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Nurses' Awareness Regarding the Newborn Hearing Screening Test at Maternal and Child Health Centers in Kafr El-Sheikh City

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Abstract

Hearing loss in newborns poses a significant challenge to their development, emphasizing the need for robust newborn hearing screening test. Maternal and Child Health Centers serve as ideal settings for implementing these test. Aim of the study: To assess nurse's awareness regarding newborn hearing screening test at maternal and child health centers in Kufr El-Sheikh City. Research design: A descriptive research design was used in this study. Setting: The study was conducted in the maternal and child health centers in Kufr El-Sheikh City. Sample: Convenience sampling technique was used: to choose 186 nurses. Tools: Two tools used: 1st tool is structured Interviewing questionnaire. It consist of 3 parts: 1) demographic characteristics, assessment of nurse's knowledge, and assessment of nurse's attitude. 2nd tool is observation Assessment of nurse's practice regarding newborn hearing screening test. Results: The study result revealed that, 65.1% of the studied sample had unsatisfactory level of total knowledge, 50.5% of the studied sample had negative attitude, 70.4% of the studied sample had adequate practice regarding newborn hearing screening test. Conclusion: Deficit in nurses' knowledge regarding newborn hearing screening test. Furthermore, there were highly statistically significant positive correlation between total scores of knowledge, total scores of attitude and total score practice of the studied sample regarding newborn hearing screening test at (P = < 0.01). Recommendation: Training programs should be developed and implemented for nurses to increase their awareness about newborn hearing impairment and screening test.

Key words: Kafr El-Sheikh City, Maternal and Child Health Centers, Nurses awareness, Newborn Hearing Screening test.

Introduction

Hearing loss (HL) is a widespread condition that affects individuals of all ages and can have significant impacts on communication and overall well-being. It refers to the partial or complete inability to hear sounds in one or both ears. Hearing loss can result from various factors, including genetic causes, infections, exposure to loud noises, certain medications, and aging. It can manifest as a mild, moderate, severe, or profound loss, with varying degrees of impact on speech perception and understanding (*Sahoo et al., 2020*).

The most recent WHO estimate suggests that approximately 466 million people (or 6.1% of the world's population) were living with disabling hearing loss in 2018. This estimate is projected to rise to 630 million by 2030 and to over 900 million by 2050. Approximately 90% of people with moderate to profound hearing impairment reside in low- and middle-income countries. The Global Burden of Disease study, which incorporated mild and unilateral hearing loss, estimated that the population with hearing loss rose from 1.2 billion (17.2%) in 2008 to 1.4 billion (18.7%) in 2017 (*Olusanya et al., 2019*).

While hearing impairment can occur at any age, hearing impairment in newborns holds particular importance due to its potential impact on language development and early learning. Permanent newborn hearing impairment (PNIH) specifically refers to hearing loss that is present at birth or develops shortly after.





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Early detection of hearing loss allows for prompt intervention, which can greatly enhance the developmental outcomes and overall well-being of newborns (*Punch et al., 2019*).

Universal newborn hearing screening test (UNHST) plays a significant role in the early detection of newborn hearing impairment. it is a systematic screening process that involves the use of objective tests to assess a newborn's hearing abilities shortly after birth. The goal of UNHST is to identify infants with hearing loss early on, typically within the first few weeks of life, to ensure timely intervention and support. By implementing UNHST test, healthcare providers can identify newborns at risk for hearing impairment and refer

them for further diagnostic testing and appropriate interventions (Marinho et al., 2020).

Nurses' awareness encompasses various aspects, including understanding the importance of screening, knowledge of screening protocols, proficiency in conducting screenings, and familiarity with referral pathways for further evaluation and intervention. Moreover, nurses' awareness acts as a catalyst for promoting adherence to best practices, ensuring accurate and reliable screening results, and facilitating timely intervention for infants identified with hearing loss (*Schulte, 2022*).

Maternal and child health centers play a vital role in providing comprehensive healthcare services to mothers and their newborns. These centers serve as primary points of contact for families, offering a range of healthcare services, including routine check-ups, vaccinations, and health education. Maternal and child health centers provide a convenient and accessible location for parents to bring their newborns for screening test, ensuring that a large proportion of infants can undergo hearing screening test in a timely manner (*Ridgway et al., 2021*).

