Assessment of Mothers' Knowledge and Practices Regarding Infant Safe Sleep

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Abstract

Background: Sleeping is necessary for the infant growth and development; So, mothers must follow recommendations of infant safe sleep to achieve the desired benefits from sleep and reduce sudden infant death syndrome. **Aim:** the study aimed to assess the mothers' knowledge and practices regarding infant safe sleep. **Design:** Descriptive correlational design was used. **Setting:** The study was conducted at outpatient pediatric clinics affiliated to Suez Canal University Hospitals and Ismailia Medical Complex at Ismailia City. **Sample:** none-probability Convenience sampling of 100 mothers with their infants who attended to the previous mentioned settings and agree to participate in the study. **Tool:** Structured interviewing questionnaire was used to assess the mothers' knowledge and reported practices regarding infant safe sleep. **Results:** The results of the study revealed that less than two thirds (63%) of studied mothers had unsatisfactory knowledge and reported practices regarding infant safe sleep, there were no statistically significant relationships among the studied mothers' characteristics and their total level of knowledge and reported practices regarding infant safe sleep. **Conclusion:** The study concluded that, the studied mothers had unsatisfactory knowledge and reported practices regarding infant safe sleep. However, there was a significant positive correlation between total knowledge and total reported practices. **Recommendations**: The study recommended that, educational programs about importance of infant safe sleep on infant's health should be organized for mothers; the contents of health education should include infant safe sleep guidelines.

Keywords: Infant safe sleep – Mothers' knowledge and practices**.**

1. Introduction

The infancy period, which spans from birth to one year of age, is considered a first and vital stage for growth and development. Sleep has a critical and significant role in the growth and development of infants because about 75% of growth and development hormones are produced while the infant is sleeping. These hormones are produced three times more during sleep than when awake; it is important for cell regeneration, immune system, cognition, behavior regulation and many other functions **(Kamariah& Damayanti, year2023).**

Infants spend more than half of their lives sleeping. Sleep is developing and solidifying during the first year of life. Sleep disorders and frequent awakenings at night have a high prevalence in infants, about 25% of sleep disorders occur in infants aged. The more

sleep disorders an infant has affect cognitive functions, attention, behavior, health and overall quality of infant's life. Sleep disorders are influenced by many factors including individual factors, environmental and physiologic factors. Infant sleep environment has attracted scientific, clinical and public attention for reducing the incidence of Sudden Infant Death Syndrome (SIDS) **(Martin et al., 2024).**

Sudden infant death syndrome (SIDS) is defined as sudden death of an infant under one year of age, which remains unexplained after thorough case investigation. **(Bono-Neri, 2021).** The definition of SIDS is applied and accepted in standard medical practice, including the American Academy of Pediatrics (AAP) **(Alanezi et al., 2023).**

The incidence of SIDS peaks between the ages of 1 and 4 months **(Priyadarshi et al., 2022).** The United States SIDS rate decreased from 120 deaths per 100 000 live births in 1992 to 56 deaths per 100 000 live births in 2001, representing a reduction of 53% over 10 years. From 2001 to 2008, the rate remained constant and then declined from 54 per 100 000 live births in 2009 to 33 per 100 000 live births in 2019 **(Centers for Disease Control and Prevention, 2020).**

Sudden infant death syndrome is related to many factors including placing an infant to sleep on an unsafe sleep surface, on a shared sleep surface, in the prone and side lying position, on a soft mattress, on the sleep surface with more blankets and pillows, or in the crib with more objects including toys and bumper pads. These risk factors consider a threat to infant safe sleep **(Osei-Poku et al., 2023).**

The American Academy of Pediatrics (AAP) recommended a safe sleep environment to reduce the risk of SIDS. This includes supine positioning, use of a firm, noninclined sleep surface, room sharing without bed sharing and avoidance of soft bedding, toys and bumper pads on sleep surface, breastfeeding, avoidance of exposure to nicotine and use of a pacifier. These recommendations include strength of evidence for each recommendation and additional information to convince and assist parents, physicians, and nonphysician clinicians in assessing risks of not following these recommendations **(Osei-Poku, 2022).**

