE guidelines.

Results. The mothers started using the pacifier for the first time when their children were at an average of 2.86 ± 3.31 months old, and they used it for at an average of 12.06 ± 9.13 months. Of the mothers, 36.4% were found to clean the pacifier every month and 30.6% to have the behavior of dipping the pacifier into a product such as sugar, honey, molasses, and jam. The mothers with undergraduate degrees had the behavior of cleaning pacifiers more than those with postgraduate degrees ($p < 0.001$).

Conclusion. Mothers preferred to give pacifiers to babies at a high rate and had misinformation about the use of pacifiers that may harm their children's health.

Keywords. behaviors, children, mothers, pacifiers, pediatric nursing

Introduction

The use of pacifier is a very common practice in the early childhood period in the world. It is thought to meet the natural sucking needs of babies, especially in low and middle-income countries. It is a method that has deep cultural bases in our society and has been used to relieve the children for centuries.¹

The American Academy of Paediatrics suggests delaying pacifier usage until one month of age for breastfed babies to ensure that breastfeeding is performed

firmly, and using a pacifier after the establishment of breastfeeding.² The use of pacifier is considered to be appropriate as it reduces the risk of sudden infant death syndrome and relieves the pain in medical procedures and calms the child.^{3,4} The American Academy of Pediatrics recommends that parents consider offering pacifiers to infants one month and older at the onset of sleep to reduce the risk of sudden infant death syndrome. In addition to the benefits of pacifier use, the harms are discussed.²

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Potential complications of pacifier use, particularly with prolonged use, include a negative effect on breastfeeding, dental malocclusion, otitis media, and starting smoking in adolescence. Adverse dental effects can be evident after two years of age, but mainly after four years.² The use of pacifiers may lead to oral motor dysfunction in the babies, babies' rejection of the mother's breast and their inability to receive sufficient breast milk. The babies who cannot get sufficient breast milk may be deprived of the protective effect of breast milk on the intestinal mucosa.⁵ At the same time, the use of pacifiers may cause the baby not to be able to perform the sucking movements that should be done normally and the lower jaw to be left behind due to dysfunction, and its long-term use may lead to mouth construction deformity and early tooth decay. When the pacifier is not disinfected under appropriate conditions, it can cause diarrhoea in the baby.^{1,6}

Mothers/caregivers are important in preventing harm that may occur due to pacifier use. There are a limited number of studies examining mothers' pacifier use in Turkey. In these studies, it is stated that mothers usually use pacifiers when they are 0-1 months old, they use pacifiers to keep them quiet when they cry, they think that using pacifiers is harmful, they find pacifiers harmful in terms of teeth development, and they would not use pacifiers for their babies if they had sufficient knowledge about it. These studies did not examine how mothers use the pacifiers.^{1,7}

In our country, the reasons for mothers' use of pacifiers and their usage patterns can be affected by traditional methods. Due to these traditional methods (not changing pacifiers regularly, not cleaning pacifiers regularly, usign with honey foods etc.), babies can be harmed by the use of pacifiers. It is necessary to determine the wrong practices, to correct the practices of the families and to inform them for the future studies.

Aim

Thus, we aimed to determine the knowledge and behaviours of mothers with children aged 0-3 about the use of pacifier in Zonguldak, Turkey. In line with this general purpose, the research questions are as follows: (1) How are the behaviours of mothers' use of pacifier? (2) What are the thoughts of mothers about the use of pacifier? (3) Is there a difference in the behaviour of mothers' use of pacifier according to their level of education? (4) Is there a difference in finger sucking behaviour of children according to their first time to start pacifier and the duration of pacifier use?

Material and methods

Study design

The study used a cross-sectional study design in which the data were collected via an electronic questionnaire

and analysed using descriptive and analytical statistics. This study is reported in accordance with strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies.⁸

Setting

The study used a cross-sectional study design in which the data were collected via an electronic questionnaire between January 10th and November 31st, 2020 with 363 mothers and analyzed using descriptive statistics in Zonguldak, Turkey. A Community Health Care nurse (a researcher) with an MSc degree, who was responsible for organizing the data collection. After the mothers had signed the consent form, they received, via email, a separate electronic code which they could use to enter the research electronic study. This study is reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies.⁸

Participants

The longest use of pacifiers is recommended between 0-3 years of age.² Therefore, mothers with children between the ages of 0-3 were included in the study. A convenience sample of the Zonguldak Maternity and Children's Hospital and the Family Health Centers, with a population whose medical records can be accessed, was used. An e-mail was sent to all mothers whose contact information was available and met the inclusion criteria. Inclusion criteria of mothers for the study are as follows: (1) Having a child between the ages of 0-3 (2) Using the pacifier for their child (3) Agreeing and being willing to participate in the study (4) Living in Zonguldak, Turkey. The mothers were informed about the purpose of the study, the benefits to be obtained from the research, the time to spend for the interview and their consent was obtained.

