Tuijin Jishu/Journal of Propulsion Technology
ISSN: 1001-4055
Vol. 45 No. 2 (2024)

Effect of Modified Burn's Wean Assessment Program Application on Weaning Outcomes among Mechanically Ventilated Patients

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Background: Knowing the weaning criteria is crucial to ensuring the success of mechanically ventilated patients, as weaning from the ventilator is the most challenging task for nurses.

The study aims to determine the effect of modified burn's wean assessment program application on weaning outcomes among mechanically ventilated patients.

Research design: Quasi-experimental was used to achieve the aim of this study.

Setting: This study was carried out in the general intensive care unit at Beni-Suef University Hospital.

Sample: A **convenient sample** included a convenience sample of 100 adult male and female mechanically ventilated patients who were recruited to fulfill the purpose of this study. Three **tools** were used in this study: **(I)** patient characteristics, medical data, hemodynamic parameters, level of conscious assessment, Mechanical ventilation data, and Acute Physiological and Chronic Health Evaluation**, (II)** Burn's wean assessment checklist**; (III)** patient's outcomes.

Results: Burn's score and weaning outcome had a statistically significant relationship, which meant that a high Burn's score was linked to a shorter ventilation time and effective weaning.

Conclusion: According to the study,

modified Burn's weaning assessment program application was effective in weaning.

Recommendations: It is advised to provide new nurses working in critical care with an application training session for the Modified Burn's Weaning Assessment Programme.

Keywords: Modified burn's weaning assessment, Mechanically ventilated patients, Weaning outcomes.

Introduction

The Burns Wean Assessment Programme (BWAP) score is a detailed clinical weaning checklist and assessment tool that was created to help clinicians manage patients who need prolonged MV. Additionally, a more practical

variant of the BWAP score called m-BWAP has been created. It is a reliable predictor of the success of weaning and extubation in patients requiring long-term mechanical ventilation. However, no study has assessed this score in patients experiencing respiratory failure as a result of a respiratory illness (**Jiang et al., 2020).**

A mechanical ventilator takes over a person's breathing duties when they are unable to do so on their own. The terms ventilator, respirator, and breathing apparatus are other terms for the mechanical ventilator (**Al-Thaqafy et al., 2021**). The primary goals of mechanical ventilation (MV) are to stabilize the alveolar gas compartments, ensure sufficient pulmonary gas exchange, and return breathing to a normal or less laborious state. In actuality, the patient's underlying respiratory failure cause is treated during the mechanical ventilation phase (**Windisch, et al, 2020).**

Prolonged mechanical ventilation (MV) is associated with an increased risk of complications such as ventilator-associated pneumonia (VAP), tracheal ischemia, lung injury, and diaphragmatic muscle dysfunction, all of which heighten the chance of death. Furthermore, around 40% of the resources in an intensive care unit are utilized by patients who struggle with weaning (**Schonhofer et al., 2020**). Weaning is defined as the complete process of taking the patient off of mechanical support and their endotracheal tube, which can take up to 90% of the patient's MV time (**Keykha A. et al., 2017).** It is critical to assess the patient's preparedness for the MV weaning procedure. Weaning a patient who has respiratory failure as a result of a respiratory illness is not an easy task, though. The decision to wean still poses a challenge to the respiratory physician since mechanical ventilation (MV) is associated with numerous problems and inappropriate weaning can result in respiratory failure and re-intubation (**Jeong and Lee (2018)**.

Outcomes Anticipated from the Weaning Procedure According to **Zein et al. (2016**), the ability to maintain spontaneous breathing for 48 hours after extubation without the need for intrusive mechanical ventilation or reintubation is known as successful weaning. The initial Burns Wean Assessment Programme (BWAP) checklist was designed to evaluate a patient's preparedness for weaning off the ventilator. It assesses weaning parameters methodically and considers all factors about lung function, gas changes, physiological state, and psychological health of a patient **(Baptistella et al., 2018).** This tool demonstrated good predictive value for successful weaning and extubation in patients requiring long-term mechanical ventilation (LTMV) for longer than 21 days. As per their research, an m-BWAP score of 60 or greater is linked to favorable extubation results **(Jeong & Lee, 2018).**

