



## **Effectiveness of Educational Program on Mothers' Knowledge and Practices for The Prevention of Sudden Infant Death Syndrome**

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### **ABSTRACT**

Sudden infant death syndrome (SIDS) is a prevalent cause of infant mortality under a year, and its reasons remain unclear. However, basic preventive strategies in infant sleeping and sleep surroundings can limit its incidence. Purpose: Evaluating the effectiveness of an educational program on mothers' knowledge and practices for the prevention of SIDS. Design and Method: On 180 recently delivered women, a quasi-experimental study was conducted in the postnatal unit. Data on the mothers and their neonates' characteristics, as well as mothers' knowledge and reported experience with SIDS, were gathered using an interview questionnaire sheet. Results: Before the program, more than 71% of the mothers had little to no understanding of SIDS. Additionally, prior to the educational program, almost half of the mothers showed an unsatisfactory level of practices on SIDS prevention. After applying for the program, the majority of them had adequate knowledge and acceptable practices levels. Conclusion: The training program had a beneficial impact on the mothers' understanding of SIDS and preventative measures. Therefore, enhancing mothers' knowledge and practices on SIDS prevention requires a regular health education program from all health teams during the post-natal period.

**Keywords:** educational program; knowledge; safe sleep practice recommendation for SIDS prevention; sudden infant death syndrome.

### **Introduction**

Sudden Unexpected Infant Death is the sudden and unexpected death of an infant in which the manner and cause of death are not immediately obvious prior to the investigation (Goldberg, Rodriguez-Prado, Tillery, & Chua, 2018a). Based on diagnostic criteria by CDC most SUIDs are reported as one of three types of infant deaths: sudden infant death syndrome, unknown cause, and accidental suffocation and strangulation in bed. About half of SUIDs are SIDS (Lambert, Parks, & Shapiro-Mendoza, 2018).

Sudden Infant Death Syndrome is defined as the sudden death of an infant less than 1 year of age that cannot be explained after a thorough investigation, the complete autopsy is conducted, an examination of the death scene, and a review of the medical history (Hauck & Tanabe, 2017). Also, it can affect infants up to one year of age, but most SIDS deaths occur by the end of the sixth month of age; the greatest number of SIDS deaths occur in infants between two and four months of age and are rare during the first month of life because most cases of

SIDS occur when a baby is sleeping in a crib, SIDS is also commonly known as “crib death”(Spinelli, Collins- Praino, Van Den Heuvel, & Byard, 2017).

According to CDC (2016), in the US nearly 3,500 infants die suddenly and unexpectedly each year and have no immediately obvious cause (Gollenberg & Fendley, 2018). On the other hand, (2015) worldwide, there were about 1,600 deaths due to SIDS (43%), 1,200 deaths due to unknown causes (32%), and about 900 deaths due to accidental suffocation and strangulation in bed (25%) (Centers of Disease Control and Prevention, 2017). In Egypt, there are inadequately recorded statistics about infant death incidences that are due to unknown causes. (Elbilgahy, Abusaad, El-mouty, El-Sheikh, & Fathy, 2019).

Researchers currently believe that the triple risk model is a useful construct for understanding the mechanism of SIDS. The triple risk model describes the convergence of three conditions that may lead to the death of an infant which includes three main categories specifically: susceptible Infant, period of critical development of the child, and external stressors (Adams, Ward, & Garcia, 2015; Spinelli et al., 2017). A susceptible infant has a defect in the parts of the brain that control respiration, and genetic mutations and heart rate make the baby vulnerable (Wennergren et al., 2015).

Moreover, critical developmental periods during the infant’s first six months of life, rapid growth phases, and changes in homeostatic controls occur. These changes may be evident (e.g., sleeping and waking patterns), or they may be subtle (e.g., variations in breathing, heart rate, blood pressure, and body temperature). Some of these changes may temporarily destabilize the

infant’s internal systems (Fleming, Blair, & Pease, 2015). In addition, outside environmental stressors, such as second-hand tobacco smoke, overheating, prone sleep position and on soft surfaces, toys in the sleeping environment, bed-sharing, and sleeping places other than a crib. Although these stressors are not believed to single cause infant death, they may tip the balance against a vulnerable infant’s chances of survival (Carlin & Moon, 2017).