Community nurses involvement is crucial in promoting awareness, delivering information to parents, and coordinating the screening process to ensure that every newborn has access to early detection and intervention for hearing loss. Nurses' awareness of newborn hearing screening test is of paramount importance in the success of screening test. Their knowledge and understanding of the significance of early detection, screening procedures, and available interventions directly impact the quality of care provided to newborns and their families (*Alqudah et al., 2021*).

Community nurses play a vital role in the successful implementation of newborn hearing screening test. As frontline healthcare providers, they are often the first point of contact for families during the early stages of parenthood. Community nurses are responsible for providing comprehensive healthcare services, including health assessments, education, and support to families in their local communities. In the context of newborn hearing screening test, community nurses serve as key facilitators, ensuring that infants receive timely screenings and appropriate follow-up care (*Abad et al., 2019*).

Significance of study

Permanent newborn hearing impairment (PNIH) is a critical concern as it can have profound effects on a child's language acquisition and cognitive development if left undetected and untreated. It is estimated that (PNIH) affects approximately 2 infants per 1,000 live births worldwide, making it one of the most common congenital conditions. Early identification and intervention are crucial in mitigating the impact of (PNIH) on a child's development. This trend has become a serious public health issue that deserves an appropriate and well-coordinated global action (*Bussé et al., 2020*).

In 2022, the Ministry of Health and Population of Egypt conducted a hearing survey for 3'004'047 newborn for early detection and treatment of hearing impairment. Newborn will be re-examined, a week after the first examination in the same unit. About 18,932 newborns were referred after the second test to 30 hospitals and referral centers across Egypt for evaluation and initiation of treatment. The number of examination centers has been increased to include 3'500 health units in all governorates to conduct audiological examinations for newborn from the day of birth until the age of 25 days (*Ministry of Health and Population2022*)





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Aim of the Study

The aim of study is assess nurse's awareness regarding newborn hearing screening **test** at maternal and child health centers in Kafr El-Sheikh City through:

- **1** Determine knowledge of nurses regarding newborn hearing screening test.
- 2- Appraise nurse's attitude regarding newborn hearing screening test.
- 3- Assess practice of nurses regarding newborn hearing screening test.

Research questions

- 1. What are the levels of nurse's knowledge regarding newborn hearing screening test?
- 2. What are the levels of attitude of nurses regarding newborn hearing screening test?
- 3. What are the practice levels of nurses regarding newborn hearing screening test?
- 4. Is there relation between nurse's knowledge, attitude and reported practice with their demographic characteristics?

Subject and Methods

The subject and methods for this study will portray under the four main designs as follows:

I-Technical items. II- Operational items. III- Administrative items. IV- Statistical items.

I) Technical items:

The technical design includes research design, setting, subject and tools for data collection.

Design:

A descriptive design was used to conduct this study.

Setting:

The study will be conducted maternal and child health centers in Kufr El-Sheikh City. Each center is a building consisting of two floors. The first floor consists of a family medicine clinic, a vaccination room, an internal pharmacy, and screening room. The screening room consists of a bed, a scale, a child sphygmomanometer, stethoscope, thermometer, and audiometer for hearing screening test. The second floor consists of Doctors' and nurses` residence.

Sample:

Convenience sampling technique was used: the study comprised a sample of (186) nurses from total (356) nurses present in 50 maternal and child health centers in Kafr El-Sheikh City.

Sample Size:

$$n = \frac{N \times p (1 - p)}{[(N - 1) \times (d^2 \div Z^2) + (p (1 - p))]}$$





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Where:

N= Total population (356)

Z= confidence level (95%)

P= probability (50%)

d= margin of error (0.05)

So, sample size (n) = (186).

Data collection Tool

The required data will be collected through the following tools:

Structured interviewing questionnaire

Prepared after reviewing the national and international related literature and approved by supervisions. It was written in Arabic language and consist of fourth **parts as the following:**

Part (1): Demographic characteristics of nurses: include data about age sex, educational level, year of experience, type of occupation, marital status.

Part (2): Determine of nurse's knowledge regarding newborn hearing screening test: it composed of (13) closed ended question such as: definition, risk factors, aim, degrees, benefit, methods of treatment.

Scoring system

The knowledge question was 13 question, each knowledge question was scored by zero for a «incorrect » answer and one for a «correct » answer. The total knowledge scores ranged from 0-13, they were evaluated as follows:

Total score knowledge

- > Unsatisfactory less than 60% (0 >7,8)
- ➤ Satisfactory from 60 %:100% (≥7,9-13)

Part (3): Appraise of nurse's attitude regarding newborn hearing screening test: It is composed of 15 items as Hearing loss is a condition that can become extremely disabling, Feel like i need more information about hearing screening test as, Newborn hearing screening test negatively affects the parent/infant "bonding" process, It is very important that newborn hearing losses be identified and interventions begun before they reach 6 months of age, Hearing screening test are deserving of the necessary health care resource expenditure for their development and maintenance.