Significance of the study

Weaning too soon or too late is still an issue, despite advances in medical knowledge. Delays in assessing weaning readiness are a common cause of late weaning. As a result, patients who need continuous ventilation may experience increased morbidity, higher death rates, drug dependence, post-extubation delirium, airway injuries, and ventilator-induced infections (**Alsharari et al., 2020**). According to the most recent figures available, there were approximately 600 patients admitted to the intensive care unit at Beni-Suef University Hospital in 2020, and 85% of them needed mechanical respiration **(Hospital records of Beni-Suef University 2020).**

The Burns Wean Assessment Programme (BWAP) was created to assess patients' preparedness for weaning off of a ventilator. This instrument assesses all parameters associated with pulmonary function, gas changes, and the patient's physiological and psychological states as well as the parameters of patients' weaning off the ventilator in a methodical manner (**Baptistella et al., 2018**). The elements of this simple-to-use checklist might be measured in ten minutes (**Dehghani et al., 2016**). **Jiang et al. (2014**) created a modified version of the BWAP and demonstrated that it was a reliable indicator of effective weaning and extubation in patients requiring LTMV for more than 21 days. So, the researchers' objective was to determine the effect of the modified burn's weaning assessment program application on weaning outcomes among mechanically ventilated patients.

Aim of the study

To determine the effect of modified burn’s wean assessment program application on weaning outcomes among mechanically ventilated patients.

Research hypotheses

1- Mechanically ventilated patients who are weaned by using a modified burn's weaning assessment program application will show a significant increase in the success rate of weaning than that among the control group patients who are exposed to routine care.

2- The duration of connection to mechanical ventilation of the study patients group who are weaned by using

modified burn's weaning assessment program application will be lesser than that among the control group.

3- The length of ICU stays among mechanically ventilated patients who are weaned by modified burn's weaning assessment program application will be lesser than that among the control group subjects who are exposed to routine care.

Operational Definitions

Weaning outcomes refer to: the success rate of weaning, duration of connection on mechanical ventilation, and length of ICU stays.

Subjects and Methods

Research design

Quasi-experimental research design was used to achieve the aim of this study.

Setting

The study was carried out in the general intensive care unit at Beni-Suef University Hospital.

Sample

A convenience sample of 100 adult male and female mechanically ventilated patients was recruited to fulfill the purpose of this study. Their age ranged from 18 - 60 years old. Connected to mechanical ventilators, and divided randomly into two equally matched groups (study and control groups) 50 patients in each one. Their GCS scores are more than 9 on admission.

Tools

Three main tools were used during data collection. They were developed by the researcher then they were adopted by the researcher.

Tool one: patient assessment tool: this tool was developed by the researcher after reviewing the literature to assess the patient condition to form baseline data **Kim, & Huh, 2020, Golubev, Alexandru, et al., 2020, Patel, Khushbu, et al., (2021)** which consisted of 6 parts:

Part 1: Included the patient's demographic data such as (age, gender, and residence)**.**

Part 2: Included patient's medical data: as past medical history, date of admission, and causes of ICU admission (respiratory, cardiovascular, trauma, neurology, gastrointestinal, obstetric, or post-operative cause).

Part 3: hemodynamic parameter: It comprises (heart rate b/m, blood pressure mm/hg, mean arterial pressure mm/hg, CVP mm/dl, and urine output) which were assessed manually for six days, in morning and evening shifts by the researcher.

Part 4: Assessment of patient's conscious level: Using the Glasgow Coma Scale, is a neurological scale that aims to give a reliable, objective way of recording the conscious state of a person for initial as well as subsequent assessment (**Reith et al., 2016)**

Part 5: Mechanical ventilation data as Mode, RR, Fio2, tidal volume (Vt) PEEP, and PS.

Part 6: Acute Physiological and Chronic Health Evaluation II (APACHE II) was adopted by the researcher and used to measure the severity of disease for adult patients admitted to intensive care units **Jaganath, (2020)**

Tool two: Modified Burn's wean assessment checklist: This tool was developed by the researcher after reviewing of literature to assess readiness to wean this tool includes 26 items, 12 items are for general measurement and 14 for patients' respiratory function **(Burn et al, 2010) Sepahyar et al, (2021)**

Tool 3: Patient's outcomes assessment tool: This tool was developed by the researcher after reviewing of literature by **Abdelaleem et al, (2020) and Sepahyar et al., (2021)** to assess the following outcomes (mortality rate, length of ICU stays, duration of connection with MV and success rate of weaning).