The SIDS rate declined considerably following the release of the American Academy of Pediatrics (AAP) safe sleep recommendations in 1992, the initiation of the Back to Sleep campaign in 1994, and the release of the Sudden Unexplained Infant Death Investigation Reporting Form in 1996 (Möllborg, Wennergren, Almqvist, & Alm, 2015). Sudden infant death syndrome rates declined considerably from 130.3 deaths per 100,000 live births in 1990 to 39.4 deaths per 100,000 live births in 2015 as reported by the CDC (Centers of Disease Control and Prevention, 2017).

Infants spend 14 hours a day sleeping and sometimes more, while sleep is an important part of an infant’s development, it can also be a dangerous time if parents and caregivers do not follow a few simple guidelines (the ABCs of safe sleep) recommended by AAP (American Academy of Pediatrics, 2016). The American Academy of Pediatrics recommends a safe sleep environment that can reduce the risk of all sleep-related infant deaths. Recommendations for a safe sleep environment include supine positioning, the use of a firm sleep surface, room-sharing without bed-sharing, and the avoidance of soft bedding and overheating (Hodges, Anderson, McKenzie, & Katz, 2018; Schaeffer & Asnes, 2018). Also, additional recommendations for SIDS reduction include

the avoidance of exposure to smoke, alcohol, and illicit drugs, breastfeeding, routine immunization, and the use of a pacifier. In addition, new evidenced guidelines are presented for skin-to-skin contact for newborn babies, use of bedside and in-bed sleepers, sleeping on couches/armchairs and in sitting devices, and use of soft bedding after 4 months of age (Lipke et al., 2018; Ward, McClellan, Miller, & Brown, 2018).

Nurses are in a unique position to educate parents and caregivers about SIDS and to help them learn and follow SIDS risk and reduction measures. Because nurses counsel parents during the prenatal period, during labor and delivery, in the immediate postpartum period and after the baby goes home, they are often among a family's most trusted advisors on how to properly care for newborns. Also, nurses have the power to influence parents' behavior by modeling safe sleep practices while the infant is in the hospital, and by following up with parents and caregivers to encourage compliance after the family return home (Moon, Hauck, & Colson, 2016).

So, this study aims to evaluate the effectiveness of the educational program on mothers' knowledge and practices for the prevention of sudden infant death syndrome.

## METHOD

### Research design:

The quasi-experimental (pre/post-test) research approach was used to conduct this study.

### Setting and study sample:

The current research was conducted in the postnatal department. 180 recently delivered mothers with the following criteria: free of

chronic disorders, eclampsia, with neonate without health problems such as respiratory distress syndrome and neonatal jaundice served as the study's purposive sample.

## Procedure and Instruments

### Interview questionnaire sheet

The researcher utilized the study tool on the guidance of the AAP's latest SIDS prevention guidelines and recommendations for a safer environment for infant sleeping (2016). Four parts questionnaire made up the closed-ended questions:

#### Part (I): Study samples' characteristics

It listed the mothers' characteristics (15 items), including their age, profession, level of education, place of residence, number of family persons, delivery method, etc. In addition, It included the characteristics of neonates (five items), including sex, age, newborn order, and the prevalence of birth problems.

#### Part (II): Knowledge of mothers regarding SIDS

This section was utilized to collect information regarding the knowledge of mothers about SIDS (eleven items), including definitions, the average age at which SIDS occurs, causes, risk factors, signs that an infant is overheating, steps taken to prevent infant experiencing smoking exposure, overheating to prevent SIDS, etc.

#### Part (III): Reported practices of mothers about SIDS

In this part, 35 items—including recommendations for infant sleep positioning, sleep environment, crib features, guidelines for maintaining the temperature of the child and his area, smoke exposure prevention, use of pacifier, feeding and vaccination

recommendations ...etc were used to gauge mothers' reported practices regarding SIDS.

