

# Evaluation of the psychological status of patients during and after weaning from mechanical ventilation

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**Background** Care for mechanically ventilated patients must incorporate psychological care.

**Aim** The aim of the study was to evaluate the overall satisfaction of ICU survivors who needed mechanical ventilation (MV) with their ICU stay including the assessment of different psychological changes.

**Patients and methods** One hundred mechanically ventilated patients (32 medical and 68 surgical) were interviewed after extubation.

**Results** Medical patients were older than surgical patients ( $57.44 \pm 13.27$  vs.  $48.69 \pm 14.74$  years,  $P = 0.005$ ), had more days on MV ( $5.8 \pm 4$  vs.  $2.6 \pm 3.7$  days,  $P = 0.0001$ ), had a positive history of previous MV (18.8 vs. 0%,  $P = 0.001$ ), and had more weaning trials ( $P = 0.0001$ ). Items that were bothersome for patients included noise (97%), poor communication with nurses (98%), poor performance of nurses and doctors (22 and 20%, respectively), nursing shift changeover (26%), being connected and ventilated by a machine (100%), discomfort because of endotracheal tube (100%), tracheal suctioning by endotracheal tube (76%), Ryle feeding (75%), being hungry and thirsty (92 and 93%, respectively), insomnia (98%), not getting enough

sleep (34%), not being able to talk (99%), lack of social communication (100%), immobilization (100%), pain (99%), loss of time orientation (83%), feelings of fearful (97%), loneliness (96%), bored (95%), hallucinations (17%), depressed (97%), neglected (66%), isolated (95%), insecurity (74%), lack of self-confidence (91%), not accepting the situation (98%), and postextubation complications including voice problems (34%), difficulty swallowing (9%), and movement problems (27%). Duration of MV correlated significantly with hallucinations ( $P = 0.0001$ ) and feeling neglected ( $P = 0.019$ ).

**Conclusion** ICU experiences were mostly negative. *Egypt J Broncho* 2014 8:160–166

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**Keywords:** extubation, intensive care unit, mechanical ventilation, psychological status, weaning

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## Introduction

The approach for investigation of weaning from mechanical ventilation (MV) has for long been dedicated to the method of weaning as well as the ability of the patient to sustain extubation. Limited researchers have dealt with the subject from the patient's point of view despite the fact that treatment in an ICU and MV may create a variety of adverse physical and psychological stresses for the patient [1–5].

This study aimed to evaluate the overall satisfaction of ICU survivors who needed MV with their ICU stay including the assessment of different psychological changes.

## Patients and methods

This prospective observational study was carried out on 100 adult ( $\geq 18$  years old) patients recruited from the Medical/Surgical ICUs of Ain Shams University Hospitals in the period between November 2011 and May 2012. Adult patients who had undergone intubation for MV were included in the study. Patients younger than 18 years, comatose patients, patients

with previous psychological disorders, major organ failure associated with impaired conscious level, patients with mental retardation, and patients with speech or communication disorders were excluded from the study. For all patients, the following were documented: demographic data, type of ICU, comorbidities, detailed assessment of medical history before MV (from the patients or relatives), thorough clinical examination, plain chest radiography, arterial blood gases analysis, routine laboratory investigations, and the requirement for sedation. Recording of the length of ICU stay, days of MV, trials of weaning from MV, and sedation during MV was done as well as identification of a history of MV. All patients included participated in an interview by the ICU doctor after extubation from MV to evaluate the psychological aspects and negative experiences of patients during and after weaning from MV. All patients were asked to provide answers to 46 questions on readiness for ICU admission in surgical patients only (two questions), ICU environment (two questions), ICU medical staff (five questions), personal care (nine questions), sleep disturbances (three questions), communication difficulties and immobilization (four questions), pain (three questions),

losing time orientation (two questions), psychological disturbances (10 questions), and weaning and post MV complications (six questions). The timing of the interview in relation to extubation from MV was identified. The study was approved by the institutional ethics committee.

**Statistical analysis**

Parametric numerical data were expressed as mean ± SD, whereas nonparametric numerical data were expressed as median, frequency, and percentage. Student's *t*-test was used to assess the statistical significance of the difference between the means of two study group. The Mann–Whitney *U*-test was used to assess the statistical difference of nonparametric variables between two study groups. A  $\chi^2$ -test was used to examine the relationship between two qualitative variables. Fisher's exact test was used to examine the relationship between two qualitative variables when the expected count is less than 5 in more than 20% of cells. The McNemar test was used assess the statistical significance of the difference between a qualitative variable measured twice for the same study group. The Kruskal–Wallis test was used to assess the statistical significance of the difference in nonparametric numerical variables between more than two study groups. Pearson's correlation was used to assess the correlation between different variables. Statistical significance was set at *P* value less than 0.05. Statistical analyses were carried out using the statistical package for the social sciences (SPSS, version 15.0; SPSS Inc., Chicago, Illinois, USA) software for Windows.

