

## CLINICAL SCIENCE

# Psychological crisis intervention for the family members of patients in a vegetative state

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**OBJECTIVES:** Family members of patients in a vegetative state have relatively high rates of anxiety and distress. It is important to recognize the problems faced by this population and apply psychological interventions to help them. This exploratory study describes the psychological stress experienced by family members of patients in a vegetative state. We discuss the effectiveness of a psychological crisis intervention directed at this population and offer suggestions for future clinical work.

**METHODS:** A total of 107 family members of patients in a vegetative state were included in the study. The intervention included four steps: acquisition of facts about each family, sharing their first thoughts concerning the event, assessment of their emotional reactions and developing their coping abilities. The Symptom Check List-90 was used to evaluate the psychological distress of the participants at baseline and one month after the psychological intervention. Differences between the Symptom Check List-90 scores at the baseline and follow-up evaluations were analyzed.

**RESULTS:** All participants in the study had significantly higher Symptom Check List-90 factor scores than the national norms at baseline. There were no significant differences between the intervention group and the control group at baseline. Most of the Symptom Check List-90 factor scores at the one-month follow-up evaluation were significantly lower than those at baseline for both groups; however, the intervention group improved significantly more than the control group on most subscales, including somatization, obsessive-compulsive behavior, depression, and anxiety.

**CONCLUSION:** The results of this study indicate that the four-step intervention method effectively improves the mental health of the family members who received this treatment and lessens the psychological symptoms of somatization, obsessive-compulsive behavior, depression and anxiety.

**KEYWORDS:** Vegetative State; Family Members; Mental Health; Psychological Crisis Intervention.

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## INTRODUCTION

Medical progress has increased the number of patients who are able to survive severe acute brain injury in a vegetative state. These patients will take more time and proceed through different stages before fully or partially recovering awareness; alternatively, they may permanently lose all brain functions. Many studies have shown that patients in a vegetative state suffer major and irreversible brain damage as a consequence of a traumatic or non-traumatic acute cerebral event (e.g., stroke, aneurysm ruptures, intoxication, infections, etc.) (1). According to the American Academy of Neurology, a vegetative state is defined as "a condition of complete unawareness of the self and the environment, accompanied by sleep-wake cycles,

with either complete or partial preservation of hypothalamic and brain-stem autonomic functions" (2). This definition means that patients in a vegetative state have some basic reflexes and can usually breathe independently but cannot communicate, understand spoken language, or engage purposefully with the surrounding environment. There are no data concerning the number of patients in a vegetative state in China; however, the annual incidence of this condition in the United States is estimated to be between 14,000 and 35,000 people (3). The life of expectancy of a patient in a vegetative state is approximately 2–5 years; however, surviving for more than 25 years is not unusual (4). Therefore, patient management raises a number of medical, ethical, and psychological concerns.

The families of patients in a vegetative state are affected by the stress associated with this difficult situation. Family members develop a wide range of feelings and anxieties, including a sense of isolation, abandonment, fear regarding the future, guilt, and feelings of inadequacy concerning the problems that they face. They may oscillate between acceptance and denial and present a range of emotions, including sadness, exhaustion, weariness, excessive protection, aggression, anger,

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and demand. These patients will often appear not to hear the information provided to them (5). Once a vegetative diagnosis has been established, the family members of the patient have relatively high rates of anxiety and distress that adversely affect their health and quality of life. When these difficulties surpass an individual's ability to cope, a psychological crisis may occur that severely influences his or her physical and mental health (6). Thus, psychological crisis intervention plays an important role in maintaining mental and physical health. Through psychological crisis intervention, people learn to call on their own resources and inner strength to recover psychological balance and obtain new skills to cope with this psychological crisis (7). In the last decade, early interventions, such as psychological debriefing, have been increasingly used to treat psychological crises. Crisis intervention became popular during the 1970s, and in 1983, Mitchell developed the Critical Incident Stress Debriefing (CISD) to prevent symptoms related to traumatic events in emergency responders (8). The CISD is designed to promote the emotional processing of traumatic events through venting and normalizing reactions. The CISD also prepares people for the experiences they may have in the future and generally involves a seven-phase treatment process with the following steps:

- a) Introduction: ground rules are established, confidentiality emphasized and participants urged to talk if they wish.
- b) Facts: participants are asked to describe what happened during the incident from their own perspective. This helps to give a total picture of what happened.
- c) Thoughts: participants describe their first thoughts about the event. The discussion becomes more personal.
- d) Emotions: participants discuss their emotional reactions.
- e) Assessment: physical and psychological symptoms are noted and discussed.
- f) Teaching or education: discussing stress reaction and responses, coping strategies.
- g) Re-entry: participants ask questions, team leaders summarize what has occurred, advise participants that they can contact team members if they wish and draw the debriefing to a close.

