

## RESEARCH ARTICLE

# Prevalence and factors associated with academic burnout risk among nursing and midwifery students during the COVID-19 pandemic: A cross-sectional study

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## Abstract

**Aim:** The aim of the study was to assess the prevalence of academic burnout (AB) and its associated factors among nursing and midwifery students during the COVID-19 pandemic.

**Design:** A correlational cross-sectional study.

**Methods:** An online survey was distributed from November to December 2020 to nursing and midwifery students in Belgium. The risk of AB was assessed using the MBI-SS Academic Burnout Inventory scale. Factors associated with AB were related to the personal life and level of education of the student and to the COVID-19 pandemic.

**Results:** The prevalence of overall AB risk was 50.0% (95% CI 48.5–53.1). Factors significantly associated with higher risk of AB were having a child, having a job, the level of academic training, working overtime, insufficient personal protective equipment against viral contamination during the last internship, work overload due to the pandemic, personal proven or possible SARS-CoV-2 infection and having a relative who died related to COVID-19.

## KEYWORDS

burnout, COVID-19 (SARS-CoV-2), education, midwives, nursing, prevalence

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## 1 | INTRODUCTION

On 11 March 2020, the World Health Organization (WHO) reclassified the COVID-19 epidemic that had appeared a few months earlier in China as a pandemic (WHO, 2020). Millions of people have been affected by this virus which has caused an unprecedented death rate (ECDC, 2020). In Belgium, a state of emergency was declared on 13 March 2020 with a lockdown leading to a series of measures that paralysed various sectors except for essential services such as health care. Educational institutions closed on 18 March 2020 and were able to reopen very gradually from 18 May 2020 in compliance with health regulations (Service Public Fédéral Belge, 2020). For some student populations, the partial return to training institutions was only achieved at the start of the 2020–2021 academic year. As a result, training institutions had to organize their training differently by creating distance learning courses and reorganizing the supervision in clinical placements. During successive waves of the health crisis, nursing and midwifery students were not required by the authorities to support and strengthen the health professional workforce in the fight against the coronavirus. However, many became involved in front-line patient management settings during the crisis either through volunteering, student jobs or through their student status when clinical placements could be restarted (van de Voorde et al., 2020). Nursing and midwifery students encountered new challenges related to the fear of infection, distance learning, the lack of personal protective equipment (PPE) and economic uncertainty (Savitsky et al., 2020). These elements may have influenced the well-being of students during their training. Indeed, academic burnout (AB) is a newly described psychological disorder affecting the mental health of students and is related to the pressure of academic success and the acquisition of new responsibilities (Faye-Dumanget, 2018; Schaufeli et al., 2002). Therefore, the COVID-19 pandemic may have increased the risk of AB among nursing and midwifery students (Kong et al., 2021; Wang et al., 2021) and led us to conduct this study.

## 2 | BACKGROUND

Burnout is a global psychological disorder that develops in the professional sphere and is associated with poor quality of working conditions, difficult interpersonal relationships, role conflicts and professional overload (Maslach et al., 2001). It is defined as a “syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment that can occur among individuals who work with other people in some capacity” (Schaufeli et al., 2009). Among the definitions of burnout, academic burnout (AB) extends this concept to education and training and refers to the student population (Faye-Dumanget et al., 2018). AB is classically described as a three-dimensional process, the dimensions of which are emotional exhaustion (EE), cynicism (CY) and the loss of the feeling of academic efficacy (AE) (Schaufeli et al., 2002). Undergraduate studies are a critical time that can impact mental health. Deterioration

of mental health is associated with a parallel deterioration in academic results (Faye-Dumanget et al., 2018; Oliveira Silva et al., 2021; Wei et al., 2021). The development of AB is associated with pre-existing promoting factors as anxiety, depression and lack of mental flexibility (Faye-Dumanget et al., 2018; Wang et al., 2019; Watson et al., 2008).

Nursing and midwifery training programmes are recognized as a major source of stress (Gibbons, 2010; Timmins & Kaliszer, 2002; Wei et al., 2021). These students, in particular, encounter various stressful events related to working conditions, responsibilities and internships (Crary, 2013; Valero-Chillerón et al., 2019). Other factors can also add a heavy emotional load to these students including repeated evaluations (Gibbons, 2010), examinations (Crary, 2013), feelings of insecurity and unpreparedness (de Brito Gomes Lima et al., 2017), the balance between school, clinical, and personal lives (Chernomas & Shapiro, 2013; Crary, 2013) and the clinical environment and nursing team (Shaban et al., 2012). It has been previously described that the rate of depression is higher among nursing students than among other types of students (Aloba et al., 2018).

