

Posttraumatic growth and predictor variables in Brazilian women with breast cancer

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Abstract: Objective: Breast cancer is the most prevalent oncologic diagnosis given to women all around the world, and can cause diverse psychiatric symptomatologies and damage to the life of its carrier. The concept of posttraumatic growth (PTG) focuses on the perception of a positive change from the experience of a stressing situation. This study's objective was to evaluate PTG and different predictor variables for women (n=84) with breast cancer in Brazil. Method: On this exploratory study, self-report scales referring to the diagnosis period and oncologic treatment were applied individually. Results: Having a husband/partner, adaptive coping strategies and a religion of identification were found to be predictor variables in different established regressive models. Rumination did not show any correlation to PTG scores, refuting the results of previous studies. The results found in this study confirm previous research as for PTG predictors, except for rumination. Conclusions: Positive changes resulting from experiencing breast cancer are present in Brazilian women and different interventions can be thought of based on the study of predictors.

Keywords: Posttraumatic growth; breast cancer; social support; rumination; coping.

[es] Crecimiento postraumático y variables predictoras en mujeres brasileñas con cáncer de mama

Resumen: Objetivo: El cáncer de mama es el diagnóstico oncológico más frecuente que se da a las mujeres en todo el mundo, y puede causar diversas sintomatologías psiquiátricas y daños a la vida de su portador. El concepto de crecimiento postraumático (CPT) se centra en la percepción de un cambio positivo desde la experiencia de una situación estresante. El objetivo de este estudio fue evaluar el CPT y diferentes variables predictoras para mujeres (n= 84) con cáncer de mama en Brasil. Método: En este estudio exploratorio, las escalas de autoinforme que se refieren al período de diagnóstico y

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al tratamiento oncológico se aplicaron individualmente. Resultados: Tener un esposo/compañero, estrategias de afrontamiento adaptativas y una religión de identificación fueron variables predictoras en diferentes modelos regresivos establecidos. La ruminación no mostró ninguna correlación con las puntuaciones de CPT, refutando los resultados de estudios anteriores. Los resultados encontrados en este estudio confirman investigaciones previas en cuanto a los predictores de CPT, a excepción de la ruminación. Conclusiones: Los cambios positivos que resultan de experimentar cáncer de mama están presentes en las mujeres brasileñas y se pueden pensar diferentes intervenciones basadas en el estudio de predictores.

Palabras Clave: Crecimiento postraumático; cáncer de mama; apoyo social; ruminación; coping.

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1. Introduction

Currently, breast cancer is the most prevalent oncologic disease between women⁽¹⁾. Its diagnosis and treatment can cause a variety of negative symptoms, such as anxiety, depression and Posttraumatic Stress Disorder (PTSD), and also interfere in one's body schema, self-image and interpersonal relations^(2,3).

Positive changes derived from stressing and/or traumatic situations have been studied among different populations⁽⁴⁻⁶⁾. Different studies with samples of women with breast cancer can be found in many countries⁽⁷⁻⁹⁾, since this is a potentially stressing diagnosis.

The concept of posttraumatic growth (PTG) was introduced by Tedeschi and Calhoun in 1996⁽¹⁰⁾. The authors state that the experience of a situation perceived as stressing can significantly impact one's mental schemas. From that, a person might go through a positive cognitive remodel, resulting in the perception of positive changes after the given experienced situation.

Once it is known that positive changes can be observed after traumatic experiences, it is important that health professionals establish interventions that facilitate the development and perception of such changes. Thus, the study of PTG predictors proves to be crucial for the effectiveness of said interventions. Cordova, Cunningham, Carlson and Andrykowski⁽¹¹⁾ began studying predictors in populations of women with breast cancer evaluating their well-being, social support, life threat perception, active verbalization about cancer and time after diagnosis. Later, other studies pursued the establishment of variables that were correlated to a greater PTG score and that explained this model^(9,12-14). Different authors concluded that rumination, social support, the use of adaptive coping strategies and the perception of the experienced situation as actually stressing have proven to be major predictors of a greater PTG^(11,14,15).

