EFFECTIVENESS OF APPLYING A BUNDLE OF CARE ON WEANING AMONG MECHANICAL VENTILATED PATIENTSIN INTENSIVE CARE UNIT ANDCARDIAC CARE UNIT

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ABSTRACT

Background: Applying of ventilator bundle of care according to evidence-based practice guidelines are expected to improve weaning, provide quality of care, improve patient outcomes, and reduce the risk of complications with ventilated patients. **Aim:** The researchers wanted to assess how effective a bundle of care was at weaning mechanically ventilated patients in the intensive care unit and cardiac care unit. **Subjects and Method:** The study used a quasi-experimental research design. A purposive sample of 60 mechanically ventilated patients at both insurance hospitals (Al-Salam) in Port Said governorate and health ministry hospital (Sherbin central) in Dakahlia governorate's critical care unit and cardiac care unit. **Tools: three tools were used, first tool** includes personal characteristics of the patients and, patient's medical history, **second tool** Is Ventilator bundle compliance checklist and **the third one** is Burns' Wean Assessment Program (BWAP) scores to assess and track weaning progresses of the mechanical ventilated patients. **Results:** This study revealed the improvement in weaning with ventilator bundle of care though out the ventilation days. Additionally, there was a statistically significant correlation between the studied patients' total Burns' weaning assessment and compliance with ventilator bundle of the studied patients with p-value <0.01. **Conclusion:** It may be concluded that mechanically ventilated patients who comply with the ventilator bundle of care have higher weaning ratings and spend less time on the ventilator. Consequently, the application of a ventilator bundle care is necessary for enhance weaning from mechanical ventilator in ICU and CCU patients.**Recommendation:** This study recommended applying the ventilator bundle practices for all mechanically ventilated patients with special focus on nursing performance. In addition, using a standardized approach to determine readiness for weaning which can aid in the management of mechanically ventilated patients. Moreover, the study's generalizability could be ensured by replication on a larger probability sample from different geographical areas in Egypt.

Keywords: Bundle Care, Cardiac Care Unit. Intensive Care Unit, Mechanical Ventilation, Ventilator-associated pneumonia, Weaning.

INTRODUCTION

Mechanical ventilation (MV) is utilised for a wide range of applications. Some of the reasons why it's used is for controlling a patient's breathing while going through a surgical procedure or the treatment of severe traumatic brain injury, oxygenating the blood when the patient's ventilator is of no use, and relaxing the respiratory muscles. Although the majority of patients require mechanical ventilation for a short period of time, 30% of those patients may require support for more than a week, increasing the risk of serious complications such as barotrauma, volutrauma, aspiration, and ventilator-associated pneumonia (VAP), tracheoesophageal fistula, stress ulcer and gastrointestinal bleeding, and deep vein thrombosis (Danielis, et al., 2020).

Weaning refers to the process of removing a patient from artificial ventilation and an endotracheal tube in order to allow them to breathe on their own. There are " three " important phases in this process: When the patient's clinical circumstances allow, breathing supports are gradually reduced in the first stage (Ready weaning); A spontaneous breathing trial (SBT) is used to test the patient's ability to breathe independently (Ready breathing) in the second stage, and the patient is subsequently freed from ventilator assistance in the third stage (Ready extubation) There are two clinical aims to weaning: The first aim is to quickly Identify patients who can be ready to start the weaning process, and then optimise the weaning regimen to lessen the time it takes to move from mechanical ventilation to independence.(Vetrugno, Guadagnin, Brussa, Orso, Garofalo, Bruni, Bove ,2020).

Furthermore, the ventilator bundle care promotes the use of best practises and evidence-based treatment. A bundle is a "structured manner of enhancing care processes and patient outcomes that has been proved to improve patient outcomes when conducted collectively and consistently." Moreover, nurses' use of ventilator bundle practises would increase their performance and improve their methodical way to thinking while dealing with critically sick patients. So, all critical care nurses were educating and made aware about bundle of ventilator care and the importance of the use of ventilator bundle care depending on guidelines regarding application of care in daily routine care for mechanically ventilator patients. to decrease duration of mechanical ventilation, achieving better patient and clinic outcomes (Elsayed, et al., 2019).