### **The total score of the study tool**

Responses from mothers were graded according to the following scale: (Two scores) for a correct and complete response, (One score) for a correct but incomplete response, and (Zero score) for a wrong answer or didn't know. Mothers were regarded to have high knowledge if their percent score was greater than 60% of the total score, average knowledge if it varied from 50% to  $\leq$  60% of the entire score, and poor knowledge if it was less than 50% of the whole score. The stated practices of the mothers were given a score of one for performed practices and zero for not performed practices. When the percent score was less than 50% of the overall score, the practices of mothers were deemed unsatisfactory, and when it was greater than 50% of the entire score, they were deemed satisfactory (Elbilgahy et al., 2019).

### **.Validity and reliability**

The content validity of the research tool was evaluated by five pediatric nursing specialists, and the necessary modifications were made in accordance with their recommendations. A high level of validity is shown in the study tool (0.892).

The developed tool's internal consistency and reliability were examined using Cronbach's alpha coefficient test. The alpha coefficient was 0.87.

### **Data collection**

Between November 2018 and April 2019, a six-month extension of the data collection was made.

## **A pilot study**

Eighteen mothers were randomly selected for the pilot study to evaluate the tool's usability, feasibility, and clarity. Additionally, they weren't included in the study sample's overall sample size. Any necessary adjustments were made as a result.

### **Study framework:**

The study was divided into five stages;

#### **Phase 1: Assessment phase:**

Every mother was individually questioned prior to the educational program's implementation to record the traits of both (the mother and her infant), through the study tool (parts I, II, and III) to evaluate the knowledge and reported practices of mothers regarding SIDS.

#### **Phase 2: planning phase:**

In order to address the requirements of the mothers in the prevention of SIDS, objectives and anticipated results of the learning program were designed based on findings of the previous phase.

#### **Phase 3: Development of educational program:**

The researcher designated the teaching program after analyzing the current evidence-based literature and the initial evaluation of the knowledge and practice level of mothers.

#### **Phase 4: Implementation of educational program:**

The researcher split up the study sample into smaller groups and the researcher went two days a week. Except for the initial session, which lasted nearly 40 minutes to cover its subjects, each session lasted between 20 and 30 minutes considering the attention span of mothers. The first session started at 10:00 a.m. The sessions were completed

immediately following one another, with only a 10-minute break in between.

The researcher designated a simple Arabic-language guidebook in color regarding SIDS prevention. Every mother was given this booklet during the first session in order to get their attention, encourage them to follow up after the session, and provide them with a resource for reviewing their learning at home as necessary.

The theoretical and practical components of the educational program were covered in four sessions.

The researcher gave a brief overview of the study and the session's goals during the first session. The purpose of this session was to introduce the mothers to the program's significance and broaden their understanding of the terminology, causes, typical incidence age, and methods of diagnosis of SIDS. The researcher covered the concept of triple risk model, SIDS risk factors, and prevention recommendations in the second session. The researcher gave the mothers education on SIDS preventive measures during the tertiary session. The researcher and the mothers discussed how to implement the suggested standards for a safer infant sleep environment during the fourth session. The researcher then expresses gratitude to the mothers for taking part in the study sessions.

#### **Evaluation phase:**

Following the training sessions, the researcher conducted individual interviews with each mother for evaluating the knowledge and practice level of the mothers using the research tool.

#### **Administrative Approval:**

Official approval was taken from administrative personnel of the Kafrelsheikh General Hospital, as well as the head of the postnatal department in the previously described setting.

#### **Ethical considerations:**

- To carry out the study, the researcher received the necessary ethical approval from the Nursing Faculty's Committee on Research Ethics at Mansoura University.
- After outlining the objectives, advantages, and methods of the study, every single mother was given verbal consent for participation.
- Participants were made aware that their participation in the study is voluntary, and they are free to leave at any time without incurring any consequences.
- Data confidentiality and anonymity were protected, and solely used for research goals.