The sample size was calculated with G*Power version 3.1.2 software.⁹ A post hoc power analysis was based on the correlation coefficient between psychosocial adjustment and adherence to medication. A power of 0.80 was determined at a 0.5 effect size and an alpha of 0.05.

Data collection

In the collection of data, a questionnaire form that consisted of 18 open and closed-ended questions prepared in line with the literature.^{1,6} This questionnaire evaluated the socio-demographic characteristics of the mothers and their thoughts about the use of pacifier. The data were collected with the web-based questionnaire method due to the isolation and protection led by the pandemic period.

Data analysis

The data were evaluated using the Statistical Package for the Social Sciences (SPSS) for Windows 22.0 statistical program. The variables were examined using descriptive statistics (frequencies, percentages, aver-

ages and standard deviations). Cross-tabulation was performed to describe nursing encounters in relation to patient age groups. The chi-squared test was used to estimate significant differences in characteristics. The origin of the differences was detected with the Fisher

Table 1. The characteristics of mothers (n=363)

		Mean ± SD	Min - Max
Age of mother		31.04 ± 5.86	18 - 53
Age of the child included in the study (month)		17.60 ± 11.6	0 - 36
		n	%
Number of children in the family	1 child	197	54.3
	2 children	120	33.1
	3 and above children	46	12.6
Education level of mother	Primary School	46	12.7
	High School	93	25.6
	University	199	54.8
	Postgraduate	25	6.9
Employment status of mother	Unemployed	179	49.3
	Employed	184	50.7
Income level of the family	The income is less than the expenditures	46	12.7
	The income is equal to the expenditures	225	62
	The income is more than the expenditures	92	25.3

Table 2. The behaviours of mothers' use of pacifier (n=363)

The behaviours of mothers' use of pacifier		Mean ± SD	Min - Max
The first time of the child's use of pacifier (month)		2.86 ± 3.31	0 - 24
The child's duration of pacifier use (month)		12.06 ± 9.13	0 - 48
		n	%
Type of Pacifier*	Orthodontic	279	73.6
	Traditional	100	26.4
Use of pacifier chain	Yes	190	52.3
	No	173	47.7
Type of pacifier chain*	With metal clips	24	9.1
	With plastic clips	96	36.2
	Long	36	13.6
	Short	49	18.5
	Rope part decorated with swinging toy	60	22.6
Pacifier cleaning	Yes	355	97.8
	No	8	2.2
Frequency of pacifier cleaning	Monthly	132	36.4
	Every two month	104	28.7
	3 months and over	88	24.2
Pacifier change	Yes	315	86.8
	No	48	13.2
Frequency of pacifier change	Monthly	132	36.4
	Every two month	104	28.7
	3 months and over	88	24.2
Behaviour of dipping the pacifier into a product	Yes	111	30.6
	No	252	69.4
The product that the pacifier is dipped into*	Sugary products such as honey, molasses, jam	110	88
	Herbal tea	6	4.8
	Breast milk	9	7.2

* More than one option has been marked

Table 3. The thoughts of Mothers about the use of pacifier (n = 363)

Thoughts of mothers about the use of pacifier		n	%
Reasons to use pacifiers	Calming the baby	196	19.4
	Getting a comfortable sleep	42	4.2
	Organising the duration between meals	68	6.7
	Being able to keep the baby comfortable and quiet	111	11
	Preventing finger sucking	118	11.7
	Helping during teething	82	8.1
	Facilitating separation from the breast after feeding	31	3.1
	Reducing the pain when there is pain	8	0.8
	Because family elders want	353	35
Thinking that pacifier is harmful for the baby	Yes, it is harmful.	129	35.5
	No, it is not harmful.	234	64.5
The harms of the pacifier *	It damages the tooth development.	94	27.8
	It damages the chin development.	108	32
	It damages the palate structure.	91	26.9
	It prevents / reduces the baby's breast milk intake.	45	13.3

* More than one option has been marked

Exact test. A p-value of < 0.05 was considered significant.