Significance of the study:

Mechanical ventilation is the most often utilised means of life support among critically sick patients today, but it comes with a lot of clinical and financial risks. The most prevalent sickness among ventilated patients and the 2nd ranked most common hospital-acquired infection, with mortality rates ranging from 20% to 70% and hospital stays ranging from 4 to 13 days, as well as a greater morbidity rate. As a result, patients should be weaned off of mechanical ventilators as quickly as feasible to avoid problems associated with mechanical ventilation. (Ahmed, Sobeih and Abdelsalam, 2019; Kasem, Abdel- Galeel, Abdel -Gawad, El- Suod & Hemdan, 2019).

As a result, implementing ventilator bundle practises may improve weaning, lessen the effect of such arising problems, improve patient care quality, enhance the prognosis of the condition of the patient, and so reduce ICU and CCU stays, reduce long-term physical, cognitive, and psychological harm to patients, improve hospital reimbursement, and lower health-care costs. (Khalil, Mohamed& Sharkawy 2018).

As a result, it's critical to look at the effectiveness of using a bundle of care to help mechanically ventilated patients in the intensive care unit and cardiac care unit wean.

AIM OF THE STUDY:

The goal of such trial was to establish an evaluation if weaning mechanically ventilated patients in intensive care unit and cardiac care unit using a bundle of care was effective.

This will be achieved through the following research objective:

1. Create a care package for weaning mechanically ventilated patients in the intensive care and cardiac care units.
2. In the intensive care unit and the cardiac care unit, implement a bundle of care for mechanically ventilated patients.
3. Determine the link between compliance with a bundle of care on weaning among mechanical ventilation patients in the ICU and CCU and health outcomes including duration of stay.

Research question:

What is the effectiveness of applying a bundle care on weaning among mechanically ventilated patients?

SUBJECTS AND METHOD

I.Technical design:

Technical design consist of a compilation of research design, setting, subjects, and data collection tools.

Research design:

This research was conducted using a quasi-experimental research approach.

Setting:

The research was carried out in the critical care units and cardiac care units of two hospitals: Al- Salam hospital in Port Said, which is linked with the Universal Health Insurance Hospital, and Sherbin central hospital in Dakahlia, which is affiliated with the Ministry of Health.

Subjects:

The current study enrolled a sample of 60 mechanically ventilated patients from the starting point of mechanical ventilation until weaning, with patients receiving the ventilator bundle protocols in full during a five-month period beginning in November 2020 and ending in March 2021.

Inclusion Criteria:

- Patients who ventilated mechanically at admission.

Exclusion criteria:

- Complicated cases as: acute respiratory syndrome - any contraindication to one of the care bundle items (as,hemorrhage, neck surgery and allergic to chlorhexidine).
- Patients admitted with pneumonia.

All critical care nurses were taught about the necessity of using a bundle of care while weaning mechanically ventilated patients.

Tools of data collection:

The following tools were used to collect data for this study:

Tool (I): *A questionnaire that included two parts:*

Part (1): patient's personal characteristics

Age, sex, marital status, and smoking status are among the socio-demographic variables of the research participants.

Part (2): patient's medical history

It contains the patient's historical medical history, such as chest infection, hypertension, chronic obstructive pulmonary disease, and diabetes miletus, as well as current medical diagnoses, co-morbidities, the primary cause for ICU admission, ventilator days, and length of stay in the ICU. (Bonten, Klompas, Moons, Murphy, van & Mourik,2015; Khalil, et al., 2018).

Tool (II): Ventilator bundle compliance checklist*:*

This test was derived from Institute for Healthcare Improvement guidelines to assess compliance with the ventilator care bundle (Resar et al., 2005). The ventilator care bundle checklist includes the following items: The evaluation of the bed's head , daily sedation interruption, assessment of readiness to wean, peptic ulcer disease and deep venous thrombosis prophylaxis, mouth care with chlorhexidine, normal saline or antiseptic oral rinse, mouth care with chlorhexidine, normal saline or antiseptic oral rinse, mouth care with chlorhexidine, normal saline or antiseptic oral rinse (I.H.I., 2017)

Tool (III): Burns' Wean Assessment Program (BWAP) scores:

This tool was inspired by (Burns, Burns, Truwit & Orso, 1990). to rigorously examine and follow mechanically ventilated patients' weaning progress Burns' Wean Evaluation Program score consists of 26 items that cover two primary areas of weaning assessment: The first component is a 12-item general examination, while the second part is a 14-item respiratory assessment. The BWAP scoring system requires only one "Yes" response to indicate that the items are present and scored "1," while a "No, Not Assessed" response indicates that the items are absent and rated "ZERO." The BWAP score is yielded by calculating the total number of the acceptance or in other words the yes responses over the total number of factors which is 26. The gadget has a cutoff value of 50%. Patients

were more likely to be successfully weaned if their score was more than or equal to 50%. If the score was less than 50%, it showed that the patients were more likely to suffer from weaning. (Abbasi and colleagues, 2012).

