

# Stress as a risk factor for chronicity: quantitative approach

## Estresse como fator de risco para cronicidade: abordagem quantitativa

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### ABSTRACT

**Objective:** To investigate the influence of stress as a risk factor in illness by chronic diseases by evaluating the perceived stress level and characterizing the population carrier of these conditions. **Method:** An exploratory, cross-sectional study with a quantitative approach, carried out from the Perceived Stress Scale -14 *Stress Scale - 14*), using the technique "snowball" online. **Results:** The study included 147 predominantly female (73.46%), with diagnosis of bronchitis, between 18 and 29 years (32.65%), married (42.8%), catholic (59.18%), graduated (43.54%), employed (39.45%), with family income greater than five minimum wages (36.05%), three dependents on this income (24.50%) and with average perception of stress (82.31%). The profile that gave rise to stress was: female, 18 to 29 years, single, umbanda religion, cancer diagnosis, graduates, home service as occupation, family income less than a minimum wage, and five or more dependents of income. **Conclusion:** The perceived stress in people with chronic health conditions is multifactorial and is related to socioeconomic variables.

**Descriptors:** Nursing; Chronic Disease; Psychological Stress.

### RESUMO

**Objetivo:** Investigar a influência do estresse enquanto fator de risco no adoecimento por doenças crônicas, mediante avaliação do nível de estresse percebido, e caracterizar a população portadora dessas condições. **Método:** Estudo exploratório, transversal, com abordagem quantitativa, realizado a partir da Escala de Estresse Percebido (*Perceived Stress Scale - 14*), utilizando a técnica "bola de neve" de forma online. **Resultados:** Participaram do estudo 147 pessoas predominantemente do sexo feminino (73,46%), com diagnóstico de bronquite, entre 18 e 29 anos (32,65%), casadas (42,8%), católicas (59,18%), graduadas (43,54%), empregadas (39,45%), com renda familiar superior a cinco salários mínimos (36,05%), três dependentes dessa renda (24,50%) e com média percepção de estresse (82,31%). O perfil que conferiu aumento do estresse foi: sexo feminino, 18 a 29 anos, solteiros, religião umbanda, diagnóstico de câncer, graduados, serviço de casa como ocupação, renda familiar inferior a um salário mínimo e cinco ou mais dependentes da renda. **Conclusão:** O estresse percebido em pessoas com condições crônicas de saúde é multifatorial e relaciona-se a variáveis socioeconômicas.

**Descritores:** Enfermagem; Doença Crônica; Estresse Psicológico.

### INTRODUCTION

Chronic Non-Communicable Diseases (NCDs) are defined as conditions that last throughout their lives and have a multifactorial cause, they include a wide classification and are related to cardiovascular diseases, cancer, chronic respiratory diseases, and Diabetes Mellitus<sup>(1,2)</sup>.

Ineffective control of these diseases has been responsible for about 63% of the deaths in the world every year. In Brazil, the data point to a high prevalence of CNCD, with about 54 million adults with at least one chronic condition and 72% of deaths are directly or indirectly related to the presence of these diseases<sup>(2)</sup>.

This panorama has an intimate relationship with the culturalization of the main risk factors for developing NCDs: smoking, sedentary lifestyle, chro-

nic stress and unhealthy diet<sup>(3,4)</sup>. The increase in CNCD in the Brazilian population has caused devastating consequences for the sick person and his or her families, society, and the health system<sup>(1)</sup>. These consequences impact the physical, social, psycho-emotional, economic, and cultural dimensions, reducing the person's autonomy<sup>(3)</sup>. In addition, despite incipient scientific production on the subject, studies correlate stress as a destabilizing factor of psychological health and development and intensification of chronic conditions<sup>(4,9)</sup>. Thus, it is essential to investigate factors that corroborate the increased incidence rates of NCDs and their decompensation, aiming for effectiveness in prevention, control, and treatment actions<sup>(1)</sup>. In this context, stress has been considered an important factor responsible for intensifying these conditions and aggravating the risks to its development<sup>(4)</sup>.

Stress is defined as any stimulus that disturbs the body's homeostasis, and it may be physical, psychological, or cover both. Although essential to life in risky situations, this mechanism has become harmful in the modern world since human beings activate this system daily and unpurposeful. Thus the response to stressful stimulus produces the release of cortisol in a prolonged way, bursting one cumulative process<sup>(4)</sup>.

