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SEÇÃO: ARTIGO

Mental health of women in stem: influences of career barriers and support

Saúde mental de mulheres em stem: influências de barreiras e suporte na carreira
Salud mental de las mujeres en stem: influencias de barreras y apoyo profesional

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Abstract: When we consider women's insertion in areas of Science, Technology, Engineering and Mathematics (STEM), social patterns marked by gender inequality might produce psychological suffering. Therefore, this study aimed to analyze the relationship between perceived barriers and support in career and the prevalence of symptoms of depression and anxiety, comparing women in STEM and non-STEM careers. Participated in the study 141 Brazilian women, which completed an online survey comprising the General Health Questionnaire, Career Support Questionnaire and Career Barriers Inventory. Results indicated that the higher the perceived barriers in career, the higher the anxiety and depression rates, with an opposing relationship when support perception was considered. All regression coefficients were higher for the women in the STEM group. We conclude that it is necessary to develop strategies and policies that favor women's mental health and psychological well-being, as well as to offer an environment that provides social support and equal career opportunities for women in STEM.

Keywords: women, career, barriers, support, anxiety, depression

Resumo: Quando consideramos a inserção das mulheres nas áreas de ciência, tecnologia, engenharia e matemática (STEM), os padrões sociais marcados pela desigualdade de gênero podem produzir sofrimento psicológico. Portanto, este estudo teve como objetivo analisar a relação entre barreiras percebidas e apoio na carreira e a prevalência de sintomas de depressão e ansiedade, comparando mulheres em carreiras STEM e não-STEM. Participaram do estudo 141 mulheres brasileiras, que responderam a uma pesquisa on-line composta pelo Questionário Geral de Saúde, Questionário de Suporte de Carreira e Inventário de Barreiras de Carreira. Os resultados indicaram que quanto maiores as barreiras percebidas na carreira, maiores as taxas de ansiedade e depressão, com uma relação oposta quando a percepção de suporte foi considerada. Todos os coeficientes foram maiores para as mulheres no grupo STEM. Concluímos que é necessário desenvolver estratégias e políticas que favoreçam a saúde mental e o bem-estar psicológico das mulheres, bem como oferecer um ambiente que forneça suporte social e oportunidades iguais de carreira para as mulheres em STEM.

Palavras-chave: mulheres, carreira, barreiras, suporte, ansiedade, depressão

Resumen: Cuando consideramos la inserción de las mujeres en áreas de Ciencia, Tecnología, Ingeniería y Matemáticas (STEM), los patrones sociales marcados por la desigualdad de género pueden producir sufrimiento psicológico. Por lo tanto, este estudio tuvo como objetivo analizar la relación entre las barreras percibidas y el apoyo en la carrera y la prevalencia de síntomas de depresión y ansiedad, comparando a las mujeres en carreras STEM y no STEM. Participaron en el estudio 141 mujeres brasileñas, que completaron una encuesta en línea que comprende el Cuestionario de Salud General, el Cuestionario de Apoyo Profesional y el Inventario de Barreras Profesionales. Los resultados indicaron



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que cuanto mayores son las barreras percibidas en la carrera, mayores son las tasas de ansiedad y depresión, con una relación opuesta cuando se considera la percepción de apoyo. Todos los coeficientes de regresión fueron mayores para las mujeres en el grupo STEM. Concluimos que es necesario desarrollar estrategias y políticas que favorezcan la salud mental y el bienestar psicológico de las mujeres, así como ofrecer un entorno que brinde apoyo social e igualdad de oportunidades profesionales para las mujeres en STEM.