II. Operational Design:

The study has gone through several phases, including the preliminary phase, validity and reliability, pilot study, and field work.

A- Preparatory phase:

Throughout this phase, the researcher used books, articles, journals, magazines, and internet explorer to examine pertinent contemporary, local, and worldwide literature addressing many elements of the subject in order to better understand the problem and build data collecting techniques. In addition, authoritative websites such as ACP Journal Club, PubMed, Cochrane Library, Ebesco, and others should be reviewed.

B- Validity:

The study tools content validity was determined by a jury panel of nine experts: four academics from the medical surgical nursing department and five non-academic experts, such as in the field of critical care medicine and critical care nursing, who provide direct care to patients. Their opinions were elicited for clarity, relevance, comprehensiveness, understanding, and applicability. Some things were rearranged in accordance with jury recommendations. From the onset of infection to the onset of complications.

C- Reliability:

To examine the reliability of the created instruments (patient assessment questionnaire, Ventilator bundle compliance checklist, Burns' Wean Assessment Program score), the Cronbach alpha coefficient was computed. by means of their inherent consistency This tool's Cronbach's alpha value for the Arabic version was 0.829.

D- Pilot Study:

It was done to see if the tool was legitimate and applicable, as well as to estimate how long it would take to complete out the research instrument. Weaning evaluations were performed on 10% (6) of mechanically ventilated patients. The findings of the pilot research and the tool's amendment by experts were taken into account. Using the findings

of the pilot study, several changes were made, such as changing the term "infection" to "complications," and all patients who participated in the pilot study were eliminated from the study population.

E- Field Work:

This study's data was collected during a five-month period, commencing in November 2020 and ending in March 2021. The researcher then began visiting the allocated location on a regular basis throughout the day and night shifts, for roughly 60 to 120 minutes each time. patients were assessed per time by using the data collection tools. After completing the filling in of each tool, the researcher reviewed every point in each tool in front of critical care staff to be sure that no points are missed.

III. Administrative design:

The director of El- Salam hospital in Port Said city and Sherbin central hospital in Sherbin city received an official letter from the Dean of the faculty of nursing at Port Said University requesting his approval for data collection at the intensive care unit and cardiac care unit at the health insurance hospitals and Sherbin hospital, and the protocol of this study was reviewed by the scientific research ethics committee at Port Said University.

Ethical Consideration:

Before collecting data, the ethical committee of research, dean of the faculty of nursing at Port Said University, granted official approval to perform the study. After explaining the research's goal and procedure to the administrators of El- Salam hospital in Port Said and Sherbin central hospital in Sherbin, permission to perform the study was granted. Patients in this study were completely voluntary, and they were informed about the study's goal, purpose, protocol, and nature. They also had the right to decline participation or withdraw at any moment without explanation. Informed oral consent was gained from the patient's relative, who was informed that the data gathered would not be used in any future studies until a second agreement was obtained. The confidentiality and anonymity of each subject were protected by coding all data and safeguarding the information gathered.

I. Statistical design:

The Epi-Info 6.04 computer software application was used to enter the data. Data were aggregated, tabulated, and presented using descriptive statistics such as frequency distributions, percentages, means, and standard deviations (SD) to represent dispersion. For statistical analysis of the data, a statistical programme for the social sciences (SPSS), version (22) was chosen, as it incorporates the test of significance found in standard statistical texts. The mean and standard deviation were used to convey numerical data. The frequency and percentage of qualitative data were used to represent the data (percent). Chi-square, Fisher's, Pearson, and t-tests were used to compare the frequency and correlation of the research variables. The probability (P-value) was used to establish the degree of significance of the results: (p-value > 0.05) was deemed not significant (NS), (p-value 0.05) was considered significant (S), and (p-value 0.01) was considered highly significant (HS) (HS).

