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Assessment of Nurses' Knowledge and Practice Regarding the Care of Newborn Infants on Mechanical Ventilators in Baghdad City, Iraq

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Abstract

Background: Neonatal Nurses caring on Mechanical ventilators present special challenges and must be competent and increase their Nursing care quality for newborn infants on mechanical ventilation, this is important in reducing neonatal morbidity and mortality rate in Iraq. **So**, **the research aimed** to evaluate the nurses' understanding and practice related to the care of the newborn using a mechanical ventilator in Baghdad City/ Iraq. **Research Design**: We used for this study a descriptive research design. **Study settings**: this research was conducted at the Neonatal Intensive Care Units of Ibn AL- Baladi Teaching Hospital, Central Children's Hospital, and Welfare Children Teaching Hospital in Baghdad City /Iraq**. Research Subject**: A convenient sample consisting of 40 nurses from the aforementioned settings was provided. Two tools were utilized to acquire data **Results:** This study illustrated that fewer than half of the nurses involved in the study (40%) had a decent practice level, while only (20%) had strong knowledge related to the care of newborn infants on mechanical ventilation. there was a positive weak correlation (r=0.297). **Conclusion:** The total knowledge score of the studied nurses and their overall practice score showed a statistically significant positive weak correlation Regarding the Care of the Newborn infant Mechanical Ventilator.

Keywords: Nurses' Knowledge, practice, Mechanical Ventilatlator, Care, Newborn Infants**.**

Introduction

The neonatal period is considered the first 28 days of life after birth. The newborn has physiological and anatomical changes during this time adjusting to the extra uterine life environment (1). One significant factor in lowering the risk of newborn mortality and morbidity is mechanical ventilation. Improving the health and well-being of neonates on mechanical ventilation is facilitated by providing them with efficient nursing care (2,3).

A mechanical ventilator is an essential feature of modern NICU care, but it carries several risks and hazards. Mechanical ventilation in NICUs has significantly increased the survival rate of newborns in recent decades, particularly those who are very preterm. 60% to 70% of newborn mortality in recent years is attributable to the neonatal period. Since intensive critical care is required for around 9% of all newborns globally, high-risk neonates need to be closely monitored by competent nurses and physicians with experience to increase their chances of survival and having a healthy life (4, 5).

An invasive life support technique that has several impacts on a neonatal intensive care unit is

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mechanical ventilation. Mechanical ventilation is used on 10% to 20% of all infants admitted to the NICU (6,7). cardiopulmonary system, Mechanical Ventilation is a life-saving measure for critically ill neonates who are hospitalized. Numerous consequences have been attributed to ventilators, including infections, particularly "ventilator-associated pneumonia," injury to the lungs, chronic lung disease, shock, hypoglycemia, intraventricular hemorrhage, air leak syndrome, retinopathy of prematurity, oral cavity deformities, and complications with the skin (8,9).

Neonatal intensive care unit (NICU) nursing staff in the critical care field plays a vital role in being one of the most important healthcare resources having a direct impact on neonatal healthcare, they are responsible for preventive measures and care of newborns on MV. Nurses have a positive influence on the care of ventilated newborns and avoid side effects because they are always nearby and taking care of newborns (10,11).

Since nurses are always at the newborn's bedside, they are the primary healthcare providers in charge of monitoring and responding to all of the newborn's requirements. They must maintain a close watch on all equipment, including ventilators (12,13). Nurses play a vital role in the inhibition of MV expected complications. Nurses have to enhance nursing practice in a systematic and high-quality manner. To provide safe and effective care, neonatal nurses must be aware of the complexities of caring for any neonate who needs mechanical ventilation. They must also monitor the neonate's use of the machine, record it at all times to prevent potential issues, provide solutions when needed, and assist with weaning (14,15).

Hence, the Assessment of Nurses' Practice and Knowledge related to Newborn Infants on Mechanical Ventilation in Baghdad City is mainly important in the Neonatal Intensive Care Unit (NICU) to improve the practice and knowledge of nurses who give direct care to newborns on invasive mechanical ventilation (16).