This chronic stress causes exhaustion of the body, and as a result, there is a generalized suppression of the immune response (development of neoplasms), in addition to changes in glycemic control (Diabetes Mellitus) and the functioning of the hypothalamus-pituitary-adrenal (arterial hypertension). Thus, stress can potentially act in the development and decompensation of chronic conditions<sup>(4)</sup>.

In this sense, the present study aimed to investigate the influence of stress while risk factor in the illness due to chronic diseases by evaluating the level of perceived stress and characterize the population with these conditions.

## METHOD

It is an exploratory and cross-sectional study with a quantitative approach. The research was conducted online, covering the Brazilian territory, with data collection by self-applicable questionnaire, between December 2020 and March 2021. The study population comprised of people aged 18 years and/or older, men and women who self-reported having a chronic condition, Diabetes Mellitus and/or Systemic arterial hypertension and/or cancer and/or emphysema and/or ch-

ronic bronchitis. The inclusion criteria were: self-reporting of one or more chronic conditions listed. Furthermore, as exclusion criteria: people with limitations for reading or sequelae made it impossible to understand the issues of the instruments to be used. Participants were invited to participate in the study via social networks (Instagram, Facebook and WhatsApp) and by *the* Snowball technique. Data collection and recording occurred through the Google Forms platform (Public Domain Online Service), being the instrument composed of two parts: the first part consists of socio-demographic and clinical data related to sex, age, schooling, occupation, marital state, family income, number of dependents, religious belief, and self-report of the chronic condition. The second part, the Perceived Stress Scale (EEP) validated in Brazil<sup>(6)</sup> consists of 14 closed questions capable of classifying the level of stress, verified according to its unpredictability, uncontrollability and feeling of overload generated in the person: EEP aims to evaluate the stress related to the previous month of application<sup>(6)</sup>.

The calculation of the EEP is carried out from the sum of the points of the 14 questions. In the questions regarding negative perception (1, 2, 3, 8, 11, 12 and 14), the sum occurs normally scored from 0 (never) to 4 (always). However, on issues of positive perception (4, 5, 6, 7, 9, 10 and 13), the score occurs in an inverted way, being "never" corresponding to 4 points and "always" having a value of zero points. The final value, the sum of scores, can range from 0 to 56 depending on the level of stress at which the person is being submitted<sup>(6)</sup>.

A total of 158 responses were obtained, 10 were excluded by duplicity, and one did not comply with the eligibility criterion of 18 years and/or more, resulting in a final sample of 147 participants. For the data analysis, descriptive analysis of the variables according to sex, age, marital status, schooling, family income, religious belief, chronic condition and degree of perceived stress were presented according to absolute and relative frequencies.

The classification of stress levels that subdivides stress into low, medium was used and high according to the score of PSS-14<sup>(7)</sup>, being: low perception of stress, with a percentile below 25, corresponding to a score equal to or less than 24 points in the PSS-14; Mean perception of stress, with percentile from 25 to 75 and score from 25 to 33 points and; High perception of stress, with

percentile above 75 and score equal to or greater than 34 points.

The Statistical Package software was used for the Social Science (SPSS), version 20.0 for descriptive and inferential statistical analysis. The results were presented using tables and/or charts containing absolute and percentage values and the numeric variables with descriptive statistics (mean, median, standard deviation, minimum and maximum). The research complied with the Resolution CNS No 466/2012<sup>(6)</sup> or 510/2016<sup>(7)</sup> and was approved by Ethics Committee (CE), number (CAAE: 38331420.0.0000.5142).

## RESULTS

The study sample consisted of 147 participants, predominantly female, from 18 to 29 years, married, catholic, with a self-reported diagnosis of bronchitis, graduated, employed, with income above five minimum wages, and three dependents on income. According to the result of PSS 14, the overall mean of perceived stress was 29.9660 (SD=10.11605), ranging from 3 to 56 points. Table 1 shows the data concerning the variables, gender, age group, marital status, religious belief, chronic condition, level of education, occupation, monthly family income and number of income dependents, the mean perceived stress, and its standard deviation.

