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Research Article- Pediatric COVID-19 Curfew in the Gulf States: A Perceptual Study from Saudi Arabia

Ossama M Zakaria [1,2], Jumanah M Almajed [1], Maryam E Alwabari [1], Hawra K Almutawah [1], Atika A Alarfaj [1], Mohamed Yasser Ibrahim Daoud [1]

[1] College of Medicine, King Faisal University, Al Ahsaa, Kingdom of Saudi Arabia
[2] Division of pediatric surgery, department of Surgery, Faculty of Medicine, Suez Canal University, Egypt

Abstract—
BACKGROUND: COVID-19 viral infection has become a global threat since the beginning of 2020. World Health Organization (WHO) has imposed universal recommendations for curfew to control the pandemic. This study designed to evaluate the perception of families within the Gulf Cooperation Countries (GCC) as regards the effect of the curfew on their children.
METHODOLOGY:A qualitative cross-sectional questionnaire-based study was performed. This questionnaire was designed in Arabic and distributed electronically among the GCC population with special emphasis on Saudi Arabia.
RESULTS: The study included 2006 respondents with a female to male ratio of 5:1. One thousand five hundred twenty-seven of the participants have taught their children the proper etiquette of performing hand hygiene as well as sneezing and/or coughing. Yet, 372 did not consider the social distancing as an important issue for their children to learn. Others (118) denoted pediatric unhealthy nutritional habits during the curfew. Overall, 609 of the participants reported the importance of extra supplementary nutrients during the lockdown. Breastfeeding was not a common practice among the participants.
CONCLUSIONS: Lack of information among the participants was reported when concerning the crucial effects of dietary and activity habits on children's immune system during the curfew era. This necessitates the implementation of extra instructional educational social strategies to overcome this defect. Similar studies with extra number of participants from all GCC may be needed in order to portrait more reliable and valid outcomes.

Keywords: COVID-19, Curfew, Pediatric, Perception. Gulf states.

1. Introduction

Coronavirus disease of 2019 (COVID-19), an enveloped RNA virus, is a type of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) [1]. It has imposed a great challenge on the health facilities worldwide since the beginning of 2020[2]. The currently available literature information denotes three routes for its transmission. They include droplets, aerosol, and direct contact [1]. Data stated that viral transmission does occur during the incubation period of the disease. This usually ranges from two to fourteen days [3,4]. It has varieties of clinical presentations. These range from being asymptomatic up to the fatal end stage of acute respiratory distress syndrome (ARDS) or even respiratory failure. Other clinical presentations of COVID-19 may include fever, fatigue, dry cough, as well as gastrointestinal and ophthalmologic manifestations[5, 6].Such manifestations were reported among the pediatric population. They are usually pronounced in mild-moderate forms [6, 7]. However, a higher percentage of the disease pathology may be dangerous among neonates and infants compared to their elder peers[7]. The early reports of this pandemic showed that adults may have a higher disease prevalence. Nonetheless, other publications have expressed a dramatic disease prevalence increase among the pediatric age groups[8, 9]. This may be attributed to the notion that protective measures are difficult to be applied among them [8]. Lately, the world health organization (WHO) has adopted the curfew as a measure to abort the infection outbreak. The curfew although being effective in pandemic control, it may have some drawbacks on children's physical and mental health [10, 11]. They sometimes suffer from limited physical activities, insomnia, anorexia or either polyphagia [10]. Some other manifestations may be a change in bowel habits (constipation or diarrhea) as well as nocturnal enuresis[9-11]. Stress, agitations, frightens, hyperactivity, depression, and other mental or

psychological diseases may accompany the curfew. This may have a negative effect on the immune system as it makes them more susceptible to infections [12]. Protective tools against COVID-19 include the wearing of masks. This may add to children's stress [13,14]. The current study was designed to evaluate the perception of disease prevention by the Gulf's families with special emphasis on Saudi nationals. It aims to evaluate their knowledge about how to protect their children from attaining the COVID-19 viral infection. It also aims to anticipate a road map for pediatric protection against this dangerous viral infection within the Gulf region.