Methods

This study where carried out through three main phases as follows: -

The preparatory phase

After describing the purpose and scope of the study to the hospital's responsible officials, permission was officially obtained to carry it out in the general ICU. The study was conducted by generally accepted ethical standards for clinical research after receiving approval from the local ethical committee. after examining the pertinent literature, The current study was conducted by preparing different data collection tools, in addition, to obtaining a formal paper agreement before conducting the study and ending by carrying out the pilot study.

Validity

Five experts in the field of critical care nursing, medical–surgical nursing, and critical care medicine from Beni-Suef University Hospital evaluated the tool's content-related validity, and the necessary revisions were made. Before data collection began,

Reliability:

Reliability was tested using Cronbach's Alpha Coefficient for the three tools, tool I was (0.78); tool II (0.77); and tool III was 0.82.

Ethical consideration:

Before beginning the study, Ethical approval by the institutional review board of the Faculty of Nursing, Sohag University. The researchers met with the directors of the selected setting to explain the study's aim and gain their cooperation. Verbal consent was obtained from the studied patients of the selected unit. In addition, the patients' agreements to be included in the study were obtained after an explanation of the nature and purpose of the study. Each patient was free to either participate or not in this study and had the right to withdraw from the study at any time without any rationale. Also, they were informed that data will not be included in any further research. The confidentiality and anonymity of each subject were assured through the coding of all data.

Pilot study:

To make sure the research tools were visible, applicable, and took the necessary amount of time to complete, it was tested on 10% (10 patients). No changes were made to the pilot study's findings. The current study sample consisted of patients who participated in the pilot study.

Implementation phase:

The researcher started data collection by going to the selected settings every day during the day shifts after receiving official approval to move forward with the intended study. The goal and design of the study were explained to each recruited patient and their family member individually. After accepting to take part in the study, the participants gave the researcher their oral consent. Afterward, the patients were split into two equal groups at random. The researcher then began gathering data from the control group by first obtaining the patient's medical and demographic information from the patient file as well as from the patient's family members for those who had been registered on the first day.

Critical care nurses provided the control group patients with standard hospital nursing care during the MV connection. This care included deep vein thrombosis prophylaxis, peptic ulcer prophylaxis, daily assessment of extubation readiness, and elevating the backrest of the bed between 30 and 45 degrees. utilized a closed suctioning system, enteral feeding, patient monitoring, medication delivery, and patient hygiene in addition. The researcher collected the medical and demographic information of the study group's participants from their patient files as well as the patient families of those who had been registered on the first day, whereas data collection from the control group was completed first.

With the help of the medical and nursing staff, the researcher administered a modified version of the Burn's Wean Assessment Programme application to the patients in the study group. The following were included in the modified burn's wean assessment program: deep vein thrombosis prophylaxis and the use of anti-embolic stockings, peptic ulcer prophylaxis, ventilator circuit care and maintaining of infection control measures to prevent nosocomial infections, routine oral care applied three times per day (once every eight hours), early mobilization typically post-ICU admission, endotracheal suctioning care using open suctioning system technique, daily sedation interruption and daily assessment of readiness to extubate to assessed patients for neurological recovery and readiness for extubation or reseated if necessary, deep vein thrombosis prophylaxis and use of anti-embolic stockings, and daily assessment of readiness to extubate to assess patients for neurological recovery and readiness for extubation or resedated if required and patient monitoring**.**

We assessed the patients' preparedness for weaning while we completed the study group's checklist. The researchers monitor the study group's nursing actions during the morning and afternoon shifts, documenting any alterations in the patient's status. Then, in compliance with the guidelines, the weaning process was started. Nursing interventions were implemented throughout the day, with a particular emphasis on the main concern indicated in the application for the modified burn's wean assessment program, as the patient did not meet the required score.

Evaluation phase:

Modified burn's weaning assessment program application was used to evaluate both the control and study groups daily throughout the morning and evening shifts to forecast how well patients on mechanical ventilation would wean using the same tools used in the pre-test.

Statistical analysis

Every patient's data was recorded in a unique chart. The gathered information was coded, examined, and tabulated. Statistical software SPSS 17.0 was used for data entry and analysis. For qualitative and quantitative variables, respectively, means and standard deviations were used to present the data using descriptive statistics. When comparing two independent groups, analysis of variance was used to analyze quantitative continuous data. Using the chi-square test to identify significant differences in non-parametric data.