Factors that may influence a mother's acceptance and use of infant safe sleep recommendations, include education, available resources and access to preventive care, as well as cultural or familial beliefs and economic level. Education includes both the highest level of education a mother has attained, as well as the source and guidelines provided to the mother regarding safe sleep practices with infants. Adherence to safe sleep recommendations would increase if medical practitioners and educational materials addressed common parental concerns and explained the reasoning behind the guidelines **(Bahgat et al., 2024).**

The pediatric nurse works with a large number of age groups in a lot of areas like emergency department, pediatric intensive care unit and outpatient clinics. They may be reassigned to a different department where infants are admitted. Through health educating and role modeling, pediatric nurses can encourage parents to follow the AAP's recommendations for infant safe sleep.

(Bono-Neri, 2021).

Significance of the Study:

In Egypt many recorded infant deaths are associated with a previously known causes like pneumonia, prematurity, infectious diseases and cardiovascular diseases but those because of unknown cause are not recorded. Also, there is lack of knowledge about SIDS in Egypt despite the world recognition of this syndrome since 1960 **(Elsobkey, 2018).** In the United States approximately 3600 infants die every year due to sleep-related infant death – an average of one infant's death every 2 hours **(Hanke, 2020).** It is difficult to determine the exact incidence of SIDS among Egyptian infants as its diagnosis requires a complete autopsy which is difficult to be done for various reasons. Also, estimation of the number of cases will not be accurate especially in places where recording of infant deaths isn't prevalent **(Gamal El-deen et al., 2021).**

The Aim of the study:

The aim of this study was to assess the mothers' knowledge and practices regarding infant safe sleep.

Research question:

1-What is the mothers' knowledge level regarding infant safe sleep?

2-What is the mothers' reported practices level regarding infant safe sleep?

3-Is there a relationship between mothers' knowledge and reported practices regarding infant safe sleep?

2. Subject and Method

Study design:

A descriptive correlational design was utilized for the current study.

Study setting:

The study was conducted at outpatient pediatric clinics affiliated to Suez Canal University Hospitals and Ismailia Medical Complex at Ismailia City.

Study subjects:

The study Non-probability Convenient samples of 100 mothers with their infants who attended to the previous mentioned settings and agree to participate in the study. Sample size was calculated according to the following equation

$$\mathbf{n = t^2 \times p(1-p)/m^2}$$ **(Blair, 2015)**

Where:

n = the sample size

t = confidence level at 95% **(standard value 1.96)**

p = is estimated prevalence in the study area = **0.07**

m = margin of error at 5% **(standard value of 0.05)**

By applying the previous figures to the equation, the sample size was:

$$n = \frac{(1.96)^2 \times 0.07\ (1-0.07)}{(0.05)^2} = 100.035 \simeq 100$$

Tool of data collection:

A structured interviewed questionnaire was used in this study; it was adapted from **Osei-Poku, (2022), Bono-Neri, (2021), Dalvie, (2020), Elbilgahy et al., (2019), Mendres-Smith, (2018) and Goodstein et al. (2015).** And after reviewing the related and recent literature. Some new questions were developed and added by the researcher to the tool. It was consisted of three parts as

following:

Part 1: It included 11 questions (Q 1:11). It was concerned with characteristics of studied mothers and their infants such as age, marital status, residence, level of education, occupation, number of siblings and if the mother had one her children was exposed to sudden death, infants' age, feeding method, rank and gender.

Part 2: It included 10 questions (Q 12:21). It was concerned with mothers' knowledge regarding infant safe sleep such as infants' safe sleep position & sleep environment, SIDS (definition & causes) and sources of knowledge about infants' sleep safety.

Part 3: It included 12 questions (Q 22:33). It was concerned with mothers' reported practices regarding infant safe sleep such as infants' sleep environment, infants' breastfeeding, infants' position, sleep bed, cover, toys and infants' pacifier.