Significance of the Study:

Many vital physiological modifications are important during the highly vulnerable neonatal period. for extra-uterine life. The world's most pressing public health issue is neonatal mortality, which disproportionately affects low-income nations. Significant progress has been made globally in reducing the mortality rate for children under five percent (3,17**).**

Prematurity, congenital anomalies, and acute respiratory distress are the primary causes of death during the first four weeks of life. Almost 80% of newborns who pass away within the first 48 hours of birth have Very Low Birth Weight or Very Very Low Birth Weight, which calls for ongoing professional nursing care. Mechanical ventilation has enhanced neonatal survival rate. Through the identification of weak spots in the care admitted, the evaluation of nursing care given to newborn infants on mechanical ventilation aids professionals in guiding future nurse-neonate interactions. Thus, it is crucial to evaluate the nurses' practice and knowledge in caring for newborn infants on mechanical ventilation (18).

Aim of the Study:

This research aimed to evaluate the nurse's knowledge and practice Regarding the Care of Newborn infants on Mechanical ventilators in Baghdad City.

The research's aim was achieved through:

- Evaluating the studied nurses' knowledge concerning the Care of the Newborn infant on Mechanical Ventilator.
- Assessing the nurses' practice concerning the Care of the Newborn infant on a Mechanical Ventilator.
- Assessing the Correlation between nurses' Knowledge and practice Regarding the Care of the Newborn infant on a Mechanical Ventilator.

Subject and methods:

Research design:

A Descriptive research design was carried out from 1st October 2023 to the end of March 2024.

Sample and sample size:

40 nurses and 40 neonates on mechanical ventilation made up the convenient sample for the current research

Study setting:

The research was carried out at neonatal intensive care units (NICUs) affiliated with Ibn AL- Baladi Teaching Hospital, Central Children's Hospital, and Welfare Children Teaching Hospital in Baghdad City/Iraq.

Tools for collecting data:

Tool I: A predesigned Interviewing Questionnaire:

After examining relevant literature, the researcher developed it, and simple Arabic was used to write to fit the specifications of the nurses. It is divided into the following three parts:

Part 1: It focuses on the characteristics of nurses, which include their age, years of experience, education, marital status, and participation in training courses.

Part 2: Newborn infants' Clinical and demographic information on mechanical ventilation, including ventilator modes, birth weight, medical diagnosis, age of admission, and gestational age at birth.

Part 3: Twenty questions were added to determine the precise degree of knowledge among the nurses under study on mechanical ventilation, including signs of weaning from mechanical ventilation, definitions, indications, and complications.

The following is the calculation of the knowledge scoring method for the nurses under study:

There were 20 questions in total, and the total score was 40. 2 points were granted for an entirely accurate answer, 1 for an answer that was only partially correct, and zero for do not know. Based on the nurses' answers, their knowledge level was divided into three categories: poor (<60%), average (60 < 75%), and good (≥ 75%).

Tool II: Nurse's Observational checklist,

Based on the most recent study, the researcher created this tool. Associated with the handbook of pediatric nursing procedures (Kalia, 2015), to evaluate the nursing care given to newborns who are on MVl ventilation. Chest physical therapy, close system endotracheal tube suctioning, axillary temperature, and hand washing were all part of it.

Ethical consideration:

Initially, the researcher conducted one-on-one interviews with the nurses in the aforementioned setting, introducing herself, outlining the goal of the study, and providing a concise and straightforward overview of it. The nurses gave their verbal consent and were informed of their right to leave the study at any moment and for any reason. Additionally, they received assurances of anonymity, and that the information gathered would only be utilized for study.

Pilot study:

4 neonatal nurses, or 10% of the sample, participated in pilot research to determine how long it would take to complete the forms and to assess the tools' applicability and clarity. following this, certain questions were clarified and modified.

Content Validity:

A panel of two pediatric nursing experts reviewed the research evaluation instruments to determine their content validity. A minor adjustment has been made.

The fieldwork:

From October 2023 until the end of March 2024, two months were dedicated to the actual fieldwork. During the morning shift, the researcher was working in the study setting.

Statistical data analysis:

SPSS version 20 was used to analyze the data. Numerical data were expressed as mean ± SD and range. Frequencies and percentages were used to express the qualitative data. The associations between the various numerical variables were evaluated with the use of Pearson's correlation. Alongside the Chi-squared test. A probability level of <0.05.

