

Mothers' Health Education based on Health Belief Model to Promote Health of Preterm Infant Related to Sudden Infant Death Syndrome

Fatma Ahmed Elsobkey*

Pediatric Nursing-Faculty of Nursing-Benha University

*Corresponding author: drfatmaelsobkey@yahoo.com

Abstract Background: Preterm infant is truly a global problem, is a major determinant of infant mortality and morbidity and has long-term adverse consequences for health. **The aim:** was to evaluate the effect of mothers' health education based on health belief model to promote health of preterm infant related to sudden infant death syndrome. **Design:** A quasi-experimental design was utilized. **Sample:** convenience mothers and their preterm infants consisted of 70. **Setting:** The study was conducted in the Neonatal Intensive Care Units at Benha Specialized Pediatric Hospital and University Hospitals. The required data was collected used the following tools, structured interview sheet; baseline characteristics of mothers and infant; knowledge about sudden infant death syndrome sheet, questionnaire developed based on the health belief model and reported safety sleep practice according to American Academy of Pediatrics. **Results:** The study results revealed that mothers who received the health education demonstrated significant higher mean score of knowledge, health belief model and reported sleep practice toward their preterm infants after 1 month from hospital discharge; these results support the proposed study hypotheses. **Conclusion:** There was positive effect of health education in improving the mother's knowledge, sleep practice as well as health belief regarding sudden infant death syndrome. **Recommendation:** Guidelines for creating hospital policy should be available, including the American Academy of Pediatrics risk-reduction recommendations, which lists step-by-step instructions for implementing a policy within the hospital setting.

Keywords: health belief model, health education, preterm infant, sudden infant death syndrome

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1. Introduction

Health belief model (HBM) is one of the accurate and important patterns and is used to determine the relationship between health beliefs and behaviors. This model (perceived susceptibility and severity of a person's understanding of the causes of the perceived threat of a health condition and on the other hand with regard to behavioral stimuli such as perceived benefits, perceived barriers and cues to action) explains the reason of doing or not doing of preventive health behavior by individuals [1].

Preterm birth defined as childbirth occurring at less than 37 completed weeks or 259 days of gestation, it is a major determinant of neonatal mortality and morbidity and has long-term adverse consequences for health [2]. Neonates who born before the completion of 37th week of gestation are considered preterm and are sometimes referred to as "preemies" [3]. Further, the risk of Sudden infant death syndrome (SIDS) for preterm and low birth weight (LBW) infants is greater than that for full-term infants, especially when preterm infants are placed in non-supine sleep positions [4].

Sudden infant death syndrome (SIDS) is defined as the sudden death of an infant less than 1 year of age, which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history [5]. SIDS 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 [6].

The causes of SIDS are unknown, the combination of variables including a particular time of development, and an environmental stress or has been proposed. These environmental stressors may include sleep on prone position, use of more blankets, exposure to tobacco smoke, accidental suffocation from bed sharing, soft articles may play a role and another hazard factor is preterm baby. SIDS makes up around 80% of SIDS [7].

There have been several studies that assessed parental knowledge and adherence to recommendations to reduce the risk of SIDS among parents of healthy, term infants. And preterm infant they found the same at-risk mothers are also more likely to follow incorrect advice from friends or family members [8,9]. Also some studies illustrated that an overheated infant go into a deep sleep.

Some evident shows that expanded SIDS risk are related with more covers and a higher temperature in the room. SIDS is higher for infants who sleep on a soft surface and/or with their heads covered than for infants who sleep on a firm surface and/or without their heads covered [10].

Bed sharing among newborn children and relatives, especially among adult and babies, is common in many societies. Many mothers share a bed with their babies since it makes breastfeeding less demanding and upgrades holding. The safest alternative to bed sharing may be room sharing, a situation in which the infant shares a room with the parents, but has his or her own crib or bassinet. Keeping the baby's sleep area close to, but separate from, where the parents sleep is recommended [11]. Infants whose mothers smoke during or after pregnancy are at greater risk of SIDS. Infants born to mothers who smoked during pregnancy are three times more likely to die of SIDS. Exposure to passive smoke in the household also doubles a baby's SIDS risk. Smoking may negatively affect development of the nervous system [12].

Teaching parents to place their infant in a supine position to sleep begins with healthcare professionals modeling safe sleep practices in the hospital. However, because critically ill infants cared for in an intensive care setting may be best cared for in a prone position during the acute phase of their illness, the sleep model seen by parents in the NICU may be inconsistent with best sleep practices for healthy preterm infants [13]. Health education is very important for mothers and the nurse in a powerful position to influence parents' behavior by modeling safe sleep practices, especially during the 24 to 48 hours following delivery, and by following up with families throughout the baby's first year to ensure that they are using the back sleeping position at home. Clearly, a point of SIDS risk-reduction intervention exists at the overlap of the parents of a high-risk infant with the neonatal nurse. It is vital to examine mother's beliefs, knowledge, and practices regarding SIDS prevention after the release of the most recent and comprehensive 2011 commendations [14].