Scoring system:

For knowledge items, 10 items, the correct responses were scored (1) and the incorrect were scored (0). The total knowledge scores were 10 scores; scores of items were summed up and the total was divided by the number of the items, giving a mean score for the part. These scores were converted into a percentage score. Knowledge was considered satisfactory if the percentage score was 50% or more and unsatisfactory if less than 50% **(Mohamed et al., 2021).**

For reported practices items, 12 items, the correct responses were scored (1) and the incorrect were scored (0). The total practices scores were 12 scores; the scores of items were summed up and the total was divided by the number of items, giving a mean score for the part. These scores were converted into a percentage score. Reported practices were considered satisfactory if the percentage score was 50% or more and unsatisfactory if less than 50% **(Mohamed et al., 2021).**

Tool validity and reliability:

The tool of the study was given to three experts in the field of pediatric nursing and Community Nursing to test the content validity of the tool and clarify the sentences as well as the appropriateness of content. Reliability of the tool was tested by using Cronbach's Alpha to ensure the internal consistency of the tool. The reliability (internal consistency) of the whole questionnaire was 0.72.

Field work:

After obtaining permissions from the director of the hospital and the director of outpatient clinics to proceed with the proposal study, the researcher initiated the process of data collection. The actual field work was carried out over a period of 3 months (from the beginning of January 2023 until the end of march 2023). The researcher was available at the outpatient pediatric clinics in Suez Canal University Hospitals five days per week (from Sunday to Thursday from 9 Am to 12 Pm) and presented at the outpatient pediatric clinics in Ismailia Medical Complex six days per week (from Saturday (from 9 Am to 2 Pm) and from Sunday to Thursday from (12.30 Pm to 2 Pm) to collect data from studied mothers. The researcher interviewed individually the mothers who agreed to participate in the study. The researcher explained the aim and objectives of the study to each mother. The study time to fill tool

took 15-20 minutes.

Pilot study:

A pilot study was carried out after the development of the study tool and before starting the data collection. It was conducted on 10% of the study sample (10 mothers) to test the clarity, objectivity, and feasibility of the tool, and determine the time required to fill the data collection tool (15-20) minutes. Necessary modifications were done such as duration of exclusively breastfeeding and the studied mothers included in the pilot were excluded from study sample.

Administrative design:

Primary approval was obtained from the Research Ethical Committee in the Faculty of Nursing, Suez Canal University (committee no. 156 at 6/2022). Written letters were issued from the Dean of the Faculty of Nursing to the directors of the previously mentioned study settings to seek their approval for carrying out the study. An official permission was obtained from the directors of the study setting, after explanation of the aim, nature, and duration of the study.

Ethical considerations:

Oral or written informed consent was obtained from each mother prior to participation in the study after a full explanation of the aim and nature of the study. The researcher assured voluntary participation, anonymity and confidentiality of the gathered data which would be used only for the purpose of the study. Also, the participating mothers have the right to withdraw at any time from the study without any effect on the care provided for her child at the outpatient pediatric clinics.

Data analysis:

Collected data were coded, entered and analyzed using Statistical Package for the Social Sciences (SPSS version 23). Correlation test was used to test relationships between mother's knowledge and reported practices. Linear regression was used to predict the size of change of mother's practice in relation to one unit increase in their knowledge. Chi-square test was used, *P*-value was set at <0.05 for significant results.

3. Results

Table (1): Shows that the mean age of the studied mothers was 28.13±5.13 years, 66% of the studied mothers were between the ages of 20 and less than 30 years. About 99%, of the studied mothers were married. About 51%, of the studied mothers lived in the rural area. In addition, 49% of the studied mothers had secondary level of education, 20% of the studied mothers had university education and only 17% were illiterate. Most of the studied mothers (82%) were not working. About 50% of the studied mothers had two children and 96.9% of infants were not exposed to sudden infant death syndrome.

Table (2): Presents that the mean age of the studied infants was 8.82±2.55 months, 48% of infants were between the ages of 10 to 12 months and 55% of infants were males. Regarding ranking of the infant about 50% of infants were the second infant, while 2% of infants were the first infant.

Figure (1): Shows that 62% of the studied mothers' infants had breastfeeding, while 19% of the studied mothers' infants used artificial feeding and 19% of the studied mothers' infants used both types of feeding

(breastfeeding and artificial feeding).

