Effect of Daily Interruption of Sedation on Level of Consciousness Among Mechanically Ventilated Patients

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Abstract
Critically ill patients require mechanical ventilator that also need for sedation. Sedative infusions are associated with several disadvantages, so the implementation of daily interruption of sedation was suggested, nurses should closely monitoring sedation and level of consciousness to minimize these complications. **Aim:** This study was carried out to evaluate the effect of daily interruption of sedation on level of consciousness among mechanically ventilated patients. **Design**: a quasi-experimental design. **Setting**: In ICUs at Assiut university hospital. **Subjects**: A convenience sampling of 60 adults patients. Sample was assigned to two equal groups (study and control). **Tools**: Two tools were utilized to collect data of study, **tool I**: Patient assessment sheet. **Tool II:** Sedation assessment tool. **Method**: The researcher used preparatory, implementation and evaluation phases to implement this study. **Results**: This study revealed that there was a gradual improvement every day in duration of interruption that led to improve ment in the levels of sedation and consciousness among study groups rather than control groups. **Conclusion**: implementing daily interruption of sedation improve level of consciousness among mechanically ventilated patient. **Recommendation** Provide in-service education and training program for critical care nurses regarding applying daily interruption of sedation.

Key words: Daily Interruption Of Sedation, Level of Consciousness & Mechanical Ventilation.

Introduction
The management of sedation requires a multidisciplinary approach, critical care nurses are included in the implementation of a daily interruption of sedation (DIS). It is a role of nurses to manage sedation therapy and closely monitoring the patient to avoid complications of over and under sedation. Sedation is titrated by nurses to an appropriate target level, in collaboration with medical staff **(Ryan et al., 2017)**.

The implementation of daily sedation interruptions has been developed. Recent evidence suggests the implementation of DIS in conjunction with validated assessment tools and hospital-based sedation protocols can facilitate improvements in patients' outcome for example level of consciousness **(Lynelle, 2015).**

Patients who received sedatives were accounted for by nurses' attitudes in nursing sedation practices. Nurses thought that mechanical ventilation that is one of the common treatment methods for various diseases complicated with respiratory failure, but its uses may be associated with uncomfortable and stressful events, so nurses reported that patients need sedation if they were treated with mechanical ventilation **(Richard, 2018).**

Sedation management is a multidisciplinary process, in which nurses are primarily responsible for making the decisions about administration and titration of sedatives. Nurses adjust sedation according to a wide range of information, including subjective assessments of patients' amnesia and comfort needs, need to prevent self-injury by patients, efficiency of care, and the nurses' own beliefs and interactions with patients' families (**Brian et al., 2018).**

Nurses' assessment may also affect sedation level. The overall goals of the sedation are to provide stability in physiological status and comfort. The use of inappropriately high or low levels of sedation in critically ill adults has marked risks. Inappropriately high levels of sedation, that are associated with the use of continuous intravenous infusions of sedatives, may lead to alterations in respiratory drive, inability to maintain and protect the airway, and unstable cardiovascular status. Conversely, inadequate levels of sedation may result in agitation, placing intubated patients at risk for self-extubation, unstable hemodynamic status, and physical harm or injury **(Uma & Rakesh, 2017).**

Optimal sedation is the goal for all patients. Some studies found that an interruption, or stopping the drug for a period of time each day, will allow the body to clear the drugs and patients become more awake and ready for earlier liberation from the mechanical ventilation **(Burry et al., 2014)**.

Sedative medications are commonly prescribed within the ICU environment primarily for the treatment of agitation and anxiety. The appropriate

use of sedatives can facilitate patient care and contribute to patient safety, but their use are associated with both short and long-term negative patient outcome, including prolonged mechanical ventilation, disturbed level of conscious and cognitive dysfunction. It is important to define the indication for sedation, as this may affect the sedative selection and acquiring the endpoint for sedative utilization
(**Brian et al., 2018)**.

