KNOWLEDGE, ATTITUDES AND PRACTICES OF NURSES TOWARDS NOISE IN A PUBLIC HOSPITAL IN PALESTINE

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ABSTRACT

Introduction: Noise exposure has been known to affect the health negatively. In hospitals, it affects the health care professionals as well as the patients. Knowledge about noise issue is limited among health care providers.

Objectives: To assess the knowledge, attitudes and practices (KAP) of nurses towards noise and determine the association between their KAP and certain socio demographic factors. Also, to determine noise sources as perceived by nurses.

Methods: Cross sectional study was used and a total of 180 nurses working in different departments at Palestine Medical Complex (PMC) were subjected to interviewing questionnaire.

Results: The findings showed that nurses' knowledge about noise was limited and poor with no statistical significance between genders, age, highest qualification obtained, total years of experience in the field and the knowledge level. Attitudes were relatively positive with a significant association between gender and attitudes level (p=0.013), also a significant relationship appeared between qualification and attitudes level (p=0.025). Nurses' practices towards noise were so poor and insufficient. Statistically significant differences were revealed between different age groups and practices level (p=0.006) and between qualification and practices level

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

(p=0.021). The major noise sources were the quarrels between the health staff and patients' visitors/companions, renovation and construction work inside PMC, loud conversations, patients, medical equipment and shouting of the staff.

Conclusion: Poor knowledge, adequate attitude and poor practices were detected among the study subjects. Educational intervention for nurses and the whole health staff is essential to increase awareness and knowledge about noise issue and ways to reduce it.

Key words: Hospital noise, nurses knowledge, nurses attitudes, nurses practices, noise pollution

INTRODUCTION

Noise may be defined as any unwanted or unfavorable sound which is subjectively annoying or disrupts performance and that is stressful from physiological and psychological aspects (Kam *et al*., 1994). It is based on the acoustical properties of the sound to be considered as noise as well as the interference it has with the purposed activities (Basner *et al.,* 2017). Every one of us has his own sensitivity to sound that makes us unequally affected by the same noise and are not affected in the same way when we are at work and also when being at home (Pantawene *et al.,* 2017). Noise now is a serious problem in both developed and developing countries and exposure to high levels of it has proven to be a health hazard for human, animals and the whole ecosystem (Anees *et al*., 2017).

Exposure to noise has known since a long time to cause hearing loss but recently it is proven to have effects on cardiovascular system, endocrine and nervous systems in addition to sleep disorders (KyooSang *et al*., 2015).

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

Annoyance is the ain psychological effect when people exposed to occupational and environmental noise (Passchier-Vermeer and Passchier, 2000).

The environment of hospitals was calm but it tended to be noisy in the recent decades and the levels of noise exceeded what is recommended by the World Health Organization (WHO) and the Environmental Protection Agency (EPA) (Choiniere, 2010). Noisy hospitals may cause harmful physical and psychological effects for both patients and nurses but nurses are much more affected as they stay longer inside hospitals (Choiniere, 2010). Stress, miscommunication, low performance and fatigue of nursing staff are among these effects (Costa *et al.,* 2013). Measurement of noise levels at different sectors and environments in hospitals appeared to be above the recommended levels by WHO (Costa *et al.,* 2013; Andrade *et al.,* 2016). Some hospitals in Taiwan showed daily average sound levels during daytime more than Taiwan noise limit of 50 decibels (Juang *et al.,* 2010). Noise levels in ICUs appeared to exceed those recommended set by WHO and EPA where the main sources of it were due to operating equipment and human activities (Khademi and Imani, 2015). The hospital noise affects the wellbeing of patients and is responsible for physical and psychological effects in them (Cunha and Silva, 2015).

Regarding knowledge on noise issue, many studies have shown lack of knowledge regarding it among nurses and other health care providers. It has

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

been reported that nurses in ICUs have limited awareness and poor knowledge regarding noise and its negative effects (Christensen, 2005; Johansson *et al.,* 2016). The educational programs focused on harmful effects of noise and changing behaviors to lower it resulted in adopting behavioral changes by the professionals to prevent the unnecessary noise (Milette, 2010; Weich *et al.,* 2011). These programs are the most beneficial and the least expensive way to decrease noise (Konkani and Oakley, 2012). They were effective in reducing the noise levels than it was before intervention in some studies in Brazil (Duarte *et al*., 2012; Zamberlan-Amorim *et al.,* 2012). Training of health care workers was really effective in decreasing sound levels in NICU in a tertiary hospital in Istanbul and ICU in Rouhani hospital in Babol (Calikusu Incekar and Balci, 2017; Zamani *et al.,* 2018). Modifications in the behaviors of nurses are inadequate to control the excessive noise and should be combined with effective management of machines and medical devices alarms besides continuous process improvement plan (Konkani *et al.,* 2014). The arrangement of physical space, repairing devices and educating staff were efficient together and functional in lowering noise levels in ICU after intervention (Kol *et al.,* 2015). In Jordan, nurses' knowledge about noise in ICUs was found to be insufficient and there is a bad need to improve it (Al-Tarawneh *et al.,* 2020).

In Palestine, noise pollution needs to be investigated, especially in hospitals since elevated levels of noise are proved to be high in hospitals in

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

everywhere and to have adverse effects on the whole staff and patients. No previous studies have been done to identify nurses' knowledge, attitudes and practices (KAP) towards noise in Palestinian hospitals. Therefore, this study was undertaken to assess KAP of nurses regarding noise in a public hospital. Also, to determine the relationship between socio-demographic variables of nurses and their level of knowledge, attitudes and practices and determine the sources of noise as perceived by nurses in their different working departments. The study attempted to highlight on such issue which will help in understanding the magnitude of the problem and recommend on suitable interventions.

SUBJECTS AND METHODS

Study design: A cross sectional study was used to assess nurses' KAP towards noise pollution.

Study setting and study population: The study was conducted in Palestine Medical Complex (PMC) in July 2020. PMC is located in Ramallah and Al-Bireh governorate in West Bank and it belongs to the Ministry of Health (MOH).

It consists of 4 main wings: Ramallah Sons wing, Emergency wing, Pediatrics wing and Cardiac and the specialized surgeries wing. Seven departments from Ramallah Sons wing were included in the study and they were: Intensive Care Unit (ICU), Cardiac Care Unit (CCU), Cardiology and Catheterization, General surgery, Internal Medicine, Operation, and Kidney

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

department which is located in a near separated building. Emergency and Orthopedic departments were taken from Emergency Wing and the departments of Critical Care Unit (CCU) and Specialized surgeries were taken from Cardiac and Specialized Surgeries Wing. Four departments from Pediatrics Wing were also included; Emergency Room (ER), Neonatal ICU, Pediatric ICU, and internal Medicine. The study included adequate number of nurses who were working in different departments in PMC. The nurses included in the study were with duration of employment of one year and more in the MOH.

Ethical considerations: Approval was obtained from the Faculty of Graduate Studies and Environmental Research at Ain Shams University and from the executive manager of the PMC. An explanatory letter was attached to every questionnaire as an informed consent to maintain participants' rights and the participation was optional.

Data collection: A structured questionnaire was developed by the researcher and revised by expert committee. A pilot study was conducted using this tool on 15 subjects to test validity and reliability. Cronbach's alpha test was done and was with acceptable level (Pallant, 2001). The same questionnaire was passed to all nurses participated in the study and they were interviewed via face to face by the researcher. The questionnaire consisted of three parts, the first part covered socio-demographic factors; the second part covered nurses' KAP towards noise problem. Knowledge section included questions on noise

68

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

definition, permissible levels in hospitals, sources, effects on nurses and patients and ways to reduce it and others. Attitudes and practices sections were measured with likert scale. An opened question was added to the practices section to tell about the practices nurses actually engaged in to reduce noise in their departments. The last part was a checklist for known noise sources in hospitals and nurses had to choose the ones they exposed to in their own department. Each questionnaire took approximately 20 to 25 minutes to be filled.

Statistical analysis: Statistical Package for Social Sciences (SPSS) software was used (version 25). The questionnaires were coded and entered into the computer. Descriptive statistics and frequencies and cross tabulation for specific study variables were formed. The scores for knowledge, attitudes and practices for each participant were transformed into percent score. The scores were classified as good score (more than 70%), average score (50-70%) and poor score (less than 50%). Appropriate statistical methods were applied (Harris and Taylor, 2014).

RESULTS

Characteristics of study subjects: A total of 180 nurses out of 186 nurses working in different selected departments in the PMC responded to the interviewing questionnaire with a response rate of (96.8%). As shown in table 1, 56.1% of the nurses were males. The majority of the participants were

under the age of 37. The average age for nurses was 32.5 and most of them were registered nurses (80.6%) with a bachelor's degree (70.6%) and 10.0% had a Master Degree and others. Most of them had an experience less than 10 years in nursing field and only 7.8% had a field experience of more than 20 years.

Table (1): Distribution of study population by certain characteristics (N=180)

Characteristics	Participants (N)	%
Gender		
Male	101	56.1
Female	79	43.9
Age[a]		
Less than 30 years	82	45.6
30-37 years	62	34.4
More than 37 years	36	20.0
Job title		
Registered nurse	145	80.6
Practical nurse	35	19.4
Highest qualification obtained		
Diploma	35	19.4
Bachelor's	127	70.6
Master and others[b]	18	10.0
Years of experience in nursing field[c]		
10 years and less	108	60.0
11-20 years	58	32.2
More than 20 years	14	7.8

[a] Mean= 32.5, SD=6.88.
[b] Diploma in different specialities in nursing field after the bachelor's degree.
[c] Mean=10, SD=6.75.

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

Nurses' knowledge towards noise: Overall mean score of knowledge was 42.26% and the knowledge score for participants was ranged from 6% to 67%. The mean score was higher among males. An independent sample t-test showed that there was no significant difference between males and females in their knowledge, t=1.937, p=0.054. Also, the mean score for knowledge was better for those less than 30 years old than the other groups and no significant difference in knowledge between the different age groups was shown by ANOVA test, F=0.863, p=0.424. The mean score for those with master and others degree was more than the other groups and there was no significant difference between respondents based on their qualification, F=0.620, p=0.539. For those who had experience of 10 years and less in the field, the mean score for knowledge was higher than others and no statistically significant difference between nurses regarding their years of experience was shown by ANOVA test, F=0.500, p=0.607 (Table 2).

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

Table (2): Mean for participants scores regarding noise knowledge based on their different characteristics

Characteristics	Participants (N)	Mean scores (%)	±SD	P-value[d]
Total	180	42.26	11.6	
Gender				
Male	101	43.72	12.0	0.054
Female	79	40.38	10.7	
Age				
Less than 30 years	82	43.40	12.0	
30-37 years	62	41.47	11.6	0.424
More than 37 years	36	40.53	10.6	
Highest qualification obtained				
Diploma	35	40.54	12.3	
Bachelor's	127	42.47	11.6	0.539
Master and others	18	44.06	10.2	
Years of experience in nursing field				
10 years and less	108	42.89	12.2	
11-20 years	58	41.60	10.5	0.607
More than 20 years	14	40.07	11.1	

[d] By independent sample t-test and ANOVA test.

Nurses' attitudes towards noise: The total mean score of attitudes for respondents was 71.74% and the range of attitudes score was from 30% to 95%. The mean score for attitudes among males was better than females and independent sample t-test showed statistically significant difference between males and females in their attitudes, t=2.512, p=0.013. The attitudes mean score was higher for those aged less than 30 years than the others and no significant difference was shown between the different age groups, F=0.534,

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

p=0.587. The attitudes mean score for those with master and others degree was better than those with other degrees and a significant difference was shown between nurses based on their highest qualification, F=3.747, p=0.025. Those with experience of 10 years and less in the field had better attitudes mean score compared to others but there was no significant difference between nurses regarding their years of experience, F=1.323, p=0.269 (Table 3).

Table (3): Mean for participants scores regarding noise attitudes based on their different characteristics

Characteristics	Participants (N)	Mean scores (%)	±SD	P-value[d]
Total	180	71.74	10.4	
Gender				
Male	101	73.44	10.4	0.013[e]
Female	79	69.58	9.9	
Age				
Less than 30 years	82	72.37	9.2	0.587
30-37 years	62	71.81	11.5	
More than 37 years	36	70.22	10.8	
Highest qualification obtained				
Diploma	35	67.51	12.3	0.025[e]
Bachelor's	127	72.71	9.7	
Master and others	18	73.17	9.5	
Years of experience in nursing field				
10 years and less	108	72.14	10.4	0.269
11-20 years	58	72.05	9.9	
More than 20 years	14	67.43	11.6	

[d] By independent sample t-test and ANOVA test.
[e] Significant p-value < 0.05.

Nurses' practices towards noise: As shown in table (4), the total mean score for nurses' practices was 27.49% and the range of the score was from 6% to 47%. The mean score for practices among males was higher and no statistically significant difference was shown between male and female in their practices level, t=1.874, p=0.063. The practices mean score among different age groups was better among those ranged 30-37 years old and statistically significant difference was shown in nurses practices between the different age groups, F=5.318, p=0.006. The practices mean score for nurses with bachelor's degree was higher than those with other degrees and there was a significant difference between nurses according to their highest qualification obtained, F=3.938, p=0.021. The practices mean score for nurses having experience of more than 20 years in the field was more than those having less years of experience but no significant difference was shown between nurses regarding their years of experience, F=0.194, p=0.824.

Table (4): Mean for participants scores regarding noise practices based on their different characteristics

Characteristics	Participants (N)	Mean scores (%)	±SD	P-value[d]
Total	180	27.49	8.2	
Gender				
Male	101	28.50	7.9	0.063
Female	79	26.20	8.4	
Age				
Less than 30 years	82	25.71	7.8	0.006[e]
30-37 years	62	30.08	8.7	
More than 37 years	36	27.08	7.3	
Highest qualification obtained				
Diploma	35	24.06	9.5	0.021[e]
Bachelor's	127	28.35	8.0	
Master and others	18	28.06	4.4	
Years of experience in nursing field				
10 years and less	108	27.23	8.3	0.824
11-20 years	58	27.71	8.5	
More than 20 years	14	28.57	6.7	

[d] By independent sample t-test and ANOVA test.
[e] Significant p-value < 0.05.

In the opened question in which the nurses were asked if there were certain practices they actually did to reduce noise at their departments, 49 of them (27%) mentioned controlling medical alarms. 47 nurses (26%) mentioned calling the security to get visitors and patients' companions out of the departments or reducing the number of them while 21 nurses (12%) tried to reduce the visitors and companions number by themselves. 11 nurses (6%) pointed to closing the door of the department and the windows inside it in

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

order not to hear noise coming from outside. Only 5 nurses (3%) asked the medical staff to keep calm while arguing or quarreling and just one nurse talked about dealing quietly or handling carefully materials and equipment.

Score levels of knowledge, attitudes and practices towards noise: The scores of knowledge for about two thirds (64%) of the respondents were poor. For attitudes score, about half of the participants had good scores (above 70%) and about half of them had average scores (50-70%). The scores for practices were poor for 100% of the participants (Table 5).

Table (5): Distribution of participants regarding level of Knowledge, attitudes and practices

Characteristics	Participants (N)	%
Knowledge		
Poor score (less than 50%)	115	63.9
Average score (50-70%)	65	36.1
Good score (more than 70%)	0	0
Attitudes		
Poor score (less than 50%)	2	1.1
Average score (50-70%)	87	48.3
Good score (more than 70%)	91	50.6
Practices		
Poor score (less than 50%)	180	100
Average score (50-70%)	0	0
Good score (more than 70%)	0	0

Sources of noise in different departments: In PMC different departments, the main sources of noise as reported by nurses were the quarrels with patients' relatives and visitors, renovation and construction work inside the wings, conversation of patients visitors, ringtones, patients moaning or

76

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

crying/shouting, the quarrels with patients' relatives and visitors outside the department, medical equipment especially in intensive care units. Other sources reported were the co-workers conversations, shouting of nursing staff and the medical staff, noise during shift change, vehicle traffic, cleaning personnel, children playing and cardiac monitors. The doorbell, rolling of trolley wheels and doors opening and closing were also reported.

DISCUSSION

This study is of importance as it attempted to determine the knowledge, attitude and practices of nurses towards noise issue in a main public hospital in Palestine State. In PMC, There was a slight male predominance among nurses and this differs from the Jordanian study which showed female predominance (Al-Tarawneh *et al.*, 2020). Globally, females account for about 90% of the nursing workforce (World Health Organization, 2020). In PMC, the reason for that may due to social and cultural reasons.

Regarding age, most of the respondents were young and this differed from the Brazilian study where the majority of nursing staff were aged 40 or more (Costa *et al*., 2013), this may due to the transfer of many experienced nurses in PMC to work in another governmental hospitals and the increased rate of employment of graduate nurses. In terms of job title and last qualifications obtained, most of them (80.6%) were registered nurses with bachelor's degree and this result didn't agree with Brazilian study where the nurses were with a percentage of 22.46% and the remaining were nurse

assistants and nurse technicians (Costa et al., 2013). Only 7.8% of them had an experience over 20 years and this differed from Brazilian study as those with experience of 20 years and more represented 49% (Costa *et al.*, 2013). This is due to the fact that most of the nurses working in PMC were young.

The findings indicated that the knowledge for about two thirds (64%) of the respondents were poor, regardless of their gender, age, qualifications and their total years of experience and the total mean score for knowledge was poor. The literature documented that nurses had poor knowledge and limited awareness regarding noise and its effects (Christensen, 2005; Johansson *et al*., 2016). The current study indicated that different age groups and years of experience had no association with level of knowledge and this agreed with Johansson and others' study (Johansson et al., 2016) but the result regarding no association between years of experience and knowledge level didn't agree with Jordanian study (Al-Tarawneh *et al*., 2020). No significant association between gender and the level of knowledge was found and this agreed with the result revealed by Duarte *et al.,* (2012) and Al-Tarawneh *et al.*, (2020). The results of the current study revealed that qualifications obtained had no association with knowledge level.

The respondents' attitudes towards noise were good although their knowledge was limited with a total mean score of 71.74%. Males had more positive attitudes regarding noise but the results showed no association between different age groups, total years of experience in the field and the

78

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

nurses' attitudes regarding noise. The current study showed a statistically significant association between the highest qualification obtained and participants' attitudes about noise as attitudes seemed to be more positive as the qualification gets higher and this is interesting. Most studies have focused mainly on investigating nurses' knowledge towards noise. But Juang *et al*., (2010) reported better attitudes towards ambient noise for those with at least had a Master's Degree among the medical care staff including nurses.

Regarding participants' practices towards noise, they were so poor and total mean score for practices was 27.49%. Gender and total years of experience in the nursing field found to have no association with the practices level. There was statistical significant difference between the different age groups in practices level and those ranged from 30 to 37 years were better and between highest qualification obtained and level of practices, those with Bachelor's degree had better practices than other participants. When nurses were asked to mention practices they actually did to reduce noise in their departments, their practices were very limited and weak. Knowledge and awareness regarding noise for nurses in PMC were weak and this may affect the practices level negatively since training and education on noise issue will sure enhance practices towards noise as revealed by study conducted by Weich *et al.*, (2011).

While most of the participants had a poor knowledge level regarding noise since they couldn't answer many questions correctly and completely and

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

even none of them had a good score, the attitudes of half of them tended to be positive and 48% had moderate attitudes. But the practices level towards noise for all participants was very poor.

Regarding noise sources, the noisiest source perceived by most nurses in their different departments was the quarrels of the medical staff with patient relatives and visitors inside and outside departments and this could be due to the nature and culture of some people in addition to the stressful conditions people experience daily in Palestine that might make them stressed and nervous. Medical equipment and co-workers conversations and conversation of patients' visitors were also mentioned and these sources were predominant in previous studies (Weich *et al.*, 2011; Costa et al., 2013; Khademi and Imani, 2015). The cardiac monitors and other medical equipment were mentioned by most nurses working in ICUs, CCUs, Kidney and adult ER departments in addition to some nurses in the operation department. Renovation and construction work inside the different wings and near to them in the PMC area, patients moaning or crying, shouting of nursing staff, children playing, doors opening and closing are also sources of noise in PMC and these were major sources in another study done by Juang *et al.*, (2010). Many of these sources can be controlled or modified.

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

CONCLUSION

Nurses in different departments at PMC had a poor and limited overall knowledge regarding noise problem. On the other hand, nurses' attitudes towards noise were relatively positive. The last qualification obtained had a statistical significant impact on nurses' attitudes. But the practices of nurses regarding noise were poor and inadequate. Different age groups and highest qualification obtained appeared to have statistical significant impact on nurses' practices towards noise. Only few percentage of nurses have mentioned performing good practices regarding noise during their daily work but even those practices were so limited in number. The main sources of noise were the health staff quarrels with patients' visitors, loud conversations among staff, loud conversations between visitors and medical equipment, the majority of noise sources in different departments were modifiable.

RECOMMENDATION

Educational program aimed to increase the knowledge and awareness regarding noise issue, its hazards and how to reduce it should be directed to nurses and the whole health care staff. Modifiable noise sources should be dealt with to reduce noise levels in health institutions.

Studies should be conducted in other hospitals in Palestine to investigate the problem of noise pollution there and to investigate the nurses and other health care professionals' KAP towards it.

Journal of Environmental Sciences (JES)
Faculty of Graduate Studies and Environmental Research, Ain Shams University
El-Afifi *et al.*

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El-Afifi *et al.*

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المعرفة واتجاهات وسلوكيات الممرضين تجاه الضوضاء
في مستشفى حكومي في فلسطين

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المستخلص

المقدمة: من المعروف أن التعرض للضوضاء يؤثر على الصحة بشكل سلبي. في المستشفيات, تؤثر الضوضاء على المتخصصين في الرعاية الصحية الى جانب تأثيرها على المرضى. المعرفة حول ما يختص بمشكلة الضوضاء تعتبر محدودة ضمن مقدمي الرعاية الصحية.

الأهداف: تحديد المعرفة والاتجاهات والسلوكيات لدى الممرضين تجاه الضوضاء وتحديد العلاقة بينهم وبين عوامل ديمغرافية اجتماعية معينة وتحديد مصادر الضوضاء في المستشفى كما يراها الممرضون.

أساليب البحث: استخدمت دراسة مقطعية وكان مجموع عدد الممرضين من العاملين في الأقسام المختلفة في مجمع فلسطين الطبي ١٨٠. تمت مقابلتهم وجها" لوجه لتعبئة الاستبيان.

النتائج: أظهرت النتائج أن معرفة الممرضين حول الضوضاء كانت محدودة وضعيفة المستوى. لم يتم العثور على فروق ذات أي دلالة احصائية بين الجنس و العمر وأعلى مؤهل للممرض ومجموع سنوات الخبرة في المجال وبين مستوى المعرفة لدى الممرضين. الاتجاهات نحو الضوضاء كانت ايجابية نسبياً. وجد ارتباط ذو دلالة احصائية بين الجنس ومستوى الاتجاهات وبين أعلى مؤهل ومستوى الاتجاهات للممرضين. فيما يتعلق بسلوكياتهم تجاه الضوضاء, وجد أن مستواها ضعيف جداً. ظهرت فروقات ذات دلالة احصائية بين الفئات العمرية المختلفة في مستوى سلوكياتها وكذلك بين أعلى مؤهل للممرض وبين مستوى سلوكياته. أهم مصادر الضوضاء كانت المشاحنات بين الطاقم الصحي ومرافقي/زوار المرضى وأعمال الترميم والبناء والمحادثات الصاخبة والمرضى والأجهزة الطبية وصراخ الطاقم الصحي.

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الاستنتاجات: المعرفة كانت ضعيفة المستوى والاتجاهات مقبولة والسلوكيات ضعيفة المستوى تجاه الضوضاء التي تم الكشف عنها بين الممرضين. التدخل التثقيفي الموجه للمرضين لكافة الطاقم الصحي هو أساسي لزيادة المعرفة والادراك بخصوص مسألة الضوضاء وكيفية الحد منها في الأقسام المختلفة.

الكلمات الدالة: ضوضاء المستشفى, معرفة الممرضين, اتجاهات الممرضين, سلوكيات الممرضين, التلوث الضوضائي.