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## Posttraumatic stress disorder symptoms in close relatives of intensive care unit patients: Prevalence data resemble that of earthquake survivors in Chile☆☆☆★

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### ABSTRACT

**Introduction:** Posttraumatic stress disorder (PTSD) in relatives of intensive care unit (ICU) patients has not been fully described. We studied potential relationships between PTSD and specific patients' conditions and relatives' psychologic characteristics.

**Methods:** This is a prospective study of family caregivers of ICU patients. Patients' clinical and physiologic variables were recorded. At admission (time I), family caregivers' sociodemographic and psychologic variables were assessed, using specific questionnaires. Reassessment occurred at 2 to 4 days (time II) and 60 days (time III). **Results:** Of 105 enrolled caregivers, 83 completed follow-up. They were mainly female adults and first-degree relatives. Caregiver's baseline anxiety and depression symptoms were observed in 30.4% and 17.4%, respectively. Higher levels associated positively with PTSD symptoms (PS). At time III, 22.89% of caregivers met criteria for PTSD, similar to Chilean general population after the 2010's massive earthquake. Patient's mean age was  $59.90 \pm 17.4$  years; Acute Physiology and Chronic Health Evaluation II score,  $17.84 \pm 7.13$ ; 50% were on mechanical ventilation (MV); and average ICU stay,  $9.40 \pm 9.82$  days. Patient's age correlated directly with PS ( $P = .017$  when patient was on MV and length of stay > 3 days). Acute Physiology and Chronic Health Evaluation II greater than 7 correlated with PS ( $P = .043$ ).

**Conclusions:** Close relatives of patients admitted to the ICU experience a high prevalence of PTSD during and after hospitalization. Individual patient factors such as severity, age, and being on MV increase the occurrence of PTSD, as well as sex and baseline anxiety levels of caregivers. Preventative measures could be devised for this particular high-risk population.

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### 1. Introduction

Hospitalization in the intensive care unit (ICU) is one of the most stressful situations both for the patient and the family [1–4]. A multidimensional crisis may arise not just due to the critical illness itself but also because of many other factors related to the ICU. The environment is unfamiliar, patients undergo complex interventions, and the overall care is different and intense [5,6]. At the same time, issues such as pain, fear, sleep deprivation, noise, and a disrupted light-dark cycle facilitate the emergence of stress symptoms [7–10]. All of those factors may

contribute to the development or exacerbation of psychologic distress. Accordingly, a substantial proportion of patients who survive a critical illness will develop adverse psychosocial outcomes as a consequence of the experiences underwent during the ICU stay [11].

In addition, the patient's family is immersed in a psychologic and emotionally vulnerable condition [12–14]. Relatives may exhibit high levels of distress that persist throughout the patient's entire hospitalization, suffering even more symptoms than patients [15]. Studies have identified some particular characteristics among family members, which are associated with increased symptoms of anxiety, depression, and posttraumatic stress disorder (PTSD) [16–18]. A large European prospective multicenter study of relatives of ICU patients reported that more than two thirds of them presented symptoms of anxiety or depression during the first days of admission, irrespective of the patients' clinical outcome [19]. This could affect the relatives' ability to fully engage in providing responsible care to the patient when needed after hospital discharge. This could also impede the recovery of patients' normal relationships as they return to society [20].

Knowledge of what relatives find stressful about having a family member in the ICU and what methods they use to handle the stress is essential for providing specific support and for planning effective coping

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strategies [21,22]. Early case identification and prompt intervention could prevent the full development of PTSD [23–25]. The aims of our study were as follows: first, to ascertain the prevalence of PTSD in close relatives of patients admitted to an ICU; second, to study the potential association of PTSD with specific patients' medical conditions; and third, to study the potential association of PTSD with relatives' own psychologic characteristics.

## 2. Methods

This was a descriptive and prospective observational study of family caregivers of patients admitted into a medical-surgical ICU in a university hospital at an academic tertiary center. The study was approved by the institutional review board and the ethical committees of the School of Medicine and the School of Psychology of the Pontificia Universidad Católica de Chile. An informed consent was signed by every patient's close relative. Caregivers of patients who were expected to remain in the ICU for more than 48 hours were included in the study. At admission and during an ICU stay, the patients' clinical and physiologic variables were measured as usual per the standard ICU practices. This included Acute Physiology and Chronic Health Evaluation (APACHE) II score, the need for mechanical ventilation (MV), and length of stay (LOS). In addition, caregiver's demographic variables, educational level, and socioeconomic status were measured. A clinical psychologist approached relatives to assess directly their psychologic status and to administer specific questionnaires in person (see below).