Sedation is required in the ICU for patients to tolerate noxious stimuli, particularly mechanical ventilation. Under and over sedation can lead to complications. To sedate patients in the ICU, midazolam is commonly administered via titrated, continuous infusions **(Ahmed et al., 2015).**

Significant of study

The usual practice for the administration of sedation is continuous intravenous infusion, which may be lead to many potential complications such as deteriorate level of consciousness and death so we suggest that intensive care nurses should be identify outcome for patients who will receive continuous sedation and daily interruption of sedation (DIS).

-There is no study in our setting identify these outcomes and its risks on patients , so we conduct this study to evaluate the effect of daily interruption of sedation on level of consciousness among mechanically ventilated patients.

-In 2016, the number of patients admitted in critical care ICUs was about (351) patients, about more than 50% of them connected to MV. **(Assuit university hospital records, 2017).**

Aim of the study

To evaluate the effect of daily interruption of sedation on level of consciousness among mechanically ventilated patients.

Hypothesis

To fulfill the aim of this study the following research hypothesisies are formulated

- Level of consciousness among the study groups will improve more than control group.
- Level of sedation in study group will be appropriate rather than in control group.

Patient & method

Research design

-Quasi experimental research design was used to conduct this study.

Variables

- Independent variable: is daily interruption of sedation (DIS).
- Dependent variable: is level of consciousness among mechanical ventilated patients.

Setting

- This study was conducted in Intensive care units at Assiut university hospital.

Subjects

By calculating comparison between proportion of study and control groups (Respiratory complication) according to pilot study; It was observed that proportion in control group was 40.6, proportion in study group was 5.1. According to the significance level of 0.05 and a power of 0.8, it was calculated that the sample size of 27 cases in each group(Sampling size),So in this study a convenience sampling of 60 adult's critical ill patients aged from (20-60 years old) who admitted to previous mentioned setting who were eligible for inclusion in the subject. Subject was assigned to two equal groups each group consist of 30 patients. Control group who was received continuous sedation infusion, study group who was received daily interruption of sedation.

Inclusion criteria

Subject who met the following criteria was included in the study:-

- Recent admission.
- Age 20-60years.
- Patients connected with mechanical ventilator for more than 12 hours and received continuous infusions of sedation for at least 24 hours.

Exclusion criteria

The study excluded patients who had the following criteria

- End stage of diseases, shocked patients, burned patients, neurological or neurosurgical diagnosis, pregnancy, addict patient, transfer to ICU after resuscitation following cardiac arrest and initiation of sedative infusion in another hospital.

Tools of data collection

Two tools were used to collect the necessary information for the study, the following tools were used**:-**

Tool one: Patient assessment sheet

- The tool was developed by the researcher after review of literatures**.** This tool used to assess patient condition, and divided into five parts as hemodynamic state and mechanical ventilation data:-

Part I: Bio-socio demographic data and clinical data assessment sheet:

- Bio-socio demographic data includes (6) questions, patient's name, age and sex. Clinical data as present and past health history, date of admission, date of discharge.

Part II: Assessment of respiratory and hemodynamic state

- This part was developed by the researcher after review of literatures and used to assess respiratory rate, oxygen saturation, pulse, and mean arterial blood pressure and central venous pressure (CVP)which this part covered (5) items.

Part III: Mechanical ventilation data:

- This part was developed by the researcher after review of literatures and used to assess parameters of mechanical ventilation include mode of mechanical ventilation, positive end expiratory pressure (PEEP), pressure support (Ps), fraction of inspired oxygen (FIO2), Tidal volume (Vt), duration of mechanical ventilation.

Part IV: FOUR score scale

- This tool was adopted from **(Wijdicks.etal, 2005).**"FOUR" is acronym for "Full Outline of UnResponsiveness".This tool used to assess neurological state**.** This score comprises four main items (Eye response (0-4), Motor response (0-4), Brain stem reflexes (0-4) and Respiration (0-4) where total score of this tool are 16 items.

Part V: Laboratory investigations

- This part was developed by the researcher and used to assess laboratory investigations that include liver, renal function test, blood glucose level and arterial blood gas.