Ethical considerations

Ethical consent was obtained from Zonguldak Bülent Ecevit University Human Research Ethics Committee for the study, dated 08/01/2020 and numbered 2020/01. Necessary written permissions were obtained from the management of the institution where the research was conducted. Data collection was based on the voluntary participation of the mothers who were included in the study. The mothers were informed about the purpose of the study and confidentiality of all data and their consent was obtained.

Results

The mean age of the mothers was 31.08 ± 6.04 (18-53) and of the children was 17.60 ± 11.6 (0-36) months. Of mothers, 54.3% had 1 child, 33.1% had 2 children and 12.6% had 3 and above children. Of the mothers, 54.8% were university graduates, 50.7% were employed, and the ratio of equal to income expense was 62.0% (Table 1).

The children started using the pacifier for the first time when they were at an average of 2.86 ± 3.31 months old, and they used it for at an average of 12.06 ± 9.13 months. 73.6% of the mothers used orthodontic pacifiers, 52.3% used pacifier chains, 36.2% used plastic clips, 97.8% cleaned the pacifier, 36.4% cleaned the pacifier every month, 36.4% changed pacifier every month, 30.6% had the behaviour of dipping the pacifier into a product, and the products that the pacifier was dipped into were sugary ones with a percentage of 88% such as honey, molasses and jam (Table 2).

In this study, 19.4% of the mothers stated that they used pacifiers to calm their babies and 35% used them as

their family elders wanted. 35.5% of the mothers stated that using a pacifier was harmful. Of the mothers, 32% and 27.8% stated that the use of pacifier gave harm to the development of the jaw and the tooth development, respectively (Table 3).

There was a statistically significant difference between the behaviours of mothers' pacifier cleaning and their educational level ($p=0.01$). The mothers with undergraduate degrees cleaned pacifiers more than those with postgraduate degrees ($p<0.001$). It was found that there was no statistically significant difference between the educational level of mothers and the behaviours of thinking that the pacifier was harmful, the first time to start the pacifier, the duration of pacifier use, the frequency of pacifier cleaning, the pacifier change, the frequency of pacifier change, and the behaviour of dipping pacifier into a product ($p>0.05$) (Table 4).

When finger sucking behaviours of children were compared according to their first time to start pacifier ($p=0.03$) and the duration of pacifier use ($p=0.001$), a statistically significant difference was found between them. The children who started using pacifier at 0-5 months old displayed more finger sucking behaviour than those who started it at 11-15 months and 16-24 months old ($p=0.03$). The children using pacifiers for 0-10 months displayed more finger sucking behaviour than those using it for 31-48 months ($p=0.001$) (Table 5).

Discussion

This study was carried out in Zonguldak city centre to determine the knowledge and behaviours of mothers with children aged 0-3 about the use of pacifier. In the study, the children started using the pacifier for the first time when they were at an average of 2.86 ± 3.31 months, and they used it for at an average of 12.06 ± 9.13 months.

Table 4. The differences in the behaviours of mothers' use of pacifier according to their level of education (n = 363)

The behaviours of mothers' use of pacifier	Educational level of mothers							
	Primary school		High school		Undergraduate		Postgraduate	
	n	%	n	%	n	%	n	%
Thinking that the pacifier is harmful								
Yes, it is.	19	14.7	29	22.5	75	58.1	6	4.7
No, it is not.	27	11.5	64	27.4	124	53	19	8.1
Statistical analysis*	$\chi^2 = 3.384$ p = 0.343							
The first time to start using pacifier (months)								
0-5	37	12.1	81	26.5	170	55.6	18	5.9
6-10	6	14.0	10	23.3	23	53.5	4	9.3
11-15	2	20	0	0	5	50	3	30
16-24	1	25	2	50	1	25	0	0
Statistical analysis*	$\chi^2 = 13.360$ p = 0.112							
Duration of Pacifier use (month)								
0-10	13	7.5	46	26.4	102	58.6	13	7.5
11-20	15	13.3	32	28.3	59	52.2	7	6.2
21-30	15	26.3	13	22.8	25	43.9	4	7.0
31-48	3	25.0	2	16.7	7	58.3	0	0.0
Statistical analysis*	$X^2 = 16.540$ p = 0.056							
Cleaning pacifiers	42	11.8	92	25.9	197	55.5	24	6.8
Statistical analysis*	$\chi^2 = 11.245$ p = 0.010							
Post hoc **	3-4 (p < 0.001)							
Frequency of cleaning pacifiers								
Monthly	21	9.1	57	24.8	133	57.8	19	8.3
Every two month	15	16.3	28	30.4	45	48.9	4	4.3
3 months and over	4	12.5	7	21.9	19	59.4	2	6.3
Statistical analysis*	$X^2 = 6.513$ p = 0.364							
Changing pacifiers	36	11.4	84	26.7	171	54.3	24	7.6
Statistical analysis*	$\chi^2 = 6.194$ p = 0.103							
Frequency of changing pacifiers								
Monthly	13	9.8	30	22.7	79	59.8	10	7.6
Every two month	17	16.3	32	30.8	50	48.1	5	4.8
3 months and over	8	9.1	22	25	49	55.7	9	10.2
Statistical analysis*	$\chi^2 = 7.566$ p = 0.263							
The behaviour of dipping the pacifier into a product	22	19.8	29	26.1	54	48.6	6	5.4
Statistical analysis*	$\chi^2 = 7.656$ p = 0.54							

