

## FACTORS INVOLVED IN COMPLIANCE WITH NURSING CARE TO PREVENT PNEUMONIA ASSOCIATED WITH MECHANICAL VENTILATION

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**Abstract:** Health Care Associated Infections (HAI) represent a threat to patient safety, presenting a greater number of cases in Intensive Care Units (ICU); highlighting Pneumonia Associated with Mechanical Ventilation (VAP), occurs in 10 and 20% of patients undergoing mechanical ventilatory assistance, with mortality between 24 and 50%.

**Goal:** To analyze the factors involved in compliance with nursing care to prevent pneumonia associated with mechanical ventilation in the ICU of the Dr. Raymundo Abarca Alarcón General Hospital, in Chilpancingo de los Bravo, Guerrero. **Method:** Quantitative, observational, descriptive, correlational and cross-sectional study. With a sample of 15 nursing professionals and 15 patients, the NAVMUCI instrument is applied. Factors related to the level of compliance of nursing staff with the non-pharmacological measures of the protocol for preventing pneumonia associated with mechanical ventilation in the intensive care unit adult, this is a risk-free research, a signed informed consent is requested and the privacy of the participants is respected. **Results:** The dimensions evaluated were: structure, process and result. In the structure dimension, it was visualized with higher percentages of no compliance with 46.7% and minimum compliance with 24.4%. For the **process** dimension, higher percentages of non-compliance were obtained with 88.9%, followed by minimal compliance 6.7% and partial compliance 4.4%. The result dimension showed levels of no compliance at 42.2%, minimum compliance 40%. At a **global level** in the three dimensions, a higher percentage of non-compliance was found with a representation of 86.7%. Regarding the **associated factors** that influence compliance with nursing care for the prevention of VAP, they are: that nursing professionals do not

work overtime; for the patients they were age and comorbidities; for the process: wash your hands before touching the patient and before performing an aseptic task, turn off the tap with a sanita, do not perform bronchial washings and oral hygiene. **Conclusion:** the level of compliance with nursing care for the prevention of VAP in the dimensions of structure, process and result was located in higher percentages of non-compliance, repeating these percentages at a global level. The factors associated with compliance with nursing care in the prevention of VAP are: that professionals do not work overtime; for patients are: age and having comorbidities. For the process: wash hands before touching the patient and before performing a clean or aseptic task; close the tap with a sanita; Do not perform bronchial washings and perform oral hygiene. On the part of the hospital, there are opportunities to correct, strengthen and train nursing professionals, to provide care with higher levels of safety and quality, avoiding this public health problem.

**Keywords:** Mechanical aspiration, Ventilator Associated Pneumonia, Intensive Care Units, Nursing.

## INTRODUCTION

Ventilator-associated pneumonia (VAP) is an adverse event that arises from healthcare, known as Healthcare Associated Infections (HAI), which represent a threat to patient safety<sup>1</sup>; la NAVM es un problema de salud pública mundial, que presenta altos índices de incidencia y mortalidad, además de tener repercusiones directas al paciente y de manera secundaria a la institución de salud, implicando más días de hospitalización, mayor consumo de insumos y carga laboral para los profesionales de salud.<sup>2</sup>

Prevalence of HAIs has been identified in Intensive Care Units (ICU), due to the susceptibility of patients<sup>3</sup>, for this reason

the main global health organizations have established recommendations for the implementation of protocols and strategies based on scientific evidence.<sup>2,4,5</sup>, with the aim of preventing VAP, in which the nursing professional plays an important role through the advanced airway care provided.<sup>5</sup>

For the development of VAP there are multiple factors associated with the host, such as advanced age, comorbidities, re-intubation, prolonged stay, male gender, among others, and factors related to the intervention, for example, endotracheal intubation, prolonged hospital stay, increased in the duration of mechanical assistance, presence of invasive devices, aspiration of gastric contents, supine position and others.<sup>2</sup>

