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RESEARCH PAPER

Emotional adjustment of patients surgically treated for aneurysmal Subarachnoid Haemorrhage (SAH)

Ajustamento emocional de doentes com Hemorragia Subaracnóidea (HSA) aneurismática tratada cirurgicamente

Ajuste emocional de pacientes con hemorragia subaracnoidea (HSA) aneurismática tratada quirúrgicamente

Pedro Ricardo Coelho Gonçalves*; Ana Carolina Frias**; Ana Dias da Fonseca***

Abstract

Theoretical Framework: The sequelae caused by an aneurysmal Subarachnoid Haemorrhage (SAH) may have a significant impact on patients' emotional adjustment.
Objective: This study aimed to characterise the emotional adjustment of patients with SAH, and identify the factors influencing this adjustment.
Methodology: Sixty patients surgically treated for aneurysmal SAH for at least six months filled out a socio-demographic and clinical data sheet, the Medical Outcomes Study 36 and the Hospital Anxiety and Depression Scale.
Results: Patients with SAH showed significantly higher levels of Depression (p= 0.002), but not Anxiety, than the general population. In this sample, 19% and 7.1% of patients showed clinically relevant levels of Anxiety and Depression, respectively. The presence of post-SAH complications and perception of low quality of life are associated with increased levels of Anxiety and Depression. Social Support is only negatively associated with levels of Depression.
Conclusions: These results support the long-term emotional impact of a surgically treated aneurysmal SAH. The study of the variability factors allows for the identification of not only patients at higher risk for adjustment difficulties, but also some strategies to improve their emotional adjustment.

Keywords: anxiety; depression; subarachnoid hemorrhage; quality of life.

Resumo

Enquadramento: As sequelas provocadas por uma Hemorragia Subaracnóidea (HSA) aneurismática podem ter um impacto significativo no ajustamento emocional dos indivíduos.
Objetivo: Este trabalho pretendeu caracterizar o ajustamento emocional de doentes com HSA, bem como identificar os fatores de variabilidade desse ajustamento.
Metodologia: Sessenta doentes com uma HSA aneurismática tratada cirurgicamente há pelo menos seis meses preencheram uma ficha de dados sociodemográficos e clínicos, a Medical Outcomes Study 36 e a Escala de Ansiedade e Depressão Hospitalar.
Resultados: Os doentes com HSA apresentaram níveis significativamente superiores de Depressão (p =0,002), mas não de Ansiedade, por comparação à população geral. 19% e 7,1% da amostra apresentaram, respetivamente, níveis de Ansiedade e Depressão merecedores de atenção clínica. A presença de complicações pós-HSA e a perceção de qualidade de vida baixa estão associadas a níveis acrescidos de Ansiedade e Depressão. O Apoio Social está negativamente associado apenas aos níveis de Depressão.
Conclusões: Estes resultados sugerem o impacto emocional, a longo prazo, da ocorrência de uma HSA aneurismática tratada cirurgicamente. O estudo dos fatores de variabilidade permite não só identificar os doentes com maior risco de dificuldades de ajustamento, bem como algumas estratégias para melhorar o seu ajustamento emocional.

Palavras-chave: ansiedade; depressão; hemorragia subaracnóidea; qualidade de vida.

Resumen

Marco contextual: las secuelas provocadas por una hemorragia subaracnoidea (HSA) aneurismática pueden tener un impacto significativo en el ajuste emocional de los individuos.
Objetivo: este trabajo pretende caracterizar el ajuste emocional de los pacientes con HSA e identificar los factores de variabilidad de este.
Metodología: sesenta pacientes con una HSA aneurismática tratada quirúrgicamente hace, por lo menos, seis meses cumplimentaron una ficha de datos sociodemográficos y clínicos, la Medical Outcomes Study 36 y la Escala de Ansiedad y Depresión Hospitalaria.
Resultados: los pacientes con HSA presentaron niveles significativamente superiores de depresión (p = .002), pero no de ansiedad, en comparación con la población general. El 19 % y 7,1 % de la muestra presentó, respectivamente, niveles de ansiedad y depresión que merecen atención clínica. La presencia de complicaciones pos-HSA y la percepción de calidad de vida baja están asociadas a niveles más altos de ansiedad y depresión. El apoyo social está negativamente asociado solo a niveles de depresión.
Conclusiones: estos resultados muestran el impacto emocional, a largo plazo, de la aparición de una HSA aneurismática tratada quirúrgicamente. El estudio de los factores de variabilidad permite no solo identificar a los pacientes con mayor riesgo de dificultad de ajuste, sino también algunas estrategias para mejorar su ajuste emocional.

Palabras clave: ansiedad; depresión; hemorragia subaracnoidea; calidad de vida.

* Student of the Post-Specialisation Degree and Master's Degree in Medical-Surgical Nursing of the Nursing School of Coimbra. RN at the Neurosurgery Service of the Coimbra University Hospital Centre, EPE, 3000-075 Coimbra, Portugal [pedrico_goncalves@hotmail.com].
Address: Urbanização Quinta das Lágrimas, 2.ª Fase, Lote 9, R/c C
3040-387 Coimbra, Portugal.
** Master's in Education and Social Development – Faculty of Psychology and Education Sciences of the University of Coimbra. Ph.D. student in Didactics – University of Aveiro. RN at the Neurosurgery Service of the Coimbra University Hospital Centre, EPE, 3000-075 Coimbra, Portugal [ana.frias@ua.pt].
*** Ph.D. in Clinical Psychology: Family Psychology and Family Intervention – Faculty of Psychology and Education Sciences of the University of Coimbra and Faculty of Psychology of the University of Lisbon, 3001-802, Coimbra, Portugal [ana.fonseca77@gmail.com].

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Introduction

Subarachnoid Haemorrhage (SAH), caused by rupture of a brain aneurysm, is a condition of high morbidity and mortality, with only a third of survivors showing *good functional outcomes* (Greenberg, 2003). Recent advances in the treatment of SAH have led to a significant increase in the number of survivors and a smaller number of sequelae. However, when, for example, paresis or aphasia occur, they are multiple and severe, reducing the quality of life and increasing the risk of psychiatric problems, such as depression (Hedlund, Zetterling, Ronne-Engstrom, Ekselius, & Carlsson, 2010). Although most research studies conducted with these patients have focused on objective assessment indicators, such as the survival rate, subsequent complications and level of functionality (King, Kassam, Yonas, Horowitz & Roberts, 2005), both clinical experience and some studies previously conducted (e.g., Berry, Jones, West, & Brown, 1997; Katati et al., 2007) show that patients with SAH experience difficulties with emotional adjustment (anxious and depressive symptomatology). It is essential to identify the nature of these difficulties for designing effective strategies to promote emotional adjustment following a surgically treated SAH. For this reason, this study aimed to: 1) Characterise the emotional adjustment of patients surgically treated for SAH at least six months before; and 2) Identify the variability factors (socio-demographic, clinical, quality of life and social support) which affect the emotional adjustment of patients surgically treated for SAH.

Theoretical Framework

Some studies have demonstrated that, in the first year after a surgically treated SAH, patients showed significantly higher levels of anxiety and depression than a control group (Berry et al., 1997; Katati et al., 2007). Hedlund et al. (2010) found that 20% and 27% of patients with SAH presented affective and anxiety disorders, respectively, seven months after a SAH. Within approximately a year after the SAH, Kreitschmann-Andermarh et al. (2007) found that 27.5% of patients showed mild to moderate levels of depression, while 10% showed clinically significant levels of depression. Approximately two years after the SAH, Fertl et al. (1999) found that 28% of patients had mild to moderate depression. With regard to the long-term impact of SAH, Wermer, Kool, Albrecht, Rinkel, and the Aneurysm Screening after Treatment for Ruptured Aneurysms Study Group (2007) found that, approximately eight to nine years after SAH, patients presented significantly higher levels of depressive symptomatology than the general population. The same was not true for anxious symptomatology. In a different cross-sectional study, it was found that 30.2% of patients who had had a SAH in the past five and a half years showed levels of anxiety and 23% showed levels of depression indicative of possible emotional disorders and the need for, at least, special clinical attention (Solheim, Eloqayli, Muller, & Unsgaard, 2006).

Finally, in another study on patients with different types of aneurysms, it was found that a previous history of SAH is not by itself a predictor of increased levels of anxiety or depression. However, the combination of previous history of SAH and the existence of an untreated aneurysm is associated with increased levels of anxiety (King et al., 2005).

To our knowledge, most studies focusing on the emotional adjustment of SAH patients are predominantly descriptive, i.e., they aim at comparing mean levels of anxious and depressive symptomatology in both SAH patients and the general population, and identifying the prevalence of clinically significant symptomatology. In this way, the influence of socio-demographic (e.g., gender, age, level of education, marital status or professional situation) and clinical factors (e.g., period of time since the SAH or post-SAH complications) in anxious and depressive symptomatology of patients with SAH is still underexplored. An exception is the study of Powell, Kitchen, Heslin, and Greenwood (2004), which found no significant correlation between gender, age and anxious and depressive symptomatology. It is important to understand the influence of these variables as they allow the early identification of patients at higher risk of experiencing emotional adjustment difficulties.

Likewise, it is also important to understand the association between perception of quality of life of patients after SAH and anxious and depressive symptomatology. Katati et al. (2007) demonstrated that a low quality of life interferes with the mental health of SAH patients. Similarly, other studies found

associations between perception of life satisfaction and depressive symptomatology (Eriksson, Kottorp, Borg, & Tham, 2009; Fertl et al., 1999). In addition, the role of social support in the emotional adjustment of patients after SAH should also be considered as many research studies have shown that social support promotes psychological wellbeing and the health of individuals in different contexts. Although we are not familiar with research studies focusing on the association between social support and anxious and depressive symptomatology in SAH patients, the association was found in patients with other pathologies.

Methodology

Procedures and sample

This study is a quantitative descriptive correlational study. The sample was collected from January to May 2011 at the Neurosurgery Service of the Coimbra University Hospital Centre (CHUC), Corporate Public Entity (EPE). The inclusion criteria for this study were: 1) patients surgically treated for aneurysmal SAH at least six months before; 2) at the moment of discharge, patients were conscious and oriented, with no language disorders; and 3) patients aged ≥18 years. The target population of this study included patients who were surgically treated for aneurysmal SAH between January 2005 and July 2010. Both the Ethics Committee for Health and Board of Directors of the CHUC, EPE, approved the study.

All patients who met the inclusion criteria were contacted at the end of a Neurosurgery outpatient appointment and had the objectives of the study explained to them. Patients who agreed to participate in the study filled out informed consent forms and provided their addresses for the submission of assessment protocols. These were sent by mail to the participants together with a prepaid envelope for return. In total, 109 patients were contacted, of whom 60 agreed to participate and returned their questionnaires duly filled out (participation rate: 55%).

Assessment tools

Socio-demographic and clinical data sheet: The data sheet aimed to collect socio-demographic (gender, age, marital status, level of education, professional status, area of residence) and clinical information (personal background, medicines/other therapies taken at home). Information on the perception of satisfaction with the support received after SAH from different sources (Partner, Close relatives, Friends, Health services and technicians) was also collected on a scale from 1 (*Not at all satisfied*) to 5 (*Highly satisfied*). Information on aneurysmal SAH, the surgery and post-SAH complications was accessed from the patients' clinical records following their consent to participate in the research study.

Hospital Anxiety and Depression Scale - HADS (Zigmond & Snaith, 1983; (Pais-Ribeiro et al., 2007): the scale measures the levels of anxious and depressive symptomatology. It is composed of 14 items with four response options each (0-3) and is divided into two subscales (Anxiety - seven items; Depression - seven items) ranging between 0 and 21 points. The authors of the original scale consider that, for each of the subscales, a score of 8-10 points suggests possible clinical symptomatology, whereas a score of 11 or higher confirms clinical symptomatology (Snaith, as cited by Pais-Ribeiro et al., 2007). Studies on the Portuguese version of the scale confirm its good psychometric properties (Pais-Ribeiro et al., 2007). In the sample of this study, Cronbach's alpha values were 0.86 for the Anxiety scale and 0.74 for the Depression scale.

Medical Outcomes Study 36 - Item Short Form - SF 36 (Ware & Sherbourne, 1992; Ferreira, 2000a): it is a generic quality of life measurement tool composed of 36 items, which are grouped into eight domains (Physical Functioning, Role Physical, Bodily Pain, General Health, Vitality, Social Functioning, Role Emotional and Mental Health). The eight domains may then be organised into two components: the first four areas form the Physical Component and the last four the Mental Component. It is also possible to calculate the scale's total score. For the interpretation of the eight domains, both components and the total score, all scores are standardised and transformed into a scale ranging from 0 to 100. Higher scores indicate a better perception of quality of life. In the sample of this study, the Cronbach's alpha value for the scale's total score was 0.94.

Statistical analysis

Data analysis was performed using the *Statistical Package for the Social Sciences* (SPSS, v. 19.0) software. The sample was characterised based on descriptive statistics (absolute and relative frequencies for categorical variables, and means and standard deviations for continuous variables). Emotional adjustment was characterised using the one-sample t-test, based on data obtained (for the general population) in the study on the adaptation of the Portuguese version of the scale (Pais-Ribeiro et al., 2007). The absolute and relative frequencies of participants in the different categories of Anxiety and Depression symptomatology were also calculated taking into account the categories proposed by the authors of the original scale.

To examine the variability factors for the emotional adjustment of patients surgically treated for SAH, student's t-tests were performed to compare mean levels of Anxiety and Depression according to different categorical variables (gender, marital status, professional status, residence, time elapsed since SAH, existence of post-SAH complications, perception of quality of life). Concerning quality of life, we followed the procedure proposed by Yamashiro et al. (2007), according to which patients were classified into two groups: patients with quality of life total scores below 50 were classified in the category "Low quality of life", while patients with scores equal or above 50 were classified in the category "Average-high quality of life". Pearson's and Spearman's correlation coefficients were also calculated to analyse the association between continuous (age) or ordinal (level of education, social support) variables and the levels of Anxiety and Depression.

Finally, two logistic regressions were performed [using Anxiety and Depression as dependent variables, in which 1 indicates levels of Anxiety or Depression worthy of clinical attention (>8) and 0 indicates normal levels of Anxiety or Depression]. Logistic regressions only included statistically significant variables in the analysis of the variability factors. The level of statistical significance was set to $p < 0.05$, but marginally significant results ($0.05 < p < 0.10$) were also reported.

Results

Socio-demographic and clinical characterisation of participants

The sample was composed of 60 participants, with a mean age of 52.77 years ($SD = 14.57$, *Min-Max*: 24-77), mainly females ($n = 37$; 61.7%). Most participants were married/in an unmarried relationship ($n = 40$; 66.7%), had basic level of education ($n = 23$; 41.1%) and were currently employed ($n = 24$; 42.8%). However, a significant percentage were retired ($n = 21$; 37.5%), on medical leave ($n = 2$; 3.6%) or unemployed ($n = 9$; 16.1%). Half of the participants who answered this question lived in an urban area ($n = 26$; 50%).

With regard to clinical characteristics, SAH had occurred, on average, 40.78 months before ($SD = 14.63$). For 61.7% ($n = 37$) of the sample, SAH had occurred over three years before. Concerning personal health history/risk factors, 46.7% ($n = 28$) had high blood pressure, 35% ($n = 21$) smoked, 30% ($n = 18$) had dyslipidaemia, and 8.3% ($n = 5$) had diabetes mellitus. Most participants showed no post-SAH complications ($n = 28$; 46.7%). However, 33.3% of the sample ($n = 20$) presented vasospasm, which is the main post-SAH complication, and 20% ($n = 12$) of the sample had other complications (e.g., hydrocephalus, cerebral infarction).

Characterisation of the emotional adjustment of patients surgically treated for SAH

Patients surgically treated for SAH showed significantly higher levels of Depression ($M = 4.79$, $SD = 3.59$) than a sample of the general population (study of Pais-Ribeiro et al., 2007; $M = 3.22$; $t_{55} = 3.26$, $p = 0.002$), but did not differ in the levels of Anxiety (SAH sample: $M = 7.17$, $SD = 4.60$; sample of the general population: $M = 7.81$; $t_{55} = -1.06$, $p = 0.296$).

Based on the classification proposed by the authors of the original scale (Zigmond & Snaith, 1983), it was found that 19% ($n = 11$) of participants showed clinically relevant levels of Anxiety (>11), while 17.2% ($n = 10$) were close to the threshold for clinical relevance (8-10). With regard to Depression, 7.1% of participants showed clinically relevant levels of depression ($n = 4$), while 14.3% ($n = 8$) were close to the threshold for clinical relevance. Low levels of

Anxiety and Depression were found in 63.8% ($n = 39$) and 78.6% ($n = 48$) of participants, respectively.

Variability factors for the emotional adjustment of patients surgically treated for SAH

Socio-demographic factors

No gender differences were found in the mean scores of Anxiety ($t_{56} = 1.07, p = 0.289$) or Depression ($t_{54} = -0.48, p = 0.636$). A positive and statistically significant association was found between age and levels of Depression ($r = 0.303$, $p = 0.023$), indicating the tendency of older participants to show higher levels of depression. The association between age and levels of Anxiety ($r = 0.111, p = 0.405$) was not significant. Marital status (married/unmarried relationship vs. widow(er)/single/divorced) did not prove to have a significant influence on the levels of Anxiety ($t_{56} = 0.21, p = 0.838$) or Depression ($t_{54} = 1.63, p = 0.109$). With regard to the level of education, a negative and statistically significant association was found between academic qualifications and levels of Depression ($\rho = -0.376$, $p = 0.006$) and Anxiety ($\rho = -0.272$, $p = 0.047$). Participants with higher levels of education usually showed lower levels of Depression and Anxiety. With respect to the professional situation, no significant differences were found in the levels of Anxiety ($t_{52} = -0.76$, $p = 0.448$) and Depression ($t_{50} = -1.09, p = 0.281$) concerning the fact that patients were or not currently employed.

Finally, no statistically significant differences were found in the levels of Anxiety ($t_{48} = 0.85, p = 0.401$) and Depression ($t_{47} = 0.85$, $p = 0.400$) in terms of area of residence.

Clinical Factors

No significant differences in Anxiety or Depression were found in terms of duration of disease (time elapsed since SAH): participants whose SAH had occurred over three years before showed higher levels of Anxiety ($M = 8.19$, $SD = 4.45$; $t_{56} = -2.24$, $p = 0.029$) and marginally higher levels of Depression ($M = 5.38$, $SD = 3.87$; $t_{54} = -1.76$, $p = 0.085$) than participants whose SAH had occurred less than three years before (Anxiety: $M = 5.50$, $SD = 4.45$; Depression: $M = 3.63$, $SD = 2.71$).

Additionally, significant differences were found in the levels of Anxiety ($t_{56} = -2.04$, $p = 0.047$) and Depression ($t_{54} = -1.88$, $p = 0.065$) in terms of the existence of post-SAH complications: the group of participants with post-SAH complications (including vasospasm and other complications) presented higher levels of Anxiety ($M = 8.29$, $SD = 4.65$) and Depression ($M = 5.58$, $SD = 3.55$) than the group of participants without post-SAH complications (Anxiety: $M = 5.89$, $SD = 4.31$; Depression: $M = 3.80$, $SD = 3.46$).

Social Support

Table 1 shows that the perception of satisfaction with the support received after SAH from different sources was strongly associated with the levels of Depression, but not with the levels of Anxiety. Results confirmed the bi-directional association between higher perceived satisfaction with received support and low levels of Depression. From among the different sources of support, the association between satisfaction with the support received from Health Services and Technicians and the levels of Depression stood out.

TABLE 1 – Spearman's correlation coefficients between satisfaction with the received support from different sources and levels of Anxiety and Depression

	Support from Spouse	Support from Family	Support from Friends	Support from Health Services and Technicians
Anxiety	-0.152	-0.053	-0.155	-0.218
Depression	-0.285†	-0.279*	-0.300*	-0.395**

†$0.05 < p < 0.10$; *$p < 0.05$; **$p < 0.01$

Quality of life

Significant differences were found in the levels of Anxiety and Depression in terms of the participants' perception of quality of life. Participants with a low perceived quality of life showed significantly higher levels of Anxiety ($M = 11.22$, $SD = 3.99$; $t_{56} = 5.54$, $p < 0.001$) and Depression ($M = 7.65$, $SD = 3.60$; $t_{56} = 4.60, p < 0.001$) than participants with

an average-high perceived quality of life (Anxiety: $M = 5.35$, $SD = 3.66$; Depression: $M = 3.54$, $SD = 2.82$).

Predictors of the levels of Anxiety and Depression worthy of clinical attention

The logistic regression model for Anxiety proved to be statistically significant [$\chi^2_3 = 19.38$, $p < 0.001$; -2 Log Likelihood = 56.55, Pseudo $R^2 = 0.28$ (Cox & Snell), 0.39 (Nagelkerke)]. Table 2 shows that post-SAH complications and low perception of the current quality of life were variables with significant predictive power of levels of Anxiety worthy of clinical attention. In addition, the logistic regression model for Depression was marginally significant [$\chi^2_6 = 11.10$, $p = 0.085$; -2 Log Likelihood = 42.56, Pseudo $R^2 = 0.19$ (Cox & Snell), 0.30 (Nagelkerke)]. Low perception of the current quality of life proved to be the only variable with significant predictive power of levels of Depression worthy of clinical attention.

TABLE 2 – Levels of Anxiety and Depression worthy of clinical attention: Logistic Regressions

	B (SE)	F_{Wald}	OR	95% CI
Anxiety				
Time elapsed since SAH[a]	-0.67 (0.73)	0.85	0.51	[0.12 – 2.13]
Post-SAH complications[b]	1.18 (0.70)	2.84†	3.24	[0.83 – 12.70]
Quality of life[c]	2.17 (0.69)	9.88**	8.74	[2.26 – 33.78]
Depression				
Age	-0.02 (0.04)	0.17	0.98	[0.91 – 1.07]
Level of education	-0.13 (0.12)	1.13	0.88	[0.69 – 1.12]
Time elapsed since SAH[a]	-0.65 (1.03)	0.40	0.52	[0.07 – 3.92]
Post-SAH complications[b]	0.56 (0.88)	0.41	1.75	[0.31 – 9.72]
Social Support	-0.09 (0.58)	0.03	0.91	[0.29 – 2.85]
Quality of life[c]	1.61 (0.81)	3.89*	4.98	[1.01 – 24.55]

[a]Time elapsed since SAH: 1 = Up to three years before; 0 = Over three years before. [b]Post-SAH complications: 1 = Yes; 0 = No. [c]Quality of Life: 1 = Perception of low quality of life; 0 = Perception of average-high quality of life
† $0.05 < p < 0.10$; * $p < 0.05$; ** $p < 0.01$.

Discussion

Results show that patients with SAH presented higher levels of depression than the general population (Pais-Ribeiro et al., 2007), but did not differ in their levels of anxiety. These results were not fully in line with the studies of Berry et al. (1997) and Katati et al. (2007), who had found differences not only in depressive but also anxious symptomatology. However, these studies had been performed on patients whose SAH had occurred just a year before, thus they assessed its short-term emotional impact. On the other hand, the results of this study were similar to those described by Wermer et al. (2007), which assessed the long-term impact of SAH, as in this study (more than three years of mean time elapsed since SAH).Usually long-lasting, limitations, which are a characteristic of this health condition (e.g., headaches, easy fatigue, concentration and memory difficulties, sleep problems, irritability, lack of initiative and interest) and are often reported by patients and associated with emotional disorders (Fertl et al., 1999; Schuiling, Rinkel, Walchenbach, & de Weerd, 2005), may be perceived as losses and, consequently, lead to increased levels of depressive symptomatology several years after SAH. Although we did not assess the variable "neurological sequelae" in this study, we believe that it is an important variable to be considered in future studies.

We also verified that 36.2% and 21.4% of participants in the sample showed levels of anxiety and depression worthy of clinical attention, respectively. These results were similar to the results found in the study of Solheim et al. (2006). They demonstrated that there were a significant proportion of SAH patients with emotional adjustment difficulties. If, on the one hand, this shows that SAH is a health condition that impacts on emotional adjustment, on the other hand, it demonstrates that patients should be provided with specific care by Health Services and Technicians.

With regard to variability factors for depression, we observed that older patients and patients with less academic qualifications showed higher levels of

depression. It is possible that both older patients and patients with fewer qualifications have fewer resources and strategies to adapt to the health condition, thus perceiving more losses and limitations which are then reflected in depressive symptomatology. In addition, it is possible that physiological changes resulting from the ageing process lead to increased levels of depressive symptomatology. Literature has shown that, during the ageing process, all important body systems are affected, and deterioration of the functional structures and abilities of the body gradually limits patients' activity, making them less and less able to cope with stress.

Similarly, we know that increasingly more people aged over 65 years take anxiolytics and antidepressants. In the sample of this study, we found that 20% ($n = 17$) of patients took psychoactive drugs, namely anxiolytics, and that two patients took antidepressants. We also observed that higher levels of depression were reported by patients whose SAH had occurred further back in time, patients who had post-SAH complications and patients perceived low quality of life. Overall, these results suggest that limitations inherent to this health condition and the burnout caused by dealing with these limitations over time seem to be associated with higher levels of depression. In fact, Jarvis and Talbot (2004) highlighted the daily difficulties faced by people treated for SAH, such as returning to work and social life, and excessive fatigue. On the other hand, we found that the social support received from different sources (spouse, family, friends and Health Services and Technicians) is a protective factor for depressive symptomatology in SAH patients, as is the case with other health conditions. Finally, we also observed that perception of low quality of life was the only variable which significantly predicted depressive symptomatology worthy of clinical attention. These results suggested that, more than the socio-demographic or clinical variables, it was the patients' perception of their current quality of life that determined their emotional adjustment.

With respect to variability factors for anxiety, we observed that only the clinical factors (SAH had occurred more than three years before and post-SAH complications) and perception of low quality of life influenced the levels of anxiety. Concerning the period of time elapsed since SAH, and despite the lack of studies to support this hypothesis, we believe that the gradual decrease in neurosurgical monitoring (e.g., decrease in medical appointments) can make patients feel more insecure, resulting in increased levels of anxiety. However, this hypothesis needs to be further investigated in future studies, particularly through longitudinal studies which assess the evolution of symptomatology over time. It is also possible that patients with post-SAH complications have more sequelae, which significantly interferes with the levels of anxiety. These patients may have an increased fear that something similar may happen again and feel more fragile as they perceive that the healing process did not run its course. Even if unjustified, the fear of SAH recurrence is, indeed, a common concern of patients (Noble et al., 2011).

A similar explanation may be given for the association between quality of life and anxiety. As shown in this study, post-SAH complications and perception of low quality of life are significant predictors of anxious symptomatology worthy of clinical attention. In short, we believe that perception of quality of life is a variable which should not be ignored by Health Professionals while assessing SAH patients because of its impact on anxious and depressive symptomatology. This was also observed in other studies (e.g., Fertl et al., 1999). However, we must not overlook the two-way relationship between quality of life and emotional adjustment and, therefore, Health Professionals' interventions in the emotional adjustment of SAH patients will also have a positive impact on their quality of life.

Although we believe that this study is an important contribution to the knowledge in the field, it had some limitations. The first limitation was the fact that we did not use a control group with similar socio-demographic characteristics of the sample of this study, which would have allowed for a more accurate comparison between the levels of anxiety and depression. The second limitation was the sample size which, given its influence on the statistical power, may have prevented the identification of some variables influencing the levels of Anxiety and Depression.

Conclusion

The first aim of this study was to characterise the emotional adjustment of patients surgically treated for SAH. We found that SAH patients showed higher levels of depressive symptomatology than the

general population, and a significant proportion of patients had anxious and depressive symptomatology worthy of clinical attention. The second aim was to identify variability factors for anxious and depressive symptomatology. Both clinical factors (time elapsed since SAH and post-SAH complications) and perception of quality of life proved to be the factors with more influence in anxious and depressive symptomatology. The results found in this study point to the need for further research on this area, by replicating this study with larger samples and assessing patients on longitudinal studies to understand the evolution of anxious and depressive symptomatology over time.

Some implications for clinical practice may also be suggested based on the results of this study. Firstly, the assessment of anxious and depressive symptomatology should integrate the process of monitoring SAH patients over time. Secondly, Health Professionals should implement strategies for SAH patients to adapt to morbidity (e.g., memory and concentration exercises, balance and gait training, use of adaptive devices) so as to reduce the impact of this health condition on the patients' daily activities, thus improving their emotional adjustment. Thirdly, Health Professionals should provide their patients with the room and opportunity to express their emotions and concerns, as well as provide them with emotional support. This is explained by the fact that the support from Health Services and Technicians proved to be an important variable to reduce depressive symptomatology. Finally, patients with higher levels of anxiety and depression worthy of clinical attention should be referred to specialised follow-up care.

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