It was found that the most significant female sex represented the largest portion of the sample, 73.46% (n=108), and was responsible for the highest perceived stress score, mean 30.7130, followed by the one who did not report sex 0.68% (n=1), with an average of 28 in PSS-14, and finally, male participants with an average of 27.8947, representing 25.85% of the sample (n=38). It was found that the male sex showed an average perception of stress, according to the score found. Regarding the age range, it was found that the younger, the higher stress level perceived, being the sample population of 18-29 years with the highest score in the PSS-14, corresponding to the average of 34.8333.

Regarding the marital status, a higher perceived stress score was observed among the single participants, with an average in the PSS-14 of 33.2157 corresponding to 34.7% of the sample (n=51); followed by married couples, with 42.8% (n=63) presenting the second highest average in PSS-14 (M= 30.4603).

Regarding religious belief, the highest score in the PSS-14 that represents the highest index of perceived stress, it was the one who self-

-declared the belief umbanda 0.68% (n=1) with mean 42.0000; followed by those who did not have religious belief 12.9% (n=19), with mean perceived stress of 32.7368, and the catholic, predominant in the study, 59% (n=87) with mean perceived stress of 30.2069. On the other hand, 7.5% (n=11) of those who self-declared spiritist belief presented a lower perceived stress index, mean of 23.8182, compared to other beliefs. The evangelic 15.6% (n=23) had the second lowest mean on the PSS-14 scale with 28.3913, followed by those who indicated the alternative "other", 4% (n=6) with a mean of 29.9660.

It was verified that the participants diagnosed with cancer, 4.7% (n=7), presented a higher mean score of perceived stress, 32.2857, followed by those with bronchitis, 35.4% (n=52), with an average of 31.9423. The predominant level of education was higher education, corresponding to 43.5% (n=64), and responsible for the highest perceived stress index, with a mean score of 33.3750.

Regarding the occupation, it was observed that for those who performed home services, 1.36% (n=2) exhibited a mean of perceived stress of 39.5000, representing the highest perceived stress index. In the sequence, those who marked "others" in occupation (n=7) with mean perceived stress of 36.7143. Retirees 15.64% (n=23) had the lowest perceived stress index, with a mean of 25.7391. Regarding monthly family income, the participants with family income lower than one minimum wage, 4.76% (n=7), obtained the highest mean score of 33.5714, representing the average perception of stress. While those with income of five minimum wages, 36% (n=53), were responsible for the lowest mean perceived stress of 27.8302. It was observed that among those who had 5 or more people dependent on income, 9.5% (n=14) showed a higher perceived stress index when compared to the others, with a mean of 33.7147; those with 3 dependents on income represented the most of it (n=36) with mean perceived stress of 29.4167. As for perceived stress, the mean score in the 14 PSS was 29.9660 SD=10.11605), corresponding to average level stress, as shown in Table 2.

It was found that 12.92% (n=19) presented a high perception of stress in PSS-14, =percentile above 75 (equal to or above 34 points), with an average of 48.16 points; 82.31% of the participants (n=121) presented mean perception of stress, percentile from 25 to 75 (25 to 33 points) in the PSS-14 score, with a mean score of 28.36

**Table 1** - Mean perceived stress according to the PSS-14 scale in relation to sex, age group, marital status, religious belief, chronic condition, education, occupation, monthly family income and number of income dependents (n=147). Alfenas, MG, Brazil, 2021