Palabras clave: mujeres, carrera, barreras, apoyo, ansiedad, depresión

In latest years, there has been an increase of women, mainly white and middle class, occupying places within universities and labor market in developed and developing countries (Davidson & Burke, 2004). Nevertheless, recent data from the International Labor Organization (ILO - 2018) has shown that, on a global scale, approximately 75% of men are inserted in the labor market, while only 48% of women are part of this reality. In Latin American countries, male participation in the labor market is 77%, while female participation is 51% (ILO - 2018). Even though Brazilian women constitute the majority of undergraduate students (55.2% - National Institute of Studies and Research - INEP, 2019), only 43% of them are inserted in the labor market (ILO, 2018).

These data evidence how gender differences are still present in work contexts, reflecting not only the percentage of occupation, but also income and hierarchical aspects. Regarding salary, data show that women still receive about 23% less than men, besides holding only 37% of managerial positions (World Bank Group, 2018). In Brazil, women receive less, have double or even triple working hours, are in lower numbers in leadership positions and in politics, in addition to exercising the most devalued professions (Ministério da Saúde, 2011). Double shifts, for instance, intensify the impact of conflicts between work and family (Feijó et al., 2017). Therefore, it is necessary to analyze women's mental health, since they experience conditions marked by unequal opportunities, especially at work.

The scenario is aggravated when we consider the female insertion in areas of Science, Technology, Engineering and Mathematics (STEM), in

which women represent only 35% of all students (Unesco, 2018). In these fields, social patterns marked by stereotyping and sexism might produce psychological suffering, therefore it is not a surprise when job and family demands are linked to more mental illnesses in women (Carr, 1997). Considering this context, the importance of investigating women's mental health as a consequence of their careers is highlighted. With regard to predominantly male areas, such differences might be accentuated, reinforcing the sexual division of labor. Hence, this study aims to compare women in STEM and non-STEM fields, analyzing the extent to which their barriers and support perceptions foster anxiety and depression symptoms.

Women in STEM

When considering the existing gender differences in STEM fields, it is clear that the entry of women is lower than men's. According to the American Community Survey (ACS, 2015), women constituted only 25% of all STEM workers with university degrees (Noonan, 2017). Even with higher levels of education, women are still less likely to get a job in STEM, despite the indicative that education level seems to be related to the employability probability in STEM fields (IBGE, 2018; Noonan, 2017).

A metaphor that illustrates the progressive decrease of women in STEM careers is the "scissor effect", which occurs as women represent higher percentages of presence in undergraduate courses and in training stages, but gradually falls over when it comes to most prominent positions (Brito et al., 2015). Lack of confidence and low self-efficacy also contribute to move women away from STEM (Falk et al., 2017), as the "leaky pipeline" demonstrates how women, throughout academic life, tend to give up certain areas due to gender-related barriers (Buckles, 2019). The "glass ceiling" metaphor, for instance, explains the subtlety of barriers, sometimes almost transparent but capable of breaking women advance, contributing to stagnation of women at junior levels (Bhojwani, 2020).

Therefore, one of the critical needs of the 21st-century remain the recruitment, retention, and graduation of women in STEM fields (Rahman et al., 2020). A consensus among the studies is that in STEM areas women face several barriers, ranging from entering higher education to career progress (Ridgeway, 2011). Given women's evasion in initial graduation stages, a research on the mental health of engineering students evidenced women's difficulties about being a minority, feelings of loneliness, high competitiveness and the need to prove their skills frequently (Deziel et al., 2013).

There is also evidence of the emotional effects of discrimination on women in works marked by gender difference, especially when combined with other types of barriers. In Chowdhury and Gibson (2019)'s study, participants pointed out discrimination at work and sexism as promoters of low self-confidence and the feeling of not being worthy. Further explanations for the scarcity of women in STEM regard gender differences in job expectations, the role of gender ideology in the notions of women and men about desirable or viable jobs, differences in long-term goals in relation to family formation and the impact of self-confidence on educational and occupational persistence (Cech et al., 2011).

On the other hand, there is evidence that having a support structure is essential for women to continue their careers and overcome barriers to ascension (Fouad et al., 2011). In this sense, it is necessary to better understand how perceiving barriers and career support may contribute to move away or maintain women in STEM, analyzing its impacts in their mental health.