1.1. Significance of the Study

The American Academy of Pediatrics defines standard guidelines for infant positioning and sleep environment to reduce the rate of SIDS, but recent data on mothers' knowledge and adherence to these guidelines in home environment are limited. There is scarcity of knowledge about SIDS in Egypt despite the worldwide recognition of this syndrome. Those who come in contact with infants including nurses as well as mothers need to be aware of such problem and its relation to prone sleep position. To identify the direction of future efforts to encourage supine sleep position, an educational need assessment should be conducted. Many of parents may not know what to do - or not do - to prevent sleep-related deaths from sudden infant death syndrome (SIDS), Nurses in a unique situation to model correct positioning and educate caregivers about SIDS prevention. Health care professionals, including nurses in the newborn nursery, endorse and educate parents about SIDS risk-reduction recommendations. Role modeling of infant care by nurses is an important factor in the care of infants once they are discharged home [15].

1.2. Aim of the study

The study aim was to evaluate the effect of mothers' health education based on health belief model to promote health of preterm infant related to sudden infant death syndrome through:

- a. Evaluate the mothers' knowledge about SIDS pre and after 1 month from health education.
- b. Evaluate the health belief models about SIDS pre and after 1 month from health education.
- c. Evaluate the mothers' reported safety sleep practice about SIDS pre and after 1 month from health education.

1.3. Research Hypotheses

The study results were testing the following hypotheses:

H1: Mothers who received health education will have higher mean score of knowledge, Health belief model and will have competent reported safe sleep practice about SIDS.

2. Subjects and Method

2.1. Research Design

A quasi- experimental research design was utilized to conduct the current study.

2.2. Setting

The study carried out in the neonatal intensive care unit (NICU) at Benha University Hospital and Benha Specialized Pediatric Hospital which Affiliated to the Ministry of Health.

2.3. Sample

None probability convenience sample was used to collect the data from (70) mothers and their preterm baby (less than 37 weeks gestational age), the samples were collected from previous setting. Their inclusion criteria were, preterm neonates with gestational age between 32 weeks less than 37 weeks, weighing 1,500 grams or more. Their exclusion criteria the infant didn't have any congenital anomalies.

2.4. Tools of Data Collection

Tool I:

Structured questionnaires were used to collect the data. The questionnaires were designed by the researcher after reviewing related literature, it was written in English language, then translated to simple Arabic language to fit the sample measures and it consisted of four parts:

Part 1: characteristics of the studied infant as gestational age, gender and weight on birth

Part 2: characteristics of the studied mothers as age, educational level, occupation, residence and parity.

Part 3: mothers' knowledge related to SIDS consisted of 12 questions as definition; causes; effect of smoking; alcohol use; Pacifier use at bedtime; sleep place should have toys and soft object and breast feeding lower SIDS.

Part 4: Reported safety sleep practices Questionnaire was developed based on the AAP recommendations for safe sleep and SIDS risk reduction to measure safe sleep practice recommendations among mothers of preterm infant. Such as the infant sleep supine when in an open crib, baby sleep with toys/stuffed animals in his/her crib, Pacifier use during bed time , Room sharing without bed sharing, overheating , smoking around the baby and use of a firm sleep surface.

2.4.1. Knowledge Scoring

Each item was assigned a score of (2) given when the answer was correct and a score (0) was given when the answer was incorrect / do not know. Mothers' total knowledge score was 24 and classified as the following; poor when total score was < 60%, average when total score was 60% < 75% and good when total score was $\geq 75\%$.

2.4.2. Reported Safe Sleep practice Score

The Questionnaire consisted of 7 items to assess how much they concur with statements about sleep practices; and asked respondents to use a Likert scale of 1-3. Corresponding never took (1) score, sometimes took (2) score and always took (3) score. The total reported practice were divided into competent if the total score above 75 and incompetent if less than 75.

Tool II: The questionnaire included key questions developed using constructs of the HBM.

It included perceived susceptibility, perceived severity, perceived barriers, perceived benefits and cues to action [16,17].

This tool was included a 25-item to measures:

- Perceived susceptibility included five items (the chances of SIDS/crib death affecting my baby, I worry a lot about SIDS, SIDS/crib death is a big problem, There is a good possibility that my baby will die from SIDS/crib death and Within the next year I know that a baby could die of SIDS/crib death).
- Perceived severity included five items such as (I am afraid to even think about SIDS, The thought of SIDS/crib death scares me, the SIDS hopeless condition, When I think about SIDS/crib death my heart beats faster).
- Perceived benefits included four items such as (Placing a baby on their back to sleep prevents SIDS, It's best for babies to sleep in their own crib or bassinet to prevent SIDS , I don't worry so much about SIDS when a baby sleeps on their back and Placing a baby on their back to sleep prevents SIDS).
- Perceived barriers included six items such as (I can't reduce the chance of a baby dying from SIDS, The best place for a baby to sleep is in the bed with their mother, Babies are more comfortable sleeping on their stomach, my family/friends would make fun of me if I put a baby to sleep on their back, Putting a baby on their back to sleep would require starting a new habit, which is Difficult and I prefer placing a baby on their stomach to sleep because it's easier for me).
- Cues to action included five items such as (I receive much of my infant care information from health professionals such as doctors and nurses; I receive

much of my infant care information from family members, had a child that died of SIDS/crib death and I know of a child that died of SIDS/crib death).