Statistically significant differences were considered when the P-value was used as follows:

P >0.05 non-significant

*P<0.05 significant

**P<0.01 moderate significant

***P<0.001 highly significant

Results:

Table (1): shows that 62% in the study group compared to 68% in the control group were males. Regarding age, the mean age of the study group was 38.77±10.99 compared to 41.33±10.15 in the control group. Regarding residence, 60% of the study group was living in urban area compared to 64% in the control group. Also, there was no statistically significant difference in studied patients in both the study and control group about gender and age groups.

Table (2): Shows regarding the cause of ICU admission, the table illustrates that respiratory cause was the common cause in both the study and control group with no statistically significant difference between them in this respect.

Table (3): Shows that there was a statistical difference was found between both groups about **APACHEII scores** on admission.

Table (4): Reveals that GCS scores differed significantly in the evening shift during the 1st day of admission with p values of (<0.001**respectively), as well as on the 6th day.

Table (5): Displays that respiratory rate and **PEEP** mode differs significantly between both study and control groups on admission in in evening shift with p- the value of (<0.001**).

Table (6): Reveals successful weaning in about (92%) of the study group subjects as compared to (32%) of the control group subjects with a highly significant statistical difference between the two groups with a p-value of (<0.001**). Thus, hypothesis one can be supported.

Table (7): Shows that about the duration of mechanical ventilation, a highly statistically significant difference was put into evidence between the study and control group with p- the value of (<0.001**). Thus, hypothesis two can be supported. Also, the length of ICU stay differed significantly between the two groups with a p-value of (<0.001**). Thus, hypothesis three can also be supported.

Table (1): - Patient's demographic data in both study and control groups (n=100)

	Study (N=50)	Control (N=50)	P. value

Variables	No	%	No	%	
Gender					
Female	19	38.0	16	**32.0**	0.687
Male	31	62.0	34	**68.0**	
Age					
18-35	13	26.0	15	30.0	0.139
36- 45	23	46.0	20	40.0	
46-65	14	28.0	15	30.0	
Mean±SD(range)	38.77±10.99 (18-61)		41.33±10.15 (18-65)		0.137
Residence:					
Urban	30	60.0	32	64.0	0.986
Rural	20	40.0	18	36.0	0.954

Table (2): - Patient's medical data concerning past medical history and causes of ICU admission in both study and control groups (n=100)

Variables	Study (N=50)		Control (N=50)		P. value
	No	%	No	%	
Comorbidity	26	52.0	28	56.0	0.978
Diagnosis					
Respiratory causes	19	32.0	15	30.0	0.977
Cardiovascular causes	5	8.0	8	16.0	0.567
Renal causes	1	2.0	3	6.0	0.599
Neuromuscular causes	5	8.0	2	4.0	0.426
Gastrointestinal causes	2	4.0	4	8.0	0.665
Obstetric causes	6	12.0	8	16.0	0.765
Trauma	9	18.0	7	14.0	0.793
Post-operative	8	16.0	3	6.0	0.204

Table (3): - Patient's medical data concerning patient's Acute Physiological and Chronic Health Evaluation in both study and control groups (n=100)

Variables	Study (N=50)		Control (N=50)		P. value
	No	%	No	%	
APACHEII on Admission	8.68±3.53		9.82±3.38		0.001**

Table (4): - Patient's medical data concerning to patient's consciousness level Using the Glasgow Coma Scale **in both study and control groups (N=100)**

Variables	Study (N=50)		Control (N=50)		P. value
	No	%	No	%	

Glasgow Coma Score	Mean±SD	Mean±SD	
6th day	13.51±1.63	12.29±2.23	0.001**

Table (5): - Differences between study and control groups regarding mechanical ventilation mode and parameters (n=100)

Mode	Morning shift					Evening shift				
	Study		Control		P. Value	Study		Control		P. value
	No	%	No	%		No	%	No	%	
On admission										
AC	32	64.0	30	60.0	0.478	8	16.0	12	24.0	0.069
SIMV	17	34.0	20	40.0		24	48.0	28	56.0	
CPAP	1	2.0	0	0.0		17	34.0	10	20.0	

