

Coping with Traumatic Brain Injury: How do Post-Acute TBI Couples compare with those from the General Population on Psychological and Marital Adjustment?

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Abstract

Objective: The picture of psychological and marital adjustment of both partners in TBI couples is incomplete, equivocal and still needs to be clarified. The aim of this study is to compare the level of psychological and marital adjustment within a large sample of couples with TBI in the post-acute phase of rehabilitation (n=70) to that of a control group made up of 70 couples from the general population.

Methods: This study uses a cross-sectional design. Couples with TBI were matched with those from the general population according to gender and duration of the marital relationship. All participants individually completed a series of self-report questionnaires assessing anxiety and depression, general well-being and marital satisfaction.

Results: Hypotheses were partially confirmed; compared to their matched group, individuals with a TBI selfreported more psychological adjustment difficulties, but remained equally satisfied with their marital relationship. Their spouses manifested higher levels of depression and distress than their matched group, but maintained comparable levels of anxiety. Caregivers also reported being less satisfied with their marital relationship as compared with control spouses. Findings suggested that severity of the injury, time since the accident, and the duration of the relationship do not significantly influence the psychological and marital adjustment of the target groups, whereas financial burden does. Finally, within all groups of the study, there is a significant relationship between psychological adjustment and marital satisfaction.

Conclusions: Adjustment represents a genuine challenge for both partners following a TBI, although each spouse is likely to experience difficulties in a particular sphere (personal versus marital). These data point to the relevance of adapting post-acute rehabilitation interventions to the specific needs of people with a TBI and their partners.

Keywords: Brain injuries; Marriage; Adaptation; Psychological; Rehabilitation; Psychosocial

Introduction

In response to demands to adjust to a traumatic brain injury (TBI), people who have sustained a TBI and their partners are likely to experience psychological difficulties and conflicts, or even become dissatisfied with their relationship. Several studies have documented the psychological and psychosocial impacts of TBI, mostly taking an individualistic perspective, either that of the injured person or the caregiving spouses [1]. Levels of anxiety, depression, distress, and life satisfaction experienced by individuals who have sustained a TBI [2-7] and their relatives [8-11] have been documented. Other studies have documented marital stability at different stages of post injury, as well as its predictors [12-17]. For instance, Arango-Lasprilla et al. [12] found that younger age and a moderate injury severity were associated with higher rates of marital breakdown. Beyond examining data analysing the likelihood that couples will stay intact or fail following injury, several studies have investigated marital quality with a focus on

variables such as marital satisfaction, marital sexual satisfaction, dyadic consensus, and variables correlating to those constructs. Findings from these studies [1] mainly depict negative outcomes related to marital adjustment following TBI in contrast to data suggesting positive outcomes as, for example, increased level of consensus regarding perceptions of communication challenges [18].

Overall, this previous literature has demonstrated vastly disparate findings regarding the range of reported levels of psychological distress and marital adjustment [1,19-21]. Therefore, it is still unclear whether individuals with TBI and their spouses experience significant levels of psychological distress or marital dissatisfaction, compared to people from the general population. Sampling methods and other methodological issues may account for the observed discrepancies, thus making it difficult to obtain a clear picture of the actual experience of couples who remain together throughout the chronic stage of TBI. For instance, samples of caregivers often include relatives who have different types of relationships to the person with TBI (e.g. spouses, parents, relatives), despite data showing quantitative and qualitative differences between these groups in regard to their adjustment [22,23]. Moreover, knowing that the TBI population is primarily composed of men, along with the fact that men are more likely to under-report distress or symptomatology than women [24], sex differences in the self-report of distress becomes a factor to consider in sampling methods. In an attempt to consider this potential reporting bias, the participants of our study were matched according to their gender.

In addition to the previous observations, very few studies to date have simultaneously assessed the adjustment of both spouses within the marital context, thereby making it possible to investigate the relationship between the individuals. In their recent review, Godwin et al. [1] pointed out that all but three of the studies (out of 14) they included in their review on marital quality following brain injury rely upon data that referred to either spousal-only or patient-only perceptions regarding the marital relationship. According to these authors, the failure "to take a systemic perspective when assessing relational constructs by including both partners may be the primary reason for the lack of clarity in this area" (p. 51). Concurrently with this need to investigate dyadic perceptions, our study simultaneously assessed both individual well-being and marital adjustment-as these variables had been linked. The marital relationship can sometimes serve as a resource by helping partners manage the stressors arising from a health condition (therefore contributing to individual adjustment) or sometimes act as a barrier to adjustment by creating high levels of stress [25].

Using a cross-sectional design, this descriptive study provides a portrait of the psychological and marital adjustment of a large sample of people who suffered a TBI and their spouses, in comparison with matched controls from the general population. It verifies the hypothesis that people who have sustained a TBI and their spouses show significantly lower levels of psychological adjustment and marital satisfaction than do control groups comprised of people from the general population who are matched for gender and length of the relationship. In addition to this primary aim, two specific research questions will be answered. Among the target groups; (1) is there a significant relationship between injury characteristics (severity of the injury, time since injury), length of the relationship, as well as sociodemographic variables (self-perception of financial burden and accessibility of rehabilitation services), and the psychological adjustment levels and marital satisfaction of both couple partners? (2) Are psychological adjustment and marital satisfaction significantly related?