Perception of Barriers and Career Support

When reflecting on how individuals make professional choices, it is expected that gender roles, personal characteristics and family commitments exert great influence on people's – and therefore women's – career choices (de Lima et al., 2017). Previous studies indicate that when choosing their careers, women take into account aspects such

as lack of support in career planning and family responsibilities demands (Davey & Stoppard, 1993). In such direction, the Socio-Cognitive Career Theory (SCCT) maps issues that can hinder or contribute to career development, as well as to understand how barriers influence professional interests, goals and choices (Lent et al., 2000). Barriers and support perceptions become fundamental for understanding such theory (Fort & Murariu, 2018), besides influencing academic trajectory and professional choices, which in turn affect career development (Raiff, 2004).

Barriers can be classified based on personal factors (e.g. self-esteem, interests, outcome expectations, self-efficacy) and contextual (e.g. sexual discrimination, support, family relationships) (Raiff, 2004). There is evidence that women in science careers, for example, experience contextual barriers such as sexual harassment, family-work imbalance, gender stereotyping, salary gap and unconscious bias, besides spending more time in domestic responsibilities than their counterparts (Carr et al., 2019). In Helwig's (2004) ten-year longitudinal survey, 87% of participants declared to support women's insertion in the labor market. However, when mentioning the existence of small children, only 15% stated that women should work in such circumstances, which reinforces the social role of women as mothers, caregivers and housewives. Although concerns such as workplace discrimination and children are more present in women than in men (Swanson & Tokar, 1991), women may be more engaged in work as a way to compensate for the perceived career barriers, in order not to compromise their career development (Raiff, 2004).

In contrast, career support involves family, social and academic incentive, in addition to financial aid that women may have to choose a career and throughout professional experience (Lent et al., 2000). Similarly, social support is present when one feels belonged and protected, and may impact the development of mental disorders and physical illnesses, as well as stress levels (Ornelas, 1994). A recent study in the technology field show that social support positively influences

individual's self-efficacy and outcome results, such that when this support comes from close people, it boosts self-confidence and obstacle overcoming (Akbulut-Bailey, 2019).

As specific occupations and work activities influence people's health and well-being, they can be either a source of satisfaction or negative psychological effects, such as anxiety (Iqbal & Yilmaz, 2014). The way that women perceive career barriers, combined with work-family conflict, could raise levels of depression, such that imbalances between professional and family compromises represent a psychosocial risk factor, which in turn may negatively influence women's health and well-being (Guglielmi & Luppi, 2019). Hence, there is indication to hypothesize that the lack of support, combined with the perception of more career barriers, could foster mental health issues.

Depression and Anxiety in Work Contexts

For analyzing mental health, this study selected depressive and anxiety disorders due to their high occurrence rate in people around the world (World Health Organization - WHO, 2017). Approximately 300 million people were diagnosed with depression in 2015, which represents 4.4% of the world population (WHO, 2017). Between 2005 and 2015, the incidence of depression worldwide increased by approximately 18%, and when comparing depression's incidence between sexes, 8% of women present depressive disorders, against 5.5% of men (WHO, 2017). Regarding Brazil, there is a total of 11,548,577 people with depressive disorder, corresponding to 5.8% of its population.

Depressive disorders comprise a set of characteristics that affect individual's functioning, including symptoms such as sadness, irritable mood and somatic or cognitive oscillations, varying in terms of duration and circumstances in which they appear (American Psychiatric Association, 2014). Depression can be understood by individuals' own dysfunctional cognitions and cognitive schemes, causing them to react to situations worse than they really would (Beck, 1963).

In addition, depressed patients may manifest difficulties in concentrating, low self-esteem and self-confidence, hopelessness, guilt, pessimistic views, suicidal thoughts, insomnia and decreased appetite (American Psychiatric Association, 2014).