Tool two: Sedation assessment tool: Richmond Agitation Sedation Scale (RASS):-

- This tool was adopted from **(Sessler.etal, 2002)** and used to assess patient's level of sedation which consists of a ten point. Three sequential steps are used: observation, response to verbal stimulation and response to physical stimulation.

Items	Score
Combative	+ 4
Very agitated	+ 3
Agitated	+ 2
Restless	+ 1
Alert and calm	0
Drowsy	-1
Light sedation	-2
Moderate sedation	-3
Deep sedation	-4
Unarousable	-5

Method of data collection

The study was conducted throughout four main phases, which were preparatory phase, assessment phase, implementation phase and evaluation phase

1. Preparatory phase for both control, and study groups

- Permission to conduct the study obtained from the hospital responsible authorities in critical care units of anesthesiology department, after explaining the aim and nature of the study.
- The tool (I) developed by the researcher based on the relevant literature reviewing.
- The developed tools (I) tested for clarity and reliability by 7 experts in the field of the study and the necessary modifications was done.

2. Assessment phase for control and study group

- During this phase the researcher assessed patient from the first day of admission and record patient socio demographic and clinical data before any data collection by taking this information from his/her sheet using tool 1 (part 1).
- The researcher assessed patient from the second morning of mechanical ventilation and at least 24hours of sedative infusion (first day of intervention) and record respiratory and homodynamic state of patient by using tool 1 (part II) for the first two hours of interruption daily on the same time for both groups.
- The researcher assessed patient from the first day of intervention and record mechanical ventilation data tool 1 (part III) four score scale tool 1 (part IV) one time daily at the same corresponding time for both groups.
- The researcher assessed patient from the first day of intervention and record laboratory investigations tool 1 (part V) included liver and renal function test were monitored on first, fourth and seventh day, blood glucose level and arterial blood gas were monitored daily after finishing trial of interruption.
- The researcher assessed patient from the first day of intervention and record level of sedation (RASS) daily tool 2 by using three sequential steps: observation, response to verbal stimulation and response to physical stimulation.

1. Observe patient
   a. Patient is alert, restless, agitated or combative (score 0 to +4)
2. If not alert, state patient's name and say to open eyes and look at speaker
   b. Patient awakens with sustained eye opening and eye contact (score –1)
   c. Patient awakens with eye opening and eye contact, but not sustained(score –2)
   d. Patient has any movement in response to voice but no eye contact (score –3)
3. When no response to verbal stimulation, physically stimulate patient by shaking shoulder and/or rubbing sternum

e. Patient has any movement to physical stimulation (score –4)
f. Patient has no response to any stimulation (score –5)

3. Implementation phase for study group

- The researcher applied daily interruption of sedation for study group after 24 hours of sedative infusion and 12hours of mechanical ventilation for seven consequent days, every day and every morning shift if sedative infusion continue as the following:
- Sedation (midazolam or fentanyl) that are routinely used in the selected setting was stopped in the morning, but timing was depend on practicalities such as daily rounds, procedures, and travel outside the ICU. Interruption occur one time every morning shift for ten consequent days if sedative infusion continue.
- Assessment patients according to assessment phase at the same corresponding time with control groups for :
  - Socio demographic and clinical data (tool 1 part I).
  - Respiratory and hemodynamic state (tool 1 part II).
  - Mechanical ventilation data (tool 1 part III).
  - FOUR score scale (tool 1 part IV).
  - Laboratory investigation (tool 1 part V).
  - Level of sedation by using RASS scale (tool 2).

4. Evaluation phase

This phase was done to evaluate effect of daily interruption of sedation on level of consciousness among mechanically ventilated patients.

Pilot study

A pilot study carried out in order to assess the feasibility and applicability of the tools and the necessary modifications were done. The pilot study was done on 6 patients were excluded from the study.