* χ^2 : Chi-square test, ** Post hoc: Fisher exact test

In this study, 19.4% of the mothers stated that they used pacifiers to calm their babies and 35% used them as their family elders wanted, and 35.5% of the mothers stated that using a pacifier was harmful.

The mothers in this study started giving pacifiers to their babies in the first months of their lives. Contrary to this practice, it is clearly stated in the World Health Organization's Ten Steps for Successful Breastfeeding Principles that "no baby bottles or fake pacifiers should be given to breastfed babies". In order not to reduce the breast milk intake of babies, it is recommended not to give pacifiers to babies who are only breastfed (for six months).¹⁰ Mothers can concern that pacifiers may in-

terfere with breastfeeding.¹¹ However, some current studies showed that early versus late recommendation of pacifier introduction did not affect the proportion of breastfeeding at six months.^{12,13} Exclusive breastfeeding is associated with reduced pacifier sucking in children at 12 months. Promotion of exclusive breastfeeding may reduce the use of pacifiers and their potential deleterious effects.¹⁴

In this study, 73.6% of the mothers used orthodontic and 26.4% traditional pacifiers. Of the mothers, 35.5% stated that using a pacifier was harmful. The mothers in the study try different types of pacifiers in order to reduce the harms of the pacifier. In the study by Sezici and

Table 5. The differences in finger sucking behaviour of children according to their first time to start pacifier and the duration of pacifier use (n = 363)

		The child's finger sucking behaviour		Statistical analysis*	Post hoc **
The child's first time to start pacifier (month)	0-5 (1)	n	62	$\chi^2 = 5.300$ $p = 0.021$	1-3 (p = 0.03) 1-4 (p = 0.03)
		%	78.5		
	6-10 (2)	n	11		
		%	13.9		
	11-15 (3)	n	3		
	%	3.8			
	16-24 (4)	n	3		
		%	3.8		
The duration of pacifier use (months)	0-10 (1)	n	51	$\chi^2 = 11.666$ $p = 0.09$	1-4 (p = 0.001)
		%	65.4		
	11-20 (2)	n	19		
		%	24.4		
	21-30 (3)	n	7		
		%	9.0		
	31-48 (4)	n	1		
		%	1.3		

* χ^2 : Chi-square test, **Post hoc: Fisher exact test

Yiğit⁷, the rate of orthodontic pacifier use was found to be as 68% and traditional pacifier use as 31.4%. On the other hand, in another study, the rates of traditional and orthodontic pacifier use were determined to be as 13.3% and 24%, respectively.¹⁵ The use of orthodontic pacifier is thought to stimulate muscle contraction, tongue position and nasal breathing, similar to breastfeeding, thus not interfering with facial growth and occlusion. Therefore, orthodontic pacifiers are preferred more frequently by mothers.^{16,17}

In this study, 30.6% of the mothers in this study had the behaviour of dipping the pacifiers into products, and the products were mostly the sugary ones (88%) such as honey, molasses and jam. Dipping the pacifier into a nutrient and giving it to the child is a traditional practice in our country and learned from the elders of the family. However, this situation may cause the child to stop breastfeeding in the early period. The history of the pacifier is based on the use of sugary products or honey to calm the new-born.^{18,19} Sezici and Yiğit⁷ stated in their study that 53.4% of the mothers gave the pacifier to their babies with sugary food.