RESULTS:

Table (1) represent patient personal characteristic and showed 51.7% males38.3% of them their ages ranged from 30-<41 years, 68.3% of them were married, and 73.3% of them admitted in CCU. then **figure (1)** represent patients' habits which showed 41.7% of studied patients were nonsmokers.

Table (2): shows that, 53.3% of the studied patients were on the Assist-Control Ventilation mode. All of them feeded through nasogastric tube. 86.7% of them was admitted to critical care unit because of clinical deterioration. 95% of them had no complications. Additionally, 76.7% of them discharged because of health improvement. 61.1% of intensive care patients their length of stay were more than 7 days. Moreover, 64.3% of patients in cardiac care unit their length of stay were more than 6 days.

Table (3): reveals a large statistical difference in in ventilator bundle of care compliance during the ventilation days, with a P-Value of 0.000 for all items in the care bundle.

Table (4): demonstrates that 100% of the patients tested were stable in terms of oral ETT > 7.5 or trach > 6.0 (I.D.) and had acceptable cough and swallow reflexes. In addition, 91.7 percent of them had a negative inspiratory pressure of less than 20.

Furthermore, 76.7 percent of them had a vital capacity of more than 10-15 ml/kg. With mechanical breathing, they all had PaCO240 mm/hg (or baseline). On FiO2 of 40%, 10 L/min and PaO2 >60.

Table (5)*:* shows that, there is a statistically significant relation between the studied patients' mechanical ventilation days and the department while there is no statistically significant relation between the studied patients' mechanical ventilation days and their gender, ages, marital status, and hospital name.

Table (6): reveals that there is a positive statistically significant link between the overall Burns' weaning evaluation and the examined patients' compliance with the ventilator bundle.

Table (1): Frequency and percentage distribution of the studied patients' personal characteristics (n=60).

Personal characteristics	No	%
Gender		
Male	31	51.7
Female	29	48.3
Age		
30-<41 years	23	38.3
41-<51 years	19	31.7
50-<61 years	13	21.7
>61 years	5	8.3
Marital status		
Single	7	11.7
Married	41	68.3
Divorced	4	6.7
Widowed	8	13.3
Department		
ICU	16	26.7
CCU	44	73.3

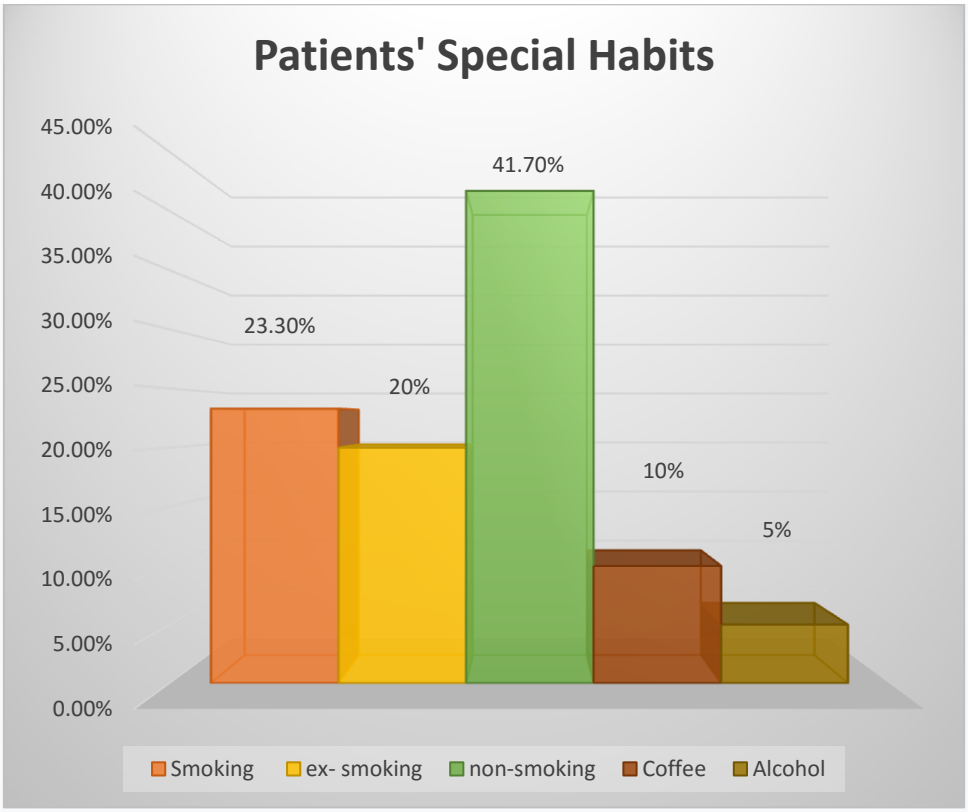

Figure (1): Frequency and percentage distribution of the studied patients according to Special Habits (n=60).