2. Methodology

The study has been approved by our Intuitional Research Board (IRB). This qualitative, cross-sectional anonymous questionnaire-based study has taken place within the GCC with special emphasis on Saudi Arabia. A specially designed Arabic questionnaire was distributed among the population. It was electronically distributed as an online survey (Appendix 1). The applied questionnaire included many questions to investigate the participant's sociodemographic data such as gender, country, education and economic status. It also contains sections related to the family environment. The knowledge and perception of the COVID-19 preventive measures were also highlighted within the questionnaire. The last two sections concerned with the pediatric lifestyle changes and their health during the curfew.

The questionnaire was initially validated on 30 random subjects to pilot the reliability of the questions. It demonstrated good internal consistency and reliability.

A minimum sample size of 1487 was calculated for our study using the formula:

$$n = \frac{Z^2 \quad {}_{1-\frac{\alpha}{2}}[2Sp^2]}{d^2}$$

Statistical Analysis was carried out by using Statistical Package for the Social Sciences (SPSS) version 23. Descriptive statistics using frequencies and percentages were performed for continuous data. Pearson's Chi-square test was used to analyze categorical variables. All statistical analysis was two-sided. Statistical significance was considered when $p \leq 0.05$.

3. Results

Two thousand six respondents have participated in the study. They were 1676 females and 330 males. With a female to male ratio of 5:1. Their Sociodemographic data are shown in [Table I]. The family income during the curfew was more jeopardized among respondents whose income is less than 2500 SR per month. The income reduction was significantly related to the family members' educational level ($p<0.001$) [table II]. One thousand five hundred twenty-six respondents have taught their children the proper preventive measures including hand hygiene and how to properly sneeze or cough. On the other hand, 372 did not pay attention to the children's knowledge about social distancing. Surgical mask was used in 1406 of the participants, while 136 of them do not wear any type of masks [table III]. The participant's practice related to their children's diet is also shown in table 3, with 118 participants stating that their children's nutritional attitude has distinctly become unhealthy during the curfew. The infants' type of feeding is demonstrated in diagram I. Nonetheless, the respondents reported a different change in the relationship among the family members during the lockdown [table IV]. Furthermore, an assessment of the changes in the participants' children health during the curfew is shown in table V.

4. Discussion

Recently,the World Health Organization (WHO) has considered COVID-19 as a global pandemic. Since then, Gulf Countries including Saudi Arabia, Kuwait, Bahrain, Qatar, and Oman have implemented the curfew as a protective measure against the spread of the infection [1,15].

This curfew showed many drawbacks on the population in general and children in particular. The current study was designed to investigate the pros and cons of curfew on the pediatric population and their families.

Educatory measures are the cornerstone in the prevention of such pandemic. A Chinese study mandates hand hygiene as the crucial preventive practice among elementary school children [16].Such practice was stressed to be the family role despite the socioeconomic status. In the current study, this practice was highly

appreciated by the questionnaire respondents. Most of them (76.07%) have practiced teaching children the proper method of hand hygiene. Moreover, they have also taught them sneezing or coughing etiquette. This act was directly related to parental economic status with special emphasis on those who are in the medical professional field. Furthermore, the media have effectively played a great role within the process of their perception and knowledge as regards this protective process. Other assessed information in the current study were the role and effectiveness of protecting masks for disease prevention. This causes a major challenge. Parents have reported that their children (N=536, 26.7%) were cooperative in continuously keeping their masks. However, 516 (25.8%) children were cooperative in wearing the masks for a little or not accepting it at all. The study participants expressed their opinions that extra efforts should be paid to encourage their children to continuously accept the mask. Social distancing is another important factor that was evaluated within the current questionnaire. It was shown that 1242 (61.91%) of the participants had taught their children the concept of social distancing practice.

Nonetheless, the American Center for Disease Control has recommended that those who are younger than two years of age should be exempted from wearing masks. The reason for this recommendation is the fear of them getting suffocation as they might not be able to remove them without external assistance [17].Unfortunately, the current study showed that the majority of the participants (N=1360, 67.8%) either did not consider or believe that infants must wear a mask. Although wearing a mask is discouraged in this age group, social distancing remains together with hand hygiene as well as the avoidance of practice licking things. This measure may reduce the risk of similar viral infections such as SARS-CoV2 according to the recommendation of the American Academy of Pediatrics [18].