#### **DATA ANALYSIS**

The SPSS package was used to pre-arrange, tabulate, and perform statistical analysis on the statistics. For quantitative data, the standard deviation, mean, and range were calculated. The distribution of numbers and percentages for qualitative data was computed. To determine whether variations among the knowledge and stated practices of the mothers are found before and after the educational program, the statistical t-test and Mc Nemar were used. The individual and Spearman correlation were used to examine the strength of the linear relationship between the qualitative and quantitative characteristics (r). Finally, a significance level of p 0.05 was assumed.

**Table (1)** demonstrates that about half of the mothers were between the ages of 25 and less than 30 (43.2%). When it comes to the education level of mothers, 55.6% of them had secondary education. Additionally, 56.7% of the mothers shared a home with other smokers.

It was apparent from the **table (2)** that all mothers (100%) didn't have any maternal disease or health problem regarding their medical history. In addition, the majority of them made follow up during pregnancy and delivered Cesarean as reported by 93.9% & 80.6% respectively of them. Moreover, more than two-thirds of the mothers didn't have prenatal problems and the majority of them didn't have natal problems as mentioned by 68.3% & 83.9% respectively of them.

**Table (3)** shows progress in mothers' knowledge regarding the definition of SIDS (0.56% & 72.22%), its causes (0.00% & 69.44%), the age of most infants 'deaths (5.56% & 73.33%), and the risk factors (1.11% & 72.78%) respectively before and after program application. Also, statistically, significant differences were observed pre and post-program implementation regarding indicators of infant overheating, measures to avoid overheating, and smoke exposure to avoid SIDS where, 12.22%, 10.56%, and 12.78% of the studied mothers had incorrect answers pre-program while, 84.44%, 88.89% and 88.89% of them had correct and complete answers post-program respectively.

**Table (4)** shows that there were significant statistical changes in the overall mothers' knowledge level before and after the execution of the program, with 94.4% of mothers having good knowledge after the program compared with 71.1% of mothers having poor knowledge pre-program implementation.

**Table (5)** showed that there were significant statistical differences between pre and post-program implementation regarding infants sleeping in separate beds close to their parents' beds in the same room, with 5% of the study's mothers doing so before program application compared to 59.44% after program application. Prior to applying for the program, 95% of them shared a bed with their infant, compared to 41.11% after.

A minority of the mothers (21.11%) placed their infants in supine sleeping positions prior to the program's implementation, versus 98.89% of mothers after implementation as shown in **table (6)**. This showed that there were significant statistical differences between the pre-and post-program regarding infants' sleeping positions. Furthermore, mothers' use of the side-lying sleeping position for their children has improved, as 79.44% of them did so prior to the program's implementation, compared to 99.44% who did not. In addition, all mothers placed their infants on the abdomen after the program when they woke up, compared to 60.56% preprogram.

**Table (7)** illustrated that high statistically significant differences were observed between pre and post-program implementation concerning safe characteristics of infant's crib in which only about one-third (28.89%, 31.11%) of studied mothers stated that infant's crib must have intact edges and no depressed side and covered by a fitted sheet with no other bedding pre-program compared to 98.89% & 95.56% post-program implementation respectively. Also, 42.22% & 36.67% of studied mothers reported that an infant's crib must be free from blankets or covers and pillows pre-program compared to 90% & 85.56% post-program implementation respectively.

**Table (8)** clarifies that high statistically significant differences were observed between before and after program application regarding how the mothers maintained the temperature of their infants and rooms in which 32.78% & 22.78% of studied mothers dressed their infants in suitable clothes to age and weather and monitored infant's temperature respectively before program whereas, all of them followed these practices post-program implementation. Also, 55.00% & 50.56% of the studied mothers covered their infants' faces and heads and used a lot of blankets and covers to become warmer pre-program while, 75.00% & 92.78% of them not done it after the program application respectively.

It was observed **in the table (9)** that, highly statistically significant differences were found between the total level of reported practices before and after the program's implementation. While 44.4% of the studied mothers had an unsatisfactory level of practice with SIDS before the program, after its implementation, all of them had a satisfactory level of practice.

According to **Table (10)**, It was shown that there was a significant positive correlation ( $P=0.000$ ) between the mothers' stated practices before and after the implementation of the learning program and mothers' score of knowledge.