This study was conducted among couples during the post-acute phase of the TBI recovery process; that is, once the injured individual has returned home after having completed intensive functional rehabilitation within a rehabilitation centre. This stage is likely to last several months or years depending on, among other things, injury severity. Specific attention is paid to the sampling method. First, the use of a homogeneous sample of spouses, instead of a sample including both spouses and relatives, makes it possible to take into account particularities of the spouses' adjustment within a marital context. Second, the inclusion of a control sample of couples from the general population makes it possible to examine the ways in which the results obtained are specific to the TBI population. Finally, in order to make the groups of individuals with TBI and their spouses respectively equivalent to those of healthy controls with regard to gender and length of the relationship, participants were matched. Methodology

Participants

The overall sample is comprised of 140 French-Canadian couples. To participate in the study, the participants had to be at least 18 years of age, and the couples had to have lived together at least 3 months. No criterion was applied to brain-injury severity among individuals with TBI. Nonetheless, TBI participants had to be at the post-acute rehabilitation stage, which we specifically limited to between 1 and 8 years following the trauma. Among other reasons, this criterion was opted for because similar criteria have been used in studies conducted in this area (e.g. [26,27]). Table 1 provides an overview of the participants' characteristics.

	Group				
	TBI couples (n=70)		Control co (n=70)	ouples	
Variables	м	SD	М	SD	
Age (years)	47.7	11.95	46.43	13.19	
Length of relationship (cohabitation - in years)	21.33	13.53	20.46	13.25	
Number of children	0.74	0.95	0.90	1.08	
Time elapsed since injury (in years)	3.11	1.40			

Table 1: Participants' characteristics.

The 70 target group couples (couples in which one of the spouses suffered a TBI) were recruited among the patients of several rehabilitation establishments in the province of Quebec through archival consultation (41.4%), clinician referral (37.2%), or TBI associations (21.4%). In this sample, 76.1% of the couples are legally married and 23.9% are living common-law. All of the couples, except three, were living together before the accident. Of the 70 participants with a TBI, 49 are men (70%), and 21 are women (30%). This ratio is similar to that observed among the TBI population in the province of Quebec, which corresponds to three men to one woman [28]. As observed in Table 2, there are a relatively equal number of participants with mild, moderate, and severe brain injury.

The 70 couples from the general population mostly live within the Quebec City region, whereas a few live in the eastern regions of the province. They became aware of the study through advertisements in newspapers (52.9%), at their place of employment or through community organizations (25.7%), or during a presentation given by the investigator to the technical staff of a rehabilitation centre (21.4%). Among these couples, 75% are legally married and 25% are living in a common-law relationship.

Instruments

Demographic data questionnaire

All participants first completed a short questionnaire in order to collect demographic data such as age, occupation, educational level, length of their relationship, and number of children. The TBI participants and their spouses were also asked to state the time elapsed

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	Group				
	TBI people (1) (n=70)	TBI spouses (2) (n=70)	Controls (3) (n=70)	Controls (4) (n=70)	
Variables	n (%)	n (%)	n (%)	n (%)	
Gender	49 (70)	21 (30)	49 (70)	21 (30)	
Male	21 (30)	49 (70)	21 (30)	49 (70)	
Female					
Highest education level completed					
Grade school	10 (14.3)	9 (12.9)	7 (10.0)	5 (7.1)	
High-school	18 (25.7)	25 (35.7)	12 (17.1)	17 (24.3)	
Professional school/institute	19 (27.1)	13 (18.6)	16 (22.9)	7 (10.0)	
College	12 (17.1)	12 (17.1)	13 (18.6)	16 (22.9)	
University degree	11 (15.7)	11 (15.7)	22 (31.4)	25 (35.7)	
Occupation					
Working	19 (27.1)	41 (58.6)	46 (65.7)	45 (64.3)	
Student	-	-	2 (2.9)	1 (1.4)	
Retired	13 (18.6)	10 (14.3)	11 (15.7)	10 (14.3)	
Household	2 (2.9)	18 (25.7)	5 (7.1)	11 (15.7)	
Unemployed	-	1 (1.4)	5 (7.1)	3 (4.3)	
Disability insurances	36 (51.4)	-	1 (1.4)	-	
Injury severity					
Mild	24 (34.3)				
Moderate	27 (38.6)				
Severe	19 (27.1)				

since the injury and its severity (as they had learned from their neuropsychological file). In addition, they rated, on a three-point

Likert scale, perceived financial burden and accessibility of rehabilitation services over the last year.

Table 2: Demographic data and TBI severity.

Three variables are measured in this study: (1) levels of anxiety and depression, (2) general well-being, and (3) marital satisfaction. The French versions of the following self-report instruments were used to measure each of these variables.