Table (3): Shows that mean scores of the studied mothers' knowledge regarding infant safe sleep was 4.15±1.65 while mean scores of the studied mothers' reported practices regarding infant safe sleep was 6.10±1.56.

Figure (2): Represents that 57% of the studied mothers took their information about infant safe sleep from family members, 23% of them took their information from internet and 15% of them took their information from pediatrician.

Table (4): Illustrates percentage distribution of the studied mothers' total level of knowledge and answers research questions number 1 and number 2. Also, this table shows that 63% of the studied mothers had unsatisfactory level of knowledge and reported practices, while 37% of the studied mothers had satisfactory level of knowledge and reported practices regarding infant safe sleep.

Table (5): Illustrates correlations between studied mothers' total level of knowledge and their total level of reported practices regarding infant safe sleep and answer the research question number 3. This table shows that there was a statistically significant positive correlation between studied mothers' total level of knowledge and their total level of reported practices, *P*-value <.001*.

Table (6): This table shows regression analysis of the relationship between studied mothers' total level of knowledge and their total level of reported practices; with every one unit increased in total level of knowledge, the total level of reported practices of the studied mothers increased by 0.474 units.

4. Discussion

A large number of infant deaths occur due to sudden infant death syndrome (SIDS), which generally occurs during sleep and mostly due to an unsuitable sleep environment, within the first year of life **(Peacock et al., 2018).** Providing infant safe sleep is a global public health priority **(Zeren et al., 2022).** The risk of sleep-related infant death may be decreased if the parents follow the safe sleep guidelines from the American Academy of Pediatrics (AAP) regarding the infant's sleep position, sleep site and surrounding environment **(Walcott et al., 2018).**

Regarding characteristics of the studied mothers, the current study revealed that nearly two thirds of the studied mothers' aged between 20 to less than 30 years with mean age was 28.13±5.13 years. This result agreed with **Gamal El-deen et al. (2021),** who conducted a study about "Effect of Educational Intervention Based on Health Belief Model for Mothers about Prevention of Sudden Infant Death Syndrome" and revealed that more than two thirds of mothers' aged between 20 to 30 years with mean 28.066 ± 4.47 years.

Regarding the studied mothers' level of education, the current study found that less than half of the studied mothers had secondary level of education. This finding was supported by **Elsobkey (2018),** who showed in her study about "Mothers' health education based on health belief model to promote health of preterm infant related to sudden infant death syndrome" and found that more than half of the studied mothers had

secondary level of education. From the researcher point of view, this finding may be due to more than half of mothers lived in rural countries where facilities of high education are limited and they preferred early marriage.

The present study reported that half of the studied mothers have two children. This finding goes in line with **Mohamed et al. (2021),** who found that more than half of the studied mothers have one to two children. This finding of the current study comes in the reverse line against **Zeren et al. (2022),** who found that less than one third of the studied mothers have two children. From the researcher point of view, the reason for this finding may be because the spread of health education for family planning through the media and health units, in addition to the economic situation in the country.

Regarding exposing to sudden infant death, the present study reported that great majority of the studied mothers' children were not exposed to sudden infant death. this finding was supported by **Elbilgahy et al. (2019),** who found that great majority of the studied mothers didn't have previous history of sudden infant death syndrome.

The present study reported that the studied mothers had infants between the age of 10 to 12 months with mean age was 8.82±2.55 months and more than half of them were males. This result agreed **Alzubaidi et al. (2022),** who conducted a study entitled "Mothers Knowledge Toward Correct Infant Sleep Practices and Sudden Infant Death Syndrome in Al-Najaf Provence" and found that more than one third of mothers had infants between the ages of 10 to 12 months with mean age was 9.3±6.3 months and more than half of them were males.

Concerning the type of infant's feeding, the current study found that more than half of the studied mothers' infants had breastfeeding. These finding was supported by **Zeren et al. (2022),** who found that more than half of studied mothers breastfed their infant. Also, this finding agreed with **Lau and Hall (2016)** who conducted a study about "Safe sleep, day and night: mothers' experiences regarding infant sleep safety" and reported that majority of studied mothers breastfed their infant.