Study time points were set as follows: time I (<24 hours after the patient was admitted to the ICU), time II (2–4 days after the patient was admitted to the ICU), and time III (2 months after time I). At time I and time II, the evaluation was applied personally to the caregivers while the patients were in the ICU. At time III, participant caregivers were contacted and interviewed by telephone.

### 2.1. Instruments

Most variables were evaluated by self-administered questionnaires applied through interviews. Validated scales and subscales were used, as well as ad hoc questions for sociodemographic variables. For caregiver's psychologic variables, basal psychopathological conditions were evaluated by self-report and specific questionnaires. For anxiety, the State Trait Anxiety Symptoms questionnaire was used [26]. For depressive symptoms during the previous month, the Short Form of the Composite International Diagnostic Interview scale was used. For the assessment of PTSD symptoms (PS), the Posttraumatic Stress Disorder Checklist, version S (PCLS), focused on a specific stressful experience, was used [27,28]. The PCLS evaluates intrusive, avoidant, and arousal symptoms. Substantial PS can be determined by an algorithm consistent with PTSD diagnostic criteria according to the *Diagnostic and Statistical Manual of Mental Disorders*[29].

### 2.2. Statistical analysis

Continuous variables were analyzed using *t* test. Categorical variables were analyzed using  $\chi^2$  or Fisher exact test as required. Logistic regression was performed to evaluate and assess the variables significantly linked to the probability of PTSD. Multivariate regression was performed to assess the determinants of the PCLS score. Fractional polynomials analysis was also performed to preserve the continuous nature of the predictor variables when most, or all, of the relationships are nonlinear, as in this study [30]. A *P* value less than 5% was considered as significant.

To evaluate the interaction between the days spent in the ICU and the levels of trait stress in caregivers, a multigroup analysis was used. We split the sample into those relatives who presented low levels of trait stress at patient admission ( $\leq 2.1$ , which represents the median observed on the scale) and those who presented high levels of trait stress ( $> 2.1$ ).

## 3. Results

One hundred fifteen family caregivers of patients admitted to the ICU were enrolled. Complete follow-up was possible with 83 of them. Patients' data are shown in Table 1A, and relatives' data are shown in Table 1B. As demonstrated, most caregivers in the sample were adults, predominantly female, first-degree relatives, well educated, and Catholic.

### 3.1. Posttraumatic stress disorder

Overall, at 2 months after hospitalization (time III) 22.89% of the family caregivers met the criteria for PTSD (19/83), according to the PCLS-S score [28].

Age presented a positive trend with PCLS score. Although it did not reach statistical significance in the whole group ( $P = .056$ ), it shows some interesting details. We observed a progressive increase in the

**Table 1**  
General data of study subjects

A. Patients demographic and clinical data	
Variable	Total (n = 74)
Age	59.90 ± 17.40
Sex (%)	
Female	37 (50)
Male	37 (50)
APACHE II	17.84 ± 7.13
LOS (d)	9.40 ± 9.82
Type of ICU (%)	
Medical	39 (52.70)
Surgical	35 (47.30)
MV (%)	50 (72.97)
Vasopressors (%)	32 (43.24)
Sedatives use (%)	41 (55.41)
Diagnosis (%)	
Respiratory	21 (28.38)
Abdominal	20 (27.03)
Cardiovascular	9 (12.16)
Neurologic	16 (21.62)
Renal	3 (4.05)
Trauma	2 (2.70)
Other	3 (4.05)
Comorbidities (%)	
0	7 (9.46)
1	15 (20.27)
2	9 (12.16)
>3	43 (58.11)
DNR directive (%)	10 (14.49)
Outcome (%)	
Alive	36 (73.47)
Dead	13 (26.53)
<b>B. Relatives' demographic and social data</b>	
<b>Variable</b>	<b>Total (n = 51)</b>
Age	47.04 ± 15.13
Sex (%)	
Female	35 (68.63)
Male	16 (31.37)
Kinship (%)	
Son	21 (41.18)
Spouse	13 (25.49)
Other (close family)	12 (23.53)
Other (extended family)	3 (5.88)
Other	2 (3.92)
School education (%)	
Complete high school	25 (49.01)
Complete secondary school	12 (23.53)
Incomplete high school	9 (15.69)
Incomplete primary and secondary school	6 (11.76)
Religion (%)	
Catholic	45 (88.24)
Protestant	5 (9.80)
Other	1 (1.96)
None	0 (0.00)

DNR indicates do not resuscitate.