Results:

Table 1, showed that, with a mean age of 27.84 ± 4.42, over two-thirds (67.5%) of the nurses were under 30 years old. Most (90%) of them did not participate in any training program related to the care of infants on mechanical ventilation, and three-quarters (75%) of them were from rural regions.

Figure 1 shows that just 20% of the nurses who participated in this study had less than five years of experience caring for newborns on invasive mechanical breathing, while almost half (42%) had five to ten years**.**

Figure 2 revealed that over one-third (38%) of the nurses in the study had a bachelor's degree in nursing, and over two-thirds (62%) had completed secondary school.

Table 2 explains that 80% of the newborns on MV were younger than three days. With a mean ±SD of 32.92 ± 4.21 weeks, nearly two-thirds (62.5%) of the neonates had gestational ages between 32 and 36 weeks

Figure 3 shows that Respiratory Distress Syndrome (RDS) was identified in almost two-thirds (60%) of newborns on mechanical ventilation, followed by Meconium Aspiration Syndrome (MAS) in 20% of cases and Apnea in 15% of cases.

Figure 4 illustrated that Only 20% of the nurses in the study had strong knowledge of newborn care on mechanical ventilation, whereas less than half (47.5%) had inadequate understanding.

Table 3 demonstrates how nurses' practices for caring for newborns with MV are distributed as a percentage. It was shown that the majority of nurses (87%) exclusively use endotracheal tube suctioning, with hand cleaning following it (75%), and intravenous infusion in third place (72.5%). Nearly one-third of nurses (30%) do not fully conduct chest physical therapy for newborns, and more than half (62.5%) do not fully practice neonatal positioning.

Figure 5 illustrates that Regarding newborn care on mechanical ventilation, only 22.57% of the nurses in the study had poor practice, while less than half (40%) had an acceptable level of practice.

Table 4 cleared that there was a statistically significant difference and a weak correlation (r=0.297) between the degree of knowledge and the total mean score of the nurses' practice in the study. ($p < 0.05$).

Table (1): The Socio-Demographic Data of the Neonatal Nurses in Percentage Distribution (n=40).

Items	Total number	
	No = 40	100%
Age: (years)		
< 30	**27**	**67.5**
≥ 30	13	32.5
Mean ± SD	**27.84 ± 4.42**	
Residence:		
Rural	**30**	**75**
Urban	10	25
Marital status:		
Single	15	37.5
Married	**25**	**62.5**
Years of experience:		
Mean ± SD	**7.49 ± 7.31**	
Participated in training courses related to mechanical ventilation?		
Yes	4	10
No	**36**	**90**

F= frequency, %= percentage

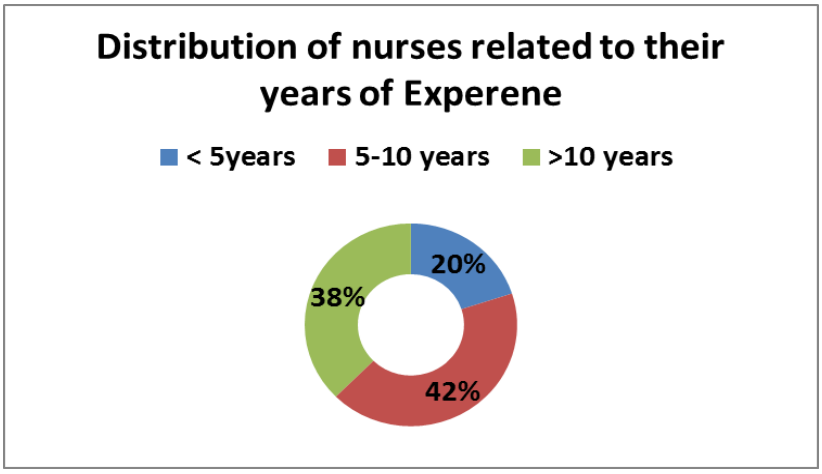

Figure 1: The distribution of the percentages of nurses in the study concerning the number of years they had worked in NICUs (n = 40)