Ethical consideration

1- Research proposal was approved from Ethical Committee in the Faculty of Nursing.
2- There was not risk for study subject during application of the research.
3- The study was following common ethical principles in clinical research.
4- Written consent was obtained from parents that are willing to participate in the study, after explaining the nature and purpose of the study.
5- Parents assured that the data of this research used only for the purpose of research.
6- Confidentiality and anonymity was assured.
7- Parents and children had the right to refuse to participate and or withdraw from the study without any rational any time.

Statistical analysis

Data entry and data analysis were done using SPSS version 20 (Statistical Package for Social Science). Data were presented as number, percentage, mean and standard deviation. Chi-square test and Fisher exact test were used to compare qualitative variables. Mann-Whitney test was used to compare quantitative variables between groups in case of non-parametric data. Wilcoxon Signed Rank Test was done to compare quantitative variables between different times. Spearman correlation was done to measure correlation between quantitative variables. P-value considered statistically significant when $P < 0.05$.

Results

Table (1): Distribution of study and control groups related to socio demographic and clinical data.

Socio demographic and clinical data	Control (n= 30)		Study (n= 30)		P-value
	No.	%	No.	%	
Age: Mean ± SD	37.67 ± 15.13		41.47 ± 14.76		0.338
Sex:					
Male	27	90.0	22	73.3	0.095
Female	3	10.0	8	26.7	
Underlying diseases:					
Respiratory diseases	19	47.5	21	52.5	0.655
Cardiovascular diseases	1	3.3	1	3.3	1.000
Gastrointestinal diseases	2	6.7	2	6.7	1.000
Other diseases	8	26.7	6	20.0	0.542
APACHE II Score on admission	17.67 ± 4.31		17.57 ± 4.23		0.864

- Independent samples t-test for comparing two groups
- Chi-square test for qualitative variables

Table (2): Distributions of study and control groups in relation to Four Score Scale to assess level of consciousness.

Four Score Scale	Control (n= 30)	Study (n= 30)	P-value
	Mean ± SD	Mean ± SD	
1st day	2.83 ± 3.22	5.00 ± 3.84	0.015*
2nd day	2.80 ± 2.98	5.20 ± 3.75	0.006*
3rd day	3.33 ± 4.03	5.53 ± 3.73	0.008*
4th day	3.89 ± 4.32	6.52 ± 4.06	0.014*
5th day	2.96 ± 3.18	6.95 ± 4.42	0.004*
6th day	3.70 ± 4.01	8.80 ± 4.59	0.004*
7th day	3.31 ± 3.20	8.57 ± 4.67	0.010*

- *Independent samples t-test*

Table (3): Distribution of study and control groups in relation to Richmond Agitation Sedation Scale (RASS)

Day	Richomond Agitation Sedation Scale	Control (n= 30)		Study (n= 30)		P-value
		No.	%	No.	%	
1st day	Alert and calm	0	0.0	0	0.0	-
	Restless	0	0.0	1	3.3	1.000
	Agitated	0	0.0	1	3.3	1.000
	Very agitated	0	0.0	0	0.0	-
	Combative	0	0.0	0	0.0	-
	Drowsy	0	0.0	0	0.0	-
	Light sedation	3	10.0	4	13.3	1.000
	Moderate sedation	2	6.7	5	16.7	0.424
	Deep sedation	5	16.7	6	20.0	0.739
	Unarousable	20	66.7	13	43.3	0.069
2nd day	Alert and calm					
	Restless	0	0.0	1	3.3	1.000
	Agitated	0	0.0	1	3.3	1.000
	Very agitated	0	0.0	0	0.0	-
	Combative	0	0.0	0	0.0	-
	Drowsy	0	0.0	0	0.0	-
	Light sedation	2	6.7	4	13.3	0.671
	Moderate sedation	2	6.7	5	16.7	0.424
	Deep sedation	7	23.3	8	26.7	0.766
	Unarousable	19	63.3	11	36.7	0.039*
3rd day	Alert and calm	0	0.0	0	0.0	-
	Restless	0	0.0	1	3.3	1.000
	Agitated	0	0.0	1	3.3	1.000
	Very agitated	0	0.0	0	0.0	-
	Combative	0	0.0	1	3.3	1.000
	Drowsy	1	3.3	1	3.3	1.000
	Light sedation	2	6.7	3	10.0	1.000
	Moderate sedation	3	10.0	5	16.7	0.706
	Deep sedation	5	16.7	11	36.7	0.080
	Unarousable	19	63.3	7	23.3	0.002*
4th day	Alert and calm	0	0.0	0	0.0	-
	Restless	0	0.0	1	4.0	0.472
	Agitated	0	0.0	1	4.0	0.472
	Very agitated	0	0.0	0	0.0	-