**Table (1): Percent Distribution of Studied Mothers Based on Their Characteristics.**

Characteristics	No n=180	(%)
<b>Age</b>		
< 25	51	28.3
25 -	78	43.3
30 -	35	19.9
35 & more	16	8.9
<b>Mean±SD</b>	<b>29. 93±5.247</b>	
<b>Education Level</b>		
Do not read or write	20	11.1
Primary education	10	5.6

Diploma (secondary) education	100	55.6
University education	20	11.1
Other	30	16.6
<b>Residence</b>		
Rural	132	73.3
Urban	48	16.7
<b>Number of other children</b>		
None	40	22.2
1-2	98	54.4
3-4	38	21.1
More than 4	4	2.2
<b>Are there smokers in your home</b>		
Yes	102	56.7
No	78	43.3

**Table (2): Distribution of The Studied mothers according to their Medical History**

Medical History	No (n=180)	(%)
<b>Maternal diseases</b>		
Yes	0	0
No	180	100.0
<b>Follow up during a pregnancy</b>		
Yes	169	93.9
No	11	6.1
<b>Mode of delivery</b>		
Normal delivery	35	19.4
Cesarean section delivery	145	80.6
<b>Prenatal problems</b>		
Yes	57	31.7
No	123	68.3
<b>Type of prenatal problems</b>		
Anemia	44	24.4
Bleeding	10	5.6
Embolism in umbilical cord	1	0.6
Falling	1	0.6
Gestational diabetes	1	0.6
<b>Natal problems</b>		
Yes	29	16.1
No	151	83.9
<b>Type of these problems?</b>		
Bleeding	16	8.9
Premature Rupture of Membrane (PROM)	10	5.6
Prolonged labor	1	0.6
Delayed labor	2	1.1

**Table (3): Percent Distribution of Studied Mothers' Knowledge about SIDS pre and post-Educational Program Application (n = 180).**

Knowledge Items	Pre-program						Post-program						$\chi^2$	P-value
	Incorrect answer or didn't know		Correct and incomplete answer		Correct and complete answer		Incorrect answer or didn't know		Correct and incomplete answer		Correct and complete answer			
	N	%	N	%	N	%	N	%	N	%	N	%		
Definition	153	85.00	26	14.44	1	0.56	1	0.56	49	27.22	130	72.22	284.1	0.000
Causes	129	71.67	51	28.33	0	0.00	0	0.00	55	30.56	125	69.44	254.2	0.000
Age of most infants 'deaths	169	93.89	1	0.56	10	5.56	45	25.00	3	1.67	132	73.33	177.7	0.000
Risk factors	118	65.56	60	33.33	2	1.11	0	0.00	49	27.22	131	72.78	244.2	0.000
Indicators of infant overheating	22	12.22	130	72.22	28	15.56	0	0.00	28	15.56	152	84.44	173.3	0.000
Measures to avoid overheating to avoid SIDS	19	10.56	105	58.33	56	31.11	0	0.00	20	11.11	160	88.89	126.9	0.000
Measures to avoid smoke exposure to avoid SIDS	23	12.78	100	55.56	57	31.67	0	0.00	20	11.11	160	88.89	125.2	0.000

P-value for marginal homogeneity test \* Significant at  $P \leq 0.05$

**Table (4): Total Level of Studied Mothers' Knowledge about SIDS before and after Educational Program Application (n = 180).**

Variable	Pre-program							Post-program							Significance	
	Good		Average		Poor		Mean±SD	Good		Average		Poor		Mean±SD	t	P-value
	N	%	N	%	N	%		N	%	N	%	N	%			
<b>Knowledge about SIDS</b>	22	12.2	30	16.7	128	71.1	23.36±9.0	170	94.4	10	6.6	0	0.00	45.5	0.000*	

t: Paired – t-test

Significance at  $P \leq 0.05$ **Table (5): Percent Distribution of the Studied Mothers' Reported Practices about Sleeping Place of Infant to Avoid SIDs pre and post Educational Program Application (n = 180).**

