

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 ± 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 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 (≥ 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 \pm 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 χ^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 \pm 14.8
Sex (male/female)	37/63 (37/63)
Type of patient (medical/surgical)	32/68 (38/62)
Days on MV ^a	3.6 \pm 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)

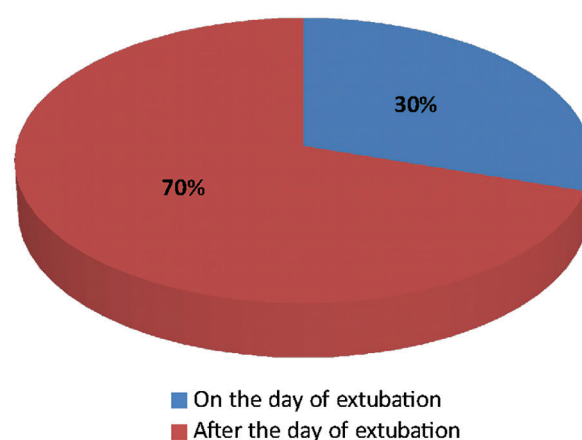
MV, mechanical ventilation: ^aData in parentheses represent median.

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 \pm 13.27	48.69 \pm 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 \pm 4	2.6 \pm 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).

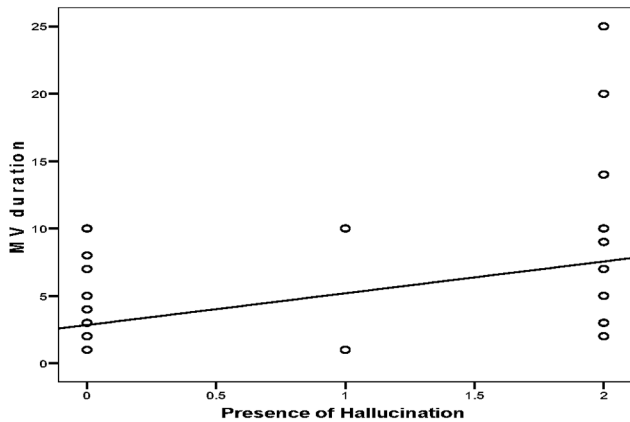
Discussion

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



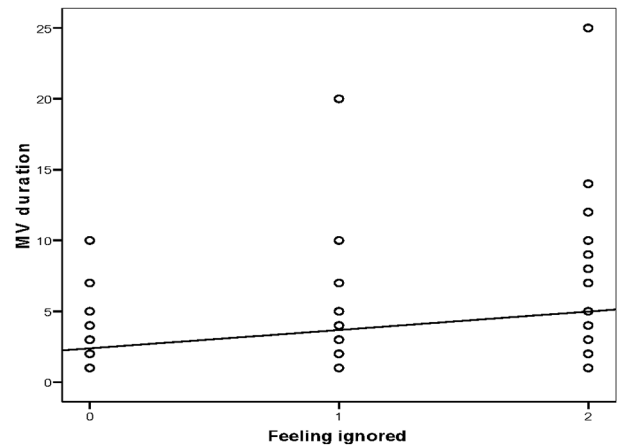
Correlation between the duration of mechanical ventilation (MV) and hallucinations.

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 strengthen 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.