Day	Richomond Agitation Sedation Scale	Control (n= 30)		Study (n= 30)		P-value
		No.	%	No.	%	
	Combative	0	0.0	0	0.0	-
	Drowsy	3	10.7	1	4.0	0.613
	Light sedation	2	7.1	3	12.0	0.658
	Moderate sedation	2	7.1	4	16.0	0.404
	Deep sedation	7	25.0	11	44.0	0.145
	Unarousable	14	50.0	4	16.0	0.009*

Table (3): Con….Distribution of study and control groups in relation to Richmond Agitation Sedation Scale (RASS).

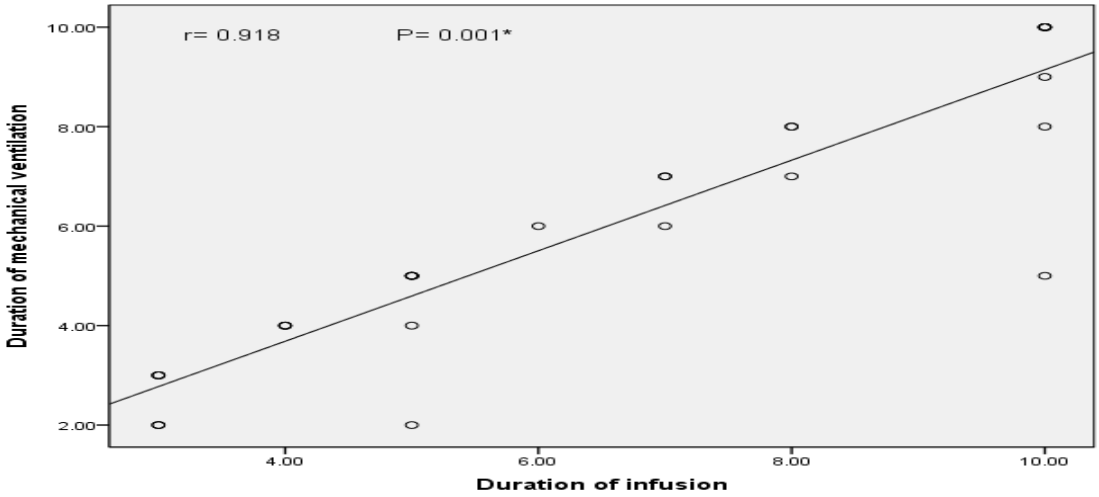
Day	Richomond Agitation Sedation Scale	Control (n= 30)		Study (n= 30)		P-value
		No.	%	No.	%	
5th day	Alert and calm					
	Restless	0	0.0	1	4.5	0.489
	Agitated	0	0.0	0	0.0	-
	Very agitated	0	0.0	0	0.0	-
	Combative	0	0.0	0	0.0	-
	Drowsy	1	4.3	2	9.1	0.608
	Light sedation	1	4.3	3	13.6	0.346
	Moderate sedation	1	4.3	5	22.7	0.096
	Deep sedation	6	26.1	8	36.4	0.457
	Unarousable	14	60.9	3	13.6	0.001*
6th day	Alert and Calm	1	5.0	0	0.0	1.000
	Restless	0	0.0	1	6.7	0.429
	Agitated	0	0.0	0	0.0	-
	Very agitated	0	0.0	0	0.0	-
	Combative	0	0.0	0	0.0	-
	Drowsy	0	0.0	2	13.3	0.176
	Light sedation	1	5.0	5	33.3	0.064
	Moderate sedation	2	10.0	2	13.3	1.000
	Deep sedation	7	35.0	2	13.3	0.244
	Unarousable	9	45.0	3	20.0	0.123
7th day	Alert and calm	0	0.0	0	0.0	-
	Restless	0	0.0	1	7.1	1.000
	Agitated	0	0.0	0	0.0	-
	Very agitated	0	0.0	0	0.0	-
	Combative	0	0.0	0	0.0	-
	Drowsy	0	0.0	2	14.3	0.481
	Light sedation	1	7.7	4	28.6	0.326
	Moderate sedation	1	7.7	2	14.3	1.000
	Deep sedation	6	46.2	2	14.3	0.103
	Unarousable	5	38.5	3	21.4	0.420