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Scoring system

15 items checklist, It was five-points Likert scale; Each positive statement had a response as Strongly agree (5'), Agree (4), not sure (3), disagree (2), and, strongly disagree (1), While negative statements had response as strongly disagree (5), disagree (4), not sure (3), agree (2), and strongly agree (1). The total score was calculated by summing up and then converting into a percentage score.

Total score Attitude

- ▶ Negative (<60%) (0-<44,9)
- ➢ Positive (≥60%) (≥45: 75)

Part (4): Assessment of nurse's practice regarding newborn hearing screening test: It is composed of (22) items as Taking birth history (antenatal- natal- postnatal), Using Otoscope in examination, Clean the Otoacoustic Emissions Screener before use, Providing a calm environment without any noisy so that the reading is correct, Form a crucial emotional support system for parents during the newborn hearingscreening test.

Scoring system

The total scores of nurses' practice were (22) for all the nursing procedures carried out for newborn hearing impairment and screening test. The nurses' was practice classified into either always (2), sometimes (1), and never (0).

- ➢ Incompetent (<60%) (0 :< 26)</p>
- Competent ($\geq 60\%$) ($\geq 26: 44$)

II) Operational items:

Preparatory phase:

It includes reviewing of related literature and theoretical knowledge of various aspect of the study using books, articles, internet and magazines to develop tools for data collection.

Validity content:

The revision of the tools for clarity, relevance, comprehensiveness, understanding and applicability as well as time needed will be done by a panel of 3 experts in the community health nursing field to measure the content validity of the tools and the necessary modification will be done accordingly.

Ethical consideration

All ethical considerations will be issued; a written approval will be obtained from scientific ethical committee Faculty of Nursing, Helwan University as well as an informed verbal and written consent will be obtained from each study subject included in this study after explanation of the purpose and the nature of the study before data collection. The participant will be given an opportunity to refuse to participate in the study and will be notified that they can withdrawal at any stage of research. Also, they will be assumed that the participation in the study is entirely voluntary, anonymity, privacy and confidentiality will be assured through coding the data. Ethics, values, culture and beliefs will be respected.

Pilot study:

A pilot study will be conducted on 10% (19) of nurses selected from previous setting (maternal and child center Kafr El-Sheik city) under study to assess the feasibility of the study as well as clarity and objectivity of the tool, and those subjects will be included.

Field Work:

Field work: Data collection of the study was started through the investigator by introducing to nurses, explained the aim of the study and its implications and how to fill in the questionnaire, and ensure their cooperation. Informed consent was obtained from the participants. Interviewing the nurses was carried out in specialized room in newborn hearing examination outpatient clinic **at Kafr El-Sheik Maternal and child health center.** the study lasted 3months from the start of July 2023 until end of september2023.the researcher was accessible three days weekly ,Saturday,





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Monday and Wednesday at the above mentioned study setting from 9:00 to 12:00 pm. the time to complete the tools took approximately 20-30mintes per nurses and an average of 5-6nurses were interviewed each day.

III) Administrative items:

Approval to carry out this study will be obtained from Dean of the faculty of nursing, Helwan University to general director of maternity and child care at the directorate of health affairs in Kufr El-Sheik and then sent to directors of east and west health centers offices and clinics in Kufr El-Sheik City.

IV) Statistical items:

The collected data will be scored, tabulated and analyzed by personal computer using Statistical Package for the Social Sciences (SPSS) program version 20. Descriptive as well as inferential statistics will be utilized to analyze data pertinent to the study. Level of significant will be set at $P \le 0.05$

Results

Table	(1):	Number	and pero	centage d	listribution	of Demo	graphic C	Characteristics	of the	Studied	Sample,	(N=186).
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Demographic data	The studied sample (N=186)			
	No.	%		
•Age:				
- 18-25years	21	11.3		
- >25- 33years	98	52.68		
- >33- 40years	65	34.9		
- More than 40 years	2	1.07		
Mean ± SD	32.7419	9 ± 4.35556		
• Sex				
- Male	61	32.8		
- Female	125	67.2		
•Marital status				
- Married	108	58.1		
- Single	33	17.7		
- Widow	45	24.2		
Educational Level:				
- Diploma degree in nursing	117	62.9		
- Bachelor's degree in nursing	69	37.1		
- Postgraduate degree	0	0		
Years of experience				
- 0-5 years	119	63.9		
- > 5-10 years	2	1.07		
- More than 10 years	65	34.9		
Setting work				
- Surgery department	3	1.6		
- Medical unit	39	21.0		
- ICU	32	17.2		
- diabetic foot outpatient clinic	62	33.3		
- outpatient clinic	22	11.8		
- Emergency department	28	15.1		