Surprisingly, 653 (40%) of Saudi women respondents believed that the “Niqab” veil is a protective and preventive tool for the viral spread. Yet, other (N=588, 39.92%) respondents reported their opinions that wearing a mask is mandatory even with the “Niqab”. They believed that more information should be addressed to their peers that the “Niqab” veil is not a really protective tool against the virus. That may be attributed to the fact that it does not fit closely to the woman’s cheeks nor chin. It is usually constituting two layers of clothes that have many gross pores. This is contradictory to the features of an effective non-medical mask according to WHO guideline [19].“Niqab” also may be a source of transmitting the disease if the used cloth is infected [20].

The relationship between dietary habits and the immune system has been widely discussed in the literature [21-26].The current study evaluated pediatric dietary and nutritional status during the time of curfew. Most participants stated minute changes in their children's nutritional habits during the curfew era irrespective to the family’s socioeconomic class. This was contradictory to a published report which stated that the socioeconomic status had led to malnutrition during similar curfews [22].Other reports correlated that such malnutrition to the unemployment during such era [23].

In general, extra nutritional supplements were reported to foster the body's immune system as a shield against infection [24, 26]. Our study respondents expressed a limited perception of the importance of extra nutritional supplements as crucial factors during the pandemic. They appraised the roles of vitamins (like vitamin D, C, and E) and trace elements (such as Zinc and Magnesium) as precursors for immune system enhancement. This concept does coincide with literature information [24, 26].

It is well known that human breastfeeding is a major and essential source to support innate immunity. It is considered as the initial vaccine any baby may get [27-29].This was proved by many literature opinions that stressed the role of breastfeeding in the decline of neonatal and infantile pneumonia-related hospitalization. On the other hand, those who are not breastfed expressed that it may facilitate their susceptibility to catch infections such as COVID-19 [27].The current study showed a limited number of neonates 178 (23.4%) out of 761 babies to have exclusive breastfeeding. Therefore, extra educatory campaigns and social programs are necessary to overcome these negative habits.

Physical fitness is the key for a strong immune system and mental wellbeing [12].Curfew negatively impacted pediatric exercise and physical fitness leading to a harmful effect on the immune system [30].This may result in a higher susceptibility to catch different types of infections including COVID-19. Our study showed a very limited number (N= 188, 9.4%) of children to have regular physical exercises. This emphasized the importance of social educatory programs concerning this aspect during the time of curfew. Yet, most of our children (N=1670, 83.3 %) did not suffer any immunization schedule lag during the curfew time. This is contradictory to previously published reports [31-32].

The efficacy of influenza vaccination among the pediatric populations is still controversial [33-38]. Yet, the

annual influenza (flu) vaccine was only received in 495 (24.7%) of the participant's children.
School closure, fear of the infection, and curfew all have drawbacks on children's psychological health with increased risk of post-traumatic stress disorders, depression, and anxiety [40, 41].In our study, the majority (N= 1478, 73.8%) of participants stated that the home atmosphere during the curfew was either stable or even witnessed an improvement of different family members relationships. Yet, 479 (45.2%) of them noticed an increase in aggression and anger among their children. Others (N=173,16.3%) noticed sleeping difficulties, and about 6% reported either nocturnal enuresis or constipation. These findings suggested negative psychological impacts on children of Gulf counties during the curfew. These are supported by a recent literature that demonstrates increased feelings of worry, nervousness, and anxiety-related insomnia among children and adolescents who were under quarantine [41, 42].This proved the importance of addressing pediatric psychological wellbeing during the pandemic. Other possible measures of improvement are needed to overcome such long-standing negative impact [40]. Pediatric adaptation to the current situation may be achieved through simplified explanatory methods about the purpose of the quarantine and disease preventive measures. This can be attained by consuming extra time by the pediatric caregiver to maintain their children's mental wellbeing [43].Other psychological supportive tools may include encouragement of an online contact with their friends and acquaintance [42-45].The current work reported 646 (32.2%) of the participants to compensate for the school closure by spending extra time for children support and education. Out of them, 426 (21.2%) stressed their regular communication with colleagues and friends. The positive aspect of this lockdown is providing the children with extra opportunities of relaxation apart from the routine stress of school homework and other family commitment [46].