Regarding anxiety, about 264 million of people, equivalent to 3.6% of the world population, present it in a pathological way, and again it is more prevalent in women, whose incidence is 4.6%, while in men this rate is 2.6% (WHO, 2017). In Brazil, anxiety disorders are present in 18,657,943 people, 9.3% of its total population (WHO, 2017). Anxiety represents a set of physiological responses such as tachycardia, sweating, tremors, dizziness and others, usually experienced in situations of danger or threat (American Psychiatric Association, 2014). It is seen as pathological when it manifests in situations that usually are not threatening, negatively affecting the daily routine of people who experience it (Angelotti, 2007). Besides taking into account contextual factors, the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) considers that anxiety disorders characteristics relate to fear in an excessive way, with behavioral disturbances, being excessive and persistent when they last for about six months or more (American Psychiatric Association, 2014).

Reflecting on anxiety and depression statistics and understanding career as one of people's main spheres of life, it is crucial to analyze the relationship between such disorders and career aspects. There is still a lot of difficulty in identifying, diagnosing and establishing a direct and clear relationship between mental disorder and work. However, according to data from the Brazilian Social Security, concessions rate for sickness benefits in cases of mental disorders due to work has grown by 19.6%, and among the most frequent are depressive and anxiety disorders (Merlo et al., 2014).

Work situations that generate frustration and disappointment are common, given the occurrence of excessive demands, competition, threats of job loss, dismissal and others that contribute to the development of depressive episodes (Ministério da Saúde, 2011). Regarding gender relations

at work, harassment based on gender portrays inequality, authoritarianism and asymmetry in organizational relationships, placing women in a situation of humiliation and embarrassment (Merlo et al., 2014).

Although there is a growing body of research on how women's depression narratives draw upon and are constituted by gender norms (Chowdhury et al., 2019), studies investigating how depression may affect women in STEM fields are scarce. As an underrepresented group, these women are often exposed to uncomfortable situations, which may influence the development of psychological malaises. Evidence points to issues related to the social pressure of being female, difficulties in reconciling work and family and the need for fulfilling the roles of good mother, wife and professional, such that single mothers with higher degrees of education reported more symptoms of anxiety (Walters, 1993). Furthermore, the combination of high-performance culture and gender discrimination imposes a greater emotional tension on these women (Chowdhury & Gibson, 2019).

In short, situations women face at work, especially in mostly male environments, may represent barriers that impact their mental health. Perception of sexual discrimination, lack of support, family-work imbalance, double shift, low representation and stereotypes could, in theory, contribute to higher prevalence of depressive symptoms or generate more anxiety. Thus, the present research aimed to analyze how barriers and career support perceptions influence the occurrence of anxiogenic and depressive symptoms, comparing women who are in predominantly male careers with those who are not. Therefore, the following hypotheses were investigated: **Hypothesis 1:** There is a significant and positive relationship between perceived barriers and depression symptoms; **Hypothesis 2:** There is a significant and positive relationship between perceived barriers and anxiety symptoms; **Hypothesis 3:** There is a significant and negative relationship between social support and depression symptoms; **Hypothesis 4:** There is a significant

and negative relationship between social support and anxiety symptoms; **Hypothesis 5:** There is a difference in the results of Hypotheses 1, 2, 3 and 4 depending on whether the participants' career field is STEM or not.

Method

Participants

Research participants represented two groups, the first of women in STEM and the second, women in other careers. In both groups, participants had at least a 6 months tenure. The sample included 141 women, average of 29.2 years old (SD = 8.4). Most were formally married, dating or in a common-law marriage (52.5%), with no children (75.9%), and were graduated, attending post-graduation or already post-graduated (63.9%).