Table (2): Clinical data related to ventilator of mechanical ventilated patients (n=60).

Mechanical ventilation data	No	%
Indication of Mechanical Ventilation		
pao2 < 50 mmhg with fio2 >0,60	9	15.0
paco2 >50 mmhg with PH < 7,25	2	3.3
Respiratory rate >35/m	1	1.7
Apnea	2	3.3
Clinical deterioration	52	86.7
Coma	25	41.7
Respiratory muscle fatigue	2	3.3
Ventilator Mode		
Controlled ventilation	11	18.3
Assist-Control Ventilation	32	53.3
Pressure support	1	1.7
Continuous positive air way pressure	2	3.3
Synchronized Intermittent Mandatory	14	23.3
Type of feeding		
Nasogastric feeding	60	100.0
Mechanical ventilation days		
≤ 3 days	30	50.0
> 3 days	30	50.0
Occurrence of Complications		
Yes	3	5.0
No	57	95.0
Types of Complications		
Ribs fractures	2	3.3
Sepsis	1	1.7
The patients' status upon discharge		
Improvement	46	76.7
Transfer to another setting	14	23.3
length of stay in intensive care unit (n=18)		
< 7 days	7	38.9
≥ 7 days	11	61.1
length of stay in cardiac care unit (n=42)		
< 6 days	15	35.7
≥ 6 days	27	64.3

Table (3): Compliance with ventilator bundle care throughout the ventilation days of the studied patients (n=60).

	Elevated head of bed		**Mouth care**		**Sedation interruption**		**Peptic ulcer prophylaxis**		**DVT prophylaxis**		**Daily assessment of progression to weaning**	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Vent. day 1 (n=60)	60	100	60	100	60	100	60	100	60	100	60	100
Vent. day 2 (n=60)	60	100	60	100	60	100	60	100	60	100	60	100
Vent. day 3 (n=60)	60	100	60	100	60	100	60	100	60	100	60	100
Vent. day 4 (n=30)	30	100	30	100	30	100	30	100	30	100	30	100
Vent. day 5 (n=14)	14	100	14	100	14	100	14	100	14	100	14	100
Vent. day 6 (n=7)	7	100	7	100	7	100	7	100	7	100	7	100
Vent. day 7 (n=3)	3	100	3	100	3	100	3	100	3	100	3	100
Vent. day 8 (n=1)	1	100	1	100	1	100	1	100	1	100	1	100
Vent. day 9 (n=1)	1	100	1	100	1	100	1	100	1	100	1	100

Table (4): Weaning progresses of the mechanically ventilated patients using Burns' weaning assessment program (respiratory assessment) (n=60).

	Pt. stable		Pt. not stable		Not assessed	
	N.	%	N.	%	N.	%
Respiratory Assessment						
Gas Flow and Work of breathing						
1. Eupneic respiratory rate and pattern ___	56	93.4	2	3.3	2	3.3.
2. Absence of adventitious breath sounds	33	55	12	20	15	25
3. Secretions thin and minimal	54	90	3	5	3	5
4. Absence of neuromuscular disease/deformity	32	53.3	18	30	10	16.7
5. Absence of abdominal distention/obesity/ascites	38	63.3	7	11.7	15	25
6. Oral ETT > 7.5 or trach > 6.0 (I.D.)	60	100	0	0	0	0
Airway Clearance						
7. Cough and swallow reflexes adequate	60	100	0	0	0	0
Strength						
8. NIP <-20 (negative inspiratory pressure) NIP = ____	55	91.7	2	3.3	3	5
9. PEP >+30 (positive expiratory pressure) ____	54	90	3	5	3	5
Endurance						
10. STV > 5 ml/kg (spontaneous tidal volume)? Spont. VT = STV/BW in kg =	44	73.3	5	8.3	11	18.3
11. VC > 10-15 ml/kg (vital capacity)? VC =	46	76.7	4	6.7	10	16.7
Arterial Blood Gases						
12. pH 7.30-7.45	58	96.7	2	3.3	0	0
13. PaCO2~40 mm/hg (or baseline) with M.V. <10 L/min * This is evaluated while on ventilator. PaCO2 = MV =	60	100	0	0	0	0
14. PaO2 >60 on FiO2 <40%	60	100	0	0	0	0