Levels of anxiety and depression: The Hospital Anxiety and Depression Scale (HADS [29,30]); translated, adapted and validated by Savard et al. [31] is a 14-item self-report symptom checklist designed to assess anxiety and depression. Respondents are instructed to answer each item in terms of how they have felt in the past four weeks, rating these items on a four-point scale. We selected the HADS questionnaire because it excludes somatic items that may be confounded with the presence of physical symptoms commonly observed in the TBI population (e.g. fatigue [32]). The 7 depression items primarily assess symptoms of anhedonia and low positive affect, whereas the 7 anxiety items assess subjective symptoms such as tension and general nervousness.

The French-Canadian version of the HADS, adapted and validated among a population of HIV seropositive participants [31] was found to be empirically equivalent to the English version. Psychometric studies confirm that the HADS assesses two constructs corresponding to both its sub-scales (anxiety and depression) and that it has excellent temporal stability (test-retest). Moreover, the HADS questionnaire shows acceptable concurrent and divergent validity, as well as excellent internal consistency.

General well-being: The general well-being schedule (GWB [33], translated and adapted by Bravo et al. [34] is a self-report questionnaire that is frequently used in large-scale epidemiological surveys evaluating psychological health. It includes 18 items that tap into the responder's feelings of well-being and distress over the past four weeks through positively and negatively worded questions. The instrument measures the following six dimensions: anxiety, depression, positive well-being, emotional control, vitality, and general health. The first 14 questions are rated on a 6-point Likert-like scale, while the last four questions use a 0 to 10 scale whose two extremities are labelled with opposing adjectives. A low score on the GWB indicates severe distress. Dupuy [33] proposes that the results be classified into one of three categories: a score of 0 to 60 indicates severe distress, a score of 61-72 moderate distress, while a score of 73-110 indicates a positive level of well-being.

The American version of this questionnaire has been subjected to several validation studies. The instrument has an internal consistency superior to 0.90 [35], and test-retest reliability coefficients varying between 0.68 and 0.85, depending on the study [36-38]. Furthermore, correlations between GWB scores and other measures of anxiety and depression vary from -0.47 to -0.80, which attests to its good concurrent validity.

Like the original version, the French version of the GWB has a unique factorial structure. The internal consistency of the French version is high (0.92), as is its test-retest reliability correlation (0.82). Finally, high negative correlational coefficients with instruments measuring anxiety and depression have been observed; -0.71 with the Beck Depression Inventory and -0.82 with the Spielberger Anxiety Inventory. These indicators, along with other data presented by Bravo et al. [34] suggest that the French version of the GWB possesses very good psychometric qualities.

Marital satisfaction: The Marital Adjustment Test (MAT [39]; translated by Wright and Sabourin [40] is one of the most frequently used measures of marital adjustment [41,42]. This 15-item questionnaire measures marital satisfaction and degree of agreement on several themes related to everyday marital life. Higher scores indicate better levels of satisfaction and adjustment. This instrument has a high internal consistency and test-retest reliability [39], good concurrent validity (r=0.86) with the Dyadic Adjustment Scale [43], and excellent validity in terms of discriminating between satisfied and dissatisfied couples [44]. Freeston and Pléchaty [45] demonstrated that the French-Canadian translation of this questionnaire has very good psychometric qualities.

The Kansas Marital Satisfaction Scale (KMSS [46]), translated and adapted into French by Migneault et al. [47] consists of three items measuring overall marital satisfaction. Each item is rated by the participant on a scale of 1 ('extremely dissatisfied') to 7 ('extremely satisfied'). All respondents are instructed to answer each item in terms of how they perceive their relationship at the present time. Total scores on the KMSS may range from 3 to 21. Elevated scores indicate higher marital satisfaction. The KMSS has been shown to be effective for distinguishing maritally distressed from non-distressed couples [48]. A cut-off score of 17 and above is suggested to identify non-distressed couple partners [49]. The psychometric properties of the original version of the KMSS have been well documented through the efforts of Schumm et al. [50]. Rigorous testing has shown good concurrent and discriminant validity [50], internal consistency [51,52], test-retest reliability [53], and criterion-related validity [46]. The French-Canadian translation and adaptation also shows very good psychometric qualities [47].

Procedure

In compliance with the rules of the rehabilitation centres' ethics committees, potential target-group participants who corresponded to the study's criteria were first contacted by a clinician or a member of the archives personnel in order to obtain their permission to have a researcher phone them and explain the study's aims and procedures or in a letter of introduction. The researcher (MCB) then telephoned 91 couples who had assented to this call and sent 64 letters of introduction explaining the study's goals and procedure. Meanwhile, four couples who had heard about the study through an advertisement in their TBI association's journal telephoned the researcher to show their interest in being potential participants. Of the 159 couples who were contacted, 89 couples agreed to participate by returning an individual consent form that had been sent to them. They were then mailed the batteries of self-report instruments, along with detailed instructions on how to complete the questionnaires, and a stamped and addressed envelope to return the forms to the researcher.

A similar strategy was used with 95 couples from the general population who answered advertisements presenting the study. Following a first phone-call, during which the study and its procedure were explained in detail, couples who met the inclusion criteria were sent a consent form. Once the consent form was returned, both partners received a set of questionnaires to complete and to mail back to the researcher.