Despite the appearing consensus regarding such variables and their importance to the PTG model, each culture presents its own particularities. Therefore, it is understood that what can be applied to one society might not be applicable to another one. For this reason, it is necessary to test such variables in order to confirm if conclusions and

interventions that are effective for a specific population can be generalized to others. Under this perspective, this study's main objective is to evaluate if rumination, social support and adaptive coping strategies can be considered PTG predictors for women with breast cancer. Its main hypothesis is that there is a positive correlation between PTG, social support, rumination and adaptive coping strategies.

2. Method

Participants

Ninety-two women were invited to participate in this study, recruited through the *snowball* method and assistance institutions for people with cancer. Out of these women, 7 refused to participate. The established including criteria were: women at least 18 years old or older, alphabetized in Brazilian Portuguese, diagnosed with breast cancer that had already finished their conventional treatment, with an exception made exclusively for ones undergoing hormone therapy at the time of the instruments' application. One participant was excluded from the sample for not having completed the study's main instrument (PTGI). Thus, this study's sample consists of 84 women (answer rate= 91.3%).

Instruments

Posttraumatic Growth

A Brazilian adaptation of the Posttraumatic Growth Inventory (PTGI) was used in order to measure possible positive changes after an experience with breast cancer⁽¹⁶⁾. The scale is composed of 21 items of Likert scale answers from 0 to 5 points that evaluate five different factors: relationship with others (factor 1), new possibilities (factor 2), personal strength (factor 3), spiritual change (factor 4) and life appreciation (factor 5). The greater the total score, the greater the positive change that is understood to have occurred. In the original study the internal consistency of the instrument acquired a *Cronbach Alpha* of 0.90 and the coefficients between the scales varied between 0.67 and 0.85⁽¹⁰⁾. In this study, the instrument presented $\alpha = 0.93$.

Social Support

The Scale of Perceived Social Support (PSS), which was constructed and validated in Brazil by Baptista and Cardoso⁽¹⁷⁾, was used to measure social support perception. Its scores are measured with a Likert scale of four points, with an achievable score of 108 points, and the greater the score the greater the social support perception⁽¹⁸⁾. In this study, the instrument presented $\alpha = 0.95$.

Coping Strategies

Folkman e Lazarus' Ways of Coping Checklist (WCC) was adapted and validated in Brazil by Savóia, Santana and Mejias⁽¹⁹⁾. It is composed by 66 items divided in

the following 8 factors: Comfort (factor 1), Seclusion (factor 2), Self-Control (factor 3), Social Support (factor 4), Responsibility Acceptance (factor 5), Dodge-Escape (factor 6), Problems Resolution (factor 7) and Positive Reevaluation (factor 8). The total score of the scale presented $\alpha = 0.87$ in this study.

Rumination

An adapted Brazilian version of the Rumination and Reflection Questionnaire⁽²⁰⁾ was used to measure rumination. It is composed by 24 items, being the first 12 items for rumination evaluation and the 12 last ones for reflection. In a study with the Brazilian population the evaluations items of rumination obtained an *Cronbach Alpha* of 0.87 and the reflection ones obtained one of 0.88⁽²¹⁾. In this study, rumination items presented $\alpha = 0.61$ and reflection ones $\alpha = 0.47$.

Depressive symptoms

The Baptista Depression Scale (BDS), created by Baptista⁽²²⁾, is composed by 45 items divided by depression categories. It is based on a Likert scale with its scores varying from 0 to 3 and the maximum score being 135. The lower the score, the lower the symptomatology is considered to be. It presented a *Cronbach Alpha* of 0,95 in a validation study⁽²³⁾. In the present study, the total score of the scale presented $\alpha = 0.93$.

File of sociodemographic and health data

A questionnaire was created in order to obtain sociodemographic and health data, including variables such as age, level of instruction, marital status and if the participants have an elected religion or not. Health data such as the diagnostic date, presence or absence of metastasis, tumor stage and other health diagnoses are obtained.

Procedure

This study was authorized by the Ethics in Research Committee of the Pontifical Catholic University of Rio Grande do Sul. In order to participate in the study, the invited participants were required to sign the free and clarified consent term. The questionnaires were applied by the researchers and previously trained students. Information regarding the study instruments was given to the participants that voluntarily accepted to participate of the study. There were no withdrawals from participants during the data collection process.