Sleeping place of infant	Pre-program				Post-program				$\chi^2$	P-value
	Done		Not done		Done		Not done			
	N	%	N	%	N	%	N	%		
Put infant in a parent 'bed	171	95.00	9	5.00	74	41.11	106	58.89	120.2	0.000
Put infant in same parent' room but in distinct bed close to their bed	9	5.00	171	95.00	107	59.44	73	40.56	122.2	0.000
Put infant in separate room	0	0.00	180	100.0	10	5.56	170	94.44	10.3	0.001

P-value for McNemar test \* Significant at  $P \leq 0.05$

**Table (6): Percent Distribution of the Studied Mothers' Reported Practices about Sleeping Position of infant pre and post-Educational Program Application (n = 180).**

Sleeping position of the infant	Pre-program				Post-program				$\chi^2$	P-value
	Done		Not done		Done		Not done			
	N	%	N	%	N	%	N	%		
Put my child on his back during sleep only.	38	21.11	142	78.89	178	98.89	2	1.11	226.9	0.000
Put my child on his side during sleep only.	143	79.44	37	20.56	1	0.56	179	99.44	38.1	0.000
Put my child on his back all the time.	50	27.78	130	72.22	2	1.11	178	98.89	196.0	0.000
Put my child on his abdomen during sleep only.	109	60.56	71	39.44	1	0.56	179	99.44	85.1	0.000
Put my child on his abdomen during wake only.	57	31.67	123	68.33	180	100.0	0	0.00	67.7	0.000

P-value for McNemar test \* Significant at  $P \leq 0.05$

**Table (7): Percent Distribution of the Studied Mothers' Reported Practices about Characteristics of Infant Crib before and after Educational Program Application (n = 180).**

Characteristics of infant crib	Pre-program				Post-program				$\chi^2$	P-value
	Done		Not done		Done		Not done			
	N	%	N	%	N	%	N	%		
Intact edges and no depressed side	52	28.89	128	71.11	178	98.89	2	1.11	54.5	0.000
Free from blankets or covers	76	42.22	104	57.78	162	90.00	18	10.00	91.7	0.000
Free from stuffed animals or toys	73	40.56	107	59.44	170	94.44	10	5.56	62.1	0.000
Covered by a fitted sheet with no other bedding	56	31.11	124	68.89	172	95.56	8	4.44	43.8	0.000
A firm sleep surface (eg, mattress in a safety-approved crib)	84	46.67	96	53.33	172	95.56	8	4.44	84.3	0.000
Free from pillows	66	36.67	114	63.33	154	85.56	26	14.44	90.5	0.000
In a place where free from hanging ropes or electrical wires	169	93.89	11	6.11	179	99.44	1	0.56	8.6	1.000

P-value for McNemar test \* Significant at  $P \leq 0.05$

**Table (8): Percent Distribution of the Studied Mothers' Reported Practices about Child and Room Temperature pre and post-Educational Program Application (n = 180).**

Maintenance of child and room temperature	Pre-program				Post-program				$\chi^2$	P-value
	Done		Not done		Done		Not done			
	N	%	N	%	N	%	N	%		
Maintain room temperature suitable to my infant	147	81.67	33	18.33	179	99.44	1	0.56	33.3	0.100
Dress my infant with suitable clothes to his age and weather	59	32.78	121	67.22	180	100.0	0	0.00	70.6	0.000
Cover infant's face and head to be warm	99	55.00	81	45.00	45	25.00	135	75.00	33.8	0.000
Use a lot of blankets and covers to become warmer	91	50.56	89	49.44	13	7.22	167	92.78	79.0	0.000
Observe and monitor my infant's temperature	41	22.78	139	77.22	178	98.89	2	1.11	40.2	0.000

P-value for McNemar test \* Significant at  $P \leq 0.05$

**Table (9): Total Level of Studied Mothers' Reported Practices about SIDS Prevention pre and post-Educational Program Application (n = 180).**