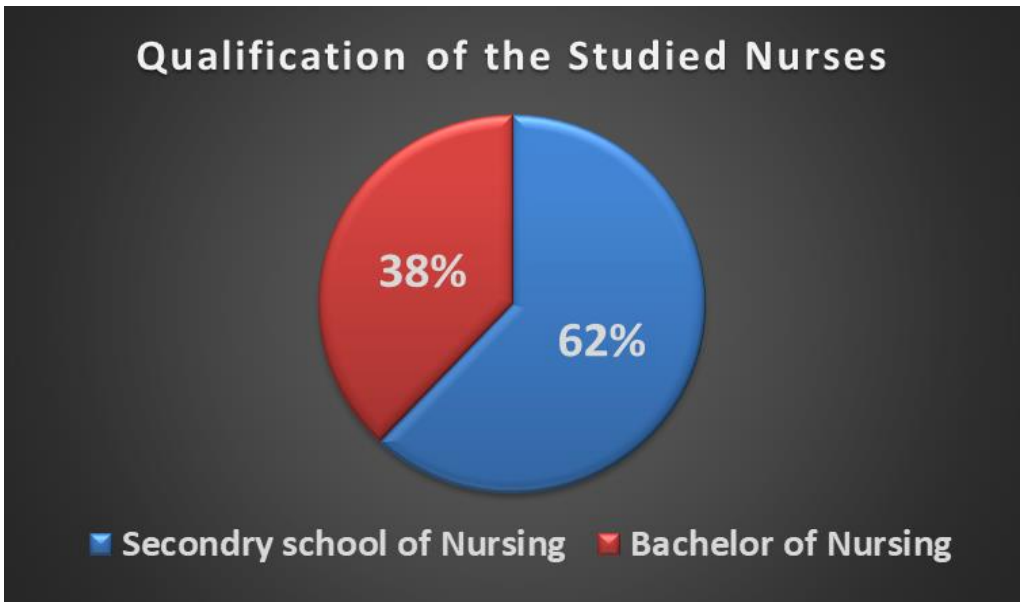

Figure 2: Distribution of the nurses in the study regarding their qualifications (n =40).

Table 2: percentage distribution of clinical and demographic information for the newborns in the study (n=40).

Items	(n=40)	%
Age on admission/ days:		
< 3days	32	80
≥ 3days	8	20
Mean ± SD	2 ±0.1	
Gestational age at birth/ weeks:		
28 < 32	5	12.5
32 < 36	25	62.5
36 – 40	10	25
Mean ± SD	32.92 ± 4.21	
Birth weight/ gm.		
Mean ± SD	2395.6 ± 82.49	

F= frequency, %= percentage

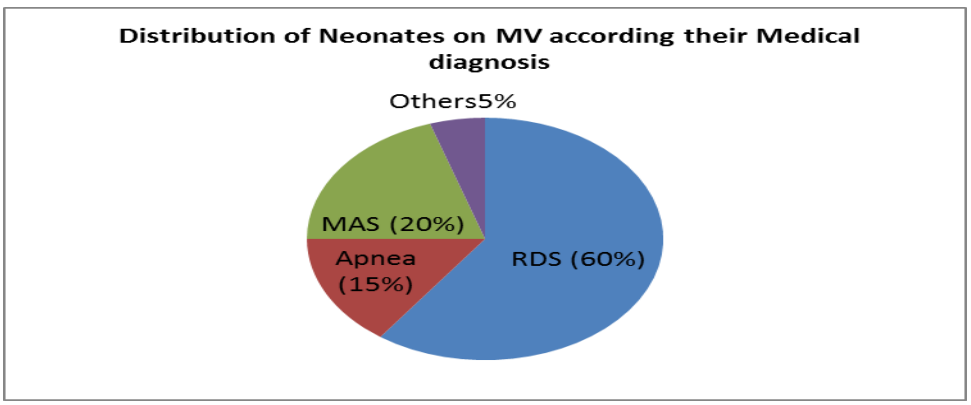

Figure 3: Distribution of Newborn Infants on MV in line with their Medical Diagnosis (n=40).