Table (5): The relation between the studied patients' personal characteristics and their mechanical ventilation days (n=60). X^2

Personal characteristics	**(n)**	**> 3 times (n=30)**		**≤ 3 times (n=30)**		**X^2**	**P-Value**
		No	**%**	**No**	**%**		
Gender							
Male	31	16	26.7	15	25	0.067	0.500
Female	29	14	23.3	15	25		
Age							
30-<41 years	23	11	18.3	12	20		
41-<51 years	19	12	20	7	11.7	3.23	.357
50-<61 years	13	6	10	7	11.7		
>61 years	5	1	1.6	4	6.7		
Marital status							
Single	7	4	6.7	3	5		
Married	41	22	36.7	19	31.7	2.36	.501
Divorced	4	2	3.3	2	3.3		
Widowed	8	2	3.3	6	10		
Hospital name							
Sherbin central hospital	31	15	25	16	26.7	0.067	.500
Al-Salam hospital	29	15	25	14	23.3		
Department							
ICU	16	4	6.7	12	20	5.45	0.21*
CCU	44	26	43.3	18	30		

(*) Statistically significant considered when P-value ≤0.05

X2 = Chi square

Table (6): Correlation between the studied patients' total Burns' weaning assessment and compliance with ventilator bundle.

		Compliance with ventilator bundle
Total Burns' weaning assessment	Pearson (r)	.439
	P-Value	.000*

(*) statistically significant correlation when P-value <0.01.

DISCUSSION:

Care bundle of ventilator may decrease harm and improve quality of outcome for mechanically ventilated patients in intensive care units. A care bundle is defined as the implementation of a group of evidence-based interventions together for a defined patient population; when each one of them is executed individually will result in improved patient's recovery process and outcomes, but when performed all together, bundle care providing better outcomes than implemented individually. The Institute for Healthcare Improvement (IHI) ventilation bundle consists of five core sets of interventions grouped in an attempt to achieve the best patient care and outcome: head of the elevation at 35–45°, daily sedation interruption, daily assessment readiness to wean, peptic ulcer prophylaxis, deep vein thrombosis prophylaxis and use of chlorhexidine for daily oral care. (IHI, 2018; Mondardini, et al., 2019).

The current study results revealed that more than half of the studied patients were males as shown in table (1). This result may be due to majority of participants in this study were males. However, this result was in agreement with Danielis, et al., (2020) who studied the understanding of patients' experiences of being mechanically ventilated in the Intensive Care Unit in South America, and found that majority of patients with mechanical ventilator in ICU were males. Conversely, this result was in disagreement with Thille, et al., (2018) who studied the impact of sleep alterations on weaning duration in mechanical ventilated patients in Europe, and found that more than half of patients that used mechanical ventilator were females.

Regarding patients' ages, the current study showed that more than one third of them their ages ranged from 30-<41 years as observed in table (1). This result may be due

to most patients that used mechanical ventilator were adults. This result was supported with Mesa, et al., (2017) who studied assessing delirium in a Latin American intensive care unit. A prospective cohort study of mechanically ventilated patients, and found that more than one third of patients their ages ranged from 30 to less than 50 years. In contrast, this result was in disagreement with Zhang, et al., (2017) who studied evaluating sedation of mechanically ventilated adults in intensive care unit in Brazil, and found that more than two thirds of patients their ages ranged from 40 to 50 years.

Regarding patients' marital status, the current study showed that more than two thirds of them were married as shown in table (1). This result may be due to majority of patients were adults. This result was supported with Ghosh, et al., (2018) who studied the cumulative fluid balance and outcome of extubation: a prospective observational study from a general intensive care unit in Indian, and found that majority of patients were married. Also, this result was in accordance with Wang, et al., (2019) who studied assessing sedative drugs used for mechanically ventilated patients in intensive care units in Japan, and found that more than two thirds of patients were married.

Regarding patients' smoking status, the current study showed that, nearly half of the studied patients were non-smokers as illustrated in figure (1). this result was in disagreement with Khan, et al., (2017) who studied decreasing delirium through music (DDM) in critically ill, mechanically ventilated patients in the intensive care unit, and found that more than half of patients were smokers.