**Results**

A total of 100 patients admitted to the ICU who fulfilled our inclusion criteria were included in the study: 32 medical and 68 surgical. Table 1 shows the characteristics of all the patients included. The exact timing of the interview in relation to extubation is shown in Fig. 1.

**Comparison between medical and surgical intensive care unit patients**

Medical patients were older than surgical patients (57.44 ± 13.27 vs. 48.69 ± 14.74 years, *P* = 0.005), had more days on MV (5.8 ± 4 vs. 2.6 ± 3.7 days, *P* = 0.0001), had a positive history of previous MV (18.8 vs. 0%, *P* = 0.001), and had increased number of trials of weaning from MV (*P* = 0.0001; Table 2).

**Items of the interview**

*Readiness for intensive care unit admission*

Only in surgical patients, the analysis of the readiness and knowledge provided to the patients before ICU

**Table 1 Baseline characteristics of all patients included**

Variables	N (%)
Age (years)	51 ± 14.8
Sex (male/female)	37/63 (37/63)
Type of patient (medical/surgical)	32/68 (38/62)
Days on MV <sup>a</sup>	3.6 ± 4 (2)
Previous MV (yes/no)	6/94 (6/94)
Sedation during MV (infrequent/no)	16/84 (16/84)
Weaning trials	
1	75 (75)
2	13 (13)
3	9 (9)
4	1 (1)
5	2 (2)

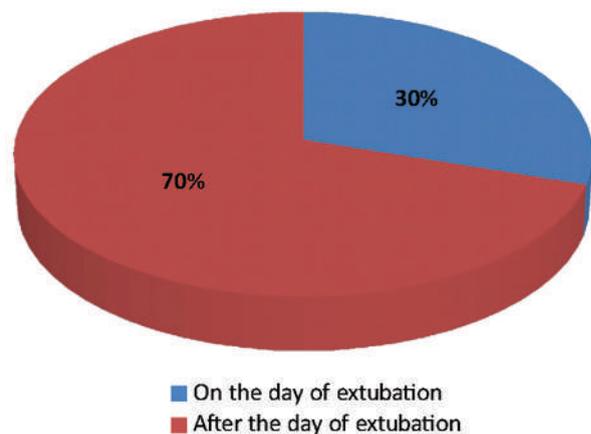
MV, mechanical ventilation: <sup>a</sup>Data in parentheses represent median.

**Table 2 Comparison between medical and surgical intensive care unit patients**

Variables	N (%)		<i>P</i>
	Medical ICU (N = 38)	Surgical ICU (N = 62)	
Age (years)	57.44 ± 13.27	48.69 ± 14.74	0.005
Sex (male/female)	11/21 (34.4/65.6)	26/42 (38.2/61.8)	0.709
Days on MV	5.8 ± 4	2.6 ± 3.7	0.0001
Previous MV (yes/no)	6/26 (18.8/81.3)	0/84 (0/100)	0.001
Sedation during MV (infrequent/no)	8/24 (25/75)	8/60 (11.8/88.2)	0.141
Weaning trials			
1	16 (50)	59 (86.8)	0.0001
2	8 (25)	5 (7.4)	
3	5 (15.6)	4 (5.9)	
4	1 (3.1)	0 (0)	
5	2 (6.3)	0 (0)	

MV, mechanical ventilation.

**Fig. 1**



Timing of the interview in relation to extubation.

admission showed that out of the 68 surgical patients, 76.5% patients were neither prepared for ICU admission nor did they receive any information before ICU admission (70.6%).

*Intensive care unit environment*

The most annoying factor in terms of the ICU environment in the majority of patients was noise (97%). The noise produced by the sound of the machines surrounding the patients caused disturbances for 93% of patients.

*Intensive care unit medical staff*

The communication with nurses was poor as reported by 98% of patients. The nursing staff did not talk enough as reported by 64% of the patients. The patients' overall evaluation of the performance of both nurses and doctors was poor (22 and 20%, respectively). Twenty-six percent of patients did not like the shift changeover of the nursing staff.