Couples were asked to fill their questionnaires out independently, without discussing their answers, but were encouraged to share them with their partner after all instruments were completed. Participants were telephoned to check on their progress, and to ensure the proper completion and prompt return of the assessment instruments. TBI participants were offered closer assistance from the researcher in accordance with their needs. Non-returns were followed up with two to three reminder telephone calls. The researcher (MCB) was responsible for contacting clinicians and the persons responsible from the organizations involved in the study, as well as for conducting the phone interviews with the participants of the entire sample.

From our sample of TBI couples, 18 withdrew from the study (19.7%), one questionnaire was withdrawn because of its high rate of uncompleted items, whereas 12 couples from the normal population withdrew (11%). Major reasons reported for dropping out are similar for both TBI couples and couples from the general population: time constraints or a lack of motivation of one or both partners. Among participants with TBI, going through a difficult period was a specific reason given for ending their participation in the study. Of the 159 TBI couples who were first contacted, the final sample was comprised of 70 couples who completed all the questionnaires, thus resulting in a participation rate of 44%.

Data processing

The sample was divided into four groups. Group 1 includes participants who experienced a TBI and group 2 includes their caregiving partners. Groups 3 and 4 are comprised of spouses from the general population. In order to make groups 1 and 2 equivalents to groups 3 and 4 respectively with regard to gender and length of the relationship, participants were matched. Once all of the couples were ordered according to length of time living together, participants from the control group were assigned to groups 3 and 4 according to their gender, thus forming blocks corresponding to those of groups 1 and 2. For example, in a given block, if the spouse with TBI (group 1) is a man, the man from the control group couple is assigned to group 3. On the other hand, if the TBI participant is a woman, it is the woman from the control group couple that is assigned to group 3. Groups 1 and 3 are thus mostly male (70%), while groups 2 and 4 are mostly comprised of women (70%). The four groups are equivalent with regard to the length of time they have lived together (F (3, 276)=0.098, p=0.961) and age (F (3, 276)=0.508, p=0.677). During this matching procedure, 12 couples from the control group whose relationships were most recent were eliminated from the sample, as was one other couple who did not meet the study's criteria.

Data were analysed using the statistical package for the social sciences (SPSS) Version 12 for PC. Data on all dependent measures were normally distributed. Statistical assumptions were tested based on the rules suggested by Nimon [54], with data meeting all the necessary assumptions of the subsequent analyses. Descriptive

statistics were used to describe the sample characteristics. A multivariate analysis of variance (MANOVA) was carried out with anxiety, depression, general well-being, and marital satisfaction as the dependent variables. The independent variable (IV) is the group to which the participants belong. Significant main effects were followed by two a priori orthogonal contrasts to test the differences between the matched groups on each of the four dependent variables. Error unit was set for each dependant variable since family wise error (for all tests related to each MANOVA) would have seriously reduced statistical power. Associations between variables were assessed using Pearson correlations (parametric) and Spearman correlations (nonparametric) as appropriate. All tests were two-tailed with a 5% alpha error and

confidence intervals have 95% nominal coverage. Power analysis was based on 80% power and an alpha of 5%. The sample size of 70 couples from both the TBI and the general populations was selected considering the rule of thumb of 10-15 participants by variable [55].

Results

Tables 1 and 2 present the socio-demographic characteristics of the participants, including brain injury severity for individuals in group 1. Table 3 shows descriptive data for all four groups on all of the variables, as well as available normative data for certain instruments.

Participant group						Available Normative data				
	TBI people (1)	9	TBI spous (2)	TBI spousesControls(2)(3)		Controls (4)				
Variables	м	SD	м	SD	м	SD	м	SD	м	SD
Anxiety (HADS-A)	8.51	3.89	6.73	3.82	5.91	3.39	5.87	3.46	3.84 ^a	3.69
Depression (HADS-D)	7.47	4.63	4.23	3.96	3.44	3.26	2.97	2.71	1.68 ^a	2.36
Well-being (GWB)	59.12	21.80	71.55	20.96	77.48	17.42	79.26	16.94	78.2 ^b	17.5
Marital satisfaction										
Locke Wallace (MAT)	105.41	25.00	97.80	30.49	107.64	28.21	110.49	22.60	109.5 ^c (M) 113.1 ^c (W)	24.2 25.5
Kansas (KMSS)	16.63	3.46	14.96	3.68	17.10	2.89	16.82	2.85	18.8 ^d (M) 17.8 ^d (W)	2.9 3.6

^aData from Clark et al. [77] (general population)

^bData from Bravo et al. [34] (general population).

^cData from Freeston and Pléchaty [45] (men [M] and women (W) from general population).

^dData from Schumm et al. [64] (men [M] and women [W] from general population).

Table 3: Mean results according to group and normative data for dependant measures.