Variable	Pre-program					Post-program					Significance	
	Satisfactory		Unsatisfactory		Mean±SD	Satisfactory		Unsatisfactory		Mean±SD	t	P-value
Reported practice score	N	%	N	%		N	%	N	%			
		100	55.56	80	44.44	21.95±5.06	180	100.00	0	0.00	32.87±2.32	33.55

t: Paired – t-test

Significance at  $P \leq 0.05$

**Table (10): Correlation between the Mothers' Total Score of Knowledge & Reported Practices about Sudden Infant Death Syndrome pre- and post-Educational Program Application.**

Total Reported practices score	Total Knowledge score			
	Before Program		After program	
	r	P	r	P
	0.21 <sup>Y</sup>	0.004*	0.40 <sup>Y</sup>	0.000*

r = correlation coefficient

\*Statistically significant difference at  $P < 0.5$

## DISCUSSION

This study was carried out to evaluate the effectiveness of the educational program on mothers' knowledge and practices for the prevention of sudden infant death syndrome. Regarding the studied mothers' characteristics According to **Table 1**, the current study's findings, more than half of the mothers had secondary education. This finding could be attributed to the fact that the majority of mothers lived in rural communities with limited facilities for higher levels of learning. This is in an agreement with the (Elsobkey, 2018) stating that two-thirds of the mothers in her study.

Furthermore, the current study findings revealed that more than half of mothers reported having smokers in their homes. This finding could be attributed to the mothers' and their families' ignorance of the risks of secondhand smoke on the health of pregnant women and their fetuses. This result contradicted the findings of research carried out in the United States (A. A. Mathews, Joyner, Oden, Alamo, & Moon, 2015). The researchers discovered that the majority of the study sample stated that there weren't any smokers in their homes.

Concerning the studied mothers' medical history (**Table,2**), the present study revealed that the majority of mothers made a follow-up during their pregnancy. This could be related to mothers' awareness about the importance of follow-up during pregnancy for more health to mothers and their fetuses and avoid any complications during pregnancy. This is in an agreement with (Moon & Omron, 2002) who perform a study about Infant sleep position determinants in an urban population, and found that ninety-two percent of mothers had more

than 5 prenatal visits during this most recent pregnancy.

Knowledge of mothers about SIDS before and after the application of educational program (**Table, 3**), the current study reflected that the majority of mothers had incomplete correct answers regarding the definition and risk factors of SIDS before the program whereas the majority of mothers demonstrated complete and correct answers after application of the program. This result can be attributed to the fact that the studied mothers were unaware of the concept of SIDS as more than half of the studied mothers in the current study had secondary education (**Table 1**). As, if the mothers become educated, they will reflect the more information they have, their practice will become better, and they will have a positive attitude compared to the secondary educated mothers. and. Besides, healthcare personnel may not give appropriate education to mothers about the care of their infants during pregnancy or after delivery. This finding is congruent with (Rholdon, Lemoine, & Templet, 2018) in their study entitled: Simulation: improving knowledge and retention of infant safe sleep practices. They showed that statistically significant differences between mean pre-intervention/postintervention written knowledge test scores and safe sleep-specific simulation scores were found.

The present study revealed that high statistically significant differences were found between the total level of knowledge pre and post-program implementation **table (4)**. Similarly,(Elbilgahy et al., 2019) in their study entitled: "Safe Sleep Intervention Program for Prevention of Sudden Infant Death Syndrome."

Bed-sharing between newborns and family members is typical in many cultures, however, it

can raise the risk of SIDS. As a result, AAP standards mandate that newborns sleep in their parent's room, close to their parents' couch, just in a distinct cot until one year of age (McDonald et al., 2019). The current study's findings revealed that, before the start of the program, the majority of the studied mothers reported putting their children in the same parent's bed. Following the program completion, more than half of the studied mothers stated that they put their newborns in the same room as them, but on a different bed close to their bed. (Table 5). This is because the studied mothers believed they had to be near their babies in order to nurse, bond with them, and stop the baby from crying. In addition, the fact that the vast majority of moms were housewives with meager incomes further contributed to the high cost of a baby's crib and poor living circumstances (Table 1). The current study findings agree with the study done in Nigeria (Isezuo et al., 2017) which reflected that the majority of the moms who were questioned, placed their infants in their brothers' bed.