PCLS score in the relative as the patient's age increases, up to 62 years old. However, for older patients, it does not happen (Fig. 1A). Age also showed a positive association with PCLS when the patient/relative was on MV ( $P = .017$ ) and became more significant when the patient's stay in the ICU was more than 3 days ( $P = .01$ ).

Patient's severity of illness, as measured by APACHE II, showed a direct and significant relationship with PS at time III, when the APACHE II score was greater than 7 ( $P = .043$ ) (Fig. 1B). This relationship is nonlinear because it was direct up to a score of 20 but flattened out afterwards. Mortality rate was not associated with the PTSD score:  $P = .332$ .

Overall, a higher ICU LOS was significantly associated with the PCLS score ( $P = .046$ ). Thus, of the relatives of patients who were hospitalized for 4 days or less, 20.8% of them had PS at 2 months (10/48). In the case of those hospitalized for 8 days or more in the ICU, 28% presented PS (7/25). Length of stay also modulates the probability of relatives presenting PS and affects the PCLS score, in association with the baseline anxiety trait (see below).

Sex also influences the stress of having a relative hospitalized in the ICU. Being a female caregiver was directly associated with the PCLS score ( $P = .013$ ). On the other hand, educational level was inversely associated with the PCLS score ( $P = .02$ ). There was no association between survival and the PTSD score ( $P = .332$ ).

### 3.2. Anxiety, depression, and stress

At patient admission (time I), the caregiver's baseline anxiety and depression symptoms were observed in 30.4% and 17.4%, respectively. Relatives with higher levels of anxiety and a greater number of symptoms of depression tended to develop more PS. Of relatives with low stress levels, only 9.7% (3/31) showed symptoms of PTSD at time III. Of relatives with high levels of stress, PS increased to 41% (7/17) at time III ( $P < .001$ ).

### 3.3. Interaction between anxiety, LOS, and PCLS

Length of stay influenced those caregivers who presented at time I with low anxiety in a different manner to those who presented with high anxiety. Relatives with baseline low anxiety at time I (low Reduced form of the State-Trait Anxiety Inventory score) displayed an increased number of PCLS symptoms the longer the stay in the ICU. However, relatives presenting at time I with important anxiety symptoms (high STAI-R score) tended to maintain their level of stress at similar levels throughout the whole ICU LOS and at 2 months (time III) (Fig. 2).

Moreover, for patients whose LOS was 2 days or more in the ICU and were on MV, baseline caregiver anxiety was significantly associated with PTSD ( $P = .032$ ) and the PCLS score ( $P = .028$ ).

## 4. Discussion

Our study showed that close relatives of ICU patients, involved in their care while in the ICU and after discharge, experience a high prevalence of symptoms of PTSD during and after the hospitalization.

Literature has reported a prevalence of PTSD in 14% of family members 6 months after a loved one's death in the ICU [31]. The proportion of cases of PTSD in the present report (23%) resembles what was reported in Chilean general population who lived by the epicenter area, after the 2010's magnitude-8.8 Richter earthquake. Governmental and independent surveys found that 3 months after the earthquake, the prevalence of PTSD was between 7.0% and 11.1% nationwide, but in the most affected area, it reached up to 22.0% to 23.9% [32]. Considering these facts, to our opinion, our results show that to have a critically ill relative hospitalized in the ICU equals the experience of enduring and surviving an earthquake, at least from a psychologic perspective.

Regarding patients' individual factors, the progressive increase in the PCLS score in the relative as the patient's age increases up to 62 years old is very interesting to us. We speculate that this can be explained by the fact that older patients are naturally more prone to die and this life fact dampens the optimistic hope of recovery of the loved one from a relative's perspective. This demographic fact, perhaps, explains why we observed no increase in relatives' PCLS symptoms despite the older the age of the patient. Kross et al [33] did find a significant association between patient age and PS, with families of older patients reporting fewer symptoms.