Statistical Analyses

Statistical analyses were made with the 21.0 variance analyses version of SPSS (ANOVAs, complemented by Tukey), t-student test and Pearson correlations were used to examine the relation between demographic variables and evaluated measurements. Multiple Linear Regression with enter method was used to control confounding factors and the evaluation of PTG predictors in order to verify explicative models of the relations between the variables. The criterion used for a

variable to enter the multivariate model was $p \leq 0.05$ in the bivariate analysis. The significance level used was of 5%.

3. Results

The average age of the participants was 55.3 years (SD=12.7). Demographic and clinical characteristics are presented on table 1. The median time period after the diagnosis was 4 years (percentiles 25-75: 2-10), with answering varying between one and 22 years. Participants that reported having a partner or husband presented greater PTG scores when compared to those who reported not having one (84.2 ± 19.5 vs 72.7 ± 24.2 ; $p= 0.019$), as well as those who reported identifying with some religion (81.7 ± 21.7 vs 66.9 ± 21.5 ; $p= 0.026$). The age of participants presented a negative correlation with factor 2 ($r= -0.32$, $p= 0.002$) and with factor 5 ($r= -0.24$, $p= 0.024$). Other demographic and health data such as level of instruction and tumor stage did not present correlations with the total score of PTG, along with its factors. As for PTGI scores, the average general score was of 79.43 points (SD=22.21), with an answer range varying between 11 and 105.

Table 1. Frequencies for demographic characteristics of women with breast cancer (n=84)

Variable	Categories	n	%
Age	18 to 39 years	9	10.7%
	40 to 59 years	41	48.8%
	60 or older	34	40.5%
Scholarity	Less than Middle School	10	12%
	Middle School only	8	9.6%
	Some High School only	2	2.4%
	High School diploma only	14	16.9%
	Associate's Degree or equivalent	3	3.6%
	Some College only	7	8.4%
	Bachelor's Degree	18	21.7%
	Graduate School	20	24.1%
	None	1	1.2%
Marital status	Married or with a partner	49	58.3%
	Single/Widow/Separated/Divorced	35	41.7%
Identifies with a religion	Yes	71	84.5%
	No	13	15.5%
Ingests or has ingested alcoholic beverage	Yes	44	52.4%
	No	40	47.6%
Has already made use of drugs	Yes	9	10.7%
	No	75	89.3%
Tumor stage	I	9	12.2%
	II	24	32.4%
	III	26	35.1%
	IV	11	14.9%
	Does not remember	4	5.4%

Variable	Categories	n	%
Metastasis	Yes	23	27.7%
	No	60	72.3%
Treatments performed	Chemotherapy	63	75%
	Radiotherapy	67	79.8%
	Hormone Therapy	45	53.6%
	Bilateral Mastectomy	12	14.3%
	Unilateral Mastectomy	20	23.8%
	Conservative Surgery	34	40.5%

n= number of participants; %= percentage

Relation between PTG and Social Support, Coping Strategies, Rumination and Depression

Table 2 shows the correlation between PTG, social support, coping strategies and rumination. No correlations were found between PTG and rumination or depressive symptoms within this sample. The results demonstrated a positive correlation between the total PTG and PSS scores ($r= 0.28$, $p= 0.010$). However, correlations were found between PTG total scores and coping strategies with all WCC factors.

Mediation with regressive analyses for predictors of PTG

The models described on table 3 were tested through multiple linear regressions. After the multivariate model's adjustment, the significant predictors of PTGI's Factor 1 were to identify with a religion ($p= 0.036$) and WCC's factor 8 ($p= 0.001$). Women with religion scored, on average, 5.52 more points on PTGI - factor 1 than those that do not identify with any religion. Furthermore, for each extra point on the total score of WCC-Factor 8, PTGI - factor 1 increases 0.76 points.

After adjustments, significant predictors of PTGI's Factor 2 were having a partner/husband ($p= 0.011$) and WCC's factor 8 ($p= <0.001$). Women with a partner/husband scored, on average, 2,81 more points on PTGI's factor 2 score, and for each extra point on WCC - factor 8's score, PTGI's factor 2 score increases 0.54. As for PTGI's Factor 3, a significant predictor was WCC's Factor 8 ($p= 0.006$). For each extra point on this factor, PTGI's factor 3 increases 0.28 points. Regardless of not having presented any significance, identifying with a religion presented bordering results in the model of factor 3 ($p= 0.052$).

