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Assessment of Parents' Knowledge Regarding Sudden Infant Death Syndrome (SIDS) Prevention and Safe Sleep Practices in Neonatal and Pediatric Units in Selected Hospitals in Palestine

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ABSTRACT: Sudden Infant Death Syndrome (SIDS) is a major cause of sudden and unexpected infant deaths. Evidence-based safe sleep recommendations include putting babies to sleep, using firm bedding, avoiding soft beds, bed-sharing, and educating parents that these practices are an important part of promoting safe sleep. The aim of this study was to assess parental knowledge of SIDS prevention and identify safety practices among parents of infants treated in selected hospitals in Palestine. A descriptive cross sectional study was conducted among 100 parents of infants admitted to pediatric and neonatal units in selected hospital in Palestine. Data were collected using a researcher-developed questionnaire in Arabic, including sociodemographic characteristics and information about SIDS, and safe sleep recommendations. The majority were mothers (91%). Al Makashed Hospital (55%) was the most represented, followed by Caritas Children's Hospital (26%) and Al Ahli Hospital (19%). In terms of knowledge about sleep safety, 79% recommend a supine or back to sleep as the safest position. Fifty percent strongly agreed that the baby should sleep in the same room as the mother but in a separate bed. Seventy-two percent identified smoking as a risk factor, 71% identified breastfeeding as a protective factor, 68% identified the importance of removing pillows and sheets, and 67% agreed that hard mattresses are safer than soft mattresses. However, significant knowledge gaps remained. In particular, although parent demonstrate the good knowledge (supine sleep position, avoid smoking, breastfeeding) important knowledge gap still remained regarding side sleeping, room sharing, overheating, and unsafe sleep surface such as sofas and armchairs

INTRODUCTION

Sudden Infant Death Syndrome (SIDS) is the sudden and unexpected death of an infant that remains unexplained after a thorough investigation, including a physical examination, review of medical history, and, if possible, an autopsy. Although the mechanisms leading to SIDS are not fully understood, evidence suggests that unsafe sleeping conditions contribute to sleep-related infant deaths [10].

Current evidence-based safe sleep recommendations advise placing infants in the supine (back) position for every sleep, including naps and nighttime sleep. Infants should sleep on a firm, flat, non-inclined surface in a safety-approved crib or bassinet, in the parents' room but on a separate bed at least the first 6 months, without pillows, loose bedding, soft objects, or

overheating, additional recommendation includes breastfeeding, vaccinating regularly, and providing a pacifier at bedtime if appropriate [12].

Despite the availability of these recommendation, parents' knowledge about safe sleep practice vary across settings, for example is Saudi Arabia Al-Shehri et al. (2021) reported high risk among mother practice including the use of soft bedding and unsafe sleep position. Studies conducted in other settings have also reported gaps in caregivers' knowledge and implementation of safe sleep recommendations, particularly regarding sleep position, sleep environment, bed-sharing or room-sharing, and other modifiable risk factors [8]. Evidence from low-resource communities in Kolkata, India, further suggests that infant sleep practices and SIDS-related risks may be influenced by caregiver beliefs, household circumstances, and access to health information [18]. Differences across populations may reflect variation in parental education, cultural infant-care practices, family influence, socioeconomic conditions, and the consistency of counseling provided by healthcare professionals [18].

In Palestine, evidence regarding parents' knowledge of SIDS prevention and recommended safe sleep practices remains limited. In particular, the extent to which parents of infants admitted to neonatal and pediatric units understand key recommendations—including supine sleeping, room-sharing without bed-sharing, avoidance of soft sleep surfaces, and prevention of overheating—has not been adequately documented. Identifying specific gaps in parental knowledge is important for guiding hospital-based education, discharge counseling, and culturally relevant public-health messages for parents and other caregivers [1, 2, 17, 20].