Intergroup differences

A multivariate analysis of variance (Manova) was conducted on all of the three variables (anxiety and depression, general well-being and marital satisfaction). The independent variable (IV) is the group to which the participants belong. The multivariate test used (Wilk's test) shows a significant IV effect (F (36, 784)=4.25; p<0.0001). A priori orthogonal contrasts (Table 4) were conducted to verify the hypothesis that people with a TBI and their partners report significantly lower levels of psychological adjustment and marital satisfaction than their matched controls from the general population.

Individuals with TBI report significantly higher levels of anxiety and depression, as well as significantly lower well-being than those from the matched control group (group 3). However, these participants do not differ significantly with regard to marital satisfaction. On the other hand, the level of anxiety reported by spouses of individuals with TBI do not differ from that of their comparison group (group 4), but they do report significantly lower general well-being and marital satisfaction, as well as significantly greater depression.

Variables	Differences between the matched groups 1 and 3	Differences between the matched groups 2 and 4		
	F(12, 265)=6,86, p<0.0001	F(12, 265)=2,13, p<0.016		
Anxiety (HADS-A)	G1>G3 (p=0.0001)	n.s.		
Depression (HADS-D)	G1>G3 (p=0.0001)	G2>G4 (p=0.04)		
General well-being (GWB)	G1 <g3 (p="0.0001)</td"><td colspan="2">G2<g4 (p="0.01)</td"></g4></td></g3>	G2 <g4 (p="0.01)</td"></g4>		
Marital satisfaction				
Locke Wallace (MAT)	n.s.	G2 <g4 (p="0.005)</td"></g4>		
Kansas (KMSS)	n.s.	G2 <g4 (p="0.0008)</td"></g4>		

Table 4: A priori orthogonal contrasts showing the differences between the four groups on each of the study's variables.
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Clinical scores

Table 5 presents the clinical thresholds suggested by the authors of the instruments used in the study, as well as the percentage of participants in each group who meet these thresholds.

	Participant group						
	TBI people (1)	TBI spouses (2)	Controls (3)	Controls (4)	Chi square χ2		
Variables	% (n)	% (n)	% (n)	% (n)			
Anxiety (HADS-A)	Anxiety (HADS-A)						
Anxious (score>7)	71.4 (50)	44.3 (31)	30.0 (21)	40.0 (28)	14.18**		
Non anxious (score<7)	28.6 (20)	55.7 (39)	70.0 (49)	60.0 (42)			
Depression (HADS-D)		- -		·			
Depressed (score>7)	54.3 (38)	24.3 (17)	14.3 (10)	10.0 (7)	32.54***		
Non depressed (score<7)	45.7 (32)	75.7 (53)	85.7 (60)	90.0 (63)			
Well-being	,		1				
Severely distressed (0< score<60)	53.6 (38)	26.1 (18)	12.9 (9)	17.1 (12)	26.53***		
Moderately distressed (61 <score<72)< td=""><td>15.9 (11)</td><td>21.7 (15)</td><td>20.0 (14)</td><td>15.7 (11)</td><td></td></score<72)<>	15.9 (11)	21.7 (15)	20.0 (14)	15.7 (11)			
Positive well-being (73< score<110)	30.4 (21)	52.2 (37)	67.1(47)	67.1 (47)			
Marital adjustment							
МАТ							
Distressed (score ≥ 100)	26.1 (18)	36.8 (26)	29.0 (20)	21.4 (15)	3.27		
Non-distressed (score<100)	73.9 (52)	63.2 (44)	71.0 (50)	78.6 (55)			
KMSS							
Distressed (score<17)	34.8 (24)	61.4 (43)	32.9 (23)	42.0 (29)	8.56*		
Non-distressed (score ≥ 17)	65.2 (46)	38.6 (27)	67.1 (47)	58.0 (41)			

Table 5: Percentages and frequencies of clinical scores and non-clinical scores within each group for anxiety, depression, well-being and marital adjustment measures. $*\alpha=0.05$, $**\alpha=0.01$, $***\alpha=0.001$.

More than half of the individuals with TBI meet the clinical threshold scores on the psychological adjustment measures (71.4% anxiety, 54.3% depression, and 53.6% severe distress). These percentages are 44.3% (anxiety), 24.3% (depression), and 26.1% (severe distress) for their caregiving spouses. The results of Chi square (χ^2) tests indicate that the proportion of individuals with TBI who meet clinical thresholds on measures of anxiety, depression and general well-being is significantly greater than that of their matched control group (group 3). On the other hand, the percentages observed among the caregiving spouses do not differ significantly from those observed in their matched control group (anxiety [χ^2 =0.16, α >0.05]; depression [χ^2 =4.66, α >0.05]; severe psychological distress [χ^2 =3.23, $\alpha > 0.05$]). However, the group with the greatest proportion of individuals who are dissatisfied with their marital relationship, according to their results on the MAT (36.8%) and KMSS (61.4%), is the caregiving spouses group (group 2). But, the difference observed between the groups is significant only for the KMSS (α =0.05).