In the model established for PTGI's factor 4, the frequency of alcohol use ($p= 0.025$) and WCC's factor 8 ($p= <0.001$) have shown to be significant. The greater the frequency of alcohol use, factor 4's score tends to decrease 0.91 points. For each extra point on WCC's factor 8, the score of PTGI's factor 4 tends to increase 0.23 points.

On the model for PTGI's factor 5, having a partner/husband ($p= <0.001$) and WCC's factor 8 ($p= <0.001$) have shown to be significant. Women that report having a partner/husband scored, on average, 2.21 more points on PTGI's factor 5. Furthermore, for each extra point on WCC's factor 8, the score for factor 5 presented 0.31 extra point. WCC's factor 6 presented adjacent significance ($p= 0.062$) on the established model.

Table 2.Correlations between PTG, social support, rumination, coping and depressive symptomatology in women with breast cancer

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PTGI total	-																
PTGI factor 1	0.94**	-															
PTGI factor 2	0.88**	0.77**	-														
PTGI factor 3	0.87**	0.81**	0.66**	-													
PTGI factor 4	0.76**	0.67**	0.57**	0.61**	-												
PTGI factor 5	0.77**	0.60**	0.69**	0.60**	0.57**	-											
PSS total	0.28*	0.03	0.30**	0.20	0.20	0.12	-										
RRQ rum.	0.12	0.15	0.08	0.11	0.07	0.05	-0.17	-									
WCC factor 1	0.29**	0.29**	0.24*	0.18	0.15	0.18	0.20	0.08	-								
WCC factor 2	0.33**	0.26*	0.29**	0.28**	0.27*	0.26*	0.36**	0.03	0.34**	-							
WCC factor 3	0.28**	0.30**	0.25*	0.14	0.22*	0.23*	0.45**	0.07	0.32**	0.49**	-						
WCC factor 4	0.25*	0.27*	0.28**	0.12	0.11	0.21*	0.19	0.12	0.30**	-0.00	0.04	-					
WCC factor 5	0.27*	0.24*	0.31**	0.19	0.19	0.10	0.15	0.34**	0.47**	0.41**	0.35**	0.36**	-				
WCC factor 6	0.31**	0.28**	0.30**	0.29**	0.27*	0.32**	0.18	0.33**	0.14	0.20	0.27*	0.31**	0.30**	-			
WCC factor 7	0.26*	0.28**	0.35**	0.11	0.07	0.18	0.41**	-0.02	0.27*	0.32**	0.28**	0.38**	0.39**	0.19	-		
WCC factor 8	0.62**	0.56**	0.61**	0.46**	0.46**	0.56**	0.25*	0.41	0.39**	0.42**	0.31**	0.50**	0.41**	0.39**	0.44**	-	
BDS	0.00	0.03	-0.05	-0.05	0.18	-0.03	-0.17	0.59**	0.25*	0.18	0.18	0.07	0.34**	0.10	-0.01	0.04	-

Pearson and Spearman Correlations *p < 0.05, **p < 0.01; PTGI= Posttraumatic Growth Inventory, PSS= Scale of Perceived Social Support; RRQ rum= Rumination and Reflection Questionnaire, rumination factor; WCC= Folkman e Lazarus' Ways of Coping Checklist; BDS= Baptista Depression Scale.

Table 3. Predictors of Posttraumatic Growth through the Multiple Linear Regression Model