Therefore, this descriptive cross-sectional study aimed to assess parents' knowledge regarding SIDS prevention and recommended safe sleep practices among parents of infants admitted to neonatal and pediatric units in selected hospitals in Palestine, and to examine the association between overall knowledge level and selected sociodemographic characteristics.

METHODS

A descriptive cross-sectional design was used. Cross-sectional studies are appropriate for assessing knowledge and other characteristics at a specific point in time and for describing the distribution of outcomes within a defined population [19]. The design was selected because the primary objective was to describe parental knowledge regarding SIDS prevention and safe sleep practices during the data-collection period.

The study was conducted in selected hospitals in Palestine that provide neonatal and pediatric inpatient care. The hospital setting was selected because parents of hospitalized infants have direct contact with healthcare professionals and may receive education concerning infant care and safe sleep.

The survey link was distributed to 120 parents of infants admitted to the selected neonatal and pediatric units; 100 parents completed the questionnaire in full, corresponding to a response rate of 83%. After excluding 20 incomplete or ineligible responses, a final analytic sample of 100 parents was retained for all analyses reported. A parent was defined as a biological mother or father who was responsible for the infant's care and was present in the hospital during the data-collection period. A total of 100 parents participated in the study.

A hospital-based, non-probability consecutive sampling approach was used. All eligible parents who were present in the participating units during the data-collection period were invited consecutively to complete the questionnaire until the target sample of 100 participants was reached. Eligible participants were biological mothers or fathers of infants aged 0–12 months who were able to understand Arabic and willing to participate. Parents were excluded if their infant had a medical condition requiring a medically indicated non-standard sleep position or if they were unable to complete the questionnaire because of significant distress or other circumstances preventing participation.

relevant literature and evidence-based safe sleep recommendations. The questionnaire comprised three sections: (1) parental sociodemographic and maternal/infant characteristics; (2) knowledge regarding recommended infant sleep positioning; and (3) knowledge regarding SIDS prevention and safe sleep practices.

The questionnaire was written in clear and simple Arabic and required approximately 15 minutes to complete. Knowledge items addressed infant sleep position, sleep surface, room-sharing, bed-sharing, soft bedding, exposure to tobacco smoke, breastfeeding, vaccination, pacifier use, overheating, heavy clothing, and unsafe sleeping locations.

Before the main data collection, a pilot study was conducted among 10 parents with characteristics similar to those of the study population. The pilot study assessed the clarity, comprehensibility, wording, feasibility, and estimated completion time of the questionnaire. Participants reported that the questions were clear, easy to understand, and straightforward to answer. No

modifications were required after the pilot study; therefore, the same final questionnaire was used in the main study. Pilot participants were the final analytical sample.

Ethical approval was obtained from the Research Ethics Committee of Palestine Ahliya University. Administrative permissions were obtained from Al Maqased Hospital, Al Ahli Hospital, and Caritas Baby Hospital. Participation was voluntary. Before completing the questionnaire, parents received information about the study purpose, procedures, potential benefits and risks, confidentiality, and their right to decline or withdraw without affecting the care provided to their infant. Written informed consent was obtained from all participants before data collection. No identifying information was collected, and all data were stored securely and accessed only by the research team.

Data were collected using a self-administered electronic questionnaire. After obtaining institutional ethical approval and administrative permission from the participating hospitals, recruitment letters and the survey link were distributed through the hospitals' relevant administrative and continuing education departments. Before starting the questionnaire, eligible parents received information about the purpose of the study, voluntary participation, confidentiality, and the right to withdraw without consequences. Electronic informed consent was obtained before participants accessed the questionnaire.

For the composite knowledge score, responses consistent with recommended safe sleep practices were coded as 1, whereas responses inconsistent with the recommendation were coded as 0. The total knowledge score ranged from 0 to and was converted into a percentage.

Knowledge levels were classified as poor (<50%), moderate (50% to <75%), or good ($\geq 75\%$).