To our knowledge, the development of PS has not necessarily been related to the severity of the disease [19,34]. Interestingly, in our series, it was associated only when the APACHE II score was greater than 7 ( $P = .043$ ). On the other hand, this relationship is nonlinear because, as described, it is direct up to a certain level of APACHE II (20 in our series) but flattens out afterwards. This is probably due to the fact that after a certain level of severity, almost all patients are under MV and at risk for developing PTSD [20]. This fact, from the relative's perspective, probably represents a steady state where the patient is so seriously ill that it will not induce a significant increase in the stress symptoms thereafter. Moreover, severity of illness is also an influencing factor. Thus, in the case of less seriously ill patients, the probability of the relatives developing symptoms of PTSD increases with each day of hospitalization, which can be explained by the fact that people do still expect that the patient condition will allow a quicker discharge to a step-down unit. However, if the ICU stay continues to prolong and the days go by and the discharge does not happen, a natural and progressive rise in concern and fear will arise. In the other hand, the opposite happens to the relatives of patients who are more seriously ill when hospitalized or get progressively sicker. In these cases, the probability of relatives developing PTSD decreases with the number of days of hospitalization, as, in general, a seriously ill patient is expected to have a less favorable outcome. This reinforces

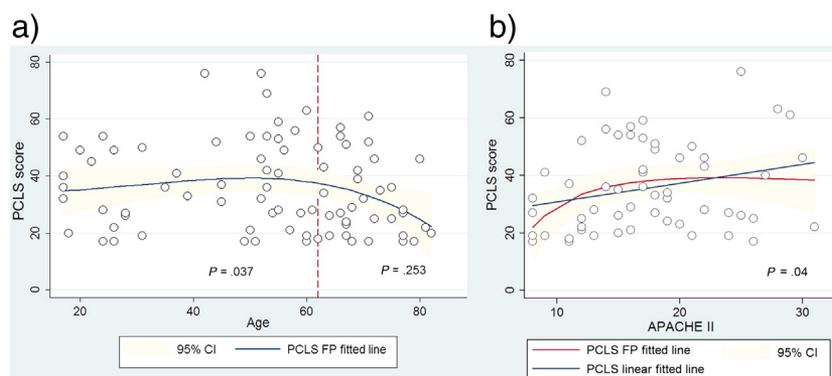


Fig. 1. A, The PCLS score according to age. B, The PCLS score according to severity of illness (APACHE II).

the obligation to provide responsible relatives with updated, adequate, and honest information regarding patients' clinical condition, eventual complications, and possible outcomes, whatever those may be [35,36].

We did not find a significant association between patient outcome and PTSD score in relatives, reflecting the impact that the critical condition itself imposes to close relatives of critically ill patients, alongside to an eventual death. We speculate that the burden of the death of this kind of patients, dreadful as it always is, has been—to a certain extent—lessened by the recurrent sequence of derangements and improvements that frequently occur in the ICU. Thus, subsequent prevalence of PTSD after 2 months lies more on the continuum of the ICU experience than on the specific event of death. Both family members of ICU survivors and nonsurvivors continued to be at high risk for developing symptoms of PTSD, anxiety, and depression, so the ICU itself works as a powerful stressor.

Regarding the relatives characteristics, we found that a higher educational level was inversely related with PCLS score, an association that had not been clearly described before. We think that this may be explained by the observation that higher formal education associates to greater knowledge of health-related issues [37] and, hence, a higher understanding of the objective health condition of their hospitalized relative. As a consequence, those relatives may display—in general—a more objective and rational approach to the ICU experience in terms of expectations, stress, disease outcome, and others and modulate their stress response.

In our study, a female caregiver was significantly associated with the PCLS score as previously reported for PTSD [18,38].

We also found that caregivers' psychologic aspects (anxiety and depression) present during the month before the patient's hospitalization are determinant for symptoms of PTSD at 2 months. Psychologic variables have been positively associated with the development of PS [38,39] and even considered to be predictors, as the anxiety score [1]. According to a study of psychiatric prevalence disorders in Chile, the predisposition to develop anxiety symptoms throughout life is approximately 16.2% [40], clearly less than our findings of 30.4%. That could be explained by the great emotional distress experienced at admission. Regarding depressive symptoms in caregivers, the percentage is similar to the population in our study, 17.2% according to the 2010 National Health Survey [41]. In addition, psychologic characteristics and cultural aspects of each population should be taken into account; this probably partially explains the differences in PTSD prevalence between countries [17–19,31].