Regarding patients' mechanical ventilation data, the current study showed that more than half of the studied patients were on the Assist-Control Ventilation mode. All of them take feeding through nasogastric tube feeding as observed in table (2). This result may be due to patients were ventilated thus their feeding accordingly by nasogastric tube. This result was in accordance with Kotfis, et al., (2018) who studied evaluating ICU delirium. A diagnostic and therapeutic challenge in the intensive care unit in America, and found that all patients that being on mechanical ventilator were fed by nasogastric tube.

Also, more than three quarters of them their status upon discharge was due to improvement. This result may be due to that health care providers in intensive care unit introduced the high quality of care for patients that admitted in ICU. This result was

accordance with Alviar, et al., (2018) who studied the positive pressure ventilation in the cardiac intensive care unit in America, and found that majority of patients connected with mechanical ventilator were discharged due to improvement of healthy status.

Regarding patients' compliance with ventilator bundle of care throughout the ventilation days, the current study shows that, there is a highly statistically significant improvement in the compliance with ventilator bundle of care though out the ventilation days as illustrated in table (3). This result may be due to nurses were conceived with the importance of the ventilator care bundle and do their best to comply with it.

This result was supported with Guilhermino, et al., (2018) who studied the education on invasive mechanical ventilation involving intensive care nurses in Japan, and found that majority nurses had improvement in using mechanical ventilator after implementation training program. Also, this result was congruence with El-Sharkawy, et al., (2017) who studied the Effect of ventilator bundle implementation on weaning indicator among mechanically ventilated patients at a selected private healthcare sector in Egypt, and found that there is a statistically significant improvement in the compliance with ventilator bundle of care.

Regarding patients according to Burns' weaning assessment program (respiratory assessment), the current study shows that, all of the studied patients were stable regarding oral ETT > 7.5 or trach > 6.0 (I.D.) and their cough and swallow reflexes adequate; Majority of them their negative inspiratory pressure ≤20, more than three quarters of them their vital capacity were > 10-15 ml/kg. All of them had PaCO2~40 mm/hg (or baseline) with M.V. <10 L/min and PaO2 >60 on FiO2 <40%, as shown in table (4). This result may be due to patients' respiratory condition was enhanced as a result of implementation of ventilator bundle that affected in their respiratory reflexes.

This result was supported with Abdelaleem, et al., (2020) who studied the value of modified Burns Wean Assessment Program scores in the respiratory intensive care unit in Egypt, and found that majority of patients had improvement in respiratory condition after implementation of Burns Wean Assessment Program. Moreover, this result is congruent with the study done by Ghanbari, et al., (2018) who studied the factors affecting the duration of weaning from mechanical ventilation based on Burn Scale in the

Intensive Care Units in Saudi Arabia, and found that there no statistically significant improvement in respiratory conditions for patients after application of Burn Scale.

Regarding relation between the studied patients' personal characteristics and their mechanical ventilation day, the current study shows that, there is a statistically significant relation between the studied patients' mechanical ventilation days and the department while there is no statistically significant relation between the studied patients' mechanical ventilation days and their gender, ages, marital status, and hospital name, as illustrated in table (5). This result may be due to patients distributed on the departments and units according to their acute level that different from place to another and affecting the ventilation days.

This result was in agreement with Mahmoodpoor, et al., (2019) who studied the effect of a probiotic preparation on ventilator-associated pneumonia in critically ill patients admitted to the intensive care unit in America, and found that there is a positive relation between mechanical ventilator days and their ages, gender, and department. Moreover, this result is congruent with the study done by Brown, et al., (2019) who studied the approaches to addressing Post–Intensive care syndrome among intensive care unit survivors in America, and found that there is a no statistically significant relation between mechanical ventilator days and their demographic characteristics.

Regarding correlation between the studied patients' total Burns' weaning assessment and compliance with ventilator bundle, the current study shows that, there is a statistically positive correlation between the studied patients' total Burns' weaning assessment and compliance with ventilator care bundle, as shown in table (6). This result may be due to presences of relation between Burns' weaning assessment and ventilator care bundle.