*Personal care and manipulations*

All patients (100%) did not like being connected and ventilated by a machine. The dependence on these machines was perceived poorly by 99% of the patients. The patients had annoying experiences in terms of the presence of the endotracheal tube (ETT) (100%), tracheal suctioning by the ETT (76%), Ryle feeding (75%), feeling hungry (92%), and sensation of thirst (93%). Expression of hunger and thirst by the patient was poor (29 and 29%, respectively).

*Sleep disturbances*

The majority of patients (96%) had sleep troubles, 98% experienced insomnia, and 34% reported that they did not have enough hours of sleep.

*Communication difficulties and immobilization*

The inability to talk secondary to the ETT was disturbing for 99% of patients. Moreover, 100% of patients did not have social communication with their relatives and 70% felt better during the visits of their relatives. The sense of immobilization was perceived poorly by all patients (100%).

*Pain*

A total of 99% of the patients stated that they had experienced pain during the ICU stay. None of these patients could clearly express this pain at that time. Among the causes of pain experienced by the patients, 50% was related to the wound site, 14% was because of ETT, 12% as a result of blood sampling, 6% because of back pain, 6% was related to the frequent change in body position performed regularly by the nursing staff, and the remaining 12% were multifactorial.

*Losing time orientation*

Only 17% of patients were oriented to time. The response of patients to the passing of time was poor as reported by 64% of the patients.

*Psychological disturbances*

Fear was perceived by 97%, loneliness by 96%, boredom by 95%, hallucinations by 17%, depression by 97%, neglect by 66%, isolation by 95%, insecurity by 74%, lack of self-confidence by 91%, and lack acceptance of the situation by 98% of the patients.

*Weaning and post-mechanical-ventilation complications*

After the onset of weaning, 42% of patients felt better. Moreover, the sense of breathing on their own led to a sense of well-being in all patients (100%). After extubation, some complications were experienced by the patients: voice problems (34%), feeding-related problems (9%), and movement problems (27%). Yet, the majority of patients (91%) did not experience psychological problems after weaning.

**Correlation between patients' psychological status and duration of mechanical ventilation**

Only hallucinations ( $P = 0.0001$ ) and feeling neglected ( $P = 0.019$ ) appeared to be significantly and directly correlated with the duration of MV. Other psychological disturbances including fear, loneliness, feeling bored, depression, isolation, feeling insecure, lack of acceptance of the situation as well as lack of self-confidence did not show a significant correlation with the duration of MV ( $P > 0.05$ ; Table 3 and Figs. 2 and 3).

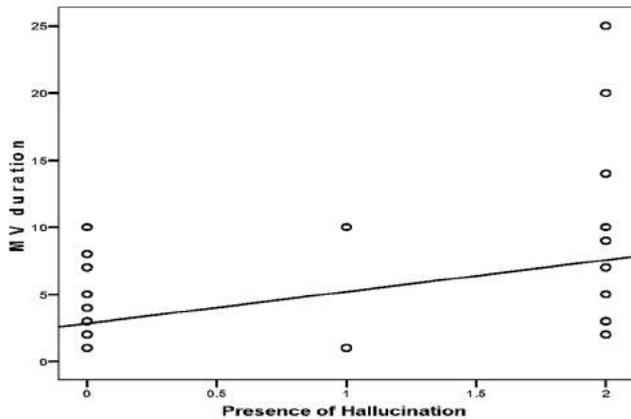
**Discussion**

Providing knowledge, mainly to the surgical patients, before ICU admission can certainly minimize the influence of ICU-related negative experiences. Preadmission information, which can be provided to patients for 'elective' ICU admission, may be a means to achieve better adaptation, but this benefit is not available for an emergency admission [6]. This was obviously found in our study where many surgical patients did not receive pre-ICU preparation, explaining, to a great extent, the overall expected ICU-related experiences of these patients. One study reported that 'when providing patients with information and an explanation, patients

**Table 3 Correlation between psychological status and duration of mechanical ventilation**

Variables	<i>P</i>
Fear	0.406
Loneliness	0.249
Feeling bored	0.688
Hallucinations	0.0001
Depression	0.704
Neglected	0.019
Isolation	0.555
Secure	0.091
Acceptance of the situation	0.450
Lack of self-confidence	0.940