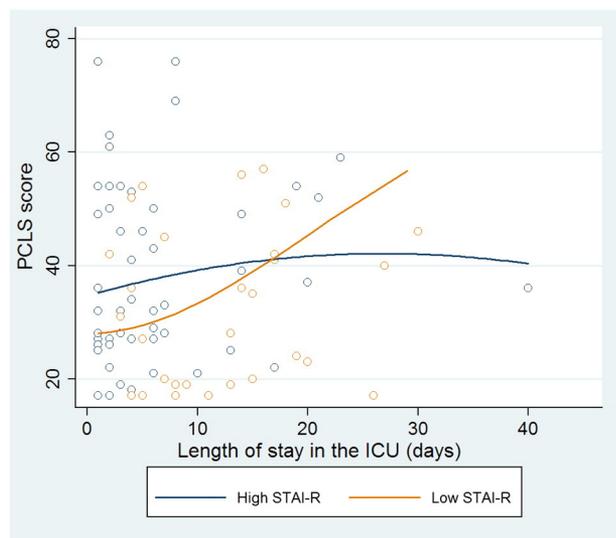


Fig. 2. Relationship between PCLS score and LOS in the ICU, according to baseline anxiety symptoms.

Table 2  
Main findings of our study

1. From a psychologic perspective, to have a critically ill relative hospitalized in the ICU equals the experience of enduring and surviving an earthquake.
2. Patient's age influences the risk of having PTSD in relatives up to a certain age. After that, the natural risk of death dampens the optimistic hope of recovery of the loved one and the risk for PTSD lowers.
3. PS have a nonlinear relationship with the severity of the disease. It seems to increase up to a certain level of severity but flattens out afterwards.
4. Survival has no significant relationship with relatives' PTSD risk.
5. Higher educational level seems to inversely correlate with PTSD, in general, due to a more objective approach to the ICU experience in terms of expectations, stress management, and outcome.
6. Relatives' psychologic aspects (anxiety and depression) present during the month before the patient's hospitalization are determinant for symptoms of PTSD after the ICU experience

Interestingly, a prehospitalization psychologic factor in the relative (the trait anxiety), as a measure of the stress load the relative brings, interacts with an important medical variable of the patients, namely, the LOS. We observed that the independent effect observed from the LOS days in the ICU is not constant for all levels of trait stress. As shown, relatives who have higher levels of trait stress tend to present constant high levels of posttraumatic stress even when patients stay only a few days in the ICU. However, relatives who present lower levels of trait stress at baseline tend to present lower levels of posttraumatic stress when their relatives stay fewer days in the ICU, but they increase steadily when the patient is hospitalized for longer. This interaction is very pertinent, as an increase in the number of days of hospitalization only increases the probability of relatives with lower levels of trait anxiety developing PTSD. As this latter group is at high risk for developing PTSD, it could be important to identify symptoms as early as at the patient's admission and to provide targeted, preventative interventions [42]. As mentioned, for those with higher levels of trait anxiety, the probability does not change with the patient's ICU LOS, which probably means that they came stress primed to the ICU. For a list of all our main findings, refer to Table 2.

There are some important limitations in our study. It was a single-center study with a short follow-up of 2 months. More research is needed to unveil the possible appearance of PS during a more extended period. Second, we relied on checklist scales to measure symptoms of anxiety, depression, and PTSD. These scales maybe less sensitive than a structured clinical interview for assessing symptoms in family members [43].

In summary, PTSD, anxiety, and depression are frequently experienced by the relatives of patients in critical care. The way a relative copes with a loved one's condition is importantly determined by the personal emotional background that he or she brings, their sex, and educational level as well as the severity of the patient's illness and LOS. These elements enable us to identify people at increased risk for PTSD and to intervene and provide preventative measures to help relatives endure an ICU experience with more ease and comfort and for it to be a less traumatic ordeal.

## References

- [1] Leske JS. Needs of relatives of critically ill patients: a follow-up. *Heart Lung* 1986; 15(2):189–93.
- [2] Mitchell ML, Courtney M, Coyer F. Understanding uncertainty and minimizing families' anxiety at the time of transfer from intensive care. *Nurs Health Sci* 2003;5(3): 207–17.
- [3] Hwang DY, Yagoda D, Perrey HM, Currier PF, Tehan TM, Guanci M, et al. Anxiety and depression symptoms among families of adult intensive care unit survivors immediately following brief length of stay. *J Crit Care* 2014;29(2):278–82.
- [4] Fumis RR, Deheinzelin D. Family members of critically ill cancer patients: assessing the symptoms of anxiety and depression. *Intensive Care Med* 2009;35(5):899–902.
- [5] Konkani A, Oakley B. Noise in hospital intensive care units—a critical review of a critical topic. *J Crit Care* 2012;27(5):522.e1–9.
- [6] Donchin Y, Seagull FJ. The hostile environment of the intensive care unit. *Curr Opin Crit Care* 2002;8(4):316–20.