The present study reported that mean scores of the studied mothers' knowledge regarding infant safe sleep was 4.15±1.65. This finding agreed with **Alzubaidi et al. (2022),** who reported that mean scores of the studied mothers' knowledge was 4.37±1.3. Also, the present study reported that mean scores of the studied mothers' reported practices regarding infant safe sleep was 6.10±1.56. This finding disagreed with **Gamal El-deen et al. (2021),** who reported that mean scores of the studied mothers' reported practices regarding infant safe sleep was 11.78 ±1.41.

The present study revealed that more than half of the studied mothers took their information about infant safe sleep from family members. This result agreed with **Alzubaidi et al. (2022),** who found that more than half of the mothers took their information from family members. While the finding of the current study comes in the reverse line against **Isezuo et al. (2017),** who conducted a study about "Infant sleep practices and knowledge of sudden infant death syndrome among mothers of infants

attending the paediatric clinics of a tertiary hospital in Sokoto, Nigeria" and found that less than one eighth of mothers took their information from family members. From the researcher point of view, the current finding may be based on the demographic characteristics of the studied mothers especially residence place, as more than half of them were found to live in rural areas, which making it easier to rely on family members to obtain their information.

The present study reported that less than two thirds of the studied mothers had unsatisfactory total level of knowledge regarding infant safe sleep. This finding goes in line with **Bahgat et al. (2024),** who found that more than three quarter of the studied mothers had inadequate level of knowledge regarding SIDS and safety measures for its prevention. The finding comes in contrary with **Alzubaidi et al. (2022),** who found that more than half of studied mothers had accepted awareness of correct infant sleep practices and SIDS. From the researcher point of view, the reason for this finding may be because the lack of awareness programs regarding infant safe sleep.

The present study reported that less than two thirds of the studied mothers had unsatisfactory total level of reported practices regarding infant safe sleep. This finding goes in line with **Gamal El-deen et al. (2021),** who found that vast majority of the studied mothers had unsatisfactory level of reported practices about infant safe sleep. While the finding comes in the reverse line against **Gaertner et al. (2023),** who revealed that most mothers implemented many SIDS recommendations. According to the researcher's viewpoint, the reason for this finding may be because of lack of knowledge and health education about infant safe sleep due to the scarcity of scientific studies and television programs that talk about infant safe sleep recommendations despite the global recognition of this syndrome.

Regarding correlation between total knowledge level of the studied mothers and their total level of reported practices, the finding of the current study revealed that there was a statistically significant positive correlation between mothers' knowledge and their reported practices**.** Also, the current finding showed regression analysis of the relationship between total knowledge and total reported practices with every one unit increased in total knowledge, the total reported practices of the studied mothers increased by 0.474 units. These findings were supported by **Mohamed et al. (2021),** who revealed that there is a statistically significant positive correlation between mothers' knowledge and their reported practices. According to the researcher's viewpoint, level of practice increases with increasing level of knowledge; so this rational showed the mothers in the present study had decreased level of knowledge and reported practices. So, educational Programs are needed to correct.

5. Conclusion:

Based on the findings of the current study, it was concluded that the studied mothers had unsatisfactory level of knowledge and reported practices regarding infant safe sleep. Also, there was a statistically significant positive correlation between studied mothers' total level of knowledge and total level of reported

practices regarding infant safe sleep.

6. Recommendations:

Based on the findings of the present study, the following recommendations were suggested:

1- Educational programs about importance of infant safe sleep on infant's health should be organized for mothers; the contents of health education should include infant safe sleep guidelines.

2- Dissemination and increasing awareness of mothers regarding infant safe sleep through mass media, publishing brochures and advertisements inside health centers and clinics.

3- Further studies regarding infant safe sleep should be conducted including larger sample size to generalize its results.