Data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS), version 24. Categorical variables were summarized using frequencies and percentages. Continuous variables were summarized using mean and standard deviation or median and interquartile range, as appropriate. Associations between overall knowledge level and selected sociodemographic characteristics, including education level, place of residence, and number of children, were examined using chi-square tests exact tests when expected cell counts were small. A two-sided p-value <0.05 was considered statistically significant.

Reliability analysis results:

Section	Items
Knowledge (Q1–Q13)	12 scored items
Awareness excl. Q24	11 items (Q14–Q23, Q25)
Awareness incl. Q24	12 items (Q14–Q25)

RESULTS

The study was included 100 parents from different hospitals. The demographic data was shown in Table 1. The majority of participants were female (91%), while 9% were male. Approximately 49% of parents were aged 21–26 years. Half of the participants (50%) lived in villages and 38% lived in cities.

Table 1. Sociodemographic and Clinical Characteristics of the Participants and Infants (N = 100)

Variable	Category	n (%)
Parent gender	Female	91 (91%)
	Male	9 (9%)
Parent age	21–26 years	49 (49%)
Place of residence	Village	50 (50%)
	City	38 (38%)

Education level	Bachelor's degree	51 (51%)
	Secondary education	29 (29%)
Number of children	≥4 children	35 (35%)
	2 children	27 (27%)
Housing status	Own home	86 (86%)
	Rent	14 (14%)
Family living arrangement	Separate family home	96 (96%)
	Extended family household	4 (4%)
Infant age	6–12 months	56 (56%)
Mother-reported health	Excellent	85 (85%)
Infant health status	No reported disease	63 (63%)
Reported infant health problem	Ex: Cardiac problems*	40 (40%)
Previous child death	No	89 (89%)
	Yes	11 (11%)
Cause of previous child death	Unknown*	6 (54.5%)

Regarding education, 51% of parents had completed a bachelor's degree and 29% had completed secondary education. Thirty-five percent of families had four or more children, while 27% had two children. Most participants (86%) owned their homes, and 14% rented their homes. Ninety-six percent lived in a separate family home rather than an extended family household.

Regarding infant characteristics, 56% of infants were between 6 and 12 months of age. Most mothers reported their health as excellent (85%). Sixty-three percent of infants were reported to be free from disease. Among reported infant health problems, cardiac problems were reported by 40% of parents who indicated that their child had a health problem.

Eighty-nine percent of parents reported that they had not experienced the death of a child. Among parents who reported a previous child death, 54.5% indicated that the cause of death was unknown.

The findings in Table 2 demonstrated varying levels of knowledge regarding SIDS and recommended infant sleep positioning. Sixty-two percent of parents correctly identified sudden infant death occurring before one year of age as unexplained. Seventy-nine percent identified the supine or back position as the recommended sleep position.

Table 2. Parents' Knowledge of SIDS and Recommended Safe-Sleep Practices (N = 100)

Knowledge/Safe-Sleep Item	Correct/Recommended Response, n (%)
SIDS occurs before one year of age and is unexplained	62 (62%)
Supine/back position is the recommended infant sleep position	79 (79%)
Some infant sleep positions may affect vital signs	57 (57%)
Prone position may cause changes in vital signs	35 (35%)
Unsafe sleep position may contribute to SIDS	50 (50%)

Infant should sleep beside the mother but on a separate sleep surface	76 (76%)
Parental smoking increases the risk of SIDS	72 (72%)
Breastfeeding reduces the chance of SIDS	71 (71%)
Vaccination reduces the possibility of SIDS	74 (74%)
Sheets and pillows should be removed from the infant's cradle	68 (68%)
A firm mattress is safer than a soft mattress	67 (67%)
Pacifier use may reduce SIDS risk	55 (55%)
Sleeping on the back is safer than sleeping on the side	50 (50%)
Infant should share the parents' room	46 (46%)
Infant with a high temperature should not be wrapped in additional blankets	44 (44%)
Infant should not wear heavy clothing while sleeping	42 (42%)
Infant should not sleep on a sofa or armchair	42 (42%)

Fifty-seven percent of mothers indicated that some sleep positions may affect the infant's vital signs, while 35% identified the prone position as a position that may cause changes in vital signs. Half of the mothers (50%) recognized that an unsafe sleep position may contribute to SIDS.