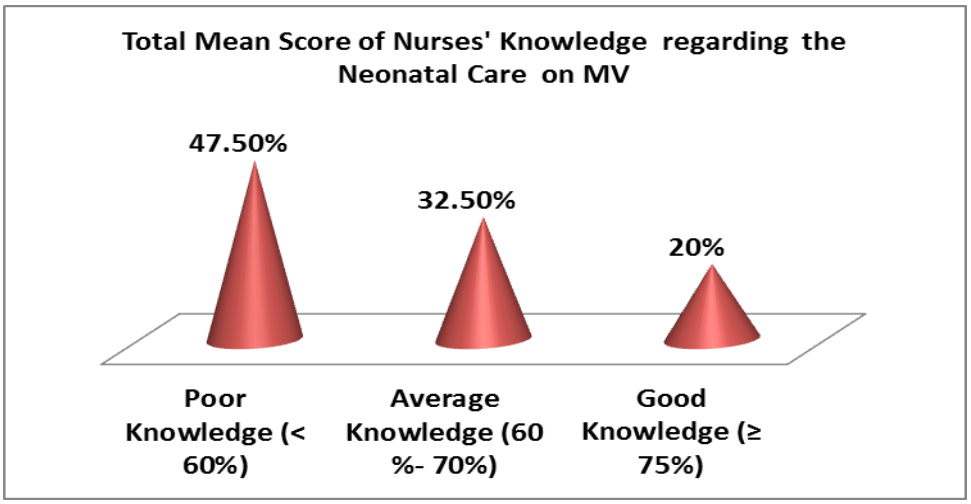

Figure 4: The total mean score for all nurses' expertise in caring for newborns on mechanical ventilation in the study (n=40).

Table 3: The distribution of the percentage of the nurses' practices that were studied concerning caring for newborn infants on mechanical ventilation (n=40).

Items	Completely done		Incompletely done		Not done	
	No.	%	No.	%	No.	%
Hand washing	30	75	6	15	4	8.5
The positioning strategies of the neonate	15	37.5	25	62.5	-	-
Taking an axillary Temperature	23	57.6	12	30	5	12.5
Intravenous Infusion	29	72.5	11	27.5	-	-
Close system of Endotracheal tube (ET) suctioning	35	87.5	5	12.5	-	-
Mouth care	25	62.5	8	20	7	17.5
Eye care	28	70	5	12.5	7	17.5
Chest physiotherapy	24	60	12	30	4	10

F= frequency, %= percentage

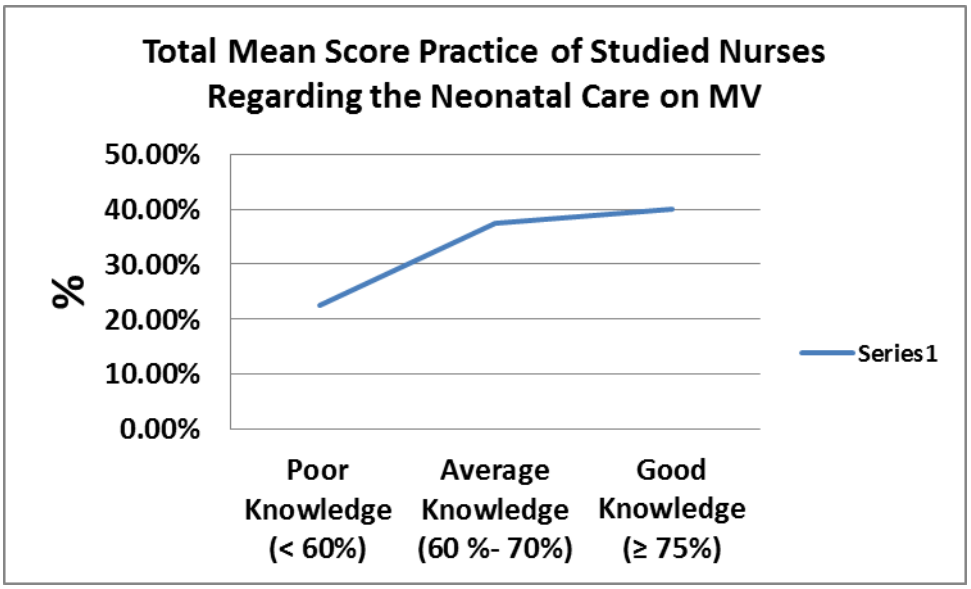

Figure 5: The study's total mean score for the nurses' practices in caring for newborn infants on mechanical ventilation (n=40).

Table 4: correlation between the nurse's practice scores and total mean knowledge in the study concerning the care of newborn infants on MV (n=40).