Table (1): Distribution of the studied mothers according to their characteristics (n=100)

Mothers' characteristics	No.	%
Age /Years		
<20	4	4
20<30	66	66
30<40	25	25
40≤50	5	5
$\bar{X}$±SD	28.13±5.13	
Marital status		
Married	99	99
Divorced	0	0
Widowed	1	1
Residence		
Urban	49	49
Rural	51	51
Level of education		
Illiterate	17	17
Primary	14	14
Secondary	49	49
University	20	20
Occupation		
Working	18	18
Not working	82	82
Number of children		
One	2	2

Two	50	50
Three	21	21
Four	19	19
Five or more	8	8
Previous exposure to SIDS (n=98)		
Exposed	3	3.1
Not exposed	95	96.9

Table (2): Distribution of the studied mothers' infants according to their characteristics (n=100)

Infants' characteristics	No.	%
Gender		
Male	55	55
Female	45	45
Age /months		
<4	2	2
4<7	25	25
7<10	25	25
10≤12	48	48
$\bar{X}$±SD	8.82±2.55	
Rank		
First	2	2
Second	50	50
Third	21	21
Fourth	19	19
Fifth or more	8	8

Figure (1): Percentage distribution of the studied mothers' infants according to type of feeding

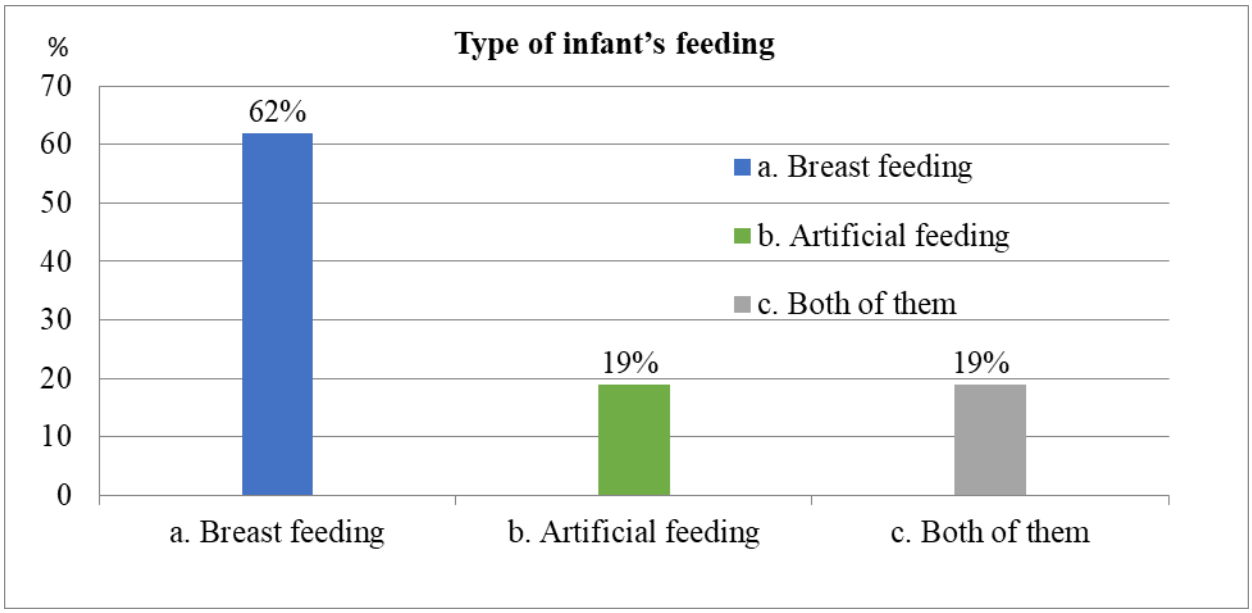

Table (3): Mean scores of the studied mothers' knowledge and reported practices regarding infant safe sleep (n=100)

Items	$\bar{X}$±SD	95% CI around mean
Total mean score of the studied mothers' knowledge	4.15±1.65	3.82-4.47
Total mean score of the studied mothers' reported practices	6.10±1.56	5.79-6.41

Figure (3): Percentage distribution of the studied mothers' source of information regarding infant safe sleep