- [7] Cazorla C, Cravoisy A, Gibot S, Nace L, Levy B, Bollaert PE. Patients' perception of their experience in the intensive care unit. *Presse Med* 2007;36(2 Pt 1):211–6.
- [8] Simini B. Patients' perceptions of intensive care. *Lancet* 1999;354:571–2.
- [9] Ringdal M, Plos K, Lundberg D, Johansson L, Bergbom I. Outcome after injury: memories, health-related quality of life, anxiety, and symptoms of depression after intensive care. *J Trauma* 2009;66:1226–33.
- [10] Alonzo AA. The experience of chronic illness and post-traumatic stress disorder: the consequences of cumulative adversity. *Soc Sci Med* 2000;50(10):1475–84.
- [11] Boer KR, van Ruler O, van Emmerik AA, Sprangers MA, de Rooij SE, Vroom MB, et al. Factors associated with posttraumatic stress symptoms in a prospective cohort of patients after abdominal sepsis: a nomogram. *Intensive Care Med* 2008;34:664–74.
- [12] Covinsky KE, Goldman L, Cook EF, Oye R, Desbiens N, Reding D, et al. The impact of serious illness on patients' families. SUPPORT Investigators. Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatment. *JAMA* 1994;272:1839–44.
- [13] Foster M, Chaboyer W. Family carers of ICU survivors: a survey of the burden they experience. *Scand J Caring Sci* 2003;17:205–14.
- [14] Siegel MD, Hayes E, Vanderwerker LC, Loseth DB, Prigerson HG. Psychiatric illness in the next-of-kin of patients who die in the intensive care unit. *Crit Care Med* 2008;36:1722–8.
- [15] Fumis RR, Ranzani OT, Martins PS, Schettino G. Emotional disorders in pairs of patients and their family members during and after ICU stay. *PLoS One* 2015;10(1):e0115332.
- [16] McAdam JL, Puntillo K. Symptoms experienced by family members of patients in intensive care units. *Am J Crit Care* 2009;18:200–9.
- [17] Anderson WG, Arnold RM, Angus DC, Bryce CL. Posttraumatic stress and complicated grief in family members of patients in the intensive care unit. *J Gen Intern Med* 2008;23:1871–6.
- [18] Paparrigopoulos T, Melissaki A, Efthymiou A, Tsekou H, Vadala C, Kribeni G, et al. Short-term psychological impact on family members of intensive care unit patients. *J Psychosom Res* 2006;61(5):719–22.
- [19] Pochard F, Darmon M, Fassier T, Bollaert PE, Cheval C, Coloigner M, et al. Symptoms of anxiety and depression in family members of intensive care unit patients before discharge or death. A prospective multicenter study. *J Crit Care* 2005;20(1):90.
- [20] Douglas SL, Daly BJ. Caregivers of long-term ventilator patients: physical and psychological outcomes. *Chest* 2003;123:1073–81.
- [21] Koller PA. Family needs and coping strategies during illness crisis. *AACN Clin Issues Crit Care Nurs* 1991;2:338–45.
- [22] Cameron JI, Franche RL, Cheung AM, Stewart DE. Lifestyle interference and emotional distress in family caregivers of advanced cancer patients. *Cancer* 2002;94(2):521–7.
- [23] Peris A, Bonizzoli M, Iozzelli D, Migliaccio ML, Zagli G, Bacchereti A, et al. Early intra-intensive care unit psychological intervention promotes recovery from post-traumatic stress disorders, anxiety and depression symptoms in critically ill patients. *Crit Care* 2011;15(1):R41.
- [24] Curtis JR, Engelberg RA. Measuring success of interventions to improve the quality of end-of-life care in the intensive care unit. *Crit Care Med* 2006;34(11 Suppl.):S341–7.
- [25] Higginson IJ, Koffman J, Hopkins P, Prentice W, Burman R, Leonard S, et al. Development and evaluation of the feasibility and effects on staff, patients, and families of a new tool, the Psychosocial Assessment and Communication Evaluation (PACE), to improve communication and palliative care in intensive care and during clinical uncertainty. *BMC Med* 2013;11:213.