There was a statistically significant difference between the mothers' pacifier cleaning and their level of education (p=0.01). Among the mothers, those with undergraduate degrees cleaned pacifiers more than those with postgraduate degrees (p<0.001). Behaviour of thinking that the pacifier was harmful, the first time to start the pacifier, the duration of pacifier use, the frequency of pacifier cleaning, the pacifier change, the frequency of pacifier change, and the behaviour of dipping

the pacifier into a product did not differ regarding the educational level of the mothers (p>0.05). The maternal education level stands out as the leading factor affecting the use of pacifiers. The more the educational level of mother got, the less the duration of pacifier use became. The number of dentist visits in the children of mothers with high educational level was also high.²⁰

In this study, starting to use pacifiers at 0-5 months, when sucking behaviour was seen mostly, caused finger sucking behaviour in children. The children using pacifiers for 0-10 months displayed more finger sucking behaviour than those using it for 31-48 months (p=0.001). According to the results, children sustain the situation of having satisfaction from the pacifier with the behaviour of finger sucking. In cases where breastfeeding cannot occur, the pacifier improves the sucking reflex by providing the neurobehavioral organization of the baby.²¹ According to Freud's psychoanalytic theory, 0-5 months corresponds to the oral period. In this period, children display sucking behaviour intensely and reach oral pleasure.²² However, Butler et al. stated that infants in the pacifier users were reported to have more night wakings, to sleep longer during the day, and to shorter stretches of nighttime sleep than finger suckers into 0-6 months.²³ Using pacifiers and finger sucking can be used to relax and help to children to sleep.

Limitations

There are some limitations of our study. Firstly, the data were collected via an electronic questionnaire. The fact that mothers cannot be reached directly may limit

whether the questionnaires are filled in by the right people (convincing/certainty). In future studies, authors can use any video app or telephone calls for interviews, rather than just an electronic questionnaire.

This research was performed according to a cross-sectional study design in Zonguldak, Turkey. The data were and represent the perceptions of those mothers who were invited to participate in that region in Turkey. Thus, generalizability of the findings is limited. The questionnaire was used for the first time in this study, and no statistical testing was conducted to prove the reliability and validity of the entire questionnaire. The last limitation of this study is that the authors did not take into account clinical data, e.g. newborn/premature infant, child's weight, weight gain, etc. In future studies, it is recommended to examine the impact of such data on pacifier use.

Conclusion

The mothers gave a pacifier to their children up to an average of 1 year old, mothers had misinformation about the use of pacifiers, which would harm the health of their children, and the level of education was important in the occurrence of this situation. It is necessary to determine the wrong practices (such as not changing pacifiers regularly, not cleaning pacifiers regularly, using with honey foods) to correct the practices of the families and to inform them for the future studies.

Considering the important roles of pediatric nurses in the treatment and follow-up of children, the current situation needs to be improved. In line with the results obtained from the research, it is recommended to increase the effectiveness and efficiency of breastfeeding education led by pediatric nurses given within the scope of "Promoting Breastmilk and Baby-Friendly Health Institutions Program" to mothers and mother candidates in health institutions, and to inform especially about the harms of pacifier use.

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Author contributions

Conceptualization, A.T., A.K., M.Y., N.T and M.Ö.; Methodology, A.T., A.K., M.Y., N.T and M.Ö.; Software, A.T., A.K., M.Y., N.T and M.Ö.; Validation, A.T., A.K., M.Y., N.T and M.Ö.; Formal Analysis, A.T., A.K., M.Y., N.T and M.Ö.; Investigation, A.T., A.K., M.Y., N.T and M.Ö.; Resources, A.T., A.K., M.Y., N.T and M.Ö.;

Data Curation, A.T., A.K., M.Y., N.T and M.Ö.; Writing – Original Draft Preparation, A.T., A.K., M.Y., N.T and M.Ö.; Writing – Review & Editing, A.T., A.K., M.Y., N.T and M.Ö.; Visualization, A.T., A.K., M.Y., N.T and M.Ö.; Supervision, A.T., A.K., M.Y., N.T and M.Ö.; Project Administration, A.T., A.K., M.Y., N.T and M.Ö.; Funding Acquisition, A.T., A.K., M.Y., N.T and M.Ö.

Conflicts of interest

All authors declare that they have no conflicts of interest.

Data availability

Data available on request from the authors.

Ethics approval

Ethical consent was obtained from Zonguldak Bülent Ecevit University Human Research Ethics Committee for the study, dated 08/01/2020 and numbered 2020/01.

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