2.4.3. Health Belief Model scoring system:

- The Questionnaire consisted of 25 items used a 5-point Likert scale (ranging from strongly agree to strongly disagree) to measure perceptions of behavior related SIDS (Strongly agree took one score. - Agree took 2 score - Natural took 3 score. - Disagree took 4 score. - Strongly disagree took 5 score).
- Perceived susceptibility included 5 questions (a min score of 5 and a max score of 25).
- Perceived severity included five questions (a min of 5 and a max score of 25).
- Perceived benefits included four questions (a min of 4 and a max score 20).
- Perceived barriers included six questions (a min score of 6 and a max score of 30).
- Cues to action included five questions (a min score of 5 and a max score of 25).

2.5. Validity and Reliability

Data collection tools were submitted to three experts of pediatric nursing to test the content validity. The experts agreed on the content. Regarding reliability, the reliability coefficients alpha between questions was 0.72.

2.6. Ethical considerations

An official permission was obtained from the director of Benha University Hospital and Benha Specialized Pediatric Hospital after clarifying the purpose of the study and the time for beginning the study. All mothers received written and verbal explanations about the nature of the study; their participation will be voluntary; what study involvement would entail; anonymity and confidentiality issues; and their right to withdraw from the study at any time and based on the basic ethical principle of beneficence.

2.7. Pilot Study

A pilot study was conducted on 10% of the studied sample (7 mothers) to test the clarity and applicability of the tools and then they excluded from the studied sample.

2.8. Field work

The study was carried out from beginning of October 2017 to the end of December 2017, covering a period of 3 months. Official approvals and letters to conduct this study were obtained from the Dean of Faculty of Nursing to Director of Benha University Hospital and Benha Specialized Hospital. To fulfill the aim of the current study the health education was constructed in four phases: interviewing and assessment, planning, implementation, and evaluation.

2.8.1. Health education related to SIDS

The Health education was designed by the researcher after extensive review of related literature according to recommendation of AAP (2011).

The first part of the health education was conducted 7 days prior to infants' discharge from the hospital based on the expectation of the neonatologist. It focused on: gave the mothers description about SIDS, assessed her knowledge about SIDS, reported safety sleep practice and health belief model.

The second part of the health education involved provision of health education activities, provided by the researcher included a half-hour session with each mother. Post follow-up care after 1 month post-discharge of each infant during each follow-up to reinforce the mother's knowledge and health belief model which provided during first part of the program.

2.8.2. Assessment phase

This phase encompassed interviewing the participant to collect baseline data, at the beginning of the interview the researcher greeted the participation, introduced herself to

each participant included in the study, explained all information about the study purpose, duration, and activities and taken oral consent. The average time for the completion of each participant interview was around (30-45minutes). Average number collected was 5participant / day. The total sample was divided into 7 groups according to their hospital then every hospital group divided into subgroups included 5 participants for each session.

2.8.3. Planning phase

Based on the results obtained from the assessment phase and relevant review of literature, a booklet about SIDS health education was designed by the researcher. This was prepared in simple Arabic language to suit mothers' level of understanding and distributed to all recruited mothers. As well as, different methods of teaching and instructional media were determined.

Items
A-level recommendations
Back to sleep for every sleep.
Use a firm sleep surface.
Breastfeeding is recommended.
Room-sharing with the infant on a separate sleep surface is recommended.
Keep soft objects and loose bedding away from the infant's sleep area.
Consider offering a pacifier at naptime and bedtime.
Avoid smoke exposure during pregnancy and after birth.
Avoid alcohol and illicit drug use during pregnancy and after birth.
Avoid overheating.
Pregnant women should seek and obtain regular prenatal care.
Infants should be immunized in accordance with AAP and CDC recommendations.
Do not use home cardio respiratory monitors as a strategy to reduce the risk of SIDS.
Health care providers, staff in newborn nurseries and NICUs, and child care providers should endorse and model the SIDS risk-reduction recommendations from birth.
Media and manufacturers should follow safe sleep guidelines in their messaging and advertising.
Continue the "Safe to Sleep" campaign, focusing on ways to reduce the risk of all sleep-related infant deaths, including SIDS, suffocation, and other unintentional deaths. Pediatricians and other primary care providers should actively participate in this campaign.
B-level recommendations
Avoid the use of commercial devices that are inconsistent with safe sleep recommendations.
Supervised, awake tummy time is recommended to facilitate development and to minimize development of positional plagiocephaly