Variable	Category	N	Average	Standard Deviation
Sex	Female	108 (73.46%)	30.7130	10.68159
	Male	38 (25.85%)	27.8947	8.22912
	Not Informed	1 (0.68%)	28.0000	-
Age Range	18-29	48 (32.65%)	34.8333	10.43181
	30-39	16 (10.88%)	33.5	9.69536
	40-49	19 (12.92%)	28.5	9.20971
	50-59	36 (24.48%)	26.5	8.35122
	60-69	15 (10.20%)	25.2	7.23286
	70-79	9 (6.12%)	24.5	11.58783
	80-89	4 (2.72%)	25.5	7.04746
Marital Status	Single	51 (34.7%)	33.2157	10.74116
	Married	63 (42.8%)	30.4603	9.48824
	Divorced	18 (12.2%)	25.0556	7.01655
	Widow	9 (6%)	19.3333	8.93029
	Others	6 (4%)	27.8333	4.07022
Religious Belief	Catholic	87 (59.18%)	30.2069	9.81235
	Spiritist	11 (7.48%)	23.8182	13.03701
	Evangelic	23 (15.64%)	28.3913	10.35172
	Umbanda	1 (0.68%)	42.0000	-
	Has none	19 (12.92%)	32.7368	9.12166
	Others	6 (4.08%)	29.9660	7.50999
Chronic Condition	Bronchitis	52 (35.37%)	31.9423	11.00697
	Diabetes Mellitus	22 (14.96%)	30.8636	9.07270
	Cancer	7 (4.76%)	32.2857	8.09762
	Emphysema	1 (0.68%)	28.0000	-
	Hypertension (SAH)	45 (30.61%)	29.1556	10.12637
	SAH and comorbidities	20 (13.60%)	24.9500	8.37587
Schooling	Without schooling	1 (0.68%)	20.000	-
	Elementary School	9 (6.12%)	28.6667	11.25833
	High School	24 (16.32%)	27.0417	8.13195
	Graduate	64 (43.54%)	33.3750	10.67633
	Post-graduate	49 (33.33%)	27.3878	8.93916
Occupation	Employed	58 (39.45%)	27.9138	10.63144
	Unemployed	8 (5.44%)	30.7500	9.72111
	Retired	23 (15.64%)	25.7391	7.65873
	Home Service	2 (1.36%)	39.5000	3.53553
	Self-employed	19 (12.92%)	29.6316	5.43865
	Student	30 (20.40%)	34.9667	10.94968
	Others	7 (4.76%)	36.7143	10.09479
Monthly Family Income	<1 minimum wage	7 (4.76%)	33.5714	9.57178
	1 to 3 minimum wages	52 (35.37%)	29.6923	10.43098
	4 to 5 minimum wages	35 (23.80%)	32.8857	9.11615
	>5 minimum wages	53 (36.05%)	27.8302	10.17300
Number of Dependents of Income	1 person	33 (22.45%)	26.4242	7.94918
	2 persons	30 (20.41%)	29.0333	7.04411
	3 persons	36 (24.50%)	29.4167	11.02562
	4 persons	34 (23.13%)	33.2647	10.78526
	5 or more persons	14 (9.52%)	33.7147	13.49888

Source: Elaborated by the author, 2021.

**Table 2** - Classification of perception of perceived stress perception in low, mean, high and overall level, assessed on the PSS-14 scale (n=147). Alfenas, MG, Brazil, 2021

Perceived Stress Level	Mean	N	Standard Deviation
Low Perception of Stress	8.29	7 (4.76%)	3.402
Mean Perception of Stress	28.36	121 (82.31%)	6.159
High Perception of Stress	48.16	19 (12.92%)	4.891
General	29.97	147 (100%)	10.116

Source: elaborated by the author, 2021.

points; and 4.76% of the participants (n=7) revealed low perception of stress (equal to or below 24 points), percentile below 25, with an average score of 8.29.

## DISCUSSION

Managing chronic conditions requires uninterrupted care throughout life since its decompensation can cause physical, psychological, and social complications, reducing autonomy and the person's quality of life<sup>(1)</sup>.

Thus, studies investigating the effects of stress through the perspective of sick people are scarce in the scientific literature but of paramount importance once this factor constitutes an essential causative agent and exacerbation of chronic Diseases<sup>(4,9)</sup>.

The general mean of perceived stress found in the present study was 29.9660 points, which represents the mean perception of stress among people with chronic conditions. It is believed that the study developed during COVID-19 may have contributed to raising the perceived stress score since this disease has caused insecurity, fear, and tension, especially among people with chronic conditions, because they are considered more vulnerable to the disease<sup>(11)</sup>. A validation study of PSS-14 in Brazil, with 76 elderly, showed a general mean of perceived stress of 24.5 points<sup>(6)</sup>. Studies using PSS-14 in different population samples found that, in nursing students, the overall average of 28.76 points was verified predominance of mean perception of stress (63=46.3%)<sup>(7)</sup>. Whereas among *Call Center* operators, the general mean of perceived stress was 26.9<sup>(10)</sup>. Regarding sociodemographic variables, it was found that the participants of the female sex presented a mean perceived score higher than males.

This result is consistent with a study that evaluated stress between men and women, and it was found that women had an increased perception of stress compared to men. This significantly increased stress pattern in the female popula-

tion can be attributed to biological differences in stress regulating hormone levels in men and women, suggesting that the stress metabolic effects may be related to higher susceptibility to stress-related diseases<sup>(13)</sup>.

