Prevalence of Depressive Symptoms and Associated Psychosocial Risk Factors among French University Students: The Moderating and Mediating Effects of Resilience

Abstract

*Background*: Previous studies have indicated that university students constitute a higher risk population for mental health problems, especially for depression. Yet, there appears to be a lack of literature addressing a such issues in France. The present study aimed to estimate the prevalence rates of depression, its sociodemographic correlates in French university students (FUS), and to examine whether individual resilience resources moderated and mediated the relationship between perceived stress and depressive symptoms.

*Methods*: The data were collected through web-based questionnaires. The sample included 1435 FUS with a mean age of 20.5 (*SD* = 3.38) years. Participants completed the Beck Depression Inventory (BDI-II), the Perceived Stress Scale, the Brief Resilience Scale, and a sociodemographic questionnaire. Descriptive, multiple logistic regression and mediation analyses were used.

*Results*: With respect to the BDI-II’s cutoff scores, 20.3% and 22.8% were positive to moderate and severe depression, respectively (43.1%). Gender and education attainment appeared as moderate risk factors when accounting for cumulative effect of perceived stress and individual resilience. Resilience was found to buffer and mediate partially the perceived stress–depression relationship.

*Conclusion*: The prevalence of depression was higher in FUS, as similar to those reported in

previous studies. The amount of academic and daily stress explained this prevalence. University students with low resilience level were more at risk. Interventions with aim to improving resilience skills could help to mitigate the negative effects of stress and to promote mental health in this population.

Keywords: Depression; prevalence; risk factors; perceived stress; resilience; university students.

**1. Introduction**

Depression is a common mental disorder across all stages of life, that hampers individual’s somatic or vegetative functioning, emotional affects, thoughts and behaviors (Clark & Beck, 2010). Depression symptoms are reported to be prevalent among young adults. Particularly, university students constitute a higher risk population for depression than the general population. The prevalence rates ranged from 10 to 84.5% worldwide (Ibrahim, Kelly, Adams, & Glazebrook, 2013a), and the pooled mean prevalence rates are estimated between 23 and 35% (Ibrahimet al., 2013a; Lei, Xiao, Liu, & Li, 2016; Puthran, Zhang, Tam, & Ho, 2016; Rotenstein et al., 2016; Tung, Lo, Ho, & Tam, 2018). According to Rotenstein et al. (2016), these rates increase by 0.2% per year. The short- and long-term consequences are alarming, including *inter alia* suicidal thoughts or attempts, impaired academic achievement, and lower occupational performance after graduation (Hysenbegasi, Hass, & Rowland, 2005; Winzer, Lindberg, Guldbrandsson, & Sidorchuk, 2018). Beiter et al. (2015) suggested the urgent necessity for universities to implementing periodic survey with the aim to evaluate the mental health needs of their students and to improve the efficacy of intervention-based programs. While these studies are expanding worldwide, in US (eg., Beiter et al., 2015; Eisenberg, Gollust, Golberstein, & Hefner, 2007), North-European countries (eg., Horgan, Kelly, Goodwin, & Behan, 2018; Ibrahim, Kelly, & Glazebrook, 2013), Asian countries (eg., Chen et al., 2013; Deb et al., 2016), African countries (eg., Fawzy & Hamed, 2017; Ngasa et al., 2017), there appears to be a lack of literature addressing the same issues in French universities (Herrmann, Déchelotte, Ladner, & Tavolacci, 2019; Verger et al., 2009). At time of completion of the present study, we found the study by Herrmann et al. (2019) estimating the prevalence of depression at 16.4% among French university students (FUS) whereas previous studies were restricted to generalized psychological distress rather than depression concerns, specifically (e.g., Verger et al., 2009).

**1.1. Sociodemographic correlates of depression in university students**

It is well established that depression is a complex mental disorder with various contributing factors (Clark & Beck, 2010; Goldman, 2012; Hankin, 2015). Accordingly, international research has documented a variety of predictive risk factors of depression. In the context of university students, a substantial number of previous studies showed that sociodemographic factors (e.g., gender, age, marital status, levels of income) constituted the significant risk factors associated to depression symptoms. Recent meta-analytic studies concluded for moderate significant gender differences in vulnerability to depression as females are more likely than males to report more symptoms of depression (Ibrahim, Kelly, Adams, et al., 2013; Liu et al., 2019). Research also indicates that single / unmarried university students are relative high-risk group (Eisenberg, Hunt, & Speer, 2013; Schofield, O’Halloran, Mclean, Forrester-Knauss, & Paxton, 2016). There are important trends, but not in all studies (Auerbach et al., 2018; Bayram & Bilgel, 2008; Chen et al., 2013), that younger students present the highest odds of depressive symptoms (Tung et al., 2018). The effect of age is sometimes interpreted through the education attainment. However, it has been shown that they first- and two-year university students may be more at risk (Bayram & Bilgel, 2008; Chen et al., 2013; Puthran et al., 2016). This may be due to the amount of academic stressors that students encounter, in addition to the many interpersonal changes that occur as they adapt with the new academic environment. Bewick et al. (2010) found that UK university students reported higher levels of strain during the first semester that declined as they progressed in their studies. Similar findings have been reported by Deb et al. (2016) in Indonesian university students and (Barker et al., 2018). However, research also suggested that postgraduates or upperclass students often experience overwhelming stress related to preparation for professional careers and preoccupation about post-graduation life (Beiter et al., 2015; Kumaraswamy, 2013). Moreover, there is accumulating evidence that university students oftentimes encounter financial pressures, with those from low income families exhibiting greater levels of depressive symptoms and psychological distress (Bayram & Bilgel, 2008; Chen et al., 2013; Eisenberg et al., 2013; Herrmann et al., 2019; Schofield et al., 2016).

**1.2. Resilience as a stress and depression protective factor**

As depicted, environmental factors involving academic requirements, adjustment to university academic environment, and financial pressures are generators of overwhelming stress (Herrmann et al., 2019; Hubbard, Reohr, Tolcher, & Downs, 2018) and risk factors for the higher prevalence rates of anxiety and depression (Bayram & Bilgel, 2008; Beiter et al., 2015; Ibrahim, Kelly, & Glazebrook, 2013b). From the perspective of cognitive stress theory, it has been shown that the way stress is appraised or perceived rather than the stressor *per se* determines the health-related outcomes (Folkman, 2013; Lazarus & Folkman, 1984). The perception of the “objectively” stressful situation is, to some extent, determined by contextual factors and one’s available assets such as self-esteem, problem-solving skills and resilience. With respect to individual resilience, it refers to the ability to challenge adverse and stressful situations and to maintain relatively stable, healthy levels of psychological and physical functioning (Bonanno, Westphal, & Mancini, 2011; Richardson, 2017; Smith et al., 2008). Building or improving resilience has been recognized to mitigate the negative effects of risk exposure and to promote mental health and well-being (Davydov, Stewart, Ritchie, & Chaudieu, 2010; Hartley, 2011; Hu, Zhang, & Wang, 2015; Steinhardt & Dolbier, 2008; Zimmerman et al., 2013). Yet, the university student research has paid less attention to the potential mediating and moderating pathways of resilience resources on the relationship between perceived stress and mental health-related outcomes. Among the available empirical evidence, resilience has been described to buffer the impact of parental conflict in the development of mental health impairments (Sart, Börkan, Erkman, & Serbest, 2016). Resilience was also found to reduce negative effects of psychological distress on the increase in depressive symptoms (Kaloeti et al., 2019). Although far from exhaustive, these studies suggest that individual differences in psychological resilience predict lower or higher subsequent depressive symptoms. In this view, promoting resilience skills in university students may contribute to help them to adequately manage the daily and academic stresses they encounter, and in turn to prevent them against the ravages of depression.

**1.3. Aims of the present study**

The present study expanded upon past depression research in university students to addressing the gap of literature on depression concerns in FUS. As has been shown, a large number of studies have examined a range of socio-demographic and economic factors as well as stress risk factors of depressive symptomatology; however, the reported findings still remain mixed and inconsistent. This study sought to enhance our understanding on these issues. In particular, despite some degree of stress is normal and an unavoidable component of academics, previous work has focused on the sources of stress and number of stressors rather than the way they are perceived. This approach by listing categories of stressors thus limits the understanding of interpersonal difference in effective coping abilities regarding these stressors. Moreover, this study extended the scope of existing research in this high-risk population for depression by testing for the multilevel role that resilience resources can play. Therefore, this study aimed to: 1) estimate the prevalence rates of self-reported depression symptoms in French university students, 2) examine sociodemographic and stress risk factors for depression symptoms, and 3) explore whether individual resilience resources moderate and mediate the relationship between perceived stress and depression symptoms.

**2. Methods**

**2.1.** **Procedure**

The data were cross-sectionally collected through web-based questionnaires, from January to February 2019. Invitations to participate were posted on social networking sites (eg., Facebook, Twitter) by associated research teams from many Universities, indicating the study purposes. The voluntary sampling was used participants were from more than 12 universities reflecting the wide geographic distribution for the nationwide sample. In accordance with the study eligibility criterion, participants were all students in Humanities and Social Sciences (eg., psychology, sociology). Of 1451 study participants, we excluded 6 who were part-time students and 10 who identified as either transgender or “other due to inadequate proportion that could potentially lead to misinterpretation of results. There were no missing data. The final sample included 1435 participants.

**2.2. Ethics statement**

Prior to data collection, institutional ethics approval was obtained from the Social Science Research Ethics Committee of the University of Picardy Jules Verne, Amiens (France). Participants signed an informed consent in accordance with the Declaration of Helsinki of 1975, as revised in 2008.

**2.2. Assessments**

2.2.1. Perceived Stress Scale (PSS-10)

Participants completed the PSS-10 (Cohen, Kamarck, & Mermelstein, 1983), a widely-used measure of perceived stressful experiences that evaluates the degree to which people perceive their lives as unpredictable, uncontrollable or overloaded. The PSS-10 queries respondents as to how often over the past month they have felt or thought about each of the 10 items on a 5-point Likert scale (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, and 4 = very often). Six of the items are negatively worded and four are positively worded. A total PSS-10 score is obtained by reverse scoring the positively worded items, then adding the scores for all 10 items. A higher total score indicates a higher level of perceived stress. In the present study, the internal reliability reached acceptable level (α = .72).

2.2.2. Brief Resilience Scale (BRS)

We used the BRS (Smith et al., 2008; French version: (Jacobs & Horsch, 2019) to measure the individual resilience. The BRS consists of six items, of out three items are negatively worded. Respondents rate each statement on a 5-point scale: 1 = strongly disagree to 5 = strongly agree. All items are summed to create a total score, after reversed scoring of appropriate items. We found the Alpha coefficient satisfactory (α = .84).

2.2.3. Beck Depression Inventory- second revision (BDI-II)

To access the current depressive symptoms, participants completed the BDI-II (Beck, Steer, & Brown, 1996). BDI-II is a standard self-administered depression screening instrument with well-established psychometric properties in clinical and community samples. It was designed for use among individuals 13 years old and older. There are 21 items rated on a 4-point Likert-type scale ranging from 0 to 3. The respondents are requested to endorse statements characterizing how they have been feeling throughout the past 2 weeks. The higher the summed score (range = 0–63), the higher the level of depression is. The instrument provides reliable cutoffs differentiating four levels of depression: 0-13 (minimal or no depression), 14-19 (mild depression), 20-28 (moderate depression), and 29-63 (severe depression). In the current study, the BDI-II yielded an excellent internal reliability (α = .91).

2.2.4. Sociodemographic information

Additionally, we collected sociodemographic data including age, gender (male, female, transgender or “other”), educational attainment (number of years of university education they completed), marital status, scholarship status, and monthly income.

**2.3. Data analysis**

Descriptive statistics were used to summarize demographics and scores of our main measures (RBS, PSS, and BDI-II). The prevalence rates of depressive symptoms were estimated including 95% confidence intervals (CI). Between-group differences were determined by using *t*-tests, chi-square tests (χ2) and one-way analysis of variance (ANOVA), as appropriate. All these analyses, in addition to correlation analysis, were performed using SPSS 21.0 (SPSS Inc., Chicago, IL, USA). Following this step, we conducted a path analysis, as a set of multiple regression analyses, to determine factors most likely to be associated with depression (dummy-coded: 0 = minimal or no depression to mild depression, 1 = moderate to severe depression), including moderation terms. Finally, to examine the mediator model, we used a similar method utilizing a residual maximum likelihood (REML) estimation. We conducted analyses simultaneously within one model including all variables. We performed moderation through multiple logistic regression and mediation analyses using R-program packages (Oberski 2014; R Core Team 2013). Except for ANOVA, all statistical tests were two-tailed.

**3. Results**

**3.1. Profile of the participants**

Table 1 summarizes the characteristics of the participants. Ages ranged from 16 to 43 years (*M* = 20.5; *SD* = 3.38; *Mdn* = 20). Female represented 87.1%, somewhat higher than the sex-ratio of French university population in Humanities (70-74% for female). They were younger than male (*M* = 20.4 *vs*. *M* = 21.2, *t*(1433) = 2.86, *p* < 0.01). The proportion of one- to three-year undergraduates was 82.6%. Nearly 43% estimated their monthly income at less than 201€, 35.7% between 200 and 500€ and 21.5% more than 500€. The level of income increased with the educational attainment, *F*(3, 1431) = 37.56, *p* < .001, η2 = .08, and depended on the scholarship status, *F*(1, 1443) = 26.34, *p* < .001, η2 = .02, as those who were grant owners (51.6%) reported higher income than those who did not (48.4%). Male reported greater monthly income than female (*F*(1, 1433) = 7.95, *p* < .01, η2 = .006). With regard to the marital status, 78% were unmarried/single and 22% were married or living with partner in committed relationship. All participants resided in France and nearly 97% were French citizens.

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**3.2. Prevalence rates of depressive symptoms and associated risk factors**

The mean total BDI score was 19.0 (*SD* = 11.70, *Mdn* = 17.0). In compliance with the BDI-II’s cutoff scores for the various categories of depression, 38.3% (95% CI: 35.8 to 40.9%) of the respondents scored in the range of minimal or no depression, 18.5% (95% CI: 16.5 to 18.5%) mild depression, 20.3% (95% CI: 18.3 to 22.4%) scored as moderately, and 22.8% (95% CI: 20.7 to 25.0%) severely depressed, respectively. Significant differences were found for age (χ2 = 14.41, *df* = 2, *p* < .001) and educational attainment (χ2 = 15.46, *df* = 3, *p* < .001), but not for gender (χ2 = 1.13, *df* = 2, *p* = .302). Bonferroni post hoc comparisons showed that the proportion of moderate to severe depression was higher among younger than among older students (+20 years) and similarly among one- to three-year undergraduates than among postgraduates. However, when accounting for the effects of perceived stress and resilience scores in the multiple logistic regression model, the effect of age was not significant (*p* = 0.218) and the effect of educational attainment tended towards statistical significance (*b* = –0.02, *SE* = 0.015, *p* = 0.097). Rather, gender emerged as moderate significant risk factor for moderate to severe depression (*b* = –0.09, *SE* = 0.035, *p* = 0.013), thus suggesting that gender-risk factor was influenced by the presence of levels of stress and resilience.

**3.3. Difference in perceived stress and resilience**

The total PSS-10 and BRS scores were 21.9 (*SD* = 4.33, *Mdn* = 22.0) and 16.4 (*SD* = 4.96, *Mdn* = 16.0), respectively. There were no significant differences in levels of perceived stress as a function of sociodemographic indicators, expected for gender (*F*(1, 1433) = 5.46, *p* = 0.02, η2 = .001) as male reported relatively lower PSS score than female. Resilience score was higher in male (*M* = 19.1) than female (*M* = 16.1) university students, *F*(1, 1433) = 61.97, *p* < .0001, η2 = .04. In addition, resilience score was positively correlated with age, educational attainment, and level of income (all *p’s <* .01).

**3.4. Intercorrelations of resilience, perceived stress, and depression**

As the results of correlational analysis indicate (see Table 2), resilience was negatively correlated to perceived stress and depressive symptoms, while perceived stress was positively correlated to depressive symptoms (all *p’s* < .0001).

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**3.5. Moderation effect of resilience** **on the relationship between perceived stress and depression**

The interactive effect was probed under moderator logistic analysis. All variables, including PSS and BRS centered scores, sociodemographics step and the interaction terms (PSS\*BRS), were entered in the model. The whole model was significant, *F*(9, 1425) = 52.76, *p* < .0001; *R*2 = 0.25. The interactive effect yielded significant level (*b* = –0.25, *SE* = 0.001, *p* = 0.037) (see Table 3). To examine in greater depth this effect through a graph, we used a multi-group comparison by splitting the centered score of the moderator (BRS) in three groups (+1 SD above the mean, mean, –1 SD below the mean), corresponding to high-, moderate- and low-resilient individuals, respectively. Summarizing the form of the moderator effect, Fig. 1 shows that in high- and moderate resilient students, depressive symptoms reportedly were less severe than in low-resilient students. With the increase of perceived stress, the difference was relatively more significant. That is, resilience was a moderator perceived stress–depression relationship.

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**3.6. Mediation effect of resilience from perceived stress to depression**

Table 4 presented the mediation model with unstandardized and standardized coefficients. To simplify the model, the direct effect of perceived stress on depressive symptoms and indirect effect through resilience are shown in Fig. 2. All the path coefficients were statistically significant at the level of *p* < .0001. According to the model, the extent of depression severity was predicted inversely by perceived stress and negatively by resilience, the standardized direct effect value of perceived stress 🡪 depression was 0.28, z-value = 11.65, *p* < .0001, the standardized direct effect value of resilience 🡪 depression was –0.33, z-value = –13.42, *p* < .0001. Perceived stress was inversely associated with resilience, with the standardized direct effect value = 0.30, z-value = –12.35, *p* < .0001. The results of bootstrapping test for indirect effect (PSS 🡪 BRS 🡪 BDI) = –0.011, *SE* = 0.001, z-value = –8.48, *p* < .0001. The total effect of perceived stress (PSS 🡪 BDI , and PSS 🡪 BRS 🡪 BDI) was –0.04, *SE* = 0.003, z-value = –17.57, *p* < .0001. In conclusion, resilience partially mediated the association between PSS and depression.

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**4. Discussion**

**4.1. Summary of research findings**

The present study represents the first attempt in France in investigating the prevalence of depression and its sociodemographic correlates among university students. Furthermore, the study extended the existing international literature by examining the nature of the potential role of individual resilience resources in perceived stress–depression relationship. Using a quite large cross-sectional sample, we found that 20.3% and 22.8% were positive to moderate and severe depression (43.1%, if considered the cutoff ≥ 20). Through multivariate logistic regression model, only gender and education attainment emerged as moderate risk factors when accounting for cumulative effect of perceived stress and individual resilience. The study demonstrated both moderating and mediating effects of resilience on perceived stress–depression relationship.

**4.2. Interpretation of ﬁndings in the context of the literature**

The prevalence rates for depression shown by this study are pretty much within the ranges that have been established by many recent meta-analytic studies (Ibrahim et al., 2013a; Puthran et al., 2016; Rotenstein et al., 2016; Tung et al., 2018). When considering studies conducted in some European countries, our findings are, however, much lower than the 59% as similarly established by two studies in North-European countries, among UK (Ibrahim et al., 2013b) and Irish (Horgan et al., 2018) university students but two to three times higher than those recently found by Herrmann et al. (2019) in FUS using the depression anxiety stress Scales-21 (DASS‐21). Indeed, previous meta-analytic studies (Ibrahim et al., 2013; Rotenstein et al., 2016) pointed out that the depression screening instruments used accounted for the important variability across international countries in rates for depression in university students. Ibrahim et al. (2013a) suggested the use of BDI as it less inflated the prevalence rates than other instruments. This suggestion guided the choice of 21-BDI-II (Beck et al., 1996) for the present study. We encourage further studies in France using similar screening instruments to enable cross-comparison. Until then, the present study appears to provide empirical evidence that perceived stress is a core significant predictor of the magnitude of higher rates for depression in FUS. Considering the PSS-10 values reported by Tavolacci et al. (2013) in FUS (*Mdn* = 16.0), the scores reported in this study appear to be higher (*Mdn* = 22.0). We believe that this difference could be explained contextually, as French universities, in recent years have implemented important academic reform regarding academic orientation, and revision of curriculum and programs, that may accentuate risks for stress and anxiety for students. An alternative explanation is that our study sampled exclusively FUS in Humanities and Social Sciences, who were found to be prone to higher perceived stress than students in Business, Medicine and Pharmacy, and Paramedic faculties (Tavolacci et al., 2013) and to higher levels of depression among Indian university students (Deb et al., 2016) than their peers from Science and Management faculties. Increasing difficulties in career or job opportunities offered by Humanities and Social Sciences area may account for these concerns, as this may be a potential source of stress and anxiety related to career plan.

Sociodemographically, only gender appeared to be a modest but significant risk factor for moderate to severe depressive symptoms. This results aligned with several past studies summarized by meta-analytic studies (Ibrahim, Kelly, Adams, et al., 2013; Liu et al., 2019) and with recent studies (Auerbach et al., 2018; Fawzy & Hamed, 2017; Peltzer & Pengpid, 2015) including the study by Herrmann et al. (2019) in France. Importantly, our results indicate that gender difference reached statistical significance as long as the cumulative effect of perceived stress and resilience was considered. This finding provides new insight on the results of previous studies reporting gender diﬀerence but not providing information about the potential causes for why female students were more at risk for depression and its comorbidities than to their male counterparts. The global explanation often suggested is that gender diﬀerence is multifactorial, encompassing biological and sociocultural factors, or variable combinations of each. Our result provides empirical argument for gender difference in managing of stress. Similarly, Tavolacci et al. (2013) found a notable gender difference in managing of perceived stress. So far as psychological resilience is considered as a dynamic process, there are some sources of stress that weaken female resilience skills and self-confidence than for their male counterparts. For example, Beiter et al. (2015) highlighted that academics and intrapersonal factors such as body image and self-esteem were significant sources of stress for females than for males. As a whole, these findings open avenue for further in-depth investigation. Apart from gender our study did not provide sufficient support for other sociodemographic factors for depression. Given that a review of the existing literature appears to indicate that financial pressures increased the odds of experiencing depressive symptoms and suicidal ideation (Eisenberg et al., 2007; Horgan et al., 2018; Roh, Jeon, Kim, Han, & Hahm, 2010), it was surprising that, in our study, low income was not associated with depressive symptoms and stress, even among females who reported much lower monthly income than males. This result, however, is consistent with Hubbard et al. (2018)’ study. Although we did not examine the role of the family parenting support, we hypothesize that university students with lower income are connected to supportive family environment that may protect them against crippling bouts of (financial) stress often leading to mental health impairments.

The main relevant results yielded by the present study are the moderating and mediating effects exerted by individual resilience on the perceived stress–depression relationship. In line of previous research, resilience was inversely associated with perceived stress and depression (Kaloeti et al., 2019). In addition, it moderates and partially mediates the relationship between stress and depressive symptoms. This pattern of findings lays strong support that increasing individual resilience could help prevent depression. The moderation model revealed buffered interaction, reflecting that the more resilient the students felt, the lower their stress level and depression score, respectively. Again, resilience, functioning as a mediator between perceived stress and depression, had the direct effect of reducing depressive symptoms. It appears to weaken the path from stress to depression. Thus, resilience appears to indicate the ability of an individual to navigate towards health-maintaining resources needed in periods of stress, and the capacity of negotiating for these resources in ways that could enhance health psychological functioning. It is noteworthy that the results supported that resilience was partially mediated to depression. This implies that there are other mediators aside from individual resilience that reduce the impact of stress on the development of depression. Also, there are undeniably other factors enhancing resilience beyond the age of maturity, educational attainment, and level of income we found in this study. For example, Brailovskaia et al. (2018) found in German, Russian, and Chinese University student samples that social support and resilience compensate each other. When there is no possibility to receive sufficient support from familiar social network, people activate their individual internal resources as protective factors. It should be interesting to explore in further studies if female university students, for example, counterbalance the deficit in individual resilience by social support received from their familial and/or peer network.

**4.3. Limitations**

It should be noted that, while this study used a large sample from many Universities, we could not ascertain that it is representative of all FUS. Future studies using randomized sampling method will enable to confirm or amend the present study findings. We also caution regarding the interpretation of gender considerations given that the sex-ratio in our sample was moderately higher relative to gender-female compared to French university students (FUS) in Humanity and Social Sciences faculties. Nevertheless, similar sex distribution was reported in many studies among FUS (Cénat, Smith, Hébert, & Derivois, 2019). Additionally, our study was not able to provide any information pertaining to transgender students given the small sample available, which would not allow reliable conclusions. Further studies including this group are necessary given that sexual orientation is not a negligible risk factor given recent findings indicating that it was associated with increased likelihood of suffering from severe depressive symptoms in Irish university students (Horgan et al., 2018). Finally, it should bear in mind that the cross-sectional design of this research did not establish causal pathways between sociodemographic factors, perceived stress, resilience and depression symptoms. Longitudinal studies are required in this regard and could be conducted among students from the first year to the end of their studies, with consideration of the stress factors associated with the studies themselves.

**4.4. Implications**

Notwithstanding the above limitations, the study findings have implications for research, prevention and intervention. For research, this study shows the need for longitudinal studies to better explore the risk and protective factors associated with depressive symptoms in students. These studies should provide a better understanding of the pathways of students with depressive symptoms and the association between depression and academic productivity, anxiety about the future, uncertainty of professional life, past experiences of various forms of violence and in romantic relationships, the quality of relation with parents, among others. These studies should also help to better identify the consequences of depression in students and develop and implement prevention programs. Indeed, since previous studies have shown a positive association between academic low productivity and depression (Hysenbegasi et al., 2005), this study shows the need for prevention and intervention programs to first reduce the number of students with depressive symptoms. It also shows the need to treat them quickly and effectively in order to prevent academic failure and other potential consequences. The results suggest that promoting individual resilience skills could contribute to reducing academic and daily stress and in turn the onset of depression problems (Steinhardt & Dolbier, 2008). Prevention and intervention programs should consider both socio-demographic factors and perceived stress, as well as stress related to the studies themselves. Thus, there is a greater necessity for paying a closer attention to mental health interventions since recent systematic and meta-analytic studies demonstrated the effectiveness of, specifically, cognitive, behavioral and mindfulness interventions in reducing stress, anxiety and depression in university students (Regehr, Glancy, & Pitts, 2013; Winzer et al., 2018).

**5. Conclusion**

The results of this study confirm that university students in France have a high prevalence of depressive symptoms. They also confirm that socio-demographic factors and perceived stress play a predictive role in depressive symptoms among university students. Specifically, high level of perceived stress was responsible for gender difference in the development of depression. In addition, these results confirm the protective role of resilience in student depression and its ability to attenuate the relationship between perceived stress and depression. As the first focusing on depressive symptoms among university students in France, this study offers the opportunity for further research to better understand and act among university students to prevent depressive symptoms and associated consequences.

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Table 1. Characteristics of the study participants.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variables | *n* | % | Variables | *n* | % |
| Gender |  |  | Educational attainment |  |  |
| Female | 1250 | 87.1 | First-year university study | 583 | 40.6 |
| Male | 185 | 12.9 | Second-year university study | 343 | 23.9 |
| Age group |  |  | Third-year university study | 259 | 18.0 |
| 16-18 years | 366 | 25.4 | Fourth-year and above | 250 | 17.5 |
| 19-20 years | 589 | 41.0 | Scholarship status |  |  |
| + 20 years | 482 | 33.6 | No | 695 | 48.4 |
| Marital status |  |  | Yes | 745 | 51.6 |
| Single – unmarried | 1119 | 78.0 | Monthly income |  |  |
| Married or common-law partnership | 316 | 22.0 | 0 – 200€ | 615 | 42.9 |
|  |  |  | 201-500€ | 512 | 35.7 |
|  |  |  | +500€ | 308 | 21.4 |

Table 2. Means, range, normal distribution tests, and correlations among study variables.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variables | *M*(Range) | Skewness (SE)  | Kurtosis (SE) | 1 | 2 | 3 |
| 1. BRS score
 | 16.4 (6–30) | 0.17 (0.64) | – 0.38 (1.13) | 1 |  |  |
| 1. PSS score
 | 21.9 (9–33) | –0.10 (0.64) | – 0.35 (1.13) | – 0.31\*\*\* | 1 |  |
| 1. BDI-II score
 | 19.0 (1–61) | 0.73 (0.64) |  0.12 (1.13) | – 0.48\*\*\* | 0.47\*\*\* | 1 |

Note: \*\*\**p* < .0001.

Table 3. Sociodemographic and psychosocial factors predicting moderate and severe depression including the moderating effect of perceived stress and resilience.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Predictors | Unstd.Estimate | Std.Estimate | SE | t-value | p-value |
| Intercept | 0.011 | 0.000 | 0.215 | 0.049 | 0.961 |
| PSS score  | 0.051 | 0.442 | 0.009 | 5.499 | 0.000 |
| BRS score | -0.009 | -0.093 | 0.012 | -0.791 | 0.429 |
| Age | -0.027 | -0.041 | 0.022 | -1.232 | 0.218 |
| Gender | -0.087 | -0.059 | 0.035 | -2.486 | 0.013 |
| Education | -0.024 | -0.056 | 0.015 | -1.661 | 0.097 |
| Marital status | 0.004 | 0.003 | 0.028 | 0.133 | 0.894 |
| Scholarship status | -0.013 | -0.013 | 0.023 | -0.550 | 0.583 |
| Monthly income | 0.019 | 0.029 | 0.016 | 1.203 | 0.229 |
| PSS score\*BRS score | -0.001 | -0.247 | 0.001 | -2.088 | 0.037 |
| Model diagnostics: Multiple R-squared: 0.2499Adjusted R-squared: 0.2452 F-statistic: F(9, 1425) = 52.76, p -value: < 0.00000000000000022 |

Table 4. Results of the mediation model of resilience on perceived stress and depression relationship using a path analysis and controlling for sociodemographic factors

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Predictor |  | Outcome | Unstd. Estimate | SE | z-value | p-value | Std. Estimate |
| PSS score | 🡪 | BDI | 0.032 | 0.003 | 11.651 | 0.000 | 0.282 |
| BRS score | 🡪 | BDI | -0.033 | 0.002 | -13.416 | 0.000 | -0.332 |
| Age | 🡪 | BDI | -0.026 | 0.022 | -1.191 | 0.234 | -0.040 |
| Gender | 🡪 | BDI | -0.088 | 0.035 | -2.528 | 0.011 | -0.059 |
| Education | 🡪 | BDI | -0.024 | 0.015 | -1.619 | 0.105 | -0.054 |
| Marital status | 🡪 | BDI | 0.002 | 0.028 | 0.089 | 0.929 | 0.002 |
| Scholarship status | 🡪 | BDI | -0.014 | 0.023 | -0.591 | 0.555 | -0.014 |
| Monthly income | 🡪 | BDI | 0.019 | 0.016 | 1.201 | 0.230 | 0.029 |
| PSS score | 🡪 | BRS | -0.348 | 0.028 | -12.352 | 0.000 | -0.304 |
| Age | 🡪 | BRS | 0.197 | 0.233 | 0.845 | 0.398 | 0.030 |
| Gender | 🡪 | BRS | -2.616 | 0.365 | -7.159 | 0.000 | -0.177 |
| Education | 🡪 | BRS | 0.200 | 0.157 | 1.275 | 0.202 | 0.045 |
| Marital status | 🡪 | BRS | -0.351 | 0.297 | -1.181 | 0.238 | -0.029 |
| Scholarship status | 🡪 | BRS | 0.255 | 0.250 | 1.022 | 0.307 | 0.026 |
| Monthly income | 🡪 | BRS | 0.366 | 0.167 | 2.187 | 0.029 | 0.057 |
| Age | 🡪 | PSS | -0.008 | 0.218 | -0.036 | 0.971 | -0.001 |
| Gender | 🡪 | PSS | 0.791 | 0.342 | 2.314 | 0.021 | 0.061 |
| Education | 🡪 | PSS | 0.264 | 0.147 | 1.794 | 0.073 | 0.069 |
| Marital status | 🡪 | PSS | -0.083 | 0.278 | -0.298 | 0.765 | -0.008 |
| Scholarship status | 🡪 | PSS | 0.457 | 0.234 | 1.956 | 0.050 | 0.053 |
| Monthly income | 🡪 | PSS | -0.193 | 0.157 | -1.233 | 0.218 | -0.035 |

Note: BDI= BDI-II score; BRS = BRS score; PSS = PSS score.



Figure 1. Model of moderation effect of resilience on the relationship between perceived stress and depression.



Figure 2. Model with standardized path coefficients depicting resilience as a mediator in the relationship between perceived stress and depression.