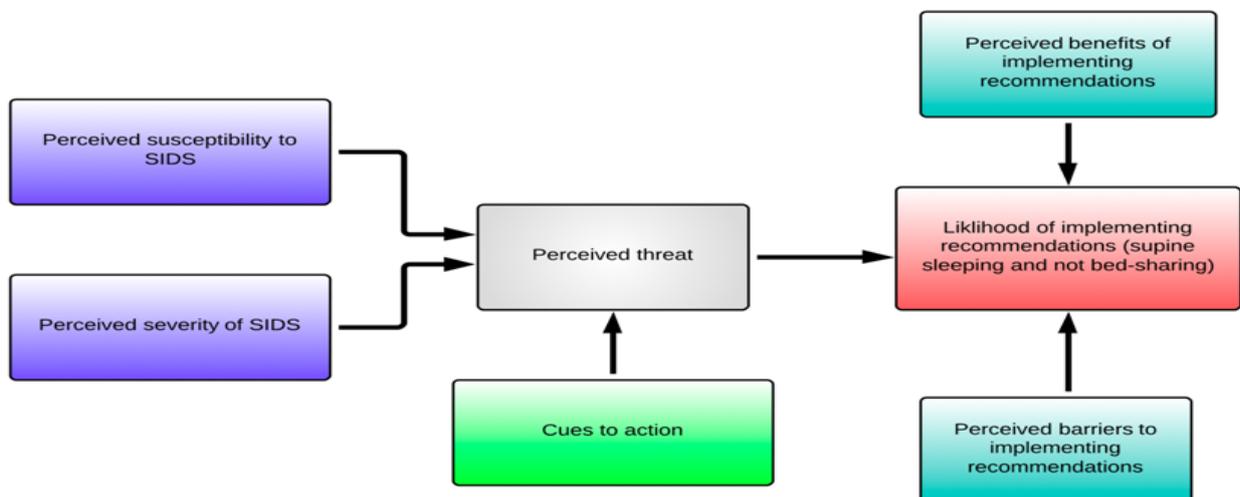


Figure 1. SIDS and the Health Belief Model

2.8.4. Implementation Phase

The researcher visited the previously mentioned settings four days/week (Sunday and Wednesday) in the University hospital; (Monday and Tuesday) in the Specialized hospitals from 11.00 Am to 2.00 Pm. The average time consumed to fill in the tools was 30-45 minutes. The health education was conducted in 4 sessions each session took approximately 30 to 45 minutes, during this time the mothers were able to provide interventions that included all knowledge and skills regarding safety sleep practice. The health education included illustrated Arabic booklet involve instructions to improve mothers' knowledge and reported safe sleep practice regarding SIDS, and the posttest done after one month from the health education implementation

The health education was implemented; it included 4 sessions.

- At the beginning of the first session; each mother was given a brief explanation related to sudden infant death syndrome and predisposing factors, effect of alcohol used, the importance of breast feeding.

- The second session was held about the beliefs, assumptions and incorrect beliefs about SIDS and issues that may be a barrier to safe sleep practice and proper behaviors.

- The third session, the mothers are encouraged to be sensitive about the SIDS and problems if they do not act in future (perceived susceptibility) and depth perception of complications that may be occurred with unsafe sleep practice(perceived severity).

- The fourth and final session about the benefits of healthy sleep practice (perceived benefits) during this period was discussed and safety sleep practice (supine position, avoid over heating during sleep, room sharing without bed sharing, sleep on firm surface and avoid any toys beside infant sleep).

Each session started with a feedback about the previous session and the objectives of the new session, using simple Arabic language to suit mothers' level of understanding. At the end of each session, mothers' inquiries were discussed to correct any misunderstanding. Methods of teaching were used including modified lectures and group discussions. Instructional media included colored poster about SIDS.

2.8.5. Evaluation Phase

The mothers' knowledge, reported safety sleep practice and health belief model was evaluated after 1 month from implementation of health education used tool 1 (part 3 and 4) and tool 11. The researcher evaluated and compared the effect of health education on mothers' knowledge, reported safety sleep practice and health belief model pre and after 1 month.

2.9. Statistical Analysis

Data was analyzed using SPSS version 21. Descriptive data were expressed as frequency and percentage. Qualitative data were expressed as mean and standard deviation. A comparison between variables carried out by using parametric Chi square test. Comparison of means was performed using paired-sample t-test. Level of significance at $p < 0.05$, 0.001 were used as the cut of value for statistical significance.

3. Result

Table 1. Percentage Distribution of Preterm Infants related to their of Baseline Characteristics

Items	N(70)	%
Gestational age:		
32-<33	7	10.0
33-<35	35	50.0
35-<37	28	40.0
Mean \pm SD	36.4 \pm 3.16	
Gender:		
Male	46	65.7
Female	24	34.3
Birth Weight:		
1500gm	3	4.3
>1500 to <2000	36	51.4
2000-<2500	31	44.3
Mean \pm SD	2091.85 \pm 382.42	

Table 1. Marked that 65.7% of them were males. Half (50%) of them their gestational age (GA) ranged from 33-<35 weeks. The mean of GA was 36.4 \pm 3.16 weeks. On the same context 51% of them their birth weight between <1500 to < 2000 grams.