Total Mean Score Practices of the Nurses	Total Mean Score Knowledge of the Nurses	
	R	*P* – Value
	0.297	0.003

HS: Highly significant at P≤0.01; S: significant at ≤0.05; NS: Non-significant at P>0.05

Discussion:

Regarding the characteristics of the nurses in this study, the result of that study revealed that With a mean age of 27.84 ± 4.42, almost two-thirds of the nurses were under 30 years old, and the great majority of them had not participated in any training associated with the treatment of newborn infants on mechanical ventilation. The result was comparable to research by (19) titled "Assessment of nursing care in neonatal RDS," which showed that the nurses' age range was 20–30 years old.

Throughout the years of experience of neonatal nurses, this research found that only 20% percent were nurses with fewer than five years of experience, while almost half (42%) had five to ten years of expertise caring for newborns on invasive mechanical ventilation. This outcome disagreed with (20) Most of the nurses in their study had fewer than five years of experience, according to their research on the "knowledge of pediatric critical care nurses regarding evidence-based guidelines for the prevention of ventilator-associated pneumonia."

The results of this research revealed that most

(90%) of them didn't take part in any training relating to the care of newborns on mechanical ventilation. This finding is supported by the fact that all of the nurses in the study did not participate in a training program (21). This conclusion was not corroborated by (22), who conducted research named "Evaluations of Nursing Care in Newborn RDS" and showed that over 50% of the nursing staff had taken part in training.

Regarding neonatal demographic and clinical data, the finding of this study presented that most neonates on MV (80%) aged less than 3 days. Nearly two-thirds (62.5%) of the newborn infants had gestational ages ranging from 32 weeks to 36 weeks with mean ±SD of 32.92 ± 4.21weeks., This result was comparable to (23)'s study on the "quality of nursing care provided for neonates with mechanical ventilation," which found that most newborns had gestational ages between 32 and 36 weeks.

Related to, the nurses' knowledge of how to care for newborn infants on MV. This research illustrated that fewer than half of the study's nurses lacked adequate knowledge (Poor level of knowledge). This outcome differed from that of (24) who discovered that over 50% of the study nurses were properly informed about enhancing the quality of care.

about the nursing staff's procedures for caring for newborns on MV. The study's findings demonstrated that most nurses completely carry out endotracheal tube suctioning, then hand washing, and then Intravenous infusion. More than half of nurses don't fully practice the positioning of newborn infants, and nearly one-third of the nurses do not fully exercise neonatal chest physiotherapy. This result contradicts (25) who found that more than half of nurses practiced hand washing well.

Also, the results of this research showed that fewer than half of the nurses in the study had a good level of practice, concerning neonatal care on MV, this agrees with (26) who cleared that more than Two-thirds of the nurses studied received low practice scores overall.

As regards the association between the total mean score of practice and the total mean score of knowledge of nurses. The finding of this research cleared that there was a weak correlation and statistically significant difference between the total mean score of the nurses' practice and their level of knowledge in the study at ($p < 0.05$). This result was similar to (20) which found a statistically significant difference between nurses' overall knowledge level and practice concerning the care of newborn infants undergoing MV, in contrast to (27) who "assess the quality of nursing care given for high-risk neonate", found no statistically significant association between the nurses' practice and overall knowledge scores and the care of newborn infants undergoing MV in the study.

Limitation

Some limitations were found such as small sample size. And There was no grant funding for this study.

Conclusion

The current study's findings indicate that what should be improved is the neonatal nurses' knowledge to reduce the inappropriate practices and knowledge surrounding the care of newborn infants on mechanical ventilators because the practice and knowledge of the studied nurses did not correlate significantly.

Recommendation

In light of this research's findings, the following suggestions are put forth:

- Replicating this research with large samples of neonatal nurses to evaluate their knowledge and practice related to newborns on mechanical ventilators in different settings in Iraq.

- Perform evidence-based training programs for the neonatal intensive care unit's nurses to keep them up to date on the latest information and techniques for caring for newborns on mechanical ventilators.

Implications for practice

Improvement of nurses' practice and knowledge related to the care of newborns on MV at NICUs based on evidence is required regularly.

Implications for neonatal research

The findings of the research refer to further research that should be conducted in the future to update nurses' practice and knowledge related to newborn infants on MV.

Conflict of interest: NIL
Funding: NIL

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