Regarding the age range, most people were between 18 and 29 years old (n=48), which disagrees with the literature since chronicity is more frequent with age advancing<sup>(3)</sup>. This divergence found in the study can be attributed to the fact that data collection has been performed through social media, which favors access of the younger population due to the ease of management of digital technologies compared to other age ranges<sup>(14)</sup>.

The highest mean of stress (M=34.8) was also found among people aged 18 to 29, which corroborates with a study carried out with young adults up to 25 years old, who had higher stress level in mature and elderly adults<sup>(15)</sup>.

It was observed that the married were the majority of the sample, however, the highest mean of stress perception resides among the single people. These data disagree with study<sup>(7)</sup> that observed a predominance of increased perception of stress among married due to increased responsibilities and concerns. Regarding religious belief, this study aimed to verify stressors and religious *coping strategies* in psychology students and observed that the presence of religious belief works as a protective factor against stress<sup>(16)</sup>. Regarding comorbidity, Systemic Arterial Hypertension alone (n=45; 30.61%) or associated with other comorbidities (n= 20; 13.60%) were the most self-reported by the participants (n=65; 44.21%). This result converges with Vigitel data of 2020, in which Arterial Hypertension in Brazil was 25.2%, being higher among women (26.2%) than among men (24.1%)<sup>(3)</sup>. However, the highest mean perceived stress was observed among those diagnosed with cancer. This result can be explained by the fact that cancer is considered a disease related to suffering and death and also causes physical, psychological, and social restrictions to

its carriers<sup>(17)</sup>. Regarding schooling, most of the study participants had graduate degrees, being this also the levels of education with the highest average perceived stress. Such a result agrees with a study conducted in Spain with 37,451 participants using PSS-14. It was identified in the study that individuals with lower schooling had the highest levels of stress, while those with higher levels of education demonstrated lower scores<sup>(12)</sup>. Regarding occupation, those employed were predominant in this study, however, the highest mean perceived stress was observed among those who performed house chores. This result corroborates with the literature, being the social determinants, strong influencers in the prevalence of chronic diseases and stress, and home services is a factor of social and economic vulnerability<sup>(18)</sup>. In addition, individuals with lower levels of education may have difficulties reaching the occupations and socioeconomic level desired, which exposes them to psychological and social stressors of greater relevance and lasting for more extended periods<sup>(19)</sup>.

Regarding the monthly family income, those who received less than one minimum wage reported the highest mean perceived stress. The study points to a close relationship between low income and stress, this factor may predict psychological problems and greater stress perception<sup>(12)</sup>.

Participants with more than five dependents had the highest score in PSS-14. This result converges with a study in which high levels of family dependence are significant sources of stress related to several other factors, such as the macroeconomic and social environment in which the family is involved<sup>(20)</sup>. From the results found, it was found that stress in people with chronic diseases is multifactorial and can be influenced by internal factors but also by social determinants of the health disease process, and these stressors accompany the daily life of these people.

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However, the increase in the perceived stress score present in this research, when compared to other studies using PSS-14, can be related to the unusual moment caused by the COVID-19 pandemic. The study demonstrates its relevance by understanding chronicity in its biological dimension and how it affects and is affected by psychological, social, and cultural factors<sup>(9)</sup>. The scientific advances in this study highlight the need for greater attention to mental health care of people with Diabetes Mellitus, Systemic Arterial Hypertension, Cancer, Emphysema, and Chronic Bronchitis, pointing out the role of stress as a risk factor for NCDs, from the perspective of the affected person. Some limitations may be pointed out for this investigation, such as the development of data collection online through social networks due to the COVID-19 pandemic, which makes it difficult to access people with more advanced age groups, lower education levels, and low income<sup>(8)</sup>.

## CONCLUSION

Through the findings of the study, the influence of stress on illness was verified due to chronic diseases and the weight of biological and social determinants in self-assessment of the stress level in people with these conditions.

Given these findings, it is necessary to have more coherent and effective health strategies to control these chronic health conditions, with a management view and, consequently, better quality of life for people.

The results found in this research can contribute to discussions about stress among people with NCDs, for the development of public policies and strategies to alleviate stress, and to control these chronic health conditions.

## CONFLICT OF INTERESTS

The authors have declared that there is no conflict of interests.

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