In total, 52.5% of the participants worked in STEM and 47.5% in non-STEM careers. The average time of work experience was 7.1 years (SD = 6.7). In order to classify groups into STEM and non-STEM, women's current profession was aligned with education field, so that the STEM group only had those who had graduated and were currently working in the following areas: researchers and scientists (university lecturers and professors, PhD students, post-doctoral students, researchers working in laboratories); technology professionals (IT analysts and systems developers, from interns to project leaders); engineering professionals (from assistants and interns to management levels within the various engineering fields, such as civil, chemical, mechanical, electrical, mechatronic and environmental). Women considered in non-STEM careers were in the following fields: health (doctors, nutritionists, nurses, speech therapists, dentists, psychologists), administrative/management (registration and collection, administrative and/or financial assistants and managers, auditing, banking, secretaries, human resources professionals), basic education (elementary and high school teachers, school supervisors) and other areas that did not fit into STEM (journalists, copywriters, communication advisors, designers, traders, sales, artisans, ac-

tresses, event producers and non-professional cooks). Also included in this group were women who, perhaps, had STEM education but worked in a different field.

Measures

The form was composed by the General Health Questionnaire (GHQ), the Career Support Questionnaire (CSQ) and the Career Barriers Inventory (CBI-R). The General Health Questionnaire was developed by Goldberg and Williams (1972), later adapted for Brazil by Gouveia et al. (2003). It is appropriate for rapid assessments about recent and current psychological discomforts. The 12-item model is widely used due to its practical and easy application, with internal consistency above 0.80 (Gouveia et al., 2012). The questionnaire has seven negative (e.g. Have you been feeling unhappy and depressed?) and five positive items (e.g. Have you been able to make decisions?) regarding mental health conditions. Answers to the negative items vary from 1 = "Absolutely not" to 4 = "Much more than usual". In affirmative items, the answers vary from 1 = "More than usual" to 4 = "Much less than usual". Responses for negative items were reversed to follow the four-point scale, in which the higher the total score, the better the level of mental health (Gouveia et al., 2003).

The Career Barriers Inventory (CBI) was originally developed by Swanson, Daniels and Tokar (1996), but the present study used the reduced version of Raiff (2004), entitled CBI-R, with 49 items. Answers for "How likely are you to encounter this barrier in your future career?" range from 1 = Never to 7 = Always (Raiff, 2004). However, in the present study this question was adapted to the past tense (How often have you encountered this barrier throughout your career so far?), since all participants were already working. The questionnaire contemplates both external barriers (perception of something that comes from social relations) and internal barriers (perceptions about oneself). By the time of this study, the CBI-R still did not have an adapted version for Brazil. Therefore, direct and reverse translations were performed, according to procedures indicated for

translation of instruments (Sousa & Rojjanasirat, 2011). Since the validity evidence research does not represent the aim of this study, the translated instrument was analyzed in relation to its main psychometric properties. For the present sample, the general alpha was 0.94, higher than the original instrument internal consistency, which was equal to 0.77 (Raiff, 2004).

The Career Support Questionnaire (CSQ) was originally developed by Lent et al. (2000) and also updated by Raiff (2004). It measures people's perception about career support, evaluating aspects such as social support and encouragement, access to mentors and financial resources. Responses range from 1 = Never and 5 = Always, regarding items listed after the question: "In your career path, how often do you encounter or have encountered this type of support?". In order to reduce participant's cognitive effort, the scale was increased to 7 points to resemble the CBI-R. As in the case of the CBI-R, there was no Brazilian version of the CSQ until the moment of the study, so the same translation procedure was used. The adapted version of Raiff (2004) with 13 items showed an internal consistency of 0.87 and this exactly value was obtained for the present sample, which reinforces CSQ's reliability.

Procedures and data analysis

The data were collected through an online survey on Google Forms platform. On the first page, the Informed Consent Form (ICF) was presented, exposing research goals, participants rights and risks and benefits of participation, besides assuring confidentiality and anonymity of provided data. After agreeing to participate, people could access the research form. The survey was disclosed in social networks such as women's groups on Facebook, as well as institutional and collective Instagram profiles. Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 20.0. Central tendency and descriptive analyzes were performed, as well as T-tests, Pearson's bivariate correlations and multiple regressions. There were no missing cases, as the digital form did not allow blank items.