For the purpose of reducing the risk of SIDS, a caregiver should put their newborns on their backs with their heads up for each nap until they are one year old. (Goldberg, Rodriguez-Prado, Tillery, & Chua, 2018b). According to the current study, the majority of the study sample placed their newborns in prone or side-lying positions during sleeping before the implementation, but the majority of the mothers placed their newborns in a supine position for sleeping after the application. (Table 6). It could be because the parents adhere to common myths about the supine position, such as the concern of asphyxia and the assumption that the baby wouldn't be comfortable during sleeping. Mothers may also worry that supine would

make their infants' heads flatter, making it impossible to adhere to safe sleep guidelines endorsed by the AAP. The results of the current study support those of the research by (Carlin et al., 2018). They claimed that once the program was implemented, The moms' choices to put their kids in a particular sleeping position were influenced.

To reduce the risk of suffocation, which can also result in SIDS, the AAP recommended placing newborns on a harder sleep surface, covering them just with a fixed top sheet, and avoiding using covers, cushions, or stuffed animals toys (Cerqueira, Cardoso, Viana, & Lopes, 2018). According to the current research, before the training, more than one-third of the parents who were surveyed believed that the newborn's cot should be empty of bedding and pillows, as opposed to most of them following the program. (Table 7). This might be explained by the lack of knowledge of mothers about the hazards to the newborn of sleeping on a soft surface with a lot of bed coverings and pillows. Furthermore, they claim that a newborn will be more relaxed if he or she sleeps on soft bedding. This result is consistent with the research in the USA (A. Mathews et al., 2016), who stated that following the program's execution, the study moms' performance had improved regarding utilizing soft bedding in the baby's crib.

Overheating has been linked to an increased risk of SIDS and thermoregulatory abnormalities, according to research. As a result, parents should keep the infant and room temperature according to the AAP recommendation. (Newberry, 2019). According to the current study, prior to the program, most of the mothers stated that always cover the heads and faces of their newborns with blankets, but the majority of them made no mention of it afterward. (Table

8). These findings may be a result of the parents' conviction that maintaining a constant temperature for the baby and the room is important for the kid's well-being and reduces the chance of the newborn being cold. Another factor might be their lack of understanding of the link between hyperthermia and SIDS risk. As a result, just slightly a third or more of the moms stated that newborn temperature increase is a SIDS risk factor before the training sessions. This result contradicts a research's findings of Iraqi research (Qasim & Alrabaty, 2017).

Concerning the total reported practices of the studied mothers about SIDS (Table,9), the current study revealed that about half of the mothers had an unsatisfactory level of reported practices regarding SIDS before the program whereas all of the mothers had a satisfactory level of reported practices after application of the program. This may be due to an appropriate and clarified manner used in demonstrating practices. Also, mothers' knowledge about the risks of SIDS was increased through the program and they became interested in how to protect their infants. This is supported by, (Voos, Terreros, Larimore, Leick-Rude, & Park, 2015) in their study entitled: Implementing safe sleep practices in a neonatal intensive care unit, who stated that, 21% of eligible infants were in a safe sleep environment pre-educational program compared to 88% post educational program.

As regards the correlation between the mothers' total reported practices and total knowledge before and after the application of the educational program (Table, 10), the present study showed that, there was a significant correlation between mothers' total scores of reported practices and knowledge before and after educational application of the program. This result can be

attributed to the fact that knowledge is the prerequisite to practice and practice facilitates the retention of knowledge. This result agrees with (Beilsmith et al., 2018).

## CONCLUSION

The majority—more than 75% of the sample study had a low level of awareness regarding sudden infant death syndrome preceding the educational program, while the majority of them had a good knowledge level after the program application. Furthermore, around half of the moms had prior to the program, there was an unsatisfactory level of sudden infant death syndrome prevention practices, but all of them were satisfactory following the program implementation. Furthermore, the current study reflected a strong link among the investigated mothers' overall knowledge and stated practices scores before and after the training session. Educational programs are suggested to raise nurses' knowledge of the necessity of informing mothers about SIDS risk factors and preventative strategies.

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