MV parameters	Morning shift			Evening shift		
	Study	Control	P.value	Study	Control	P.value
	Mean±SD	Mean±SD		Mean±SD	Mean±SD	
On admission						
Fio2	48.22±10.3	44.78±9.66	0.094	43.74±6.66	41.08±5.55	0.587
Spontaneous respiratory rate	13.88±2.42	12.22±0.55	<0.001**	13.9±2.33	12.24±0.56	<0.001**
Tidal volume	473.45±76.55	497.66± 94.74	0.372	484.44±76.62	496.46±96.86	0.388
PEEP	6.77±1.4	6.92±1.77	0.056	6.08±1.4	6.77±1.96	<0.001**
PS	7.66±1.10	7.88±1.08	0.192	7.67±1.20	7.69±1.08	0.276

Table (6): - Differences between both study and control groups concerning weaning success (N=100)

	Study (N=50)		Control (N=50)		P. value
	No	%	No	%	
Success or failure of weaning					
Succeed	46	92.0	16	32.0	<0.001**
Failed	4	8.0	34	68.0	

Table (7): - Differences between the study and control groups concerning outcomes (N=100)

Items	Study (N=50)		Control (N=50)		P. value
	No	%	No	%	
Duration of mechanical ventilation					
Less than 10 days	32	64.0	10	20.0	<0.001**
From 10-20 days	18	36,0	24	48.0	
More than 10 days	0	0,0	15	30,0	

Length of stay in ICU					
Less than 10 days	29	58.0	6	12.0	<0.001**
From 10-20 days	12	24.0	18	36.0	
More than 10 days	9	18.0	26	52.0	

Discussion:

The m-BWAP score is being evaluated for the first time, as far as we are aware, in the process of weaning an identifiable group of adult ICU patients off of mechanical ventilation. We have noted that Egyptian adult patients with various diseases could benefit from the application of the mBWAP score. Using a cut-off value of 55, the m-BWAP score was higher (84.85%, specificity) in patients who had completed weaning. The use of the modified burn's wean assessment program is seen as a "package" of evidence-based guidelines that are intended to improve weaning techniques, and lower VAP rates to enhance therapeutic outcomes (**Alsoda. et al., 2020**). So, the study was done to determine the effect of modified burn's wean assessment program application on weaning outcomes among mechanically ventilated patients

The results of the current investigation indicated that there was no statistically significant difference in the gender and age categories of the analyzed patients in either the study or control group. The results of this study illustrate the researcher's point of view, which is that, as people age and undergo physiological changes, most persons over forty are more vulnerable to a variety of health issues, including neurological, respiratory, kidney, and hepatic diseases. This finding aligns with a study by **Kasem et al. (2019**) and they found that age did not significantly differ between the study and control groups. **Faramarzi (2020**) their findings contrast with the current study, which found that most of the patients were over 60.

Regarding gender, the majority of the study's patients and control groups were men, according to the results of the current investigation. Males are more at risk than females due to high levels of calcification in their arteries, as well as increased exposure to occupational dangers, stress, and regular use of hookahs and cigarettes, according to the study's findings translated by the researchers. The results of the study were in line with those of **Ghiani et al. (2020**), who investigated "predicting weaning outcome among prolonged mechanically ventilated patients." and stated that males made up more than three fifths of the cases in both the weaning failure and success groups. A study by **Alkotami, et al. (2019**) on "patients requiring ventilatory support at the neurointensive care unit" found that high percentage of the patients evaluated were female, which is in contrast to the current study's findings.

When the reasons for ICU admission in the study and control groups were compared, respiratory disease turned out to be the common cause for both groups. The present study's findings are interpreted by the researcher, who believes that respiratory disorders are the primary causes of compromised pulmonary circulation and regular breathing, accounting for the majority of patients using mechanical ventilation. This result was in line with the findings of **Karagozlu et al. (2018**), who found that in most of the managed and uncontrolled groups, internal medical issues were the main reason for ICU admission. The results of **Lee et al. (2016**) showed that results were not consistent with the findings of the present investigation.