Results

Initially, sample descriptive statistics were analyzed according to the created groups: a)

General sample; b) Women in STEM; c) Women in Non-STEM. According to Table 1, the STEM group (B) presented the highest averages in all variables.

Table 1 – Descriptive Statistics and correlations

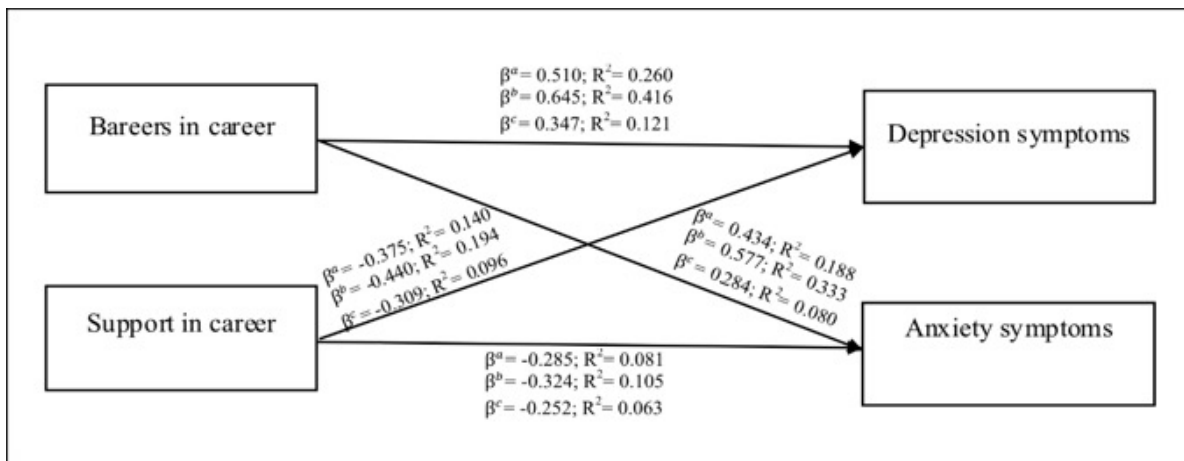
| | Mean (SD) | | | Anxiety | | | Depression | | | Barriers | | | Support | | |
|----|----------------|----------------|----------------|---------|--------|-------|------------|--------|-------|----------|--------|-------|---------|---|---|
| | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| 1. | 2.70 (0.69) | 2.71 (0.64) | 2.69 (0.75) | 1 | 1 | 1 | | | | | | | | | |
| 2. | 2.44 (0.77) | 2.47 (0.75) | 2.41 (0.81) | .74** | .76** | .72** | 1 | 1 | 1 | | | | | | |
| 3. | 2.96 (1.00) | 3.03 (1.11) | 2.88 (0.88) | .43** | .57** | .28* | .51** | .64** | .34** | 1 | 1 | 1 | | | |
| 4. | 4.31 (1.16) | 4.34 (1.21) | 4.27 (1.11) | -.28** | -.32** | -.25* | -.37** | -.44** | -.30* | -.49** | -.59** | -.34* | 1 | 1 | 1 |

Note. A = General (N = 141); B = STEM group (N = 74); C = non-STEM group (N = 67); * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Results from T-test indicated that there were no significant differences in the obtained means regarding the two groups. Bivariate correlations displayed in Table 1 pointed to significant and positive correlations between barriers perception and anxiety and depression symptoms, with the highest correlations in Group B (women in STEM), and the lowest, in Group C (non-STEM). As for perception of support, significant and negative correlations with anxiety and depression were identified in the three groups, again with the highest correlations coming from Group B and the lowest, from Group C.