Of the invasive procedures most performed in Intensive Care Units (ICU), intubation and mechanical ventilation stand out as respiratory support, being essential in vital therapy, however they are also maneuvers that multiply the risk of complications, since they alter the patient's first-line defenses; adverse event that can be carried out directly through the aspiration of secretions and secondarily through the reflux of gastric contents into the respiratory system<sup>2</sup> and by indirect mechanism at the hands of the health professional, their clothing or the pathogens that adhere to the respiratory equipment.<sup>4</sup> Some of the main complications of the therapeutic resource of mechanical ventilation are: VAP, sepsis, acute respiratory distress syndrome, pulmonary embolism, barotrauma and pulmonary edema, and the most prevalent complication is VAP.<sup>6</sup>

The data indicate that in the ICU there is a higher incidence of IAAS; In Europe during 2017, of 142,805 patients who remained in the ICU, 11,787 had at least one infection, of which 8,983 were cases of pneumonia and almost the total was associated with intubation, presenting an incidence of 6.6 episodes per

1000 patients per day.<sup>7</sup> In Mexico, in 2017 the ICU ranked fourth in hospital services that reported the highest proportion of HAIs with 7,265 cases, and in the same way the most frequent infection was pneumonia with 2,903 reported cases, including procedure-associated pneumonia and mechanical ventilation-associated pneumonia.<sup>8</sup> It must be noted that VAP occurs in 10 and 20% of all patients who are subjected to mechanical ventilatory assistance for more than 48 hours, with a mortality range of between 24 to 50%, increasing the lethality to 76% when the infection is caused by multiresistant microorganisms.<sup>9</sup>

In this sense, the nursing professional can intervene in factors related to care, whether in the management of the airway, the level of knowledge and the mastery of practices, which in turn will largely determine the decrease or increase in risk. to develop NAVM, so that the nursing professional plays an indispensable role, since they are responsible for providing care.<sup>10</sup> Considering the relevance of the care provided by the nursing professional, it is of utmost importance that strict compliance is given to the basic prevention measures for VAP, since the frequency of compliance in nursing care has demonstrated its usefulness in prevention. of event<sup>11</sup>, where it is essential to audit compliance rates in order to implement measures that help guarantee better results, not only in statistical data but also in best practices for patients with mechanical ventilation in ICUs.<sup>12</sup>

This is why monitoring of activities must be carried out in clinical practice. <sup>4</sup> that allow the verification of the recommendations established in scientific guides and strategy documents, in addition to the training and preparation of nursing staff who provide direct care to patients with mechanical ventilation.<sup>5</sup> On the other hand, it is worth considering the structural aspects of the hospital, the

availability of medical supplies and the technological resources available, because these, together with the care provided, will influence the quality and safety of the care provided to the patient.<sup>13</sup>

Of course, this health phenomenon is observed in all hospitals, so it is advisable to carry out a diagnostic study of the situation regarding compliance with nursing care and the factors that intervene in its compliance, in the intensive care unit of the Hospital. General Dr. Raymundo Abarca Alarcón, second level public hospital, located in the city of Chilpancingo de los Bravo, Guerrero, which admits beneficiaries from different parts of the state and therefore has great demand, in addition to the majority of patients treated In this service they have invasive respiratory assistance, and have been subjected to various invasive procedures that increase the risk of developing VAP.

The objective of this study was: To analyze the factors involved in compliance with nursing care to prevent pneumonia associated with mechanical ventilation in the Intensive Care Unit of the Dr. Raymundo Abarca Alarcón General Hospital, in Chilpancingo de los Bravo, Guerrero.

## METHODS

It is a quantitative study, with a non-experimental design of an observational, descriptive, correlational and cross-sectional type.<sup>14</sup>

The study population consisted of 18 nursing professionals belonging to the ICU service, with the participation of 15 professionals, and 18 patients with mechanical ventilation admitted to the Dr. Raymundo Abarca Alarcón General Hospital during July 11 to September 11, 2022.