- [26] Spielberg CD, Gorsuch RL, Lushene RD. Test manual for the State–Trait Anxiety Inventory. Palo Alto, California: Consulting Psychologists Press; 1970.
- [27] Blanchard EB, Jones AJ, Buckley TC, Forneris CA. Psychometric properties of the PTSD Checklist (PCL). *Behav Res Ther* 1996;34:669–73.
- [28] Marshall GN. Posttraumatic stress disorder symptom checklist: factor structure and English-Spanish measurement invariance. *J Trauma Stress* 2004;17(3):223–23.
- [29] American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Arlington, VA: American Psychiatric Association; 2013[DSM-5].
- [30] Royston P, Altman DG. Regression using fractional polynomials of continuous covariates: parsimonious parametric modelling. *Appl Stat* 1994;43:429–67.
- [31] Gries CJ, Engelberg RA, Kross EK, Zatzick D, Nielsen EL, Downey L, et al. Predictors of symptoms of posttraumatic stress disorder and depression in family members after patient death in the intensive care unit. *Chest* 2010;137(2):280–7.
- [32] Larrafaga O, Herrera R. Ministerio de Planificación Gobierno de Chile: Encuesta Posterremoto. Efectos en la calidad de vida de la población afectada por terremoto/tsunami; 2010.
- [33] Kross EK, Engelberg RA, Gries CJ, Nielsen EL, Zatzick D, Curtis JR. ICU care associated with symptoms of depression and PTSD among family members of those who die in the ICU. *Chest* 2011;139(4):795–801.
- [34] Girard TD, Shintani AK, Jackson JC, Gordon SM, Pun BT, Henderson MS, et al. Risk factors for post-traumatic stress disorder symptoms following critical illness requiring mechanical ventilation: a prospective cohort study. *Crit Care* 2007;11(1):R28.
- [35] Davidson JE, Powers K, Hedayat KM, Tieszen M, Kon AA, et al. American College of Critical Care Medicine Task Force 2004–2005. Clinical practice guidelines for support of the family in the patient-centered intensive care unit: American College of Critical Care Medicine Task Force 2004–2005. *Crit Care Med* 2007;35(2):605–22.
- [36] Schleder LP, Parejo LS, Puggina AC, Silva MJP. Spirituality of relatives of patients hospitalized in intensive care unit. *Acta paul enferm* 2013;26(1):71–8.
- [37] Liu CY, Liu JS. Socioeconomic and demographic factors associated with health care choices in Taiwan. *Asia Pac J Public Health* 2010;22(1):51–62.
- [38] Azoulay E, Pochard F, Kentish-Barnes N, Chevret S, Aboab J, Adrie C, et al. Risk of post-traumatic stress symptoms in family members of intensive care unit patients. *Am J Respir Crit Care Med* 2005;171:987–94.
- [39] Pillai L, Aigalikal S, Vishwasrao SM, Husainy SM. Can we predict intensive care relatives at risk for posttraumatic stress disorder? *Indian J Crit Care Med* 2010;14(2):83.
- [40] Vicente B, Rioseco P, Saldivia S, Kohn R, Torres S. Chilean study on the prevalence of psychiatric disorders (*DSM-III-R/CIDI*) (ECPP). *Rev Med Chil* 2002;130(5):527–36.
- [41] Encuesta Nacional de Salud 2010 Ministerio de Salud de Chile. Departamento de Epidemiología; 2012[Accessed May 21 2015. [http://epi.minsal.cl/wp-content/uploads/2012/07/Informe-ENS-2009-2010.-CAP-5\\_FINALv1juliocepi.pdf](http://epi.minsal.cl/wp-content/uploads/2012/07/Informe-ENS-2009-2010.-CAP-5_FINALv1juliocepi.pdf)].
- [42] Lautrette A, Darmon M, Megarbane B, Joly LM, Chevret S, Adrie C, et al. A communication strategy and brochure for relatives of patients dying in the ICU. *N Engl J Med* 2007;356(5):469–78.
- [43] First MB, Spitzer R, Gibbon M, Williams JB. Structured Clinical Interview for *DSM-IV* Axis I Disorders, Research Version, Patient Edition (SCID-1/P, Version 2.0). New York, NY: New York State Psychiatric Institute; 2002.