The influence of TBI severity

One of the study's objectives was to examine the influence of TBI severity on the psychological adjustment and marital satisfaction of the

target groups. The validity of the self-reported information regarding the severity of their brain injury was first verified. For 56 of the participants, this data was cross-checked with data from neuropsychological files, with their prior consent. In 78.5% of the cases (n=44), there was perfect agreement between the TBI severity level indicated in the files and that reported by the individuals with TBI and their spouses. Overall, the Spearman correlation between self-reported severity and that indicated in the file is 0.66 (p<0.01), suggesting a high level of confidence in this self-reported information. In the 12 cases where self-reported severity differs from that noted in the neuropsychological file, the information from the file was used for the analyses. Results of a MANOVA for groups 1 and 2 show no significant differences on any of the variables studied according TBI severity (Wilks' Lambda F (24, 246)=1.02, p=0.4427).

The influence of length of relationship and time since injury (TSI)

The influence of the length of the marital relationship and TSI on the quality of psychological adjustment and marital satisfaction of participants from groups 1 and 2 was verified using Pearson correlations. The results indicate a very weak and non-significant relationship between length of the relationship and the majority of the predicted variables. However, there is a significant and positive link between this variable and the psychological well-being among the individuals with a TBI (r=0.24, p<0.05), indicating that spouses with TBI who have been in a couple longer tend to report a higher level of well-being. Finally, the correlations observed suggest that there is no significant relationship between TSI and the variables predicted.

Perception of access to resources and of financial situation

Table 6 shows the data gathered on the tailor-made questionnaire relating to the perception that participants from groups 1 and 2 have of their financial burden and the accessibility of rehabilitation services over the last year. A large proportion of the participants in the target group are worried or very worried about their financial situation (57.3% and 44.1% in groups 1 and 2, respectively). More than half of the individuals with a TBI (55.7%) consider that rehabilitation services are readily available, while this is the case for 44.1% of their caregiving spouses. This difference is not significant (χ 2=1.06, α >0.05).

	Group 1 (n=61)	Group 2 (n=59)			
	% (n)				
'Currently, with regard to your financial situation, would you say that you are'					
Not at all worried	42.6 (26)	55.9 (33)			
A little worried	47.5 (29)	35.6 (21)			
Very worried	9.8 (6)	8.5 (5)			
'Over the past year, to what extent have you benefited from rehabilitation services and resources that you have needed?'					
Have not needed services	31.1 (19)	39.0 (23)			
Easy access	55.7 (34)	44.1 (26)			
Delayed or difficulties accessing	11.5 (7)	13.6 (8)			
Did not access services	1.6 (1)	3.4 (2)			

Table 6: Perception of financial situation and access to rehabilitation services.

Spearman correlations between the perception that participants from groups 1 and 2 have of their financial situation and the availability of services, and each of the predicted variables, were calculated. In both target groups, a moderate and significant relationship is observed between perception of financial situation and marital satisfaction variables (MAT and KMSS [between -0.28 and -0.29, p<0.05]), and between perception of financial situation and psychological adjustment variables (HADS-A, HADS-D, GWB [between 0.33 and -0.49, p<0.05 and p<0.01]). These data suggest that financial worry is related to lower levels of marital satisfaction and psychological adjustment among individuals with a TBI and their spouses. On the other hand, there is no significant link between the participants' perception of the availability of resources and any of the predicted variables.

The relationships between psychological adjustment and marital satisfaction

The results of correlational analyses show significant, moderate to high relationships [56] between the psychological adjustment and marital satisfaction variables in all of the study's groups (r=-0.28, p<0.05 to 0.66, p<0.01). The relationships involving the KMSS are generally weaker than those obtained with the MAT.

Discussion

The main objective of this study consisted of measuring levels of psychological and marital adjustment in a large sample of couples during the post-acute rehabilitation phase following a TBI, and comparing them to matched couples from the general population. The variables measured were anxiety, depression, general well-being, and marital satisfaction. The hypothesis that individuals who sustained a TBI and their spouses report significantly lower levels of psychological and marital satisfaction than couples from the general population is partially confirmed.

Individuals who sustained a TBI report significantly greater anxiety, depression and distress than their comparison group, but do not differ with regard to marital satisfaction. A considerable proportion of individuals with TBI meet clinical thresholds for anxiety (71%), depression (54%) and severe distress (53%), which is significantly greater than that of their matched control group. Previous estimates reported in the literature varied greatly [2,21]. However, this data supports those studies suggesting a high prevalence of emotional problems following a TBI, even during the post-acute rehabilitation phase [3,26].

The caregiving spouses report being significantly more depressed, more distressed, and less maritally satisfied than individuals from their matched group, but they are not distinct with regard to anxiety. Approximately a quarter of the caregiving spouses present clinical levels of depression and psychological distress while more than 44% of this sample present anxiety symptoms that reach a clinical threshold. These percentages may appear to be high at first, but they are not significantly superior to those observed in their matched group. In fact, these prevalence rates are among the lowest observed in studies investigating psychological adjustment among the relatives of individuals who have sustained a TBI [8,57]. However, these comparisons should be approached with caution since the samples of several previous studies included both parents and spouses, in addition to using different assessment instruments. One key fact is that caregiving spouses are the group with the greatest proportion of individuals who are dissatisfied with their marital relationship, the difference being significant for one of the two measures (KMSS).