Living with and caring for patients that have been diagnosed as being in a vegetative state can be a highly stressful experience for family members. These family members witness their loved ones transition from being in danger to undergoing active clinical treatment and finally exhibiting symptoms that are identical to a coma. The suddenness of the final diagnosis of being in a vegetative state usually directly affects the family members. If not managed and resolved appropriately, either by oneself or with assistance, the stress experienced by the family members may lead to several psychological disorders, including posttraumatic stress disorder, depression, abuse of alcohol or other drugs, etc. Given their great emotional distress, the need for a psychological intervention among these sufferers is warranted. Few studies have investigated the psychological stress and the effects of a psychological intervention on the family members of patients in a vegetative state. This study describes the efficacy of a psychological crisis intervention for this population and provides evidence for additional psychological crisis intervention in clinical work.

## MATERIALS AND METHODS

### Participants

Thirty patients in a vegetative state admitted to long-stay hospitals were selected. In accordance with the American Neurology Academy (2), the vegetative state diagnosis and inclusion criteria were as follows: (a) no awareness of oneself or the environment; (b) no directed behavioral responses; (c) no expression or comprehension of language; (d) the presence of a sleep-waking cycle; and (e) the complete or partial preservation of hypothalamic and brainstem function. The sample patients were healthy individuals previously without any serious or life-threatening problems such as heart attack, respiratory failure, coma, and had been previously expected to live normal lives.

The participants were family members of the patients in a vegetative state and were consecutively admitted to the neurology department of a general hospital for treatment. The participants were clearly conscious and able to communicate verbally without visual or auditory problems. Participants were excluded for having a previous psychiatric illness, a history of brain injury, a serious family accident, or an acute psychological trauma which is a type of damage to the psychology that occurs as a result of a traumatic event such as war, earthquakes, plane crashes, medical emergencies, etc. One hundred twenty-eight family members were eligible to participate in this study, and 89% of these members agreed to volunteer. Of the 114 participants enrolled, 107 participants met the above inclusion criteria and were included in data analyses.

We assigned the study participants to one of two groups using simple random sampling: the intervention group (54 participants), who experienced a psychological intervention, or the control group (53 participants), who did not receive an intervention. The control and intervention designations (1:1 ratio) were sealed in opaque envelopes that were intermixed. A research assistant assigned the participants to a group by opening an envelope when an eligible participant was in triage. The study and consent procedure were performed in accordance with the Declaration of Helsinki. The hospital ethics committee approved this study.

### Instruments

At the baseline and one-month follow-up examinations, the Symptom Checklist-90-R (SCL-90-R) (9,10) evaluated the psychological stress as well as the effects of the intervention on participants. The SCL-90-R contains 90 items concerning the participants' psychosomatic symptoms across the following nine domains: somatization, obsessive-compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychosis. All 90 items are rated on five-point Likert scales of distress that indicate the symptom occurrence rate at a particular time. The SCL-90-R is particularly useful for discriminating symptoms related to depression and anxiety.

The family members answered the questionnaire, and the baseline data were collected prior to beginning the psychological intervention. The family members were required to complete the questionnaire in thirty minutes. One month after the psychological intervention, a reevaluation was conducted during which the questionnaire was administered and retrieved for both groups.

## Psychological Crisis Intervention

Following Mitchell's seven-phase CISM process (11), a brief single-session group intervention was established with the participants. This intervention strategy has four steps: in the facts stage, participants describe what happened during the vegetative state from their perspective, which helps to provide the full picture of what happened; in the thoughts phase, participants describe their first thoughts concerning the event, and the discussion becomes more personal; in the assessment phase, participants discuss their emotional reactions, and we note and discuss their physical and psychological symptoms; and in the assisting stage, we encourage participants to reexamine their feelings of helplessness and conduct the appropriate training to increase their coping abilities.

The intervention was held 48-72 hours after the patient was diagnosed as being in a vegetative state. The intervention group participated in a psychological session that was led by an occupational psychologist and lasted between 3 and 4 hours. The family members of patients who were involved in the same accident were randomly assigned into separate intervention debriefing group sessions containing 3-10 participants.

## Statistical Analyses

The data are presented as the means and standard deviations (SDs). Quantitative variables were investigated using SPSS 16.0. Descriptive statistics characterized the participant's demographic characteristics, including education level and the relationship to the patient. A t-test was conducted at the baseline and follow-up examinations for both groups. Differences ( $\Delta$ ) between the SCL-90-R scores at the baseline and follow-up evaluations were calculated for each patient. A t-test also compared the differences between the intervention and control groups. A *p*-value of  $<0.05$  was considered as significant (two-tailed).

## RESULTS

### Participant characteristics

One hundred seven participants were eligible to participate in this study. Of these participants, 61.7% were men and 39.3% were women. The average age was 55 years (range = 41-68 years), 89.7% of participants were married and 10.3% of participants were single. Fifty-nine participants (55.1%) had a high school education, 25 participants (23.4%) had a middle school education (or less), and 23 participants (21.5%) had a university degree. Of the participants who provided data regarding their relationship to the patient, 25.2% were parents, 17.8% were spouses, 29.9% were siblings and 27.1% were children (Table 1).

### Between-group comparisons of SCL-90 factor scores and the national norm

We chose the SCL-90 for this study because it evaluates a broad range of psychological symptoms in family members of patients in a vegetative state. A single-sample t-test was performed using the SCL-90 factor scores for all participants, and these scores were compared with the corresponding national norm (12). Table 2 shows that the factor scores of participants in both groups were significantly higher than those of the national norm ( $p < 0.001$ ). The range of factor scores from highest to lowest corresponded to the categories of depression, phobia anxiety, anxiety,

**Table 1** - Characteristics of the family members of patients in a vegetative state (n = 107).

| Characteristic              | N  | %    |
|-----------------------------|----|------|
| Gender                      |    |      |
| Male                        | 65 | 61.7 |
| Female                      | 42 | 39.3 |
| Age (years)                 |    |      |
| 40-50                       | 21 | 19.6 |
| 50-60                       | 54 | 50.5 |
| 60-70                       | 32 | 29.9 |
| Marital Status              |    |      |
| Married                     | 96 | 89.7 |
| Single                      | 11 | 10.3 |
| Education                   |    |      |
| Middle school or less       | 25 | 23.4 |
| High school                 | 59 | 55.1 |
| College/university/graduate | 23 | 21.5 |
| Relationship to patient     |    |      |
| Parent (mother/father)      | 27 | 25.2 |
| Spouse (Husband/wife)       | 19 | 17.8 |
| Sibling (brother/sister)    | 32 | 29.9 |
| Child (son/daughter)        | 29 | 27.1 |

somatization, paranoid ideation, hostility, interpersonal sensitivity, obsessive-compulsive behavior, and psychosis. Table 2 also compares the intervention and control groups with regard to their SCL-90 factor scores at baseline. There was no difference at baseline between the intervention and control groups with regard to their SCL-90 factor scores.

### Comparisons between baseline and follow-up examinations with regard to SCL-90 factor scores for both groups

Table 3 compares the SCL-90 factor scores at baseline to those at the follow-up examination for both groups. The SCL-90 factor scores of the intervention group were significantly lower at the follow-up evaluation compared with those observed at baseline ( $p < 0.001$ ). This difference was also statistically significant ( $p < 0.001$ ) for the control group except with regard to the somatization, obsessive-compulsive behavior, depression, and anxiety subscales.

### Between-group comparisons with regard to the mean difference of SCL-90 scores

Most SCL-90 factor scores at the follow-up evaluation were significantly lower than those at baseline for both groups. There is not a definitive intervention effect because time may have influenced our results. To demonstrate a definitive intervention effect, Table 4 reports the mean  $\Delta$  between the SCL-90 scores for the baseline and follow-up examinations for both groups. t-tests compared the mean  $\Delta$  between the two groups; significant  $\Delta$  values were found on the following SCL-90 scales: somatization, obsessive-compulsive behavior, depression, and anxiety ( $p < 0.05$ ).

## DISCUSSION

Loss is a situational crisis that poses a threat or challenge to an individual. When family members witnessed a loved one's loss of consciousness, a severe psychological stress response occurred, and their mental health was adversely affected. This study revealed psychological distress in the family members of patients in a vegetative state using the SCL-90-R. The SCL-90-R is a reliable, self-administered, and

**Table 2 - Between-group comparisons of SCL-90 psychological symptoms and the national norm (mean ± SD).**

| SCL-90 Factors                | Intervention group<br>(n = 54) | Control Group<br>(n = 53) | National norm<br>(n = 1,388) | p1-value | p2-value | p3-value |
|-------------------------------|--------------------------------|---------------------------|------------------------------|----------|----------|----------|
| Somatization                  | 2.33 ± 0.55                    | 2.37 ± 0.61               | 1.37 ± 0.48                  | <0.001   | <0.001   | 0.835    |
| Obsessive-compulsive behavior | 1.97 ± 0.44                    | 1.92 ± 0.41               | 1.62 ± 0.57                  | <0.001   | <0.001   | 0.733    |
| Interpersonal sensitivity     | 2.03 ± 0.52                    | 1.95 ± 0.49               | 1.65 ± 0.51                  | <0.001   | <0.001   | 0.547    |
| Depression                    | 2.89 ± 0.57                    | 2.92 ± 0.59               | 1.50 ± 0.59                  | <0.001   | <0.001   | 0.874    |
| Anxiety                       | 2.61 ± 0.53                    | 2.64 ± 0.55               | 1.39 ± 0.43                  | <0.001   | <0.001   | 0.859    |
| Hostility                     | 2.01 ± 0.52                    | 2.06 ± 0.57               | 1.48 ± 0.56                  | <0.001   | <0.001   | 0.782    |
| Phobia anxiety                | 2.81 ± 0.48                    | 2.86 ± 0.51               | 1.23 ± 0.41                  | <0.001   | <0.001   | 0.796    |
| Paranoid Ideation             | 2.36 ± 0.50                    | 2.33 ± 0.48               | 1.43 ± 0.57                  | <0.001   | <0.001   | 0.891    |
| Psychotic                     | 1.96 ± 0.51                    | 1.90 ± 0.47               | 1.29 ± 0.42                  | <0.001   | <0.001   | 0.708    |

p1-value = Intervention group vs. national norm.  
p2-value = Control group vs. national norm.  
p3-value = Intervention group vs. control group.

validated instrument for assessing psychological and symptomatic distress in both clinical and research settings (13). Our study demonstrated that the SCL-90 factor scores of the family members of both groups were significantly higher than the national norm. Six SCL-90 factors exceeded a score of two: depression, phobia anxiety, anxiety, somatization, paranoid ideation and hostility. Higher scores on the SCL-90 indicate a higher level of psychological distress. These results indicate that family members of patients in a vegetative state experience a range of emotional reactions that include anxiety, depression, guilt, irritability, aggressiveness, and impulsivity. Many factors may contribute to these reactions, such as the loss of their loved one, social circumstances, and the complex medical and ethical decisions in which they become involved (14). In a recent study, over 70% of family members of patients in a vegetative state reported social isolation and low levels of engagement in recreational activities (15). When there is little expectation of recovery, many family members become upset and anxious because they do not want to abandon hope. Furthermore, the family members feel guilty because their feelings for their loved ones change. These family members may be unable to mourn and adjust to their loss because the body remains alive.

Thus, the sudden unconsciousness of a loved one caused a dramatic change in family members' psychological functioning. The need for urgent crisis intervention seems necessary. Crisis intervention refers to the methods used to offer immediate short-term help to individuals who experience an event that produces emotional, mental, physical, and behavioral distress. In many cases, it may be appropriate for the

teams who work with these families to encourage them to seek psychological support from external sources. The CISD can be a valuable tool to assist others in coping with the physical or psychological symptoms generally associated with exposure to trauma. Based on Mitchell's CISD model, a brief four-step intervention method was developed, and this study assessed its effectiveness. There was no difference between the intervention and control groups at baseline with regard to their SCL-90 factor scores. Most of the SCL-90 factor scores were significantly lower at the follow-up evaluation than at baseline for both groups. One month after the psychological intervention, the intervention group improved significantly more than the control group with regard to most subscales, including somatization, obsessive-compulsive behavior, depression, and anxiety. This finding suggests that the psychological and physical symptoms of family members improve with psychological intervention. Our findings support our hypothesis that the four-step intervention effectively improves the general psychological distress of family members of patients in a vegetative state with regard to reductions in somatization, obsessive-compulsive behavior, depression and anxiety. Psychological interventions must be provided through short-term crisis intervention methods. In this study, the intervention followed the four steps of self-introduction, expressing feelings and emotions, providing information, and assisting abreaction. In addition, our study showed that we developed a reproducible, easily implemented, low-cost intervention to reduce psychological distress and the perception of stress in family members of patients in a vegetative state.