The technique used was a survey, which made it possible to obtain work, academic and sociodemographic data of

the nursing professionals.<sup>14</sup> To obtain information regarding the sociodemographic characteristics, hospitalization (duration, diagnosis, and comorbidities) and ventilatory support (mode ventilatory, days duration, fixation, among others) of the patients, the clinical records were consulted, because they are general data, it was not necessary to obtain informed consent from the family member, likewise, the information collected is completely maintained confidential.

To collect data on compliance with nursing care for the prevention of VAP by the nursing professional in the ICU, the compliance audit instrument for the protocol for the prevention of pneumonia associated with mechanical ventilation NAVMUCI13 (Scheme) was used. Number 1), was evaluated through direct observation during patient care, at the time of executing the secretion aspiration technique, a circumstance in which ideally all prevention activities are carried out.

It is important to highlight the Hawthorne effect <sup>15</sup>, since it is a reaction that occurs because the subjects involved may feel observed and this implies that they can modify their practices; In order to reduce the effect, a prior inclusion to the Intensive Care Unit for 2 weeks was carried out. On the other hand, the professional did not know the exact moment in which he was observed and the duration of the investigation was increased to a period of 2 months.

## **INSTRUMENT**

Compliance audit instrument for the prevention protocol for pneumonia associated with mechanical ventilation NAVMUCI <sup>13</sup> Factors related to the level of compliance of the nursing staff with the non-pharmacological measures of the protocol for the prevention of pneumonia associated with mechanical ventilation in the adult intensive care unit, with a global Kuder Richardson-20 Index

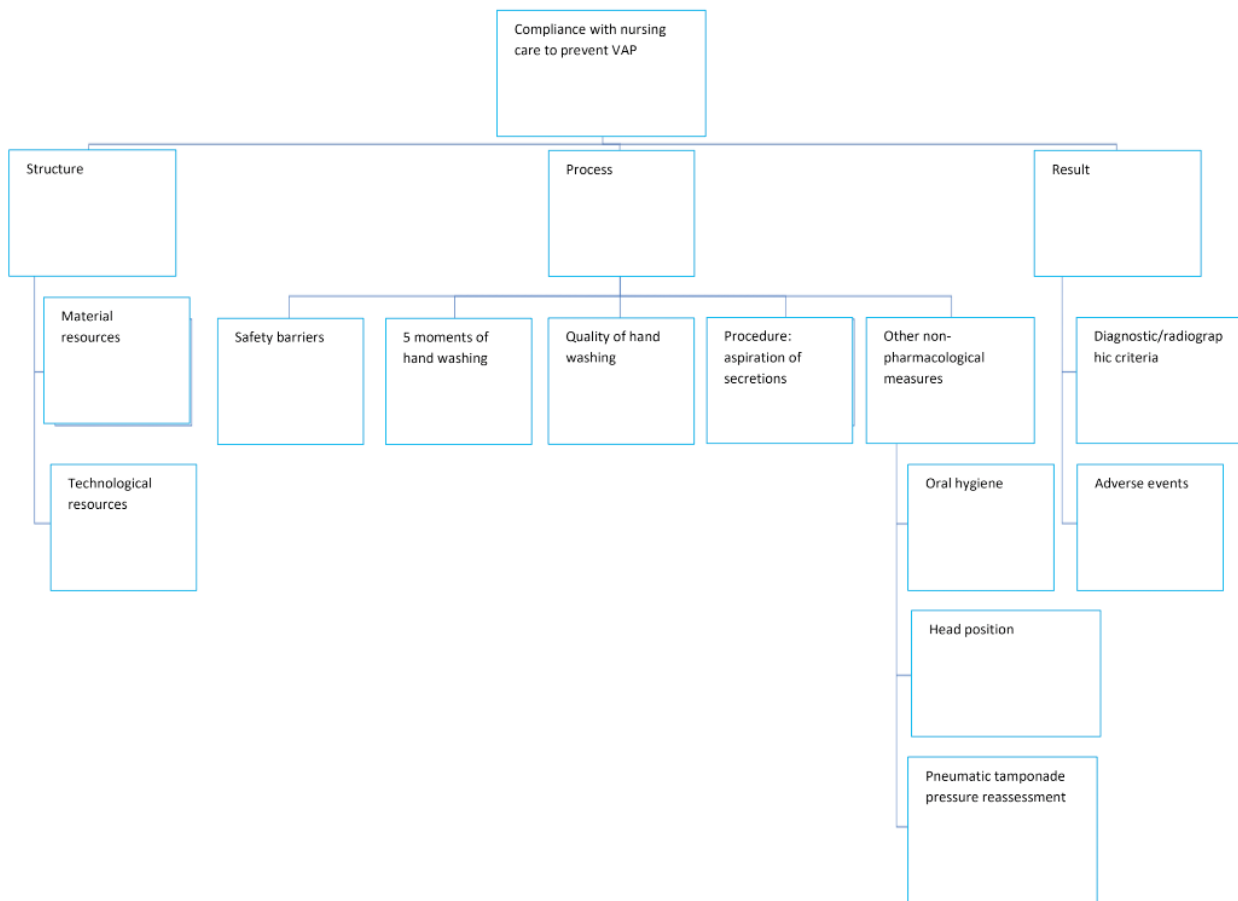
of 0.878, a test of the Spearman correlation with a significance of 0.000 and a test-retest reliability with a Student's t with a significance of 0.050, considered acceptable.<sup>14</sup>