Parents demonstrated relatively strong knowledge in several areas of SIDS prevention. Seventy-six percent as shown in Table 3 strongly agreed that an infant should sleep beside the mother but on a separate sleep surface. Seventy-two percent strongly agreed that parental smoking increases the risk of sudden infant death, while 71% strongly agreed that breastfeeding reduces the chance of sudden infant death. Seventy-four percent strongly agreed that vaccination reduces the possibility of sudden infant death.

Table 3. Sources of Information Regarding Infant Sleep Positioning (N = 100)

Source/Information-Seeking Behavior	Yes, n (%)
Received guidance regarding infant sleep positioning	74 (74%)
Received guidance from family members	Not reported
Received guidance from nurses	Not reported
Received guidance from doctors	Not reported
Searched for and read information about safe sleep positioning	74 (74%)

Regarding the sleep environment, 68% strongly agreed that sheets and pillows should be removed when placing an infant in a cradle, and 67% strongly agreed that a firm mattress is safer than a soft mattress.

Knowledge was lower for some recommendations. Fifty-five percent agreed that pacifier use may reduce SIDS risk. Fifty percent agreed that placing an infant on the back is safer than placing the infant on the side. Forty-six percent agreed with the room-sharing recommendation. Forty-four percent agreed that an infant with a high temperature should not be wrapped in additional blankets, while 42% agreed that an infant should not wear heavy clothing when sleeping. Forty-two percent agreed that an infant should not sleep on a sofa or armchair.

Seventy-four percent of mothers reported receiving guidance from others (Family members, nurses and doctors) regarding how to position the infant for sleep, and 74% reported searching for and reading information about safe sleep positioning. These findings indicate that many parents had been exposed to information about safe sleep; however, the presence of information exposure did not necessarily correspond to complete knowledge across all recommendations.

DISCUSSION

The present study found that 79% of parents identified the supine (back) position as the recommended sleep position for infants. This is an important finding because the American Academy of Pediatrics recommends placing infants in the supine position for every sleep until 1 year of age. Side sleeping is not recommended because infants may more easily roll from the side to the prone position. The finding suggests that the central safe-sleep message has reached a substantial proportion of parents. However, only 50% of parents agreed that placing an infant on the back is safer than placing the infant on the side. The difference between these responses may indicate that some parents recognize the back position as a recommendation without fully understanding that side positioning is also considered unsafe [3–7, 17, 20]. The AAP specifically notes that side sleeping is not safe and that the supine position does not increase the risk of choking or aspiration in healthy infants. Therefore, parental education should explain both what position to use and why side and prone positions should be avoided [14][11].

The study demonstrated relatively good knowledge of several components of the infant sleep environment. Seventy-six percent of mothers strongly agreed with sleeping in the same room as the mother while using a separate sleep surface, and 68% recognized the importance of removing pillows and sheets from the sleep area. These findings are consistent with current AAP recommendations for room sharing without bed sharing and for keeping soft objects and loose bedding away from the infant's sleep area. Nevertheless, only 46% agreed with the room-sharing recommendation as presented in the questionnaire. This suggests that some parents may remain uncertain about the distinction between room sharing and bed sharing. The AAP recommends that infants sleep in the parents' room, close to the parents' bed, but on a separate sleep surface, ideally for at least the first six months [9][16].