Table 2. Percentage Distribution the Mothers of Preterm Infants related to Baseline Characteristics

Items	N(70)	%
Mother's age		
18-<23	52	74.3
23-<28	12	17.1
28-32	6	8.6
Mean \pm SD	22 \pm 2.44	
Educational Level		
Read and Write	7	10.0
Secondary Education	42	60.0
University	21	30.0
Occupation		
Working	21	30.0
House wife	49	70.0
Residence		
Urban	25	35.7
Rural	45	64.3

Table 2 revealed that the mean age of mothers was 22 \pm 2.44 years. More than half (60%) of mothers were had secondary school education. The highest percentages (70%) of mothers were house wives and more than half of them from rural residence.

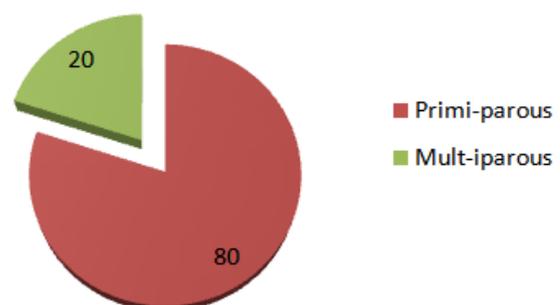


Figure 2. Mothers' Distribution according to their Parity

Figure 2. This figure illustrated that 80% of the mothers primi-parous while 20% of them Multi-parous.

Table 3. Indicated that the total mothers' knowledge regarding SIDS, the most (82.9%, 84.3%, 85.7 & 91.4% respectively) of them had incorrect knowledge about definition, common age, the place of sleep contain soft object and breast feeding lower risk of SIDS respectively. To evaluate the knowledge retention among mothers after health education implementation at 1 month 71.4%, 91.4%, 84.3% & 87.1% respectively of the mothers had correct of knowledge and there was statistically significant difference between pre and after 1 month from implementation (p=<0.001). the same table also illustrated the most (81.4 %, 87.1% & 91.4% respectively) of them had incorrect knowledge about back sleep, pacifier reduce risk of SIDS and back sleep during the night

only respectively. To evaluate the knowledge retention among mothers after 1 month After health education implementation 90.0% & 88.6% respectively of the mothers had correct of knowledge and there was statistically significant difference between pre and after 1 month (p=<0.001).

Table 4. The study results proved that nearly two third of the mothers (77.1%, 74.3%, 75.7%, 77.1 and 74.3% respectively) had never reported practice about sleep supine for every sleep, room sharing without bed sharing, keep soft object out of the crib, avoid smoke exposure and avoid over heading respectively. While after one month they had always reported practice on the same mentioned items. There was statistically significant relation between pre health education implementation and after one month from implementation (p=<0.001).

Table 3. Mother's Knowledge about SIDS before Health Education Implementation and after 1 Month from Health Education Implementation

Items	Pre Health Education				After one month from Health Education				X ²	P
	Correct		Incorrect		Correct		Incorrect			
	N	%	N	%	N	%	N	%		
Definition of SIDS	12	17.1	58	82.9	50	71.4	20	28.6	.091	<..005
Common age	11	15.7	59	84.3	64	91.4	6	8.6	5.82	<..001
Alcohol use during pregnancy increase SIDS	15	21.4	55	78.6	61	87.1	9	12.9	.869	<..005
The sleep place should have toys and soft object	10	14.3	60	85.7	59	84.3	11	15.7	.588	<..005
Baby who share the bed with caregiver smoking increase risk of SIDS	17	24.3	53	75.7	63	90.0	7	10.0	.078	<..005
Breast feeding lower risk of SIDS	6	8.6	64	91.4	61	87.1	9	12.9	.968	<..005
Back sleeping reduce risk of SIDS	13	18.6	57	81.4	63	90.0	7	10.0	1.77	<..005
Pacifier use during bed time increase risk of SIDS	9	12.9	61	87.1	62	88.6	8	11.4	1.33	<..005
The infant back position during the night time only	7	10.0	63	90.0	62	88.6	8	11.4	1.004	<..005
The risk of infant suffocation can be reduced	17	24.3	53	75.7	66	94.3	4	5.7	1.36	<..005
The risk factors of SIDS can be reduces	13	18.6	57	81.4	63	90.0	7	10.0	1.77	<..005
Preterm baby risk for SIDS than full term	17	24.3	53	75.7	63	90.0	7	10.0	2.49	<..005

Table 4. The Mother's reported Safe Sleep Practice before Health Education Implementation and after 1 Month from Implementation