This result is in agreement with the study done by Sepahyar, et al., (2021) who studied the effect of nursing interventions based on burns wean assessment program on successful weaning from mechanical ventilation in Iran, and found significant relation between burns wean assessment program and mechanical ventilator. Conversely, this result was in disagreement with the study done by Khalil, et al., (2018) who studied the patients' weaning from mechanical ventilation: Complete versus incomplete ventilator

care bundle implementation in Africa, and found that there no statistically significant relation between ventilator care bundle and weaning from mechanical ventilation.

CONCLUSION

The following conclusions may be drawn from the current study's findings: compliance with the ventilator bundle of care resulted in a greater rate of weaning and a shorter duration on the mechanical ventilator for mechanically ventilated patients. The entire Burns' weaning evaluation and compliance with the ventilator bundle of the examined patients had a statistically significant connection. Therefore, the application of a ventilator bundle care is essential in weaning among mechanical ventilated patients in ICU and CCU.

RECOMMENDATIONS

The following suggestions are made in light of the findings of this research:

Recommendations for hospitals include:

1) Developing and distributing a simplified and comprehensive booklet and posters about basic information of ventilator bundle care including definition, components, importance, and nursing role towards prevention of ventilator associated pneumonia.

2) Develop critical care nurse education programmes for in-service training.

3) Monitoring of nurses' compliance with the use of ventilator bundles with their patients, with a particular focus on nursing performance.

Recommendations related to patients:

(1) Using all of the ventilator bundle practices in complete compliance for mechanically ventilated patients.

(2) All mechanically ventilated patients should have a ventilator bundle.

Recommendations for furthers researches:

(1) Using a standardized approach to determine readiness for weaning can aid in the management of mechanically ventilated patients

(2) The study's generalizability is ensured by replicating it on a bigger probability sample from different geographical regions in Egypt.

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فاعلية تطبيق حزمه من الرعايه على الفطام لمرضي التنفس الاصطناعي في وحدة العنايه المركزه ووحدة عناية القلب

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الخلاصة

من المتوقع أن يؤدي تطبيق حزمة رعاية جهاز التنفس الصناعي وفقًا لإرشادات الممارسة القائمة على الأدلة إلى تحسين الفطام ، وتوفير جودة الرعاية ، وتحسين نتائج المرضى ، وتقليل مخاطر حدوث مضاعفات مع المرضى الذين يخضعون للتهوية. **هدف البحث:** التحقق من فعالية تطبيق حزمة من الرعاية على الفطام بين المرضى الخاضعين للتهوية الميكانيكية في وحدة العناية المركزة ووحدة العناية القلبية. **طرق وأدوات البحث:** اجريت الدراسه شبه تجريبيه علي60 من المرضي المتصلين بجهاز التنفس الصناعى بوحدة العناية المركزة ووحدة العناية القلبية بكل من مستشفي التأمين (السلام) بمحافظة بورسعيد ومستشفى وزارة الصحة (شربين المركزي) بمحافظة الدقهلية..حيث تم تجميع البيانات عن طريق ثلاث استمارات استبيان هما كما يلي ،الاستماره الاولى تتضمن استبيان معلوماتى للمرضى يتكون من جزئين الجزء الاول : الخصائص الشخصيه للمرضى، الجزء الثاني: اسئلة تقييم المرضى ، الاستماره الثانيه: نموذج تقييم تطبيق الحزمة الوقائيه الخاصه بأجهزة التنفس الصناعي، الاستماره الثالثه: برنامج تقييم فطام بيرنز. **النتائج:** أوضحت هذه الدراسة وجود علاقة ارتباط ذات دلالة إحصائية بين تقييم الفطام الكلي للمرضى الخاضعين للدراسة والامتثال لحزمة جهاز التنفس الصناعي للمرضى الخاضعين للدراسة. **الأستنتاجات**: : يمكن أن نستنتج أن الامتثال لحزمة جهاز التنفس الصناعي لرعاية المرضى الخاضعين لاجهزة التنفس الصناعى لديهم درجات فطام أعلى ومدة أقصر لجهاز التنفس الصناعي. **التوصيات :** أوصت الدراسة بضرورة تطبيق ممارسات حزمة جهاز التنفس الصناعي للمرضى التنفس الصناعى ***كلمات مفتاحية :*** *التنفس الصناعي ، الفطام ،حزم الرعايه، العناية المركزة ، وحدة العناية المركزة ، الالتهاب الرئوي المصاحب لجهاز التنفس الصناعي.*