Results from regression analysis are displayed in Figure 1, which indicates that all hypotheses were corroborated, since both barriers and support perception predicted higher levels of anxiety and depression. Considering Hypothesis 1, there is a significant ($p < 0.001$) and positive ($\beta = 0.510$) relationship between barriers perception and de-

pression symptoms, with a large ($R^2 = 0.26$) effect size (reference size effects according to Espirito Santo & Daniel, 2017). Considering Hypothesis 2, there is a significant ($p < 0.001$) and positive ($= 0.434$) relationship between barriers perception and anxiety symptoms, with a medium ($R^2 = 0.18$) effect size. For Hypothesis 3, there is a significant ($p < 0.001$) and negative ($= -0.375$) relationship between perceived support and depression symptoms, also with a medium effect size ($R^2 = 0.14$). For Hypothesis 4, there is a significant ($p < 0.001$) and negative ($= -0.285$) relationship between perceived support and anxiety symptoms, with a low effect size ($R^2 = 0.08$). Finally, according to Hypothesis 5, there are differences in the results of Hypotheses 1, 2, 3 and 4 depending on whether the area of activity is predominantly male or not, as shown in Figure 1, as regression coefficients were always higher for women in the STEM group.



Note. β^a = General (N = 141); β^b = STEM group (N = 74); β^c = non-STEM group (N = 67).

Note. Confidence intervals for all relationships were between 95% and 99%.

Figure 1. Regression coefficients for hypothesis testing

Discussion

Considering the results, it was observed that perceived barriers and support significantly predict depression and anxiety symptoms in women, with coefficients varying according to occupational area, which supports Hypotheses 1, 2, 3, 4 and 5. Results from descriptive statistics indicated that women from the STEM group presented the highest averages in all variables. Such results relate, for instance, to Poggesi et al.'s (2020) review, which demonstrates that women in STEM careers experience more individual and contextual gender barriers. However, the fact that results from T-tests showed no significant average differences among groups may lead to the assumption that all women are, somehow, affected by inequalities such as double shifts, work-family conflicts (Feijó et al., 2017), devaluation at work and lower occupation of leadership positions, which could help to explain their higher rates of depression and anxiety in comparison do men (WHO, 2017).

Regarding Hypotheses 1 and 2, they show that women's perceived career barriers predict symptoms of depression and anxiety. Although career barriers are commonly part of women's lives, excess of barriers may lead to feelings of inadequacy, which in turn would affect mental health. These feelings are less experienced by men because as they become parents, they are perceived as more reliable and stable, which

contributes to professional permanence and advance (Windsor & Auyeung, 2006). Women and men are traditionally seen through cultural lens that consider previously defined gender roles, in which men are responsible for providing the family through paid external work, while women are due to homecare and children bearing (Jean et al., 2015).

Therefore, social pressure on women to assume the role of mother/caregiver represents an important gender-related barrier. According to Helwig (2004), the support of others for female insertion in the labor market will depend on whether she has children or not. Women continue to be more involved with children and homecare than men, which causes an accumulation of functions and work overload especially when considering the lower time that men spend on such tasks (Phillips & Imhoff, 1997).

Considering Hypotheses 3 and 4, the more support women perceive, the less symptoms of depression and anxiety they present, which highlights the relevance of the support, especially from important people. This result is corroborated by Mullet et al., (2017), which indicate that women's success is stimulated by perceived social and emotional support. Besides, Ornelas (1994) states that social support directly affects people's mental health. Thus, it is necessary to emphasize the importance of support to people's

well-being, especially when they keep on facing barriers just for being women.