Mothers reported safe Sleep Practice	Pre Health Education		After one month from Health Education		X ²	P
	No	%	No	%		
Supine for every sleep:					15.62	<0.001
Always	9	12.9	62	88.6		
Some times	7	10.0	4	5.7		
Never	54	77.1	4	5.7		
Firm Sleep Surface:					6.23	<0.05
Always	10	14.3	61	87.1		
Some times	18	25.7	4	5.7		
Never	42	60.0	5	7.1.		
Room Sharing without bed sharing:					25.45	<0.001
Always	8	11.4	66	94.3		
Some times	10	14.3	0	0.0		
Never	52	74.3	4	5.7		
Keep Soft Objects and Loose Bedding out of the Crib:					25.45	<0.001
Always	7	10.0	66	94.3		
Some times	10	14.3	6	5.7		
Never	53	75.7	0	0.0		
Avoid Smoke Exposure:					1.59	<0.05
Always	5	7.1	65	92.9		
Some times	11	15.8	0	0.0		
Never	54	77.1	5	7.1		
Offer a pacifier at sleep Time:					15.55	<0.001
Always	30	42.9	60	85.7		
Some times	12	17.1	4	5.7		
Never	28	40.0	6	8.6		
Avoid Over Heating:					3.12	<0.05
Always	10	14.3	62	88.6		
Some times	8	11.4	4	5.7		
Never	52	74.3	4	5.7		

Table 5. Comparison of Mothers' Health Belief Models Mean score before Health Education Implementation and after 1 Month from Implementation

Items	Pre Health education		After one month		t test	P value
	Mean ± SD		Mean ±SD			
Perceived Susceptibility	9.10 ± 3.44		21.34 ± 3.39		15.80	<0.001
Perceived Severity	8.67 ± 3.53		22.08 ± 2.23		22.67	<0.001
Perceived Barriers	12.28 ± 4.01		26.54 ± 2.79		21.61	<0.001
Perceived Benefits	7.65 ± 2.03		17.95 ± 1.76		27.28	<0.001
Cues to Action	7.82 ± 2.46		21.92 ± 2.93		27.38	<0.001

Table 6. Comparison between the Total Mean Score of Mother's knowledge & Reported Safe Sleep Practice before Health Education Implementation and after 1 Month from Implementation

Items	Pre Health education		After one month		t test	P
	N	%	N	%		
Total Knowledge about SIDS:						
Good	16	22.9	62	88.6	23.93	<0.001
Average	15	21.4	5	7.1		
Poor	39	55.7	3	4.3		
Mean ±SD	14.1 ± 3.25		22.52 ± 1.09			
Total reported practice:						
Competent	5	7.1	66	94.3	28.94	<0.001
Incompetent	65	92.9	4	5.7		
Mean ±SD	10.15 ± 2.26		19.91 ± 1.53			

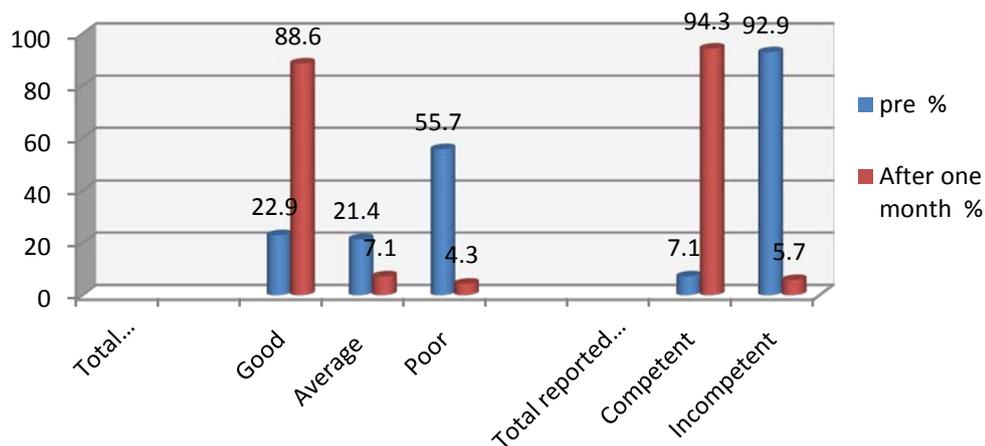
**Figure 3.** Mothers' Distribution related to their total Knowledge and Reported Safety Sleep Practice before and after 1 Month from Implementation of Health Education

Table 5. Demonstrated that there was statistically significant difference between pre and after 1 month from health education ($p < 0.001$) related to health belief models items it showed that increase mean score of health belief model of the mothers after implementation of health education.

Table 6. The total mothers' knowledge regarding SIDS, indicated that more than half (55.7%) of them had poor level of knowledge before health education implementation. The mean of the total score of mothers' knowledge was 14.1 ± 3 . To evaluate the knowledge retention among mothers after 1 month from health education implementation the same table proved that 88.6% of the mothers had good knowledge and the mean of total score was 22.52 ± 1.09 . There was statistically significant difference between pre and after 1 month from health education ($p < 0.001$). The same table illustrated that the total mother's reported safe sleep practice, indicated that 7.1% have competent sleep practice before health education implantation. While after

one month from implementation 94.3% & 82.6% respectively have competent sleep practice.