This pattern of results suggests that the impacts of the injury are felt in distinct spheres for each of the partners of TBI couples. The individuals who sustained a TBI exclusively report difficulties in regard to their personal adjustment. For their spouses, the consequences they experience affect both the personal and marital spheres (without, however, significantly affecting their levels of anxiety). Several factors may explain the specific pattern of difficulties of each spouse.

The depressive symptoms observed among individuals with TBI may be explained in part by damage to the central nervous system [58]. But our team believes, like Glenn [3], that the depressive and anxiety symptoms appear largely in reaction to increasing awareness

of disabilities resulting from the injury. This explanation is even more plausible among participants in the post-acute rehabilitation phase because it coincides with the community reintegration stage. This process involves several challenges for individuals with TBI and confronts them with the limits they may face in performing the social roles – personal and professional – they held before the accident [59, 60]. It is unlikely that the measure used to assess anxiety and depression could explain the high results that individuals with a TBI obtained, given that the HADS questionnaire is specifically designed to measure these constructs in populations with physical symptoms associated with their condition. It contains no somatic items that could confound depressive symptoms with the residual symptoms of a brain injury (difficulty concentrating, fatigability, etc.) and therefore artificially increases the rates observed.

For individuals with TBI who are experiencing serious personal difficulties, it is likely that their spouse becomes the principal source of support, and their relationship a significant resource to deal with stressors and probably therefore a source of comfort. This could contribute to explaining the high level of marital satisfaction observed in this group. It is unlikely that the problem of disease awareness observed in other studies [2,61] played a role in this result since if this were the case, it would likely have manifested both with regard to the assessment of marital satisfaction and psychological adjustment.

One possible explanation for the lower marital satisfaction experienced by caregiving spouses is that they are likely to experience more of the negative effects of role changes in the couple relationship following the TBI. These role-changes frequently translate into an increase in decisional and family responsibilities, as well as overall burden. Previous studies suggest that factors like the loss of a sharing, mutually supportive companionship relationship with the TBI partner contribute to lower marital satisfaction in caregiving spouses [22,62]. It could be hypothesized that deterioration of the marital relationship reported by the caregiving spouses negatively affects their mood and well-being. However, the correlational transversal design of this study does not allow us to identify a direction of the relationship between these difficulties, that is, if marital dissatisfaction constitutes one of the causes or rather one of the consequences of a low level of psychological adjustment in the caregiving spouses.

Despite everything, the discrepancy observed in marital satisfaction between TBI couple partners is a critical feature of this population's profile. These findings support those of earlier studies [62] and reveal the presence of an uneasiness experienced by couples where one partner has sustained a TBI, an uneasiness that is almost exclusively felt by the caregiving spouses. One could argue that a tendency observed in previous studies [63,64] for women to report lower marital satisfaction than male partners may play a role in this pattern. However, this effect cannot be the only factor explaining the significant difference observed here between groups 1 and 2, since the results do not indicate any significant differences in the levels of marital satisfaction reported by the men and women within these two groups. Knowledge of this discordance raises fundamental questions regarding the adjustment of couples following TBI. Knowing that dyadic consensus may constitute a potential marital strength for TBI couples, how is this gap actually experienced by each of the couple members? In addition, how this gap could potentially interfere with their marital interactions [65,66]? Does marital dissatisfaction put caregiving spouses at higher risk for initiating marital break-up or do they rather decide to pursue the couple relationship by modifying their expectations in response to stressors and limitations due to TBI? In

potential support of the latter hypothesis are findings obtained by some studies looking at marital stability after TBI which suggest that couples in which one partner has sustained a TBI are not at greater risk of separation/divorce [14,16].

Because they experience difficulties in distinct spheres, individuals with TBI and their spouses are likely to have different preoccupations and needs, thus posing a challenge for rehabilitation interventions at the post-acute phase of TBI. Caregiving spouses might be mostly interested in interventions to improve their couple relationship, while partners with TBI, who feel satisfied with their relationship, are less likely to feel the need for such interventions, but are rather more concerned with individual interventions. To assist partners and favour a satisfying relationship, rehabilitation interventions must take into account the specific needs of both partners. Moreover, research has demonstrated that couple interventions can lead to a decrease in personal problems while increasing marital satisfaction [67]. This information should be taken into consideration when developing interventions for couples where one partner has sustained a TBI and when identifying strategies that encourage the active involvement of both partners in such programs.

Influence of trauma related and demographic variables

The results show that neither the severity of the brain injury, nor TSI, significantly influences psychological and marital adjustment of couples in the target-population. These observations corroborate those of previous studies that revealed no link between TBI severity/TSI and various emotional symptoms in the people who sustained a TBI and their partners [22,26,27,68]. Alternative explanations make it impossible to conclude however, that there is no link between these variables. In fact, as in other studies [5], it may well be that a nonlinear relationship exists between severity of disability and adjustment. Lezak [69] also observed, among three possible patterns of psychosocial adjustment, a curvilinear pattern with regard to TSI where the gains observed in the second half of the first year (decreased anxiety and depression) were lost in subsequent years. Such curvilinear relationships would not be captured by the Pearson correlations calculated here but Spearman correlation allows to capture some non-linearity (monotonic function). Only longitudinal studies, such as growth curve modelling could respond to this complex question. Besides, the data suggest that, within the entire sample, duration of the marital relationship does not significantly influence psychological adjustment and marital satisfaction.