According to Hypothesis 5 results, the anxiety and depression symptoms that women in STEM careers experience are affected by their support and barriers perceptions, in a greater extent than for women in other careers. In other words, although there were no differences in terms of how women from different groups perceive each variable separately, women from the STEM group evidenced higher perceptions of their relationship, such that for STEM women, anxiety and depression symptoms are more strongly predicted by perceptions of barriers and support. Research has also indicated that barriers such as competitiveness and the daily need to prove their skills lead women in STEM to experience feelings of loneliness more often (Deziel et al., 2013). Such feelings can be associated with anxiety and depression symptoms, as evidenced by the present research. Recalling the smaller participation of women in the labor market in comparison to men (WHO, 2017), it is noticeable that not only female talents would be vanishing from STEM, but women also become more ill, which according to our results may be due to the fact that they perceive more barriers and less support.

Overall, our results indicate that in addition to the perception of barriers and lack of support influencing anxiety and depression symptoms in women, it is necessary to highlight that this relationship may be intensified when it comes to women in STEM. There are different reasons why women are in lower numbers in STEM careers, as many situations are gender influenced, including selection processes (Saucerman & Vasquez, 2014). Recalling leaking pipeline, glass ceiling and scissor effect metaphors, it could be assumed that one of the reasons why women from different fields give up or simply do not progress in career is associated with the premise that the lack of support and presence of barriers make them more anxious and depressed.

Final considerations

This study achieved its aim of investigating

the relationship between perceived barriers and career support with the prevalence of depression and anxiety symptoms, as well as to compare differences between women in STEM and non-STEM. The survey results showed that the more women perceive barriers, the more they experience symptoms of anxiety and depression. On the other hand, the more they perceive support, the less they show symptoms of anxiety and depression. These relationships are accentuated when women are in STEM careers, which signal the need for greater attention to this group.

Considering that women's talents often disappear in face of so many barriers and lack of social support, we understand that the results found could subsidize the promotion of gender equity organizational practices that take into account the specificities pointed out here. Despite the cons that such practices may present as to give rise to interpretations of supposed female incapacity and fragility, it is necessary to highlight that as we consider gender barriers, women tend to give up earlier and more frequently, as well as to become more ill. Since it is important to escalate everyone's well-being in organizations, it is urgent to pay attention to the establishment of a friendly environment to all, considering the particularities of each group and, in this case, of women in STEM.

Another practical implication refers to mental health services. From the data presented here, there is evidence about the predictive relationships between women's perceived barriers and support and lack of mental health symptoms, which could foster, for example, the proposition of public policies that involve this issue. When considering the Brazilian scientific panorama, it is observed that there is still a great absence of studies about women and gender issues in Organizational and Work Psychology, as well as in relation to the perception of barriers and career support. In this sense, the present study is a pioneer when it comes to Brazil and South America realities, as it presents relevant information for managers and organizations with regard to the professional development of women, especially in

STEM careers. Therefore, there is room for reflection on how to develop strategies to attract and keep more women in STEM careers, contributing to their rise and considering the occupational impacts on their psychological well-being.

However, one of the limitations refers to the cross-section design and the use of self-report for investigating variables, which may be affected by social desirability. Another limitation concerns the lack of emphasis on the ethnic-racial issue, as black women experiences for certain could account for differences in the analyzed variables, especially in STEM fields. Additionally, the questionnaires used for evaluating anxiety and depression only represent indicatives or symptoms, with no psychodiagnosis made.

A suggestion for future research is the analysis of more specific aspects, such as how sub-factors of the Career Barriers Inventory (sex discrimination, lack of confidence, multiple roles conflict, racial discrimination, etc.) correlate to a greater or lesser extent with women's mental health. Further aspects of mental health could also be investigated, in other quantitative or qualitative approaches, as well as longitudinal observations, daily reports or previous psychiatric/psychological diagnostics. In addition, studies should include fields of activity that are also predominantly male, but that do not fit in the professions called STEM. Larger samples of women could also be contemplated, as well as in comparison with male groups. Finally, studies regarding multiple countries and cultures should be carried out, as well as studies with women in different career stages, in order to analyze whether these differences on gender equity policies and practices may affect perceptions of barriers and support and, therefore, mental health indicators.

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