References

- Bergbom-Engberg I, Haljamae H. Assessment of patients' experience of discomforts during respiratory therapy. *Crit Care Med* 1989; **17**:1068–1072.
- Hall-Lord ML, Larsson G, Steen B. Pain and distress among elderly intensive care unit patients: comparison of patients' experiences and nurses' assessments. *Heart Lung* 1998; **27**:123–132.
- Adler DC. The experience and caring needs of critically ill mechanically ventilated patients. *Crit Care Med* 1999; **27**:A92.
- Schelling G, Stoll C, Haller M, et al. Health related quality of life and posttraumatic stress disorder in survivors of the acute respiratory distress syndrome. *Crit Care Med* 1998; **26**:651–659.
- Jastremski CA, Harvey M. Making changes to improve the intensive care unit experience for patients and their families. *New Horiz* 1998; **6**:99–109.
- Price AM. Intensive care nurses' experiences of assessing and dealing with patients' psychological needs. *Nurs Crit Care* 2004; **9**:134–142.
- Cornock MA. Stress and the intensive care patient: perception of patients and nurses. *J Adv Nurs* 1998; **27**:518–527.
- Hofhuis JG, Spronk PE, van Stel HF, et al. Experiences of critically ill patients in the ICU. *Intensive Crit Care Nurs* 2008; **24**:300–313.
- Strahan E, McCormick J, Uphrighard E, et al. Immediate follow-up after ICU discharge: establishment of a service and initial experiences. *Nurs Crit Care* 2003; **8**:49–55.
- Ely EW, Gautam S, Margolin R, et al. The impact of delirium in the intensive care unit on hospital length of stay. *Intensive Care Med* 2001; **27**:1892–1900.
- BaHammam A. Sleep in acute care units. *Sleep Breath* 2006; **10**:6–15.
- Khan DM, Cook TE, Carlisle CC, et al. Identification and modification of environmental noise in an ICU setting. *Chest* 1998; **114**:535–540.
- Ramful A. Psychological disturbances caused by sleep deprivation in intensive care patients. *Br J Anaesth Recovery Nurs* 2005; **6**:63–67.
- Honkus V. Sleep deprivation in critical care units. *Crit Care Nurs* 2003; **26**:179–189.
- Freedman NS, Kotzer N, Schwab RJ. Patient perception of sleep quality and etiology of sleep disruption in the intensive care unit. *Am J Respir Crit Care Med* 1999; **159**:1155–1162.
- Basak T, Uzun S, Arslan F. Investigation of the moral sensibility of intensive care nurses. *Gulhane Med J* 2010; **52**:76–81.
- Ashworth P. *RCN research series. Care to communicate: an investigation into problems of communication between patients and nurses in intensive therapy units*. London: Whitefriars Press; 1980.
- Laitinen H. Patient's experience of confusion in the intensive care unit following cardiac surgery. *Intensive Crit Care Nurs* 1996; **12**:79–83.
- Stein-Parbury J, McKinley S. Patients' experiences of being in an intensive care unit: a select literature review. *Am J Crit Care* 2000; **9**:20–27.
- Granja C, Lopes A, Moreira S, et al. Patients' recollections of experiences in the intensive care unit may affect their quality of life. *Crit Care* 2005; **9**:R96–R109.
- Demir Y, Korhan EA, Eser I, et al. Factors affecting experiences of intensive care patients in Turkey: patient outcomes in critical care setting. *J Pak Med Assoc* 2013; **63**:821–825.
- McCabe C. Nurse patient communication: an exploration of patient's experiences. *J Clin Nurs* 2004; **13**:41–49.
- Van de Leur JP, van der Schans CP, Loef BG, et al. Discomfort and factual recollection in intensive care unit patients. *Crit Care* 2004; **8**:467–473.
- Aldana C, Morales C, Novoa M, et al. Program Intensive Care Unit. Faculty of Psychology 2000; 2:555.
- Halm M, Titler M. Effect of family support groups on anxiety of family members during critical illness. *Heart Lung* 1990; **19**:62–71.
- Lynn-McHale D, Bellinger A. Need satisfaction levels of family members of critical care patients' and accuracy of nurses' perception. *Heart Lung* 1988; **17**:447–453.
- O'Connell E, Landers M. The importance of critical care nurses' caring behaviours as perceived by nurses and relatives. *Intensive Crit Care Nurs* 2008; **24**:349–358.
- Cook DJ, Meade MO, Perry AG. Qualitative studies on the patient's experience of weaning from mechanical ventilation. *Chest* 2001; **120**:469S–473SS.
- Bergbom-Engberg I, Haljamae H. A retrospective study of patients' recall of respiratory treatment (2); nursing care factors and feelings of security/insecurity. *Intensive Care Nurs* 1998; **4**:95–101.
- Herr K, Coyne PJ, Key T, et al. Pain assessment in the nonverbal patient: position statement with clinical practice recommendations. *Pain Manag Nurs* 2006; **7**:44–52.
- Puntillo KA, White C, Morris AB, et al. Patients' perceptions and responses to procedural pain: results from Thunder Project II. *Am J Crit Care* 2001; **10**:238–251.
- Pasero C. Pain in the critically ill patient. *J Perianesth Nurs* 2003; **18**:422–425.
- Pochard F, Lanore JJ, Bellivier F, et al. Subjective psychological status of severely ill patients discharged from mechanical ventilation. *Clin Intensive Care* 1995; **6**:57–61.
- Aissaoui Y, Zeggwagh AA, Zekraoui A, et al. Validation of a behavioral pain scale in critically ill, sedated, and mechanically ventilated patients. *Anesth Analg* 2005; **101**:1470–1476.
- Johnson MM, Sexton DL. Distress during mechanical ventilation; patients' perceptions. *Crit Care Nurs* 1990; **10**:48–57.
- Patak L, Gawlinski A, Fung I, et al. Patients' reports of health care practitioner interventions that are related to communication during mechanical ventilation. *Heart Lung* 2004; **33**:308–321.
- Scragg P, Jones A, Fauvel N. Psychological problems following ICU treatment. *Anaesthesia* 2001; **56**:9–14.
- Rattray J, Johnston M, Wildsmith JA. The intensive care experience: development of the ICE questionnaire. *J Adv Nurs* 2004; **47**:64–73.
- Adamson H, Murgu M, Boyle M, et al. Memories of intensive care and experiences of survivors of a critical illness: an interview study. *Intensive Crit Care Nurs* 2004; **20**:257–263.
- Rotondi AJ, Chelluri L, Sirio C, et al. Patients' recollections of stressful experiences while receiving prolonged mechanical ventilation in an intensive care unit. *Crit Care Med* 2002; **30**:746–752.
- Mencke SF, Watkins LR, Fleshne M. Psychoneuroimmunology. The interface between behavior, brain, and immunity. *Am Psychol* 1994; **49**:1004–1017.
- Skoretz SA, Flowers HK, Martino R. The incidence of dysphagia following endotracheal intubation: a systematic review. *Chest* 2010; **137**:665–673.

- 43 Gallimore D. Caring of patients after mechanical ventilation. Part 1: physical & psychological effects. *Nurs Times* 2007; **103**:28–29.
- 44 Rose D, Roggla M, Behringer W, *et al.* Recollections of ventilated patients after a stay in intensive care unit. *Wien Klin Wochenschr* 1999; **111**:148–152.
- 45 Engström A, Söderberg S. The experiences of partners of critically ill persons in an intensive care unit. *Intensive Crit Care Nurs* 2004; **20**:299–308.
- 46 Özdemir L. Determining experiences of the patients staying at coronary intensive care units. *Hemsirelikte Arastirma Gelistirme Derg* 2010; **1**:5–12.
- 47 Karlsson V, Forsberg A. Health is yearning – experiences of being conscious during ventilator treatment in a critical care unit. *Intensive Crit Care Nurs* 2008; **24**:41–50.
- 48 Lóf L, Berggren L, Ahlstrom G. Severely ill ICU patients recall of factual events and unreal experiences of hospital admission and ICU stay – 3 and 12 months after discharge. *Intensive Crit Care Nurs* 2006; **22**:154–166.