Our study has several limitations. Our research recruited a relatively small and heterogeneous sample across a

**Table 3 - Comparisons of SCL-90 factor scores at the baseline and follow-up examinations for both groups (mean ± SD).**

| SCL-90 Factors                | Intervention group |             |         | Control Group |             |         |
|-------------------------------|--------------------|-------------|---------|---------------|-------------|---------|
|                               | Baseline           | Follow-up   | p-value | Baseline      | Follow-up   | p-value |
| Somatization                  | 2.33 ± 0.55        | 1.71 ± 0.54 | <0.001  | 2.37 ± 0.61   | 2.25 ± 0.58 | 0.672   |
| Obsessive-compulsive behavior | 1.97 ± 0.44        | 1.69 ± 0.46 | <0.001  | 1.92 ± 0.41   | 1.94 ± 0.49 | 0.876   |
| Interpersonal sensitivity     | 2.03 ± 0.52        | 1.62 ± 0.49 | <0.001  | 1.95 ± 0.49   | 1.65 ± 0.51 | <0.001  |
| Depression                    | 2.89 ± 0.57        | 2.03 ± 0.61 | <0.001  | 2.92 ± 0.59   | 2.95 ± 0.62 | 0.893   |
| Anxiety                       | 2.61 ± 0.53        | 1.97 ± 0.55 | <0.001  | 2.64 ± 0.55   | 2.66 ± 0.57 | 0.865   |
| Hostility                     | 2.01 ± 0.52        | 1.59 ± 0.54 | <0.001  | 2.06 ± 0.57   | 1.63 ± 0.46 | <0.001  |
| Phobia anxiety                | 2.81 ± 0.48        | 1.79 ± 0.50 | <0.001  | 2.86 ± 0.51   | 2.02 ± 0.53 | <0.001  |
| Paranoid Ideation             | 2.36 ± 0.50        | 1.74 ± 0.49 | <0.001  | 2.33 ± 0.48   | 1.88 ± 0.43 | <0.001  |
| Psychotic                     | 1.96 ± 0.51        | 1.52 ± 0.46 | <0.001  | 1.90 ± 0.47   | 1.55 ± 0.49 | <0.001  |

**Table 4** - Between-group comparisons of the mean SCL-90 difference score.

| SCL-90 Factor                 | Intervention $\Delta$ | Control Group $\Delta$ | p-value |
|-------------------------------|-----------------------|------------------------|---------|
| Somatization                  | -0.63                 | -0.12                  | 0.028   |
| Obsessive-compulsive behavior | -0.29                 | 0.02                   | 0.046   |
| Interpersonal sensitivity     | -0.41                 | -0.35                  | 0.612   |
| Depression                    | -0.86                 | 0.03                   | 0.002   |
| Anxiety                       | -0.62                 | 0.02                   | 0.019   |
| Hostility                     | -0.45                 | -0.46                  | 0.893   |
| Phobia anxiety                | -1.02                 | -0.84                  | 0.095   |
| Paranoid Ideation             | -0.63                 | -0.49                  | 0.276   |
| Psychotic                     | -0.44                 | -0.38                  | 0.604   |

relatively short period of time. Therefore, most of the SCL scores were still significantly different from population norms at the time of the follow-up observation. Additional research should be conducted using a larger number of people and with different lengths of follow-up. In addition, the four-step approach used in this research was not compared with any alternative psychological therapies. Thus, we cannot conclude that this four-step approach is more effective than other forms of psychological interventions; however, we can state that it is more effective than typical interventions that do not include a psychological approach. Furthermore, family members in the control group had no intervention, and they completed the questionnaire at the baseline and follow-up examinations. Therefore, the interventionist attended to all participants. Other factors, such as interventionist attention and participant expectations, might have affected the measured improvement of participants. Despite these limitations, our results may have important implications for future psychological crisis interventions.

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## AUTHOR CONTRIBUTIONS

Li YH was responsible for project development, psychological crisis intervention, clinical analyses, and manuscript writing. Xu ZP was responsible for project development, clinical case collection and psychological testing.

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