5. Conclusion

In conclusion, pediatric populations need a special attention during the era of COVID-19 pandemic curfew to maintain their mental health. Such attention may also help in preventing infection. The participants of this current study expressed a difficulty in keeping the masks on their children's faces. Most of them expressed lack of information about the minimal age below which children must not wear masks. They also expressed their wrong believes about the preventive role of "Niqab". Nevertheless, the current data expressed shortage of knowledge and perception of breastfeeding in supporting the immune system. They also expressed an acceptable perceptual experience when pediatric stress was concerned. It is recommended that media should be directed to raise the social knowledge to enhance more effective healthy practices to overcome the drawback of pediatric COVID-19 infection.

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7. Appendix

Appendix 1: The used questionnaire:

[1] The Child Care Provider Information:

Gender:
- Female
- Male

Social status:
- Single
- Married
- Divorced
- Widower

Educational level:
- Uneducated
- Elementary school
- Middle school
- Secondary school
- University

Nationality:
- Saudi Arabia
- Emirates
- Kuwait
- Bahrain
- Qatar
- Oman

[2] Child's Environment:

Average income of the family:
- Less than 2500 SR per month
- Between 2500 and 5000 SR per month
- Between 5000 and 10000 SR per month
- More than 10000 SR per month

Was the family's income affected by the preventive measures and the home quarantine?
- Yes, for the better
- Yes, for the worst
- Yes, the income stopped (due to dismissal or due to the curfew).
- Not yet

How do you see the effect of curfew on the general atmosphere at home?
- Significant improvement in relationships between home members
- A slight improvement in the relationships between home members
- Things are stable with no change in the general atmosphere
- A slight increase in squabbling and anxiety
- A marked increase in squabbling and anxiety

[3] The infection prevention:

Did you teach your children how to disinfect hands (with soap or alcohol for a period of not less than 30-40s with the recommended steps by the ministry of health)?

- Yes
- No
- Not applicable / The child (children) is (are) too young.

Have you taught you child/ children the healthy way to sneeze or cough (use a tissue or bend the elbow)?

- Yes
- No
- Not applicable / The child (children) is (are) too young.

Have you made sure that your child/ children stick to the safe distance (no less than 2 meters) away from others?

- Yes
- No
- Not applicable / The child (children) is (are) too young.

How acceptable is your child (if her is over 2 years old) to keep a face mask when out of the house? (you can choose multiple answers if there is a difference between your children)

- Yes
- No
- I have only a two-year-old (or younger) baby, whose face cannot be covered due to a fear of suffocation.

What type of masks do you often use for you and your children?

- N95 mask
- Surgical mask
- A cloth mask
- We do not use a mask.

Do you think "the niqab" can replace the need of wearing the mask when going out?

- Yes
- No
- I do not know.

If you wear "niqab", do you wear a mask with it? (females only)

- Yes
- No

Do you think that a child younger than 2 years should wear a mask?

- Yes
- No
- I do not know.

What sources do you use to read about COVID-19? (you can choose multiple answers)

- Medical sites
- Medical journals
- Ministry of health instructions from text messages, TV, or social media
- Doctors and specialists accounts on social media
- Public accounts on social media
- Instructions from a relative
- I am not interested to read about the disease.
- Others … (mention it)

[4] Child's Lifestyle:

Did you notice a change in the child's eating habits during the period of home quarantine? (you can choose multiple answers if there is a difference between you children)

- Yes, food is healthier.
- Yes, food has become unhealthy.
- No, eating habits are the same as normal days.

Have you noticed a change in the number or size of a child's meals during the home quarantine period? (you can choose multiple answers if there is a difference between your children)

- Yes, a noticeable increase in the number or size of meals
- Yes, a significant decrease in the number or size of meals

- No, the number or size of meals has not changed.

If there is an infant under your care, what kind of feeding he/she is having?

- Exclusive breastfeeding
- Mainly breastfeeding, sometimes formula feeding
- Mainly formula feeding, sometimes breastfeeding
- Formula feeding only

Is/are your child/children taking nutritional supplements (such as vitamin D, or multiple vitamins)?

- Yes
- No

Has /have your child/ children been vaccinated with all required vaccinations for the matched age?

- Yes
- No

Has/ have your child/ children been vaccinated for the annual flu vaccination?

- Yes
- No

Does/ do you child/ children exercise during the curfew?

- Yes, regularly
- Sometimes only
- No
- Not applicable / The child (children) is (are) too young.

During the quarantine period, were you keen to compensate for the closure of schools and the lack of communication with other children by teaching the child (such as reading, arithmetic, scientific information, kinetic games, documentary films … etc)?