The first section of the instrument corresponds to general data of the participant: work, academic and sociodemographic. Section two is for obtaining general patient data: sociodemographic, hospitalization (duration, diagnosis, and comorbidities), ventilatory support (ventilatory mode, days duration, fixation, among others). The third section responds to the elements of compliance divided into three dimensions: structure, process and result, using a dichotomous measurement of compliance and non-compliance, the degree of compliance is rated with 1, 2.3 and 5 points and non-compliance with -1. or with 0 points.

In each dimension (structure, process and result) you can obtain a minimum of 0 points and a maximum of 50, the total degree of compliance has a measurement of 0 to 150 points, where obtaining <70% is given a grade of no compliance, 70%-74% minimal compliance, 75%-84% partial compliance, 85%-90% significant compliance and 100%-91% an excellent degree of compliance.<sup>13</sup>

## **BIOETHICAL ASPECTS OF RESEARCH**

This study is based on the Declaration of Helsinki <sup>16</sup>, in the General Health Law <sup>17</sup> in article 100 and in the Regulations of the General Health Law <sup>18</sup> in Matters of Research for Health in its second title, article 13, which speaks of respect for human dignity and protection, article 14 according to scientific and ethical principles that justify research, article 16 of protection of the privacy of the individual who is a subject of study, in article 17 establishing that this is a risk-free investigation, article 20, 21 and 22 that state the necessary requirements for the formulation



**Scheme Number 1:** Organizational chart of the NAVMUCI instrument.

**Source:** Own author, 2023.

Factors	RM	IC		SIG. (p=0.05)
		Min.	Max.	
<b>Regarding the profesional</b>				
Overtime worked (other job) = 0 hours	0.500	0.125	1.999	0.008
<b>Regarding the patient</b>				
Age	0.150	0.023	0.957	0.028
Comorbidity	2.053	1.488	2.832	0.019
<b>Process</b>				
If you wash your hands before touching the patient	6.667	1.044	42.553	0.028
If you wash your hands immediately before performing a clean/aseptic task	6.667	1.044	42.553	0.028
If you turn off the faucet with a towel	8.929	0.946	84.248	0.029
The person does not perform bronchial lavages	14.500	1.507	139.532	0.005
If you perform oral hygiene	1.100	0.108	11.155	0.036

Table 1. Factors associated with compliance with nursing care for the prevention of VAP in the ICU, of the Dr. Raymundo Abarca Alarcón General Hospital, 2022.