The findings showed relatively good recognition of several SIDS-related risk and protective factors. Seventy-two percent of mothers recognized smoking as a risk factor, while 71% recognized breastfeeding as protective and 74% recognized vaccination as beneficial. These findings suggest that parents may be familiar with several broad health messages related to SIDS prevention. Knowledge of pacifier use was lower, with 55% agreeing that pacifier use may reduce SIDS risk. The variation across individual recommendations reinforces the importance of comprehensive safe-sleep education rather than relying on a single message [14, 16, 19].

The lowest levels of correct responses were observed in several practical areas, including avoiding heavy clothing, avoiding additional blankets, and avoiding sleep on sofas or armchairs. These areas are clinically important because the AAP identifies overheating, loose bedding, and couches or armchairs as hazards in the infant sleep environment [21][13, 15].

The findings also demonstrate that exposure to information does not necessarily ensure complete understanding. Although 74% of parents reported receiving guidance and 74% reported searching for information, knowledge gaps remained. This supports the use of standardized, repeated, and practical education rather than relying solely on parents' independent information-seeking.

Limitations. This study has several limitations. First, the cross-sectional design captures parental knowledge at a single point in time and precludes causal inference regarding the factors that shape this knowledge or its influence on parents' actual sleep practices at home. Second, participants were recruited using a hospital-based, non-probability consecutive sampling approach from three hospitals, which may not be representative of all parents in Palestine and may introduce selection bias, particularly toward parents whose infants required hospital admission and who had direct contact with healthcare staff during their stay.

Third, knowledge was assessed through self-reported responses to a questionnaire, which may be subject to social-desirability bias, particularly for items describing recommended practices that parents may recognize as the expected 'correct' answer without necessarily applying them at home. Fourth, the sample was overwhelmingly female (91% mothers versus 9% fathers), so the findings predominantly reflect maternal knowledge and may not adequately represent fathers' knowledge or their role in implementing safe-sleep practices. Finally, the questionnaire was a researcher-developed instrument rather than a previously validated scale; although a reliability analysis was conducted, these values fall below the conventional threshold for acceptable internal consistency ($\alpha \geq 0.70$), indicating that the instrument's items may not consistently measure a single underlying construct, and that the composite knowledge and awareness scores should therefore be interpreted with caution. In addition, because the total number of eligible parents approached was not systematically documented, a response rate could not be calculated, which further limits assessment of potential non-response bias. These limitations should be considered when interpreting and generalizing the study findings.

This study also has several notable strengths. It is, to our knowledge, among the first studies to assess parental knowledge of SIDS prevention and safe-sleep practices among parents of hospitalized infants in Palestine, addressing a previously identified gap in the local literature. The questionnaire covered a comprehensive range of evidence-based safe-sleep recommendations spanning sleep position, sleep surface, room-sharing, overheating, and other modifiable risk factors, rather than focusing on a single practice in isolation. Data were collected across three hospitals with different institutional characteristics (governmental and private), broadening the range of parents represented relative to a single-site study. The questionnaire was piloted for clarity and comprehensibility prior to use, and the study explicitly examined associations between overall knowledge level and sociodemographic characteristics, providing actionable, hospital-relevant baseline data to guide future parental education and discharge-counseling initiatives.

CONCLUSION

These findings should be interpreted in light of the study's cross-sectional design, hospital-based consecutive sampling from three hospitals, reliance on self-reported data, the predominance of mothers among respondents, and the modest internal-consistency reliability of the researcher-developed questionnaire (see Limitations); accordingly, the results should be considered preliminary and may not be generalizable to all parents in Palestine. Future research should (1) recruit larger, multi-site samples using probability-based sampling to support inferential analyses of the correlates of parental knowledge; (2) more systematically include fathers to characterize paternal knowledge and involvement in safe-sleep practices; (3) develop and psychometrically validate a standardized SIDS-knowledge instrument for the Palestinian context; and (4) consider interventional or pre-/post-education study designs to evaluate whether hospital-based counseling measurably improves parental knowledge and, ultimately, home safe-sleep practices.

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