- Yes
- Sometimes only
- No
- Not applicable / The child (children) is (are) too young.

During the curfew, did you make sure to keep the connection between your child/children and other friends?

- Yes, the communication with them is regularly.
- Yes, the communication with them is sometimes.
- No, there is no contact with them.
- Not applicable / The child (children) is (are) too young.

[5] Child's health:

Have you noticed one of these symptoms in your child/children during the curfew? (you can choose multiple answers)

- Change in the mental status
- An increase in the violent behavior and anger
- General fatigue
- Fever (that did not respond to usual temperature reducers)
- Convulsions
- Headache
- Redness of eyes
- Skin rash (neck and chest)
- Toothache
- Sore throat
- Neck pain/ stiffness
- Chest pain
- Abdominal pain
- Loss of appetite
- Vomiting
- Cough (more than 3 times a day)
- Shortness of breath
- Loss of smell

- Loss of taste
- Diarrhea
- Constipation
- Nocturnal enuresis
- More introverted and quite
- A marked increase in the child's sleeping hours
- Difficulty falling asleep
- Others … (mention it)

Appendix 2:tables and graphs

Table I: Sociodemographic Details of the Participants			
		N	%
Gender	Male	330	16.5
	Female	1676	83.5
Social Status	Divorced	87	4.3
	Married	1695	84.5
	Single	218	10.9
	Widower	6	.3
Education	Primary school	11	.5
	Middle school	40	2.0
	Secondary school	401	20.0
	University	1553	77.4
	Uneducated	1	.0
Country	Saudi	1913	95.4
	Kuwait	51	2.5
	Bahrain	19	.9
	Oman	13	.6
	Qatar	1	.0
	UAE	9	.4

Table II: The Relationship of Sociodemographic and the Effect on Income								
			Effects of protective measures and curfew in the family income during COVID-19 Pandemic				Total	*P* value
			Not yet	Yes, for the better	Yes, for the worst	Yes, the income stopped		
Income per month (in Saudi riyals)	Less than 2500	N	35	6	41	22	104	<0.001
		%	33.7%	5,8%	39.4%	21.2%	100.0%	
	Between 2500 and 5000	N	125	39	127	40	331	
		%	37.8%	11.8%	38.4%	12.1%	100.0%	
	Between 5000 and 10000	N	342	138	141	18	639	
		%	53.5%	21.6%	22.1%	2.8%	100.0%	

	More than 10000	N	540	230	144	18	932	
		%	57.9%	24.7%	15.5%	1.9%	100.0%	
Education	Primary school	N	6	2	1	2	11	<0.001
		%	54.5%	18.2%	9.1%	18.2%	100.0%	
	Middle school	N	14	7	17	2	40	
		%	35.0%	17.5%	42.5%	5.0%	100.0%	
	Secondary school	N	188	71	114	28	401	
		%	46.9%	17.7%	28.4	7.0%	100.0%	
	University	N	834	333	302	66	1553	
		%	53.7%	21.4%	20.6%	4.2%	100.0%	
	No primary education	N	0	0	1	0	1	
		%	0.0%	0.0%	100.0%	0.0%	100.0%	

Table III: Practices and Attitude Related to Safety and Preventive Measures for Children During COVID-19 Era

		N	%	**Work Sector**
				P value
Teaching child(s) how to disinfect hands	Yes	1526	76.07	0.041
	No	88	4.39	
	Not applicable / The child (children) is (are) too young.	392	19.54	
Teaching child (s) the healthy way to sneeze or cough	Yes	1528	76.17	0.015
	No	86	4.29	
	Not applicable / The child (children) is (are) too young.	392	19.54	
Teaching child(s) social distancing practices	Yes	1242	61.91	0.942
	No	372	18.54	
	Not applicable / The child (children) is (are) too young.	392	19.54	
Child attitude in using face mask	Accept it a little and then refuse it	445	22.2	0.495
	Accepted to keep the mask continuously	536	26.7	
	Refuses to wear masks	72	3.6	
	I don't know, we did not go out.	729	36.3	
	I have only a two-year-old (or younger) baby, whose face cannot be covered due to a fear of suffocation.	224	11.2	
Type of Face Masks used	N95	51	2.5	0.891
	A cloth mask	413	20.6	
	Surgical mask	1406	70.1	
	Not using a mask	136	6.8	
Change in the eating habits of child(s) during lockdown period	No, eating habits are the same as normal days.	927	46.2	0.423
	Yes, food is healthier.	961	47.9	
	Yes, the food has become unhealthy.	118	5.9	