4. Discussion

Sudden infant death syndrome (SIDS) remains the third leading cause of infant death and the leading cause of death beyond 1 year of age. In 2011, the American Academy of Pediatrics (AAP) released the newest SIDS risk-reduction recommendations. The results of this study were discussed in frame of previously mentioned research hypothesis. As regards the characteristics of preterm infants in the study, the study results evident that the maximum percentage of them was males, and more than half of the infants their gestational age ranged from 33-35 weeks. Their birth weight was 1500-2000 grams. A previous study by [18] to evaluate the effectiveness of structured discharge education on maternal confidence and

caring knowledge and the growth of preterm newborns have shown that, 79.3% and 56.7% respectively of preterm infants in the study and control group were males. Their mean of gestational age as was 31.43 ± 3.41 and 31.9 ± 3.13 weeks respectively. In an Egyptian study conducted by [19] to evaluate the effect of lateral versus supine position on Oxygen saturation among 100 preterm infants with RDS, they found that 64% and 60% respectively of preterm infants in the study and control group were males. The mean of their gestational age was 32.7 ± 1.8 weeks and their mean of birth weight was 1.952 ± 0.57 grams. Furthermore, [20] investigated 40 newborn infant in the NICU at Benha Specialized Hospital, Egypt and they found that 50% of them were males. In another Egyptian study by [21] to assess the quality of nursing care provided for preterm infants with RDS. The study revealed that 59.2% of preterm infants were males, 64.8% of their GA ranged from 34-37 weeks, and 77.5% of them had birth weight from 1500 to <2500 grams.

As regards the mothers of preterm infants, the study results revealed that overall, the mothers predominately, were: in their twenties; can read and write or secondary school graduates; and, housewives. a study conducted by [22] to determine the knowledge and attitude of nursing staff and mothers towards kangaroo mother care in the eastern sub-district of Cape Town. Using A cross-sectional descriptive study on 30 mother having preterm infants and six neonatal nurses, they found that, the mean age of the mothers was 26.9 ± 6.25 years and approximately 53% of mothers had not completed their secondary education. As regard to parity most of the mothers were primiparous and consider that was the first baby for her.

As regard mothers' knowledge about SIDS, the present study showed that most of the mother have poor knowledge and didn't aware of the risk factor pre health education compared to after 1 month from health education most of them had good knowledge and most of them knowledgeable about SIDS. This may be due to the mothers were primiparous and didn't have previous education about SIDS prevention. It has been reported that mothers with preterm newborns possessed less maternal confidence and caring knowledge than those with full-term newborns. Therefore, building the maternal confidence of mothers of preterm newborns can help them reduce the difficulties of caring for their infants after discharge from hospital [18] The results of the present study were in accordance to the above mentioned empirical evidences these results would indicate the urgent need for educating and instructing mothers how they provide adequate care for their preterm infants after hospital discharge for reduction of SIDS. These findings indicate the effectiveness of the health education on improving level of knowledge among mothers. It also verifies the ability of the mothers to retain the acquired knowledge till 1 month after health education implementation. The current study results support the research hypothesis. Similarly, a study conducted by [23] to evaluate the effects of a researcher-developed transitional care program for mothers of preterm infants on the mothers' transition from hospital to home. Participants included 72 mothers and 81 preterm infants. They reported that mothers involved in the education program had increased knowledge and skills about how to

care for their fragile infants' needs, most likely assisted them in being better able to provide appropriate infant care.

As regard the reported safe sleep practice, the result study illustrated that the most mothers never practice about supine position as reduce SIDS, room sharing without bed sharing, keep soft object out of the crib and keep a pacifier at bed time respectively before health education as compared to after 1 month from health education most of them always practice the same point. This may be due to the effect of health education on the reported safety sleep practice and the mothers knew the importance of position her infant in supine position. [24] Stated that, Preterm infants are at increased risk of SIDS, and the association between prone sleep position and SIDS among low birth weight and preterm infants is equal to, stronger than the association among those born at term.

[25] Stated that the supine sleep position does not increase the risk of choking and aspiration in infants, even those with gastroesophageal reflux, because infants have airway anatomy and mechanisms that protect against aspiration Preterm infants should be placed supine as soon as possible.

Preterm infants should be placed supine for sleeping, just as term infants should, and the parents of preterm infants should be counseled about the importance of supine sleeping in preventing SIDS. Hospitalized preterm infants should be kept predominantly in the supine position, at least from the post menstrual age of 32 weeks onward, so that they become acclimated to supine sleeping before discharge." NICU personnel should endorse safe sleeping guidelines with parents of infants from the time of admission to the NICU [23].

[26] Stated that the infants should be placed on a firm sleep surface and covered by a fitted sheet with no other bedding or soft objects to reduce the risk of SIDS and suffocation. A firm surface maintains its shape and will not indent or conform to the shape of the infant's head when the infant is placed on the surface. A soft mattress, including those made from memory foam, could create a pocket (or indentation) and increase the chance of re breathing or suffocation if the infant is placed in or rolls over to the prone position.

Soft materials or objects, such as pillows, quilts, comforters, or sheepskins, even if covered by a sheet, should not be placed under a sleeping infant. If a mattress cover to protect against wetness is used, it should be tightly fitting and thin. Soft objects, such as pillows and pillow-like toys, quilts, comforters, sheepskins, and loose bedding, such as blankets and non-fitted sheets, can obstruct an infant's nose and mouth. An obstructed airway can pose a risk of suffocation, entrapment, or SIDS [27].

[28] Has found that the use of a pacifier decreases the incidence of SIDS through such mechanisms as helping maintain a patent airway and facilitating the maturation of the mouth and neck muscles used during sucking and breathing. However, a societal trend of abstaining from pacifier use has persisted as a result of a previous link between use and reduced breastfeeding duration [29]. Pacifiers should thus be introduced at sleep times after an infant has developed and maintained a pattern of successful latching during breastfeeding, a period that should not extend more than 3 to 4 weeks after breastfeeding initiation [30].The most recent published

research, however, has found that pacifier use does not interfere with breastfeeding instead; easy access to formula may be the biggest deterrent [31,32]. In large epidemiological studies of SIDS, it seems that sleeping in the parents' room without bed sharing confers the least risk, compared with sharing a sleep surface (most risk) and sleeping in another room (intermediate risk) [33]. [34] Determined that 84.8% of mothers shared the same room but in different beds. [35] Also found that sharing a couch to sleep is associated with an increased risk of SIDS, and sleeping in the same room as parents is associated with a lower risk compared with sleeping in a separate room. Preterm or with low birth weight regardless of parental smoking status, even for breastfed infants, there is an increased risk of SIDS when bed-sharing if younger than 4 months. This appears to be a particularly vulnerable time, so if parents choose to feed their infants younger than 4 months in bed, they should be especially vigilant to not fall asleep.

As regard health belief model the present study illustrated that there significant difference between the health belief model before and after implementation of health education. Due to the effective use of health belief model on the mothers, in this study for the first time, Health Belief Model to reduce risk of SIDS, that its results confirmed the model on health behaviors and appropriate prevention. SIDS continues to be a significant contributor to preterm deaths among the mothers of preterm baby. This study demonstrated the need for incorporation of beliefs and perceptions of SIDS as important mothers of preterm baby. These factors may play important roles in how researchers and health professionals can improve health messages. [36] Stated that Perceived susceptibility and severity in particular were significant factors identified in this study. Many mothers expressed the seriousness of SIDS but did not that died of SIDS. This is a community issue that requires community-based interventions. Thus, there is a need for health messages that focus on creating awareness of the SIDS problem in the mothers of preterm infant. Applications for improving perceived susceptibility and Perceived severity include personalizing risk to a person's behavior, making it consistent with their actual risk and specifying consequences of risks and conditions. The mothers' needs to be better informed of the depth of the problem and how it affects their children, their neighbors and their communities. Nurse advice and radio/television increased the probability of supine sleeping. [37] Stated that a community health practice may include emphasis on SIDS education and risk reduction during pregnancy check-ups as well as before discharge after birth. The research study also demonstrated the importance of perceived barriers and benefits of the SIDS risk reducing recommendations. There was some uncertainty about the sleeping position that babies prefer. There are some messages that babies sleep better on their stomach and are more comfortable in this position as. Therefore, public health messages also need to emphasize that babies are safer and just as comfortable sleeping in the supine position and discuss the strategies for increasing the infant's comfort in the supine position, such as swaddling or the use of a pacifier. Moreover, these messages should not just focus on parents with young infants but also caretakers of young children.

It is also essential to identify significant cues to action for implementing the SIDS risk reducing recommendations. Although cues to action performed poorly in this study, it is possible that the significant and influential prompts to initiate action related to SIDS risk behaviors.

5. Conclusion

The current study concluded that positive effect of health education on mother's knowledge, reported safety sleep practice and health belief. Mothers who received the health education based on health belief model demonstrated significant higher mean score of knowledge, health belief model items and reported safe sleep practice among their preterm infant to reduce the risk of SIDS. These results support the proposed study hypotheses.

6. Recommendations

Neonatal Intensive Care Units practice and policy should focus on frequent nursing education and competency requirements regarding SIDS and safe sleep. NICUs should adopt early transition to safe sleep for clinically stable infants, as well as continual preparation of parents to aptly encourage safe sleep for these highest-risk infants, who will continue to be at high risk for SIDS long after discharge home.

Changes within the hospital setting are necessary to create a culture of evidence-based practice among nurses. This may include the implementation of written policies in postpartum units regarding SIDS prevention practices.

Guidelines for creating hospital policy should be available, including the American Academy of Pediatrics risk-reduction recommendations, which lists step-by-step instructions for implementing a policy within the hospital setting.

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