Several patients with various respiratory conditions were included in another trial. Furthermore, compared to the unsuccessful group, the successful weaning group had a considerably larger number of individuals with asthma, overlap syndrome, and pneumonia/ARDS. Conversely, compared to the successful weaning group, the number of patients with COPD and bronchiectasis was considerably higher in the failure group. Pathophysiologic problems such as airway obstruction, dynamic hyperinflation, anomalies of the diaphragmatic muscle, and ventilation-perfusion mismatch are well-known in patients with COPD **(Global Initiative for Chronic Obstructive Lung Disease, 2021).**

The current study's findings are explained by the researcher's point of view, which states that respiratory issues are the main factor compromising the body's ability to breathe normally, circulate blood throughout the lungs, and maintain lung compliance. As a result, respiratory issues are the most common diagnosis for patients with mechanical ventilation. According to the current study's findings, there was a statistically significant difference between the two groups' admission APACHE II scores. This outcome was consistent with research by **Shin et al. (2020**), who found that the successful weaning group had a significantly reduced APACHE II score. According to the researchers, it demonstrated the benefits of using the modified Burn's Wean Assessment Programme.

The results of this study showed that there were significant differences in GCS scores on the first day of admission and the sixth day during the evening shift. According to the study's findings, patients with stable conditions had higher GCS scores, which suggested that they were more likely than non-stable patients to have a successful weaning process and a brief MV connection. In line with **Cinotti et al.'s (2018**) study and discovered that semi-coma GCS >10 was present in most individuals who were predictors of successful extubation. The results of the current study were in contrast to those of a study by **Okabe (2018**) and revealed that nearly one-third of the groups receiving PMV and SMV had a significantly higher rate of severe GCS.

According to the current study's findings, both the study and control groups' spontaneous respiration rates and PEEP modes differed significantly upon admission for the nighttime shift. Most research and control groups employed synchronized intermittent mandatory ventilation, according to the first ventilated mode findings. The current study's findings are consistent with the researcher's hypothesis, which states that the most efficient and successful method of ventilation for patients in the synchronized intermittent mandatory ventilation (SIMV) mode is to synchronize the ventilator breath with the patient's inspiratory effort. It is helpful for early weaning since it will lessen the difficulty of patients trying spontaneous breathing and encourage them to use their respiratory muscles.

The current investigation's findings corroborated those of **Abd-Elbaky & Mohammed (2020**), who found that every patient in the research maintained a SIMV mode connection to the mechanical ventilator during the MV hookup. In contrast, only one-third of the control group remained hooked to the ventilator for more than ten days, according to the current study's results, while almost two-thirds of the study group did the same.

The current study's findings are explained by the researcher's point of view, which states that since SIMV mod patients are partially dependent on MV, the ventilator breath is synchronized with the patient's inspiratory effort. This mode of ventilation has been called the most effective and efficient, particularly in the intensive care unit. This will facilitate spontaneous breathing trials, promote the usage of the patient's respiratory muscles, and improve early weaning. The results of the current investigation aligned with those of **AbdElbaky & Mohammed's (2020**) study, "Impact of body positions on the endotracheal tube cuff pressure measurement between critical patients," which discovered that every patient in the study stayed connected to the mechanical ventilator in SIMV mode throughout the MV connection. **Al-Banna et al. (2016)** found in their study " Relationship between Body Mass Index and Selected Patients Outcomes at a University Hospital in Cairo" that over 75% of the studied groups were in continuous mandatory ventilation (CMV) mode. In contrast, the results of the current study were found to be different from such findings.

The current study's results showed that almost all of the study group's subjects successfully underwent weaning, compared to about one-third of the subjects in the control group. This difference in the two groups' weaning rates was statistically significant. The researcher's claim that employing the BWAP enhanced the likelihood of successful weaning explains this finding. The results of this study showed that patients who had a BWAP score of 50 or above had a significantly better likelihood of weaning than those who had a lower score. According to the results, nurses' thorough assessment of the patient utilizing BWAP **Sepahyar et al., (2021)** significantly shortened the duration of MV. Furthermore, patients' modified burn wean assessment program (m-BWAP) ratings were higher who were effectively weaned and lower for those who weren't **(Jeong & Lee, 2018).**

There was a highly statistically significant difference between the study and control groups for the length of mechanical ventilation. Additionally, the current study's findings regarding weaning scores demonstrated that, when compared to the control group, which did not use all individual elements together with a statistically significant difference found between the two groups, the study group that used all individual components of the modified Burn's wean assessment program obtained higher weaning scores. According to the researcher's perspective, the current study's findings indicate that the application of a modified Burn's Wean Assessment Programme may decrease the incidence of such complications, enhance patient care, improve the prognosis of the patient's condition, and ultimately shorten the average duration of ventilation support and hospital length of stays.