Change in the number or size of a child(s)'s meals during the lockdown period.	No, the number or size of meals has not changed.	1015	50.6	0.313
	Yes, a noticeable decrease in the number or size of meals	310	15.5	
	Yes, a noticeable increase in the number or size of meals	681	33.9	
Child (s) involved in exercise or physical activities	Sometimes	1028	51.2	0.779
	Yes, regularly	188	9.4	
	No	398	19.8	
	Not applicable / The child (children) is (are) too young.	392	19.5	
Usage of nutritional supplements	Yes	609	30.4	<0.001
	No	1397	69.6	
Child (s) undergone vaccination of all ages	Yes	1670	83.3	0.331
	No	175	8.7	
Child (s) taken annual flu (influenza) vaccination	Yes	495	24.7	0.045
	No	1511	75.3	

Table IV: Perceptions and Practices Related to Personal Life and Social Life During COVID-19

		N	%
Effect of curfew on the general atmosphere in the home.	Significant improvement in relationships between home members	555	27.7
	A slight improvement in the relationships between home members	298	14.9
	Things are stable with no change in the general atmosphere	625	31.2
	A slight increase in squabbling and anxiety	391	19.5
	A marked increase in squabbling and anxiety	137	6.8
Compensate for the school closure by spending extra time for children support and education.	Yes	646	32.3
	Sometimes only	896	44.7
	No	214	10.7
	Not applicable / The child (children) is (are) too young.	250	12.5
Online communication with the child's colleagues and friends	Yes, regularly	426	21.2
	Yes, sometimes	895	44.6
	No	429	21.4
	Not applicable / The child (children) is (are) too young.	256	12.8
Replacement of the mask with the 'niqab' when going out (all respondents)	Yes	801	39.9
	No	855	42.6
	I don't know / male	350	17.4
Replacement of the mask with the 'niqab' when going out (Saudi females only (N=1631))	Yes	653	40.0
	No	720	44.1
	I don't know.	258	15.8
Usage of mask with niqab (all participants)	Yes	650	32.4
	No	988	49.3
	Mot prefer to say / male	368	18.3

Usage of mask with niqab (Saudi females only (N=1631))	Yes	588	39.92
	No	885	60.08
Child(s) younger than two years should wear a mask.	Yes	756	37.7
	No	646	32.2
	I don't know	604	30.1
Source used for information related to COVID-19	Medical sites	80	4.0
	Medical journals	160	8.0
	Ministry of Health instructions from text messages, TV, or social media	180	9.0
	Doctors and specialists accounts on social media	170	8.5
	Public accounts on social media	362	18.0
	Instructions of a relative	154	7.7
	I am not interested to read about the disease.	112	5.6
	Multiple sources	788	39.3

Table V: Noticeable Symptoms on Children During the Curfew		
Change in mental status	N	151
	%	14.2%
An increase in violent behaviors and anger	N	479
	%	45.2%
Fatigue	N	45
	%	4.2%
Fever which did not respond to temperature reducers	N	27
	%	2.5%
Convulsions	N	7
	%	0.7%
Headache	N	69
	%	6.5%
Redness of eyes	N	97
	%	9.2%
Skin rash (on neck and chest)	N	38
	%	3.6%
Toothache	N	210
	%	19.8%
Sore throat	N	68
	%	6.4%
Neck pain and stiffness	N	35
	%	3.3%
Chest pain	N	143
	%	13.5%
Abdominal pain	N	8
	%	0.8%
Loss of appetite	N	131
	%	12.4%
Vomiting	N	38
	%	3.6%
Cough	N	43
	%	4.1%
Shortness of breath	N	4
	%	0.4%

Loss of smell	N	4
	%	0.4%
Loss of taste	N	4
	%	0.4%
Diarrhea	N	100
	%	9.4%
Constipation	N	73
	%	6.9%
Nocturnal enuresis	N	68
	%	6.4%
More introverted and quite	N	47
	%	4.4%
A marked increase in the child's sleeping hours	N	134
	%	12.6%
Difficulty falling asleep	N	173
	%	16.3%
others	N	8
	%	0.8%

Graph I: Type of infant feeding: