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Original Article

N95 MASK: PERCEPTIONS OF SURGICAL CENTER WORKERS

MÁSCARA N95: PERCEPÇÕES DOS TRABALHADORES DO CENTRO CIRÚRGICO

MÁSCARA N95: PERCEPCIONES DE LOS TRABAJADORES DEL CENTRO QUIRÚRGICO

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Objective: to identify the perceptions of surgical center workers regarding the use of the N95 mask as Personal Protection Equipment in relation to surgical smoke. Method: qualitative research through audio-recorded interviews with nine workers from the Surgical Center of a hospital in northern Paraná, Brazil. It was questioned: what is the perception of workers exposed to surgical smoke in relation to the use of N95 masks? The technique of content analysis was used. Results: the study reveals the fragility of professionals' knowledge about the use of the N95 mask and the risks they are exposed during their working day, when exposed to surgical smoke. As well as discomfort from wearing the mask. Conclusion: training for health professionals exposed to surgical smoke is suggested, where it can be clarified about the use of Personal Protective Equipment correctly and its importance in preventing the development of occupational diseases.

Descriptors: Respirators N95. Respiratory protection device. Smoke. Occupational health. Surgical Center.

Objetivo: identificar as percepções dos trabalhadores do centro cirúrgico quanto ao uso da máscara N95 como Equipamento de Proteção Individual em relação à fumaça cirúrgica. Método: pesquisa qualitativa mediante entrevistas áudio-gravadas, com nove trabalhadores do Centro Cirúrgico de um hospital no norte do Paraná, Brasil. Questionou-se: qual a percepção dos trabalhadores expostos à fumaça cirúrgica em relação ao uso das máscaras N95? Foi utilizada a técnica de análise de conteúdo. Resultados: o estudo revela a fragilidade do conhecimento dos profissionais sobre a utilização da máscara N95 e sobre os riscos que estão expostos durante sua jornada de trabalho, quando expostos à fumaça cirúrgica. Assim como o desconforto pelo uso da máscara. Conclusão: sugere-se capacitação aos profissionais da saúde expostos à fumaça cirúrgica, onde possa ser esclarecido sobre o uso de Equipamento de Proteção Individual de forma correta e sua importância na prevenção para o desenvolvimento de doenças ocupacionais.

Descritores: Respiradores N95. Dispositivo de proteção respiratória. Fumaça. Saúde do trabalhador. Centro Cirúrgicos.

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Objetivo: identificar las percepciones de los trabajadores del centro quirúrgico en cuanto al uso de la máscara N95 como Equipo de Protección Individual en relación al humo quirúrgico. Método: investigación cualitativa mediante entrevistas audio-grabadas, con nueve trabajadores del Centro Quirúrgico de un hospital en el norte de Paraná, Brasil. Se preguntó: ¿cuál es la percepción de los trabajadores expuestos al humo quirúrgico con respecto al uso de las máscaras N95? Se utilizó la técnica de análisis de contenido. Resultados: el estudio revela la fragilidad del conocimiento de los profesionales sobre la utilización de la máscara N95 y sobre los riesgos que están expuestos durante su jornada de trabajo, cuando están expuestos al humo quirúrgico. Así como la incomodidad por el uso de la máscara. Conclusión: se sugiere capacitación a los profesionales de la salud expuestos a humo quirúrgico, donde pueda ser esclarecido sobre el uso de Equipo de Protección Individual de forma correcta y su importancia en la prevención para el desarrollo de enfermedades ocupacionales.

Descriptores: Respiradores N95. Dispositivo de protección respiratoria. Humo. Salud del trabajador. Centro Quirúrgicos.

Introduction

The Surgical Center (SC) is a hospital unit where invasive procedures of high precision, of varying degrees of complexity and different clinics are performed and, as a consequence, it presents stressed workers, afraid of and, at the same time, empowered to work in a unit that requires highly qualified human resources[1-2].

This qualification requires the worker knowledge in relation to scientific techniques, necessary for patient care, but leaves them without information regarding all the risks that accompany him during his working day within the SC. In this case, the perceptions of these workers end up leaving gaps in the need for protection during exposure.

One of the risks to which the worker is exposed in the SC is the surgical smoke, generated during the use of electrocautery, a device widely used, with the functions of reducing the time of surgery, intraoperative and postoperative bleeding as well as making incisions without bleeding or with minimal hemorrhage and providing better visibility of the operative field[3].

The surgical smoke is composed of 95% of water and 5% of organic vapors and cellular debris, being considered an occupational health problem, due to the offensive odor and significant air contamination by the presence of Volatile Organic Compounds (VOC), Carbon Monoxide (CO), toluene, Polycyclic Aromatic Hydrocarbons (PAH), among others[4].

These chemical compounds can trigger genetic mutations over the time of exposure, such as cancer[1,5], headache, foreign body sensation in the throat, nausea, vomiting, eye irritation, weakness, dizziness, burning in the pharynx, nasal congestion, sneezing and irritation of the nasal mucosa and oral cavity[6-7].

Despite this, workers do not perceive this exposure, and when using the usual masks during the working day, they are not using Personal Protective Equipment (PPE), as recommended, which is the N95 mask[8].

However, factors such as discomfort and lack of knowledge about this type of PPE lead to their low adherence[9], in addition to the lack of legal determinations and guidance to managers of these hospital units.

Despite the recommendations for the protection of workers exposed to surgical smoke, little has been done in relation to this serious problem, both in relation to the development of research and management actions for the protection of workers. But for the actions to be effective, it is necessary to know the opinion of the workers themselves exposed to this risk.

Therefore, what is the perception of workers exposed to surgical smoke in relation to the use of N95 masks?

With the objective, the proposal is to identify the perceptions of surgical center workers regarding the use of the N95 mask, as Individual Protection Equipment for exposure to surgical smoke.

Method

Qualitative research in a hospital located in the north of the state of Paraná, Brazil, developed

with nursing workers (nurses, nursing technicians and nursing residents), who were present in the surgical room during the anesthetic procedure surgical, and used the electrocautery, as well as general services workers, who performed the cleaning of the operating room after each procedure. Participants were selected for convenience, with no refusal to participate in this research.

Data collection took place in February and March 2020, through an audio-recorded interview, individual, after the work shift. The participants were approached by the researchers who explained the purpose of the study and delivered the consent form. The data were obtained by a single trained researcher, who had no previous contact with the study participants.

Previously, a pilot study was conducted with two workers to assess the relevance of the interview script and the interviewer's calibration. As it was not necessary to change the script, the data collected in the pilot were included in the analysis.

The guiding question for the collection of interviews was: what is the perception of workers exposed to surgical smoke in relation to the use of N95 masks? In addition to this question, the interviewer put in his script, some important questions for this research: "Do you know the mask N95?" ; "How often do you use the N95 mask?" ; "Last month you used the N95 mask how many times?" ; "What did you feel when you used the N95 mask?" ; "Do you think the N95 mask needs to be changed?" ; "Do you know the risks you are susceptible to in the operating room?" ; "Do you know what surgical smoke is?" "Do you recognize surgical smoke as a health risk?"; "Do you use any smoke protection measures?".

The duration of each interview was approximately 15 to 20 minutes. This variation was related to the particularity of each participant, in the way he expressed his ideals, but did not represent a difference in the content of the interviews. The interviews were fully transcribed by the author on the same day of their performance, so when the data were saturated, the interviews stopped being conducted.

Data analysis was performed using the content analysis technique, which consists of three phases: pre-analysis of the collected data, exploration of the material and treatment of the obtained results[10].

The first phase (pre-analysis of the data) consisted of the organization of the material to be analyzed. After the dynamic reading of the questionnaires, the choice of relevant terms was made, according to the objectives proposed in the research. In the second phase (Exploration of the collected material), the analytical description was made. The third phase (treatment of the results obtained) was characterized by the analysis of the answers given by the research subjects, search for ideologies, trends and characteristics regarding the objectives of the study. To illustrate the speeches, the letter P (participant) was assigned, followed by a number corresponding to the worker's interview order, to preserve their identity.

The Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist was used to follow the methodological rigor required for this research approach.

The approval of the Ethics and Research Committee on Human Beings (CEP) was obtained, under opinion n. 3,436,045. The workers signed the Informed Consent Form (ICF), after being guided about the objective of the research.

Results

Of the nine participants in this research, one was male. The age range of the participants varied between 22 and 51 years old. The time of professional exercise was from one week to 26 years old. Regarding the professional category of the participants, there were four nurses, two nursing technicians, two general services workers and one nursing resident.

After the analysis of the discourses, three thematic categories emerged: use and reasons for the use of the N95 mask by workers of the Surgical Center; difficulties with the use of the N95 mask; knowledge regarding occupational risks arising from surgical smoke.

Category 1 – Use and reasons for the use of the N95 mask by workers of the Surgical Center:

Participants reported that they know the N95 mask, even those who have never used it. Some did not know how to answer the reason for its use, others answered mistakenly about the need to use N95, presenting that it should be used in the precaution for droplets of the patient and still, some of them have never used this type of PPE, not being this equipment of routine use of those who work in SC, as shown in the following statements:

> *Only in prevention of droplet contamination.* (P1)
>
> *In cases of patients with a suspected or confirmed diagnosis of airway isolation* [...] *it is very difficult to use.* (P3)
>
> *Only when there is a patient with tuberculosis, it is very difficult to have it in here* [...] *I used it only once.* (P7)
>
> *More in multidrug-resistant* (MR) *and carbapenem-resistant* (CR) *patients.* (P8)
>
> *I used the N95 mask once in the last month.* (P1)
>
> *Here so far I have not used the N95 mask once.* (P2)
>
> *Never once* [...] *I don't remember using the mask.* (P9)

Category 2 - Difficulties with the use of the N95 mask:

This category revealed that professionals feel great discomfort during the use of the N95 mask, and some understand the need to modify them, while others, even with the difficulties encountered, believe that the format of the N95 mask should remain the same, as shown in the following participant statements:

> *Because it's very difficult for you to attend some long surgeries with a mask like that.* (P1)
>
> *Well, I'm kind of claustrophobic so I felt really suffocated.* (P2)
>
> *I feel a little short of breath.* (P4)
>
> *A lot of shortness of breath.* (P8)
>
> [...] *I believe it's quite suffocating.* (P9)
>
> *I think the mask needs to be changed.* (P1)
>
> *I can't think of a change. (P2)*
>
> *It brings security* [...] *it doesn't need to be changed.* (P3)
>
> *It's more uncomfortable, it's tighter, but we feel that it's really adhered, that it doesn't get in and the air doesn't come out either.* (P6)
>
> *I think you need to modify.* (P8)

Category 3 - Knowledge regarding occupational risks arising from surgical smoke:

The research participants' speech clarifies the lack of knowledge about the risks to which SC workers are exposed, especially when related to exposure to surgical smoke, as follows:

> *No, I don't think so* [...] *I don't know, the only smoke I know is the cautery smoke* [...] *so I don't know if it's good or bad.* (P1)
>
> *Yes, I know* [...] *I know that there are studies that seek to identify these risks, but I don't know of any, I believe there is* [...] (P2)
>
> *I don't know what surgical smoke is* [...] *I don't know the risks.* (P4)
>
> *I know what surgical smoke is, I know it's harmful* [...] *I know, but not everyone.* (P6)
>
> *Yes, I know, I recognize that smoke is a risk.* (P9)

Discussion

The need for the use of PPE by health workers is already well discussed and determined by the Regulatory Standard 32 (NR-32)[11]. But the discussion regarding surgical smoke and the need for the use of PPE when exposed is still a new subject and needs to be extensively researched.

In a research on surgical smoke and the use of PPE for this protection, none of the post-graduate workers of the intraoperative team, who were exposed to the risk of surgical smoke, used some type of N95 respiratory mask during the 50 surgeries studied[12]. Even with the recommendation made by organs and scholars of the subject, where the mask type N95 is recommended when a worker presents this exposure[8].

In addition to scientific research, it is necessary to educate those exposed to the risks

of this exposure, so that they feel the need to use PPE and can charge for this safety equipment of their managers.

The research participants were wrong about when the type N95 mask should be used, because the recommended droplet precaution is the surgical mask and the recommended for aerosol precaution is the N95[13]. Another issue regarding the use of the N95 mask is in relation to the discomfort that workers have when they use it. Many complain of nausea when using N95[9] and also end up presenting negative attitudes to the use of this PPE, such as forgetting its relevance[14].

The professionals who work in the SC use the surgical mask in the day to day work, however, it is not effective for protection against surgical smoke, because they are not able to retain particles smaller than 5μm and have loose points that do not adhere to the face of the user, thus allowing the inhalation of surgical smoke[4,15].

In a study conducted with surgeons, nurses and nursing technicians, most participants affirm that they do not use special respiratory devices during the working day and do not know the importance of using N95[15], exposing themselves to the chemical risks they are subjected to in their work activities.

Some signs and symptoms are reported by professionals who are exposed to surgical smoke and do not use adequate protection, such as: foreign body sensation in the throat, burning in the pharynx, nausea, nasal congestion, irritation in the eyes, burning pharynx, nausea and vomiting[6,16].

Despite the reports of professionals not believing that the N95 mask needs changes, they believe in the efficiency and safety of the same , when used for the correct indication[17].

The study revealed the fragility of the knowledge of these professionals about the risks they are exposed during their working day, as well as the lack of knowledge about surgical smoke and forms of prevention when exposed to it.

The study reveals the fragility of the knowledge of these professionals about the use of the N95 mask, and how uncomfortable they feel when using this Personal Protective Equipment, show lack of knowledge about the risks they are exposed during their working day, especially in relation to surgical smoke.

Conclusion

Given the above, it is suggested training to health professionals exposed to surgical smoke, where it can be clarified about the use of PPE correctly and its importance in preventing the development of occupational diseases. It also warns of the need for changes in masks type N95, bringing more comfort to the worker, when there is a need for their use.

Collaborations:

1 – conception and planning of the project: Letícia Nunes Maia Mendonça, Helenize Ferreira Lima Leachi and Renata Perfeito Ribeiro;

2 – analysis and interpretation of data: Letícia Nunes Maia Mendonça, Helenize Ferreira Lima Leachi and Renata Perfeito Ribeiro;

3 – writing and/or critical review: Leticia Nunes Maia Mendonça, Helenize Ferreira Lima Leachi and Aryane Apolinário Bieniek;

4 – approval of the final version: Leticia Nunes Maia Mendonça, Helenize Ferreira Lima Leachi, Aryane Apolinário Bieniek and Renata Perfeito Ribeiro.

Conflicts of interest

There are no conflicts of interest

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