The current study, "Implementation of Burn's Wean Assessment Program for Prevention of Ventilator-associated Pneumonia in Intensive Care Unit," was conducted by **Alsoda et al., (2020**). Their findings showed a significant reduction in the duration of mechanical ventilation (MV) following the program's implementation; for both groups, the total mean ventilation duration was 10 ± 89 days. A recent study that supports **Wolfensberger et al. (2020**) examined " evaluation bundle of a care regarding prevention of non-ventilator associated hospital-acquired pneumonia - a mixed-methods study protocol for a hybrid type 2 effectiveness implementation trial" and discovered that, following the application of Burn's wean assessment program, the majority of the test group had a shorter MV connection with a statistically significant difference.

In support of the current study's findings, **Jeong & Lee (2018**) examined " application of modified burns wean assessment program scores at first spontaneous breathing trial in weaning patients from mechanical ventilation" and discovered that, following application of the burn's wean assessment program, the study group had a significantly higher rate of successful weaning scores than the control group. Similarly, the results of the current study were in line with those of **Lavallée et al. (2019**), who investigated "The effects of care bundles on patient outcomes: a systematic review and meta-analysis." They discovered that the study group's application of Burn's wean assessment program practices was linked to favorable patient outcomes, such as a higher rate of successful weaning scores, a lower rate of mortality, and a shorter length of stay.

The study also showed that the control group's regular weaning assessment and the study group's burn wean evaluation program led to a longer mean duration of stay in the intensive care unit (ICU) for the intervention group than for the control group. This is consistent with the findings of **Jeong and Lee (2018**), who discovered that patients who underwent successful weaning yielded better scores on the modified burn wean assessment program (m-BWAP) than those who did not. Furthermore, it was shown that the m-BWAP score at the time of the first SBT had a substantial clinical value in predicting the likelihood of liberation from MV, independent of the duration of the condition. Additionally, **Wu et al.'s (2019**) findings, indicated that days of mechanical ventilation before weaning, and length of ICU stays affected weaning success.

Additionally, their findings indicated that successful extubation outcomes are associated with an m-BWAP score of ≥60. Weaning success in patients with an endotracheal tube in place at initial SBT was found to be well predicted by the m-BWAP score, according to **Jeong & Lee's (2018**) prospective enrollment of 103 patients in a medical ICU. The current study found that among patients with various respiratory problems in the ICU, the m-BWAP score enhanced the likelihood of effective weaning, which is consistent with the findings of **Jang et al. (2014**) and **Jeong & Lee (2018**). **Blackwood et al. (2021**) found that daily evaluation of weaning readiness criteria based on weaning protocols could shorten hospital stays and the amount of time patients need mechanical breathing, as well as cut expenses and weaning failure rates. Our findings therefore have potential therapeutic and economic implications, especially in the context of developing countries such as Egypt.

Conclusion:

The following can be concluded based on the findings of the current study and the research hypothesis: the application of the modified Burn's weaning assessment program was a successful weaning approach in improving outcomes for patients on mechanical ventilation.

Recommendations:

The following recommendations are made based on the current study's findings:

Recommendations related to nurses

- Developing a critical care nurse's in-service training curriculum to enhance the nurses' knowledge and use of the modified Burn's weaning assessment program.
- Close monitoring and follow-up regarding nurses' adherence to the modified Burn's weaning assessment program when applying it to patients.
- Producing a concise yet thorough pamphlet that covers the fundamentals of the Burn's Weaning Assessment Programme, such as its definition, risk factors, nursing role, components, and significance.

Recommendations related to patients

- Ensuring that the mechanically ventilated patients follow the weaning assessment program methods for grouped burn patients in full compliance.
- A duplicate of the modified Burn's weaning assessment program should be conducted on patients on artificial ventilation with various diagnoses.

Recommendations for further research

- To guarantee the study's generalizability, it should be repeated using a bigger probability sample drawn from other Egyptian regions.
- Analyzing the clinical BWAP factors in detail and updating them in research that comes after.
- Making the most of BWAP as a helpful tool in a different study to determine a patient's readiness for weaning and to achieve optimal weaning results.

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