- *Chi-square test*

Table (4): Distribution of study groups in relation to duration of interruption for sedative infusion every day.

Duration of interruption for sedative infusion per hours in the Study group	Mean ±SD
1st day	1.05 ±1.09 hrs.
2nd day	1.48 ± 1.16 hrs.
3rd day	2.30 ±1.37 hrs.
4th day	2.50 ±1.59 hrs.
5th day	2.64 ±1.60 hrs.
6th day	2.70 ±1.68 hrs.
7th day	3.63 ± 1.25hrs.

- *Descriptive statistic*
-



Figures (1): Correlations of duration of sedative infusion with duration of mechanical ventilation

- *Person correlation*

Table (1): This table illustrates socio demographic and clinical data of study and control groups. Regarding to age, it was noticed that the main age in study and control groups (41.47 ± 14.76 and 37.67 ± 15.13) respectively. Related to sex, just under three quarters of patients were male in study groups and majority of patients were male in control groups (73.3% and 90.0%) respectively. As regard underlying diseases, it was observed that there was no a statistical significant difference between study and control groups (P value > 0.05). According to APACHE II score, it was found that there was no a statistical significant difference between study and control groups (P value > 0.05).

Table (2): Illustrates Four Score Scale (FSS) of study and control groups. It was found that there was a statistical significant difference between study and control groups in1st,2nd, 3rd, 4th, 5th,6th, and 7th days (P= 0.015*&P= 0.006*& P=0.008*& P=0.014*& P=0.004*& P=0.004*P= 0.010*) respectively.

Table (3): This table shows Richmond Agitation Sedation Scale (RASS). Regarding Unarousable, It was noticed that there was a statistical significant difference between study and control groups in 2nd, 3rd, 4th and 5th days (P=0.039* & P=0.002* & P=0.009* & P=0.001*) respectively. According to others items of RASS (Alert and calm, Restless, Agitated, Very agitated, Combative, Drowsy, light sedation, Moderate sedation and deep sedation): results revealed that there was no a statistical significant difference between study and control groups (P value > 0.05)**.**

Table (4): This table shows duration of interruption for sedative infusion in the Study groups per hours every day every morning shift. Results revealed that the highest duration of interruption in the study groups were in 7th day (3.63± 1.25) hrs.' respectively. While in control groups, sedative infusion was continue 24hrs per day without interruption.

Figure (1): This figure presented that there was significant positive correlation between duration of sedative infusion and duration of mechanical ventilation (P=0.001*) respectively.