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Table (1): shows the general characteristics of the studied sample, 52.6% of the studied sample were in the age group 25-<33 years old, with mean SD 32.74 ± 4.35 years. Regarding sex and marital status, (67.2% and 58.1%) of them were female and married, respectively. Also, 62.9% of them had diploma degree in nursing. Moreover, 63.9% of them had 0-5 years of experience. Furthermore, 68.3% of them didn't attend training courses regarding newborn hearing screening test. Also, 33.3% of them working at diabetic foot outpatient clinic.

 Table (3): Number and percentage distribution of total knowledge scores and level among the nurses regarding newborn

 hearing screening test, (N=186).

Total knowledge scores	The studied sample (N=186)			
	No.	%		
Level of total knowledge				
- Unsatisfactory (<60%)	121	65.1		
- Satisfactory (>60%)	65	34.9		
Range		11		
Mean ± SD	10.8574 ± 8.2482			

Table (3) presents the total knowledge scores and level among the nurses regarding newborn hearing screening test. that, 65.1% of the studied sample had unsatisfactory level of total knowledge regarding newborn hearing screening test. While, 34.9% of them had satisfactory level of total knowledge. The mean SD of total knowledge scores was 10.8574 ± 8.2482





Fig (2) shows the total knowledge scores and level among the nurses regarding newborn hearing screening test. that, 65.1% of the studied sample had unsatisfactory level of total knowledge regarding newborn hearing screening test. While, 34.9% of them had satisfactory level of total knowledge.





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Table (5): Number and percentage distribution of total attitude scores and level among the Nurses regarding Newborn hearing screening test, (N=186).

Total attitude scores	The studied sample (N=186)			
	No.	%		
Level of total attitude				
- Negative (<60%)	94	50.5		
- Positive (>60%)	92	49.5		
Range		29		
Mean ± SD	47.1935 ± 9.77339			

Table (5) displayed the total attitude scores and level among the nurses regarding newborn hearing screening test. that, 50.5% of the studied sample had negative attitude regarding newborn hearing screening test. While, 49.5% of them had positive attitude. The mean SD of total attitude scores was 47.19 ± 9.77





Fig (4) revealed the total practice scores and level among the nurses regarding newborn hearing screening test. that, 70.4% of the studied sample had adequate practice regarding newborn hearing screening test. While, 29.6% of them had inadequate practice.





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 Table (7): Number and percentage distribution of total Practice scores and level among the Nurses regarding Newborn hearing screening test, (N=186).

	The studied sample (N=186)			
Total Practice scores	No.	%		
Level of total Practice				
- Inadequate (<60%)	55	29.6		
- Adequate (>60%)	131	70.4		
Range	43			
Mean ± SD	23.0645 ± 14.74930			

Table (7) displayed the total practice scores and level among the nurses regarding newborn hearing screening test. that, 70.4% of the studied sample had adequate practice regarding newborn hearing screening test. While, 29.6% of them had inadequate practice. The mean SD of total practice scores was 23.06 ± 14.74 .

Table (11): Correlation between total scores of knowledge, Total Scores of attitude and total Score practice of the studied sample regarding newborn hearing screening test, (N=186).

	Total knowledge scores			
Variables	R	Р		
> Total Scores attitude	0.496	0.000		
> Total Scores practice	0.647	0.000		

*Significant (P<0.05)

r= Pearson Correlation Coefficient

Table (11) indicates that, there were highly statistically significant positive correlation between total scores of knowledges, total scores of attitudes and total score practice of the studied sample regarding newborn hearing screening test at (P = < 0.01).

Discussion

Regarding age of the studied nurses, the results of the present study revealed that more than half of the studied nurses their age were from >25- 33 years. This result was in the same direction with a study done by *Neumann et al.*, (2020) in Germany entitled "A survey on the global status of newborn and infant hearing screening test" and showed that nearly half of the studied subjects their age was 25-35 year.