Fig. 2



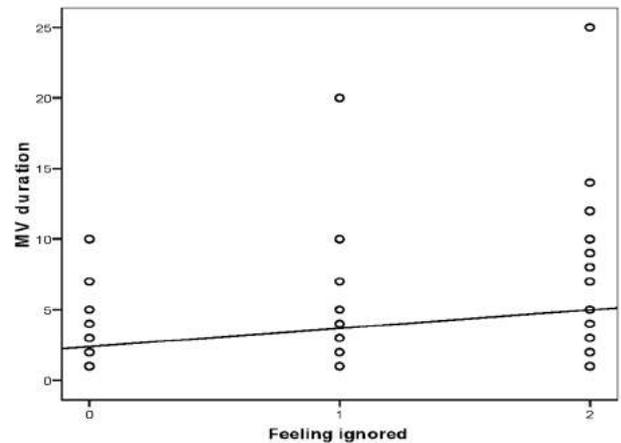
Correlation between the duration of mechanical ventilation (MV) and hallucinations.

were more aware of what was going to happen so that they could focus on feeling more relaxed and better able to handle the stress' [7]. For an emergency admission, the patient usually experiences higher level of stress and anxiety because of a sudden change of environment and unavoidable traumatic encounters [8]. Preadmission information was not provided to the medical patients in our study, in whom admission to the ICU was emergency.

Our study showed that the most annoying factor in terms of the ICU environment in the majority of patients was noise attributed to the sound of machines surrounding the patients. This was of utmost importance taking into account that noise exposure can have a critical effect on the human body including cardiovascular stimulation, increased gastric secretion, pituitary and adrenal stimulation, suppression of the immune system and wound healing, sleep disruption, increase in sedation requirements in critically ill patients, and hearing loss, thereby increasing the risk for delirium [9,10]. Comparable data were obtained in an earlier study where most of the patients reported discomfort because of noise. The fear of no clinical improvement combined with noise led patients to feel tired and unable to handle their critical situation in the ICU adequately [7].

Sleep disruption and deprivation in critically ill, mechanically ventilated patients is very common in the critical care environment and is mostly multifactorial; acute illnesses are associated with abnormal sleep architecture; the ICU environment, in which loud noises and frequent care-related interruptions are prevalent, may interfere with continuity of sleep; medications prescribed commonly for patient comfort also have marked effects on sleep; and dyssynchronous

Fig. 3



Correlation between the duration of mechanical ventilation and feeling ignored.

patient-ventilator interactions may further result in sleep disruption [11]. The majority of patients in our study had sleep troubles, mostly insomnia, and to a lesser extent not enough hours of sleep. Sleep deprivation should be viewed with great interest owing to its potential impact on patients including visual hallucinations and delirium [12], with suppression of the immune system leading to an impaired capacity to combat infection and impedance in wound healing; weakened upper airway musculature; and delayed weaning from ventilation [13]. Our results were consistent with one study in which the majority of patients reported poor sleep or sleep deprivation [14].

Patient comfort is the responsibility of ICU medical staff, both nurses and doctors.

The goal of intensive care nursing is to balance the individual's physiological, psychological, emotional, and social needs as much as possible while providing personal care directly affecting his/her life [15]. Our findings showed that the attitude of the ICU medical staff considerably influenced the psychological well-being of the patients. Lack of communication between patients and medical staff additionally and negatively affected the patients and this negative effect was augmented by the inability of the patients to move or even talk. Similar results were obtained in another study that investigated problems in communication between nursing staff and patients with orotracheal, nasotracheal, or tracheostomy tubes; they described the nurse-patient communication as depersonalizing, short, and failing to acknowledge each patient's individuality. Moreover, most of the time, the nurses' communication failed to address the patients' specific physical and emotional needs [16]. One previous study showed the importance, claimed by patients, of having a closer relationship with the professionals

in charge; it is indicated that perceived safety and acceptance feelings depend mostly on the quality of this presence [17]. In published findings, positive experiences of intensive care were mostly attributed to excellence in nursing care and high qualification of the nursing staff [18,19]. Owing to the pivotal role of the ICU staff, a previous study recommended that ICU staff must consider stressors that arise simply from being in intensive care and must provide adequate orientation to the ICU environment to enable the patients to focus on the healing processes [20].