Discussion

Sedative infusions have been used to enable patient to tolerate mechanical ventilation since the birth of intensive care 50 years ago. Heavy sedation allowed for uncomfortable procedures to be performed and mechanical ventilation to be administered .It also reduced the risk of patient accidentally removing tubes and lines on which they depended .Infusions have often been preferred because this provides more consistent sedation, fewer complications such as hypotension, and is more practical for workforce resources. **(Larrow & Klich, 2016).**

Many physicians believed that the deepest sedation was the best option for patients admitted to the ICU under mechanical ventilation. Deep sedation was necessary to adapt the patient to the mechanical ventilator**. (Fabio & Ary, 2016)** In another study demonstrates that over sedation is bad, heavy sedation was associated with longer ventilation times**.** The specific mechanism for reducing this, be it daily interruption of sedation rather than infusions. **(Debabrata et al., 2017).**

A change in sedation management was made from continuous intravenous infusion of sedatives to daily interruption of sedation in which sedation is stopped once per day when sustainable sedation is possible was introduced as the sedation method. The concept of daily interruption of sedation was born from these concerns. (**Mark et al., 2018**)

Hence, the present study **aim** at evaluate the effect of daily interruption of sedation on level of consciousness among mechanically ventilated patients**.**

Regarding socio demographic data

The present study showed that the main age in study and control groups (41.47 ± 14.76 and 37.67 ± 15.13) while just under three quarters of patients in study groups and majority of patients in control groups were males. Approximately half of patients were diagnosed with respiratory diseases. Concerning mean APACHE II score on admission was similar in both groups. This might be related to no bias between two groups for the following comparisons in the current study. This is in line with **(William & Daniel, 2017)** who found that two groups had similar age, gender, Acute Physiology and Chronic Health Evaluation II score (APACHE II score) Furthermore **(Linda et al., 2017)** provided that there were no difference between the two groups in demographic characteristics age, Gender, APACHE II score and admission diagnosis**.**

According to level of consciousness

The present finding indicated that there was a statistical significant difference between study and control groups regard to Four Score Scale (FSS) in all days .There is evidence that there is a negative correlation between consciousness level of the patients and deep sedation. This is agree with **(Abou-Chebl et al., 2018)** who found that the intervention group had higher consciousness compared to the control group.

Regarding sedation

Intensive care unit patients are restless and need sedation due to many reasons such as device noises, loss of contact with the outside environment, little differentiation between day and night, intubation, mechanical ventilation, underlying issues, and pain. Ideal sedation level should be neither deep nor inadequate. Planning and intervention of the medical team are essential in this regard.

In the current study, It was noticed that there was a statistical significant difference between study and control groups regarding un arousable (RASS score = -5) in second day, third day, fourth day and fifth day. This may be due to level of sedation was better controlled in the study group that led to improve the quality of sedation in ICU patients This is agreeing with **(Chris Nickson , 2016)** who found that patients on sedative infusion were minimally arousal or non arousal. On the other hand with **(Aliye et al, 2017)** who suggested that using daily interruption of sedation does not have much effect on the ICU patients' sedation level.

The finding of this study revealed that there was a significant positive correlation between duration of sedative infusion and duration of mechanical ventilation and there was significant negative correlation between duration of sedative infusion and SPO2.In this result, daily sedation interruption and targeting light sedation levels are safe and proven to improve oxygenation. This in according with (**Ahmed et al., 2015)** who found that daily interruption of sedation is safe and practical approach to treating patients who are receiving mechanical ventilation.

As consequence of the current study results revealed that the highest duration of interruption in the study groups were (3.63± 1.25) hrs in seventh day of interruption. In this result, this interruption done to benefit from advantages of lightly sedation which led to improve conscious level of patients. This is congruent with **(Lynelle, 2015)** who found that sedation was interrupted for a mean of 3.5 hours.

Finally, the major finding of this study was that implementing daily interruption of sedation and repeated trials of interruption every day, make number of benefits, including a reduction in duration of mechanical ventilation, the patient more awake and improve consciousness level, while reduction in the consciousness level of the patients caused by deep sedation can have many risks for ICU patients.

Conclusion

Based on the results of this study, it could be concluded that: Implementation of daily interruption of sedation is practical and has the potential to prevent excessive sedation of critically ill patients, improving conscious level of critical ill patients.

Recommendation

1. Provide in-service education and training program for critical care nurses regarding applying daily interruption of sedation.
2. Reapply this research on a larger probability sample acquired from different geographical areas in Egypt for generalization.

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