The majority of the participants of our sample reported they can easily access the supportive resources of the health care system available at the post-acute stage of rehabilitation. However, the high prevalence of anxiety, depression and psychological distress observed in this group leads one to question the relevance of the intervention targets and the effectiveness of strategies currently implemented at this rehabilitation phase.

Furthermore, a large proportion of participants from the target group are worried or very worried about their financial situation. It is likely that this is a consequence of job loss, which is often encountered after a TBI, and the need for individuals with TBI to reorient themselves professionally. This is without counting the large number of caregiving spouses who likely reduced their number of paid work hours or who quit their jobs in order to take on the role of caregiver [70]. What is even more worrisome is the significantly inferior level of psychological and marital adjustment observed among individuals from the target groups who are worried about their financial situation, which is in keeping with previous research [10]. The fact that the participants were questioned regarding their *perception* of their experience does not diminish the importance of these results because, as Stebbins and Pakenham [71] suggested, the individual's appraisal of the situation (especially financial situation [72]) influences both the quality of his or her adjustment and the objective characteristics of the situation itself. Clinically, this observation is worrisome. To some extent, it may mean that despite the implementation of the best intervention programmes possible, in cases where individuals are worried about their financial situation, they are at risk of remaining anxious, depressed, or less satisfied with their marital relationship. Since participants from the control groups did not report their perception of their financial situation, there is no available data on the association between this variable and adjustment levels within the general population.

Finally, as expected and similarly to what has been observed by other authors [73], there is a significant relationship between psychological adjustment and marital satisfaction. Knowing that these two areas of adjustment go hand in hand, in other words, that marital difficulties are important risk factors not only for the couple relationship but also for the individual well-being of the spouses, it becomes even more relevant to consider them jointly, not only within the context of research, but also at a clinical level.

Conclusions and Further Research

Studying adjustment in couple partners following a TBI is a relatively recent and complex area of research. This study distinguishes itself for several reasons. First, it simultaneously examines both couple partners on psychological and marital dimensions at the same time, during the post-acute rehabilitation phase. Furthermore, the caregiver group is exclusively comprised of spouses, as compared with several previous studies which looked at heterogeneous samples of caregivers. Finally, it includes a control group made up of couples from the general population who were matched according to gender and duration of the marital relationship. The latter characteristic confers great methodological value to the study, especially since the results of the control group on the different measures are comparable to those of normative data, thus giving it a high level of representativity. However, the participants were not matched according to their education levels. This may represent a limitation of the study, since the differences between groups in regard to education level were significant (using Kruskal-Wallis rank sum test; 13.72, p=0.003), and some data in the general population suggest that higher educational level may have a protective effect against anxiety and depression [74].

Overall, the results of this study corroborate those of previous studies suggesting that individuals with TBI and their spouses experience significant negative consequences following a TBI. Moreover, they identify the areas in which each partner experiences these difficulties. As compared to their matched groups, individuals with TBI manifest more difficulties in terms of psychological adjustment, but conserve a comparable level of marital satisfaction. The caregiving spouses report higher levels of depression and psychological distress, but maintain levels of anxiety that are comparable to those of their matched group. Furthermore, they report being significantly less maritally satisfied. The severity of the injury, time since the accident, and the duration of the relationship do not significantly influence the psychological and marital adjustment of the target groups, whereas financial burden does.

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The present study compared the psychological and marital adjustment levels of TBI couples to those of people from the general population, assuming that both experience a different range of stressors. Future studies could verify whether the current results hold when TBI couples are compared to controls where one partner has another type of disability (e.g. spinal cord injury, multiple sclerosis, chronic illness, cancer). Results from these comparisons would enable the identification of both similarities and particularities associated with the adaptation process following a TBI. As well, one of our research questions focussed on the association between injury characteristics as well as length of the relationship, and psychological/ marital adjustment. The influence of other socio-demographic variables on adjustment following TBI would be worth of further examination, as for example pre-morbid characteristics such as educational level.

In addition, further studies in this field might benefit by bringing together knowledge derived from different but interrelated areas of research on couples [75,76] and, as Godwin et al. [1] have suggested, by adopting a marriage and family therapy framework. This could help develop a more integrated body of knowledge leading to the improvement of intervention strategies aimed at the individual and marital well-being of people who have sustained a TBI and their partners. Finally, it would be necessary to explore central constructs such as dyadic cohesion, intimacy, and communication between partners in order to further document this area of research. These variables would be useful for a better understanding of how a certain proportion of individuals with a TBI and their caregiving spouses implement effective adjustment mechanisms when facing the important stressors related to the rehabilitation process. Such knowledge could lead to proactively identifying and targeting at-risk couples and implementing effective strategies to help them adjust along the rehabilitation journey.

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