**Source:** applied instrument

and establishment of written informed consent as a requirement to carry out this investigation. This study was evaluated and approved by the Research Ethics Committee of the Faculty of Nursing and Midwifery with document No. 009/2022.

## RESULTS

The nursing professionals had a minimum age of 26 and a maximum of 49 years; The majority of the participants were female with 93.3%.

Nursing professionals work 26.7% in the evening shift, the morning and night shift A with 20% respectively, the cumulative day and night shift with the same percentage 13.3% and the night shift B with 6.7%. Regarding the hiring category, a greater number of professionals were found with a nursing assistant contract 40%, specialists with 33.3% and the rest as general or technical nurses. The professionals have a minimum institutional seniority of 4 years and a maximum of 29, with an average of 18.80. Regarding seniority in service, the majority have less than one year and a maximum of 20 years. Of the hours worked per week, 40% work from 32.5 to 36 hours, and only one professional had another job with an overtime of 30 hours per week.

The academic characteristics showed that 40% of the participants have a master's degree, 33.3% have a bachelor's degree in nursing, and 26.7% have a bachelor's degree and a specialty or post-technical degree. In relation to knowledge of the guidelines for the prevention of pneumonia associated with mechanical ventilation, 66.7% of professionals stated that they knew them.

The level of compliance with nursing care in the structure dimension was visualized with higher percentages of no compliance with 46.7% and minimal compliance with 24.4%. For the process dimension, higher percentages of non-compliance were obtained

with 88.9%, followed by minimal compliance 6.7% and partial compliance 4.4%. The result dimension showed levels of no compliance at 42.2%, minimum compliance 40%. At a global level, a higher percentage of non-compliance was found with a representation of 86.7%, where the same behavior was followed in the other dimensions.

When analyzing each dimension, subdimensions were obtained; From the structure dimension, the following were obtained: the first was material resources (inputs) necessary to provide care, with the minimum availability of resources at 37.8%, 24.4% partial and 22.2% significant availability; The second subdimension corresponds to technological resources, where 100% had humidification systems and hemodynamic monitoring equipment.

In the process dimension, which refers to the care procedures provided by the nursing professional, in its subdimensions: safety barriers, results were obtained with significant compliance levels of 75.6% and partial compliance with 20%. The next subdimension corresponded to the five moments of hand washing, where levels of significant compliance were reached in 64.4% and excellent with 24.4%; In the handwashing quality subdimension, which covers all handwashing steps proposed by the World Health Organization, favorable percentages remained, with significant compliance at 51.2% and partial compliance at 44.4%.

The secretion aspiration subdimension, where the total number of procedures was performed with a closed technique, reached significant scores of 64.4% and partial scores with 31.1%. Within this subdimension, bronchial washings were performed in 66.7% of the procedures, and changes were made. closed suction circuit if necessary in 6.7%.

The subdimension of other pharmacological measures covers oral hygiene carried out by

15.6%; maintain head position between 30° and 45°, carried out 62.2% of the time; Regarding the measurement of pneumotamponade, it was not carried out at any time, due to the unavailability of the equipment.

The outcome dimension incorporates two subdimensions, the first includes diagnostic criteria for pneumonia associated with mechanical ventilation, with radiographic criteria present in 8.9% of cases, for the systematic criteria that integrates fever data, it was not presented in 66.7%, In cases of leukopenia or leukocytosis it occurred in 86.7%, alteration of arterial gases was identified in 77.8%, for pulmonary criteria there was presence of neutrophils in 86.7% of cases. The second subdimension refers to adverse events that include: unscheduled extubation, reintubation, accidental disconnection from mechanical ventilation, bronchoaspiration and mucous plug, where 71.1% was obtained, which indicates that these events occurred on few occasions.