Regarding sex and marital status of the studied sample, the results of the present study revealed that, more than two thirds and more than half of them were female and married, respectively. These results were consistent with *Sharma et al.*, (2021) who applied a study under the title of "Knowledge and attitude of nurses about newborn hearing screening



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test in Nepal" and presented that all participants were female and married. Also, that similar to *Khan et al.*, (2018) who reported that the majority of participants were female and married.

Regarding to educational level of the studied nurses, the current study showed that less than two thirds of the studied nurses had diploma degree in nursing. This finding can be explained as, it is common for nursing professionals to start their professional lives in middle level programs as primary care providers, even with the possibility of moving on to higher education. This finding agreed with *Mohamed & Hassan*, (2022) at a study conducted in Egypt and entitled "Knowledge and attitude of nurses regarding newborn hearing impairment and screening at health centers and clinics in Assiut city" which found that more than two thirds of them (67%) had graduated from nursing secondary school.

Regarding to total knowledge scores and level among the nurses regarding newborn hearing screening test, the current study clarified that less than two thirds of the studied sample had unsatisfactory level of total knowledge regarding newborn hearing screening test. While, more than one third of them had satisfactory level of total knowledge.

These findings were in a harmony with *Wong et al.*, (2021) at a study conducted in Sweden under title "Quality measures of a multicentre universal newborn hearing screening program in Malaysia" who stated that poor knowledge towards hearing impairment of infants among more than half of nurses across north India.

Regarding total attitude scores and level among the nurses regarding newborn hearing screening test, the present study revealed that more than half of the studied sample had negative attitude regarding newborn hearing screening test. While, nearly half of them had positive attitude. This finding was in agreement with *Almutairi et al., (2022)* at a study entitled "Knowledge and attitude of the general population regarding infant hearing loss in Saudi Arabia" which revealed that more than half of the participants had negative attitude regarding infant hearing screening test. This result was inconsistent with *Mazlan & Min, (2018)* at a study conducted in Malaysia entitled "Knowledge and attitude of Malaysian healthcare professionals towards newborn hearing screening test" who found that an overall positive attitude was indicated by all participants.

Concerning total practice scores and level among the studied nurses regarding newborn hearing screening test, the present study illustrated that more than two thirds of the studied sample had adequate practice regarding newborn hearing screening test. While, more than one quarter of them had inadequate practice.

This result was supported with a study performed by *Mohamed et al.*, (2022) who concluded that more than two thirds of the studied nurses had un satisfactory practice regarding newborn hearing screening test. As well as, *Ravi et al.*, (2018) who studied "Systematic review of knowledge of, attitudes towards, and practices for newborn hearing screening test among healthcare professionals" in <u>King Khalid University</u> at Saudi Arabia clarified that more than half of nurses had inadequate practice regarding newborn hearing screening test.

Concerning correlation between total scores of knowledge, total scores of attitude and total score practice of the studied sample regarding newborn hearing screening test, the current study showed that there were highly statistically significant positive correlation between total scores of knowledge, total scores of attitude and total score practice of the studied sample regarding newborn hearing screening test.

As well as, *Mohamed et al.*, (2022) at a study entitled "Knowledge and Attitude of Nurses Regarding Newborn Hearing Impairment and Screening at Health Centers and clinics in Assiut City" cleared that there was a positive correlation between total score of knowledge, skills and attitude among nurses regarding newborn hearing impairment







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with significant relation. On the same line, *Almutairi et al.*, (2022) at a study entitled "Knowledge and attitude of the nurses regarding infant hearing loss in Saudi Arabia" stated that there was a positive correlation between total score of knowledge, practice and attitude among nurses regarding newborn hearing screening test with significant relation.

Conclusion

In the light of the present study findings, it can be concluded that:

Deficit in nurses' knowledge regarding newborn hearing impairment and screening test; fluctuation in their attitude between negative and positive, and high level of practice. Furthermore, there were statistically significant relation between the level of nurses' knowledge and practice except education level, work setting with attitude. There was positive correlation between nurses' knowledge, their attitude, and practice regarding newborn hearing screening test.

Recommendations

Based on the findings of the present study, the following suggestions are recommended

- Nursing education should pay more attention to newborn hearing impairment, and screening as it is their responsibility to prepare competent nurses for the common issues they will face in practice.
- Training programs should be developed and implemented for nurses to increase their awareness about newborn hearing impairment and screening.
- Future research to replicate this study in other health centers and clinics with different nurses to increase the ability to generalize the findings.

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