Mechanically ventilated patients experience many barriers in communicating their needs; lack of verbal communication because of the ETT, lack of social communication as well as a sense of immobilization were among these potential barriers in our study. Comparable results were obtained in previous studies; nonverbal communication barrier was a source of discomfort in ICU [21,22], and immobilization and restriction of movement were considered distressing factors for the psychological well-being of the patient [23]. Our results showed that social communication of the patient with the family directly influenced the psychological well-being of patients. These results were similar to other studies where the family was encouraged to visit their patients more frequently as this might help to improve patient care by the family member providing information about the patient, which can be utilized to improve and individualize patient care. Furthermore, family members may provide emotional support to the patient, and by orientating the patient, might reduce the incidence of 'intensive care psychosis' [24,25].

Being connected to and dependent on the ventilator was itself considered an annoying factor for all patients. Moreover, the various manipulations encountered by the patients, including the presence of ETT, tracheal suctioning, Ryle feeding, and feeling hungry and thirsty, exerted additive negative effects. Comparable results were obtained in previous studies where nursing interventions were considered the most important factor affecting patient intensive care experiences [7,18,22,26]. In one study, although tracheal suctioning was generally considered unpleasant, careful explanation of the procedure was considered important to relieve discomfort [7]. Thus, the explanation of unpleasant procedures can to some extent limit the sense of discomfort experienced by the patients in whom these unpleasant procedures are mandatory. Similarly, sensation of thirst was also considered an annoying factor by most of the patients in our study as well as in other studies [22,27].

As in other studies [7,20,28–32], our study showed that many ICU patients experienced pain. The cause of pain

in half of our patients was related to wounds; this was not surprising taking into account that 68% of patients in our study were surgical patients in whom wound pain is most expected. Similarly, one study reported that surgical patients had higher pain intensity compared with medical patients [33]. Our results showed that pain resulting from the presence of ETT represented the second common cause of pain; in addition to this, patients recalled negative feelings during the process of suctioning from ETT. Comparable results were obtained in several previous studies [1,22,30,34]. Blood sampling was the third leading cause of pain; this could be attributed to the critical nature of patients admitted to the ICU with a frequent need for blood sampling for laboratory investigations.

Our study proved that mechanically ventilated patients experienced various forms of psychological disturbances, especially when on the ventilator; fear, loneliness, bored, depression, neglect, isolation, insecurity, lack of self-confidence, and lack of acceptance of the situation were the major disturbances experienced by the patients. Comparable results were obtained in other studies [18,27,28,32,35,36]. Moreover, cognitive abilities of patients can be affected during ICU stay as proven in our study, where half of the patients lacked time and place orientation. Similarly, another study showed that 55% of patients could not identify the current day and time [27]. The duration of MV was found to have a direct effect on patients' perception of hallucinations and feelings of neglects. In previous studies, longer periods of stay in ICU also affected the patients' experiences negatively [18,20,37–39].

Although MV is commonly used to support the respiratory function of patients with life-threatening illnesses, despite the therapeutic, and at times, lifesaving nature of MV, it is not an intervention without complications [40]. Following extubation, some complications were experienced by the patients including problems with voice, feeding, and movement. Results from other study showed that 14.4–50% of patients who underwent tracheal intubation complained of hoarseness of voice [41]. Endotracheal intubation may cause dysphagia not only as a temporary problem soon after extubation but may also be a long-term complication; the highest frequencies of dysphagia occurred following prolonged intubation [42]. Although the study of psychology of patient during MV is important, the study of patients' psychology during and after weaning is also equally important. Mechanically ventilation generated negative feelings in the majority of patients; these negative feelings disappeared in nearly half of these patients at the beginning of weaning and completely disappeared in all patients after weaning. Previous

studies have reported both differences and comparable findings. One study reported that patients may become anxious when removed from the ventilator as they may have become psychologically dependent on it to help them breathe [43]. Another study showed that patients recall extubation as an unpleasant experience [44].

In conclusion, as in several previous studies [7,18–20,38,40,45–48], our study confirmed that ICU experiences were mostly negative. However, insights into these negative experiences can increase the understanding among clinicians of patients' needs during their ICU stay, thereby improving the quality of care provided for these patients to achieve a better outcome.

Finally, it is worth mentioning that our study has some limitations; the patients were interviewed while still in the ICU, which might have affected their response owing to the uncertainty in terms of their complete cure, and yet, this might also represent a strength of this study as patients' recollection of their ICU-related experiences was not retrospective after discharge from the ICU. A further limitation is the lack of a specialized psychiatric assessment of the patients; however, our assessment was based on the presence or absence of any psychological disturbance rather than an objective assessment of the extent of the disturbance.

## Acknowledgements

### Conflicts of interest

There are no conflicts of interest.

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