The results described served to establish the relationship between the characteristics of the nursing professionals, the patient, and the structure and process dimensions with the degree of global compliance; Statistical significance of 0.008 was found with nursing professionals not working overtime, but given that only one professional reported working overtime, this data requires more research to consider its association with compliance with nursing care in the prevention of VAP. The patient factors that had a statistically significant relationship are age, so patients who are between 15 and 50 years old represent 0.1 lower chances of compliance with care compared to patients over 51 years old, indicating greater compliance. The patient's hospitalization characteristics, a statistically significant figure of 0.019 was observed with patients who have comorbidities, showing that individuals who suffer from other diseases are

twice as likely to receive nursing care for the prevention of VAP. In relation to the factors that make up the structure, no relationship was found, while in the process significance was found in the following variables: statistical significance of 0.028 was identified if the nursing professional washes his hands before touching the patient, a practice that indicates that if you wash your hands before touching the patient, you are 6.6 times more likely to comply with VAP prevention care. Regarding the second moment of hand washing "before performing a clean or aseptic task", a statistical relationship of 0.028 was also found, demonstrating that there is a 6.6 times greater chance of compliance with nursing care in the prevention of VAP. In the hand washing procedure, specifically in the last step of turning off the tap with a disposable towel, a statistical significance of 0.029 was found, which shows 8.9 times more chances of compliance with care, when turning off the tap with a towel than when it is not done this way. Regarding the secretion aspiration procedure with closed technique, a significance of 0.005 was found in the practice of not performing bronchial lavages, which denotes 14.5 times more possibilities of compliance with care in the prevention of VAP. A significance of 0.036 was found if the patients' oral hygiene was performed, where there were 1.1 more possibilities of compliance in nursing care for the prevention of VAP, remembering that this practice must be carried out strictly in all patients (Table 1).

## DISCUSSION

The prevention of VAP in recent years has become a relevant topic, due to the statistical data on morbidity and mortality, coupled with the increase in respiratory complications derived from COVID 19, which has placed greater emphasis on the application of the preventive measures to reduce HAIs.<sup>12</sup>



In Mexico at the national level, a study in 2022 carried out by Pastrana Domínguez et al.<sup>13</sup>, developed in Mexico City, described percentages of excellent compliance with the structure dimension, non-compliance with the process and significant values in results, with an overall score of partial compliance; different condition from the results of this research, where at a global level a higher percentage of non-compliance was found in all dimensions.

It is difficult to analyze the results with other researchers, because in multiple research articles they only take into account certain elements of the prevention packages for VAP, without considering other factors that complement the compliance with the care provided by the nursing professional; Therefore, the instrument proposed by Pastrana Domínguez et al.<sup>13</sup> allowed for a complete and accurate investigation.

The International Consortium for Nosocomial Infection Control (INICC) emphasizes the importance of considering the socioeconomic conditions of developing countries given that they have hospitals that, due to their very condition, lack the human factors and material resources necessary to provide care with safety and quality<sup>19</sup>, situation that was visualized in this government hospital of the State of Guerrero, due to the minimum complete availability of resources, by virtue of the fact that it is the only public hospital of second level of care in the city, which has an ICU, characteristics that problematize the availability of resources necessary for the exercise of quality care.

In relation to the safety barriers used by the nursing professional in the various care processes and specifically during a secretion aspiration procedure, in the research by Pastrana Domínguez et al.<sup>13</sup> in 2022, they found partial compliance in 40% of the use of a gown, hat, face mask or mask, protective

glasses and gloves, a similar condition in this study from the Dr. Raymundo Abarca Alarcón General Hospital.

In the case of the five moments of hand washing, established by the World Health Organization as key moments for the prevention and control of infections<sup>20</sup>, Ciampoli et al.<sup>21</sup> in 2020, they reported low adherence in the five moments, similar to what Pastrana Domínguez et al. stated.<sup>13</sup> in 2022, with higher non-compliance data, while in another study carried out by Murugesan et al.<sup>22</sup>, in 2022, revealed higher percentages of compliance in the five moments, in this subdimension there is greater agreement with Murugesan, since it is necessary to highlight that the nursing professionals of the ICU of the Dr. Raymundo Abarca Alarcón General Hospital demonstrated significant and excellent compliance in adherence to the five moments of hand washing.

It is important to highlight that when we talk about compliance with hand washing it does not mean that there is quality in the procedure; in several investigations they only consider some moments and not all the steps established by the World Health Organization.<sup>23</sup>, the research that did take into account all handwashing steps was carried out by Pastrana Domínguez et al.<sup>13</sup>, 2022, showing that more than half of the observations met levels of excellence in this procedure, it is worth highlighting that in this study, this activity was significantly fulfilled, which strengthens essential action number five for the reduction of HAI.

Endotracheal aspiration is of utmost importance to avoid a blockage in the endotracheal tube, therefore, prevention and care is based on meeting the cleaning needs to avoid the accumulation of bronchial secretions, whether with a closed or open system.<sup>12,24</sup>, in this sense López Martín<sup>25</sup> in 2021 and the Clinical Practice Guide Prevention, Diagnosis

and Treatment of Pneumonia Associated with Mechanical Ventilation 2013<sup>3</sup>, describe that both techniques can produce events, although the closed aspiration system shows greater advantages in its use, for the prevention of these situations; favorable case observed in the hospital, where nursing professionals performed aspiration intervention with the closed circuit technique on all patients.

Regarding adherence in following the steps for the endotracheal aspiration procedure, the study by Pastrana Domínguez et al.<sup>13</sup>, demonstrated significant compliance with a significant level, a situation similar to that demonstrated by the ICU nursing staff of this government hospital in Guerrero.

The American Association for Respiratory Care (AARC) advised against the use of saline in aspiration of secretions with a level of evidence B.<sup>24</sup>, practice that continues to be carried out in variable frequency in hospitals in Yemen according to what was exposed in the research by Alkubati et al.<sup>26</sup>, 2022, and also at the Dr. Raymundo Abarca Alarcón General Hospital.

Zhao et al.<sup>27</sup> collaborators in their 2020 research, establish that oral hygiene for patients who are under mechanical ventilation in intensive care areas is of utmost importance, and performing oral hygiene with mouthwash or chlorhexidine gel is more likely to reduce the incidence. of VAP from 18 to 26%, unfavorably the results of Pastrana Domínguez et al.<sup>13</sup> In 2022, they showed that oral hygiene was not performed 51% of the time, unfortunately this practice was also not performed in this research.

Recommendations from the Zero Pneumonia Project<sup>12</sup>, sets to maintain the header position above 30°, Pastrana Domínguez<sup>13</sup> 2022, stated that the head position of 30° to 45° is carried out, as evidenced by the nursing professional in Chilpancingo.

The research of Arias Rivera et al.<sup>12</sup> In 2022, it was established that the measurement of pneumotamponade pressure and its continuous maintenance is a practice with scientific evidence for reducing the incidence of VAP. Unfortunately, the hospital investigated did not have this equipment, so this practice is not done.

Papazian et al.<sup>28</sup> in 2020, they indicated that to obtain a diagnosis of VAP, clinical suspicion criteria and radiographic criteria can be used, in the case of this research, the clinical suspicion criteria: leukopenia or leukocytosis, alteration in arterial blood gases and neutrophils, which, If they occurred in higher percentages in the patients, on the other hand, fever was not present in greater frequency. Regarding the radiographic criterion, it was not present in almost the majority of patients. Despite these data, it is essential to take into account that these criteria will depend to a greater extent on the health condition and characteristics of the patient.

The Public-Private Partnership for the Promotion of Patient Safety<sup>29</sup> I report that the most common adverse events are unplanned extubations, reintubations, disconnections of the respiratory circuit, and occlusion problems in a lower percentage. In the case of this research, results of excellent compliance were found, a fact that has a very favorable representation when not high percentages of adverse events occur.

Pastrana Domínguez et al.<sup>13</sup> 2022, found that a professional factor that is associated with non-compliance with care is ignorance of VAP prevention guidelines; On the other hand, Yin et al.<sup>30</sup>, 2022, identified other nursing factors associated with VAP, including the ratio of nurses per bed, the proportion of nurses with a bachelor's degree or higher, the proportion of nurse practitioners, nursing work experience of 5-10 years, the number of patients in charge of nurses at night, however

in this study compliance with care only showed significance if the professional did not work overtime, so there is a good chance that contextual and behavioral factors are the ones that have the greatest impact. association with compliance or non-compliance with VAP prevention measures.

In the research developed by Kózka et al.<sup>31</sup> in 2022, indicate that comorbidities have statistically significant associations for the development of VAP, for Pastrana Domínguez et al.<sup>13</sup> 2020, having comorbidities was identified as a protective factor for non-compliance, a result reinforced by this research, because greater adherence was demonstrated in the professional's care for patients with comorbidities.

The World Health Organization<sup>20</sup> has established the importance of key moments to perform hand hygiene, and that every health professional must maintain adequate hygiene at the correct times, Pastrana Domínguez et al.<sup>13</sup>, 2020, indicates that not washing your hands in 4 of the 5 moments of hand washing represents a risk for non-compliance with VAP prevention protocols, and in this research, washing your hands before touching the patient and performing a clean/aseptic task implied greater possibilities of compliance with care for the prevention of VAP.

Mannan Laskar et al.<sup>32</sup>, 2018, suggest that handwashing can be considered an all-or-nothing phenomenon; it is mandatory to comply with all the steps to say that it is effective, substantiating the results of Pastrana Domínguez et al.<sup>13</sup>, 2020, which indicate that not carrying out the majority of handwashing steps are identified as factors associated with non-compliance with nursing care, and in this study it is demonstrated, since the last handwashing step, "turning off the tap with a towel" meant greater possibilities of compliance with the VAP prevention protocol.

The American Respiratory Care

Association (AARC)<sup>24</sup> I advise against the use of saline solution in aspiration of secretions, an action demonstrated in this research, since not performing the bronchial lavage action showed statistical significance for compliance with VAP prevention measures, contrary to what was described in Pastrana's research. Dominguez et al.<sup>13</sup>, in 2020, where not doing bronchial lavage implied a risk of non-compliance with the VAP prevention protocol.

The research developed by Li Sang et al.<sup>33</sup>, in 2023, and the Zero Pneumonia Project 2022<sup>12</sup>, express the importance and effectiveness of oral hygiene in the prevention of VAP, to Pastrana Domínguez et al.<sup>13</sup>, in 2020, not performing oral hygiene implies a risk of non-compliance with the VAP prevention protocol, therefore, the result of this research is strengthened, which shows that, if this care is carried out on a mandatory basis, there is an association with compliance. of nursing care for the prevention of VAP.

## CONCLUSIONS

The level of compliance with nursing care for the prevention of VAP in the dimensions of structure, process and result, was located in higher percentages of non-compliance, repeating these percentages at a global level.

The factors that influence compliance with nursing care for the prevention of pneumonia associated with mechanical ventilation are: that professionals do not work overtime, with respect to the characteristics of the patients, the factors that intervene are age and having comorbidities.

The process factors involved in compliance with care are 2 of the 5 handwashing moments, washing hands before touching the patient and before performing a clean or aseptic task. According to the hand washing procedure, the factor involved is turning off the tap with a towel.

Regarding the secretion aspiration procedure, the influencing factor was not performing bronchial washings and for other non-pharmacological care measures it was performing oral hygiene.

The structure dimension presents non-compliance, which is an opportunity for senior management to correct.

With the training of staff and the strengthening of the structure, regardless of the patient's health condition, care will

be provided with greater safety and quality, avoiding adverse events.

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

## FINANCING

The authors declare that there was no type of financing.

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