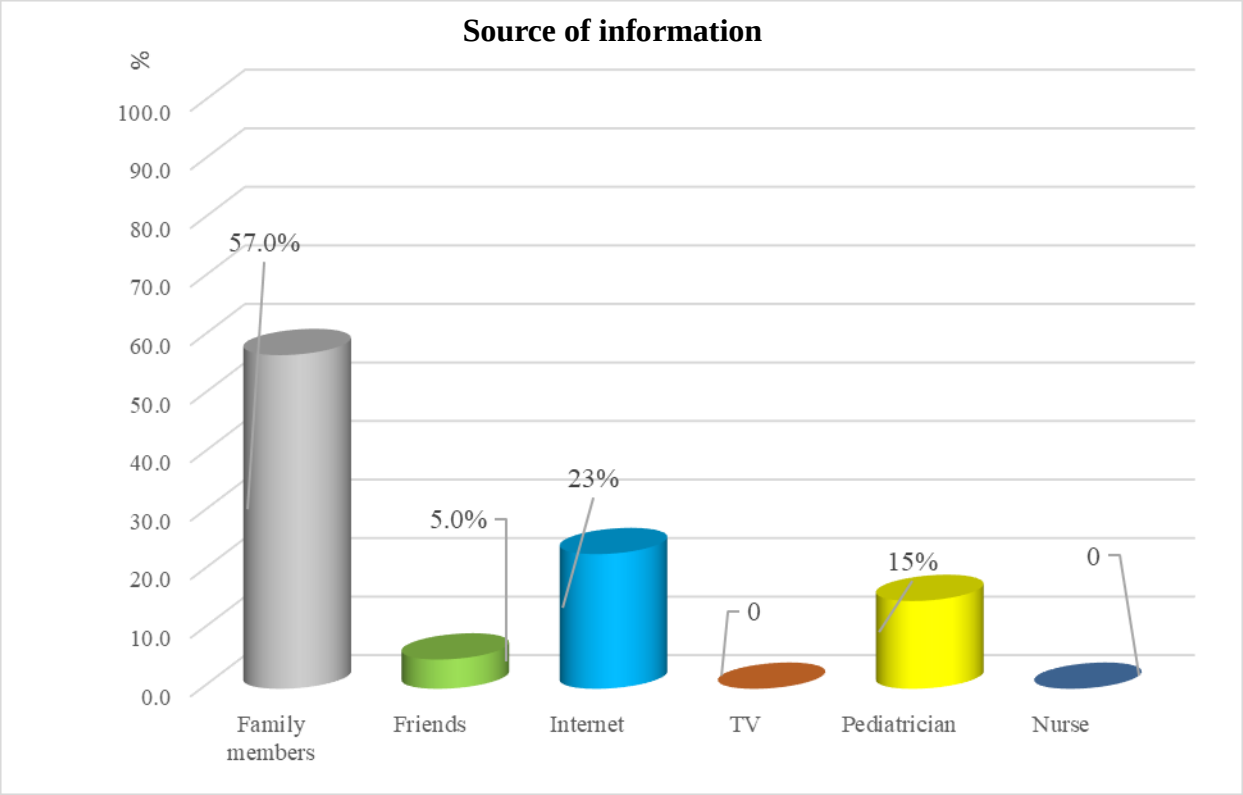

Table (4): Distribution of the studied mothers' total level of knowledge and their total level of reported practices regarding infant safe sleep (n=100)

Items	Total level of the studied mothers' knowledge		Total level of the studied mothers' reported practices	
	No.	%	No.	%
Satisfactory	37	37	37	37
Unsatisfactory	63	63	63	63

Table (5): Correlation between studied mothers' total level of knowledge and their total level of reported practices regarding infant safe sleep (n=100)

Items	Studied mothers' total level of reported practices	
Studied mothers' total level of knowledge	r	.501*
	P-value	**<.001**

r is Pearson correlation & *P*-value is significant (two tailed significance) ≤.05

Table (6): Regression analysis of the relationship between studied mothers' total level of knowledge and their total level of reported practices regarding infant safe sleep (n=100)

Dependent factor	Independent Factor	Unstandardized Coefficients		Beta	t	*P*-value
		B	Std.Err			
Total level of reported practice	**Total level of knowledge**	.474	.083	.501	5.73	**<.001***

t is independent t test & *P*-value is significant (two tailed significance) ≤.05

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