Outcomes	Variables	b (IC 95%)	β	<i>p</i>	R ²
Factor 1*	Religion	5.52 (0.38 to 10.7)	0.22	0.036	33.1%
	Factor 8 - WCC	0.76 (0.33 to 1.18)	0.45	0.001	
Factor 2**	Having a husband/partner	2.81 (0.66 to 4.96)	0.23	0.011	44.1%
	Factor 8- WCC	0.54 (0.26 to 0.82)	0.46	<0.001	
Factor 3***	Religion	2.46 (-0.02 to 4.93)	0.20	0.052	25.5%
	Factor 8- WCC	0.28 (0.08 to 0.48)	0.32	0.006	
Factor 4****	Use of alcoholic beverage	-0.91 (-1.69 to -0.12)	-0.24	0.025	47.9%
	Factor 8 – WCC	0.23 (0.11 to 0.35)	0.39	<0.001	
Factor 5*****	Having a husband/partner	2.21 (1.01 to 3.40)	0.33	<0.001	40%
	Factor 8 – WCC	0.31 (0.16 to 0.46)	0.49	<0.001	
	Factor 6- WCC	0.31 (-0.02 to 0.64)	0.19	0.062	
Total Score*****	Having a husband/partner	9.83 (2.03 to 17.6)	0.22	0.014	45.8%
	Factor 8 – WCC	2.24 (1.22 to 3.25)	0.51	<0.001	

*Adjusted for PSS total score and factors 1, 2, 3, 4, 5, 6 and 7 of WCC; **Adjusted for age, performed chemotherapy, PSS total score, and 2, 3, 4, 5, 6 and 7 factors of WCC; ***Adjusted for frequency of alcohol use, religious identification and factors 2 and 6 of WCC; ****Adjusted for scholary, income, religious identification, drug use and factors 2, 3 and 6 of WCC; *****Adjusted for age and factors 2, 3, 4 and 6 of WCC; *****Adjusted for religious identification, frequency of alcoholic beverage use, PSS total score and factors 1, 2, 3, 4, 5, 6 and 7 of WCC.

The last model to be tested was referent to the total PTGI score, on which significant predictors were having a partner/husband ($p=0.014$) and WCC's factor 8 ($p<0.001$). Women that reported having a partner/husband scored, on average, 9.83 more points on PTGI. Furthermore, for each extra point on factor 8 - WCC, there was, on average, an increase of 2,24 points on PTGI's total score.

All of the tested models presented a significance for WCC's factor 8, exhibiting a direct influence on all factors and PTGI's total score. Reporting to have a partner/husband influenced models 2, 5 and 6. Identifying with a religion interfered on model 1, and showed to be a adjacent variable on the third established model. The other variables that had presented significant correlations did not present significance on the tested models, failing to predict PTG or its factors in a distinct manner.

4. Discussion

The objective of this article was to evaluate whether or not adaptive coping strategies, social support and rumination are PTG predictors in women in Brazil after their cancer treatment. Coping strategies were determinant on PTG's explicative model, being considered a predictor factor. Having a partner/husband and identifying with a religion were found to be significant sociodemographic variables in the models established through linear regressions. Despite not presenting itself as a predictor, the total score of the social support evaluation displayed a positive correlation with the total score on PTGI.

Analyses showed that factor 8 of the WCC instrument, “Positive Reevaluation”, was present in all models that were made for outcome predicting factors. Such findings validate previous studies’ results^(24,25), which presented adaptive coping strategies as PTG predictors.

Regardless of not presenting significance in the total score of PTG’s explanatory model, all other factors that compose the instrument of coping evaluation were found to have correlation with it. Thus, factors regarding adaptive coping strategies, as well as maladaptive strategies (ex: factor 2 – seclusion; factor 6 – dodge/escape) were related to a greater score of PTG. A qualitative measurement could facilitate the understanding of the strategies used by the women of this sample in order to evaluate the reason behind the positive correlation between maladaptive coping strategies and PTG. It is understood that women’s awareness about the coping strategies that they use, especially those concerning their perception of such strategies being adaptive or maladaptive, is singular. Therefore, qualitative analyses could provide an explanation as to why factors representing maladaptive strategies were found to be linked to great scores of PTG.

The total score of the social support evaluation was found to be positively correlated to PTG in this sample; however, it was not considered significant, whereas the sociodemographic variable of “having a partner/husband” was found to be significant in the explanatory models established for factor 2 (new possibilities), 5 (life appreciation) and for PTGI’s total score. So, despite the total score of the instrument that evaluated social support not being considered a predictor, it is understood that, through this sociodemographic variable, the social support provided by one’s partner was found to be a predictor of greater PTG. This result validates the findings of other studies that analyzed this variable^(26,27), but contradicts the work of Hasson-Ohayon et al.⁽²⁸⁾. In this last study, the authors evaluated different types and sources of social support, and their results showed that marital support was not correlated to PTG in their sample. Cognitive support referring to information access, however, was found to be explanatory in the regressive model that was tested. Thus, it is understood that the social support variable is important in the PTG model, but it is crucial to further study its particularities, such as different sources and types, in order to comprehend which is more determining in each kind of population.

At first, there was the hypothesis that rumination would be correlated to and a predictor of PTG. Still, for this population, it did not show any significant correlation. This contradicts previous studies^(11,12,29,30), that found active verbalization about cancer to a predictor of PTG in different populations of women with breast cancer.

The results presented above can be interpreted in two ways. The first one is with respect to the instrument chosen for this evaluation. During data collection the women who were evaluated presented a noticeable difficulty in answering some of the instruments’ questions, specifically when items required a reverse response. Thus, it is believed that this might have been an important bias, causing the answers of this instrument to not be entirely reliable. This possibility is reinforced by the calculation of the RRQ’s Cronbach’s alpha in this study, where rumination items presented $\alpha = 0.61$. The second one is that only the total score of rumination was evaluated, and not different forms of rumination. Studies that have shown correlation between this variable and PTG^(15,29) included the differences of types of rumination and ways of doing so in relation to PTG. Therefore, the evaluation of different types and individual ways of rumination must be evaluated in order to verify if any of those would be found to be explanatory for this model in this sample.

The sociodemographic variable of “identifying with a religion” was found to be explanatory in the established model for PTGI’s factor 1 (relationship with others) and was found to be adjacent in the model for its factor 3 (personal strength), regardless of not showing significance in the established model for the total score. However, it presented a positive correlation with factor 4 (spiritual change) and with PTGI’s total score. Considering the content of the factors on the PTGI, these results match with the ones found in studies that have shown religion as a protective factor for women with breast cancer^(31,32). The results presented in this study indicate that religion is found to be a predictor of improved relationships with others and greater perceptions of personal strength, and presents a correlation with spiritual change and great PTG scores. In a study that was made with patients that survived different types of cancer, religious coping showed a positive correlation with the total score of PTG⁽³³⁾. It is understood that religious people tend to present a certain degree of spirituality, and this is a known predictor of PTG⁽³⁴⁾.

In the explanatory model for the fourth factor of the PTGI (spiritual change), the variable “alcohol use” presented a negative significance in this model. Along with the variable factor 8 - WCC, it explained 47,9% of the variance. Considering the strength of this variable in the established model, a further investigation on its possible role in the development of PTG should be considered. Therefore, it is suggested that a greater exploration of the use of alcohol is done in future studies.

5. Conclusions

The study of predictors has shown to be more and more important for the improvement of theoretical models in health psychology. In the case of PTG, understanding its predictors and associated variables aids not only the improvement of the theoretical model, but also in rethinking the clinical practices of health professionals. Once the predictor factors are known or present significant correlations, the development of more assertive interventions can be empirically supported.

This study provides a greater knowledge about PTG and its predictors, as well as sociodemographic variables associated to women with breast cancer in Brazil. From its results, it is possible to consider intervention strategies based on them. Finally, it opens room for more studies on this field in the country, since those are still scarce.

Study Limitations

The results previously described must be interpreted with caution, in consideration of their methodological limitations. As described in the literature^(11,30), the perception of the given situation as stressful and/or traumatic for the person experiencing it is an important factor for the possibility of PTG development. In this study, there was no use of any measurement that evaluated the participants’ perceived stress, using the presumption that the experience of breast cancer is a potentially stressful situation to some degree.

Also, this study did not consider the different types and sources of social support, or the different types of rumination. Thus, it is important that new analyses consider the particularities of those variables.

It is important to note that, despite the use of a clinical sample, its size is modest, which makes inferences difficult. In addition, the time period after the end of the treatment varies, which can directly influence the measured variables. Lastly, as this was a transversal study, it is important that new studies are made with a longitudinal methodology in order to evaluate if the studied variables show variance when analyzed in different time periods.

Declaration of Conflicting Interests

The author(s) declare(s) that there is no conflict of interest.

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