Concerning the training of nurses in Belgium in particular, there are two training paths to become a nurse: the certification level (European Qualification Framework [EQF] level 5) and the bachelor level (EQF level 6). To comply with European Directive 2013EC/55, students must complete half of their education in clinical placements. This has consequently increased the duration of nursing education and, since the increase, a significant decrease in the number of registrations in nursing colleges has been observed. In fact, there is currently a shortage in the number of active nurses in Belgium (Jouck et al., 2019). The average number of patients allocated per nurse in Belgium remains below international quality standards (Bruyneel et al., 2019; KCE, 2020). The nurse-to-patient ratio during the day is 8.12 for university hospitals and 9.4 for non-university hospitals. This ratio increases to 18 at night, whereas the upper limit of international standards is a maximum of 6.1 patients per nurse over 24 hours (van den Heede et al., 2019). These realities could impact the quality of patient care and patient safety and could indirectly lead to a lack of resources to assure adequate educational supervision of nursing students (Aiken et al., 2012; Dzau et al., 2018; Sermeus et al., 2011).

Since March 2020, the world has been facing the COVID-19 pandemic caused by the SARS-CoV-2 virus. In Belgium, the Hospital Emergency Plan was launched on March 13, 2020 (Molenberghs et al., 2020). At the international level, during the peak of the initial COVID-19 outbreak, frontline nurses and students were exposed to higher levels of stressful events (Chen et al., 2021; Guixia & Hui, 2020; Hu et al., 2020; Jalili et al., 2020; Shechter et al., 2020), a high workload and other unfavourable training conditions (e.g. exposure to death and suffering, fear of contracting COVID-19, constant reorganization of training programmes) that could increase the risk of AB. This was also the case with Belgian nurses (Bruyneel, Gallani, et al., 2021; Bruyneel, Smith, et al., 2021). Due to working conditions and training but also in the context of the COVID-19 pandemic, nursing and midwifery students may be particularly prone to AB.

### 3 | THE STUDY

#### 3.1 | Aims

The aims of the present study were (1) to assess the prevalence of AB in nursing and midwifery students during the COVID-19 pandemic and (2) to identify factors associated with the occurrence of AB.

#### 3.2 | Design

This was a correlational, cross-sectional study designed to assess the risk of AB and associated factors during the second wave of the COVID-19 pandemic between 16 November 2020, and 9 December 2020. STROBE guidelines were used to write this study report (Vandenbroucke et al., 2007).

#### 3.3 | Sample/participants

The estimated population of nursing and midwifery students in 2019–2020 was 10,509 students. This number is an approximation based on the number of enrolments registered with the authorities for nursing and midwifery students in French-speaking Belgium. All participants were student nurses (EQF levels 5 and 6), including nurse candidate specialists or midwives. In Belgium, the possibility of specialized training is only opened to bachelor-level nurses (specialist candidates, EQF level 6). For midwife training, only a bachelor's degree (EQF level 6) is available. The inclusion criteria for the study were as follows: (1) to be over 18 years of age and (2) to be enrolled in nursing or midwifery education in one of the 27 schools in French-speaking Belgium. Researchers contacted the principals of these 27 schools and asked them to distribute the invitation to participate in the study by e-mail to their students in the nursing or midwifery sections. A non-random sample of 2275 students was obtained on a voluntary basis and the study sample, therefore, represents approximately 22% of the eligible population.

#### 3.4 | Data collection

Aiming to assess the risk of AB as the dependent variable, an online questionnaire including 48 questions was used (closed, multiple choice or Likert scale). The outcome variable was the overall risk of AB. The risk of AB was assessed using the previously described questionnaire that included the validated French version of the Maslach Burnout Inventory—Student Survey scale (MBI-SS) (Faye Dumanget et al., 2015) (The English version of this scale is available at the following link: <https://www.mindgarden.com/313-mbi-general-survey-for-students>). This 15-item scale evaluates the risk of AB according to three dimensions: EE (5 items, e.g. I feel exhausted at

the end of the university day), CY (4 items, e.g. I feel more cynical about applying my lessons) and AE (6 items, e.g. In my opinion, I am a good student). Items were scored on a 6-point frequency rating scale ranging from 1: Never to 6: Always. The extreme values were [5; 30] for EE, [4; 24] for CY and [6; 36] for AE. The MBI-SS Burnout Inventory does not include a global score. The risk of AB was stratified into three categories: low, moderate and high risk of AB according to the final scores. For EE, low risk was defined as a score between 5 and 13, moderate risk between 14 and 22 and high risk between 23 and 30. Following the same reasoning, for CY, the three categories were low [4; 10], moderate [11; 17], high [18; 24] and for AE categories were defined as: low [6; 16], moderate [17; 26], high [27; 36] (Faye-Dumanget et al., 2018). It is important to emphasize that the MBI-SS is a tool for estimating the risk of developing AB but does not allow for the diagnosis of AB. It was for this reason that, for the purposes of this study, the overall risk of AB was estimated based on whether participants reached a high-risk score in at least one of the three dimensions (Boutou et al., 2019; Rotenstein et al., 2018). A pre-test of the questionnaire was carried out with a small population of students ( $n = 10$ ) to ensure that the questions were clear and intelligible. This online questionnaire was systematically sent to students attending the 27 nursing and midwifery colleges in French-speaking Belgium. Response to the questionnaire was voluntary. The data were collected using the Qualtrics online platform. Data were collected to assess factors associated with the occurrence of AB risk as the independent variable. These data were divided into three main categories: first, those related to the student's personal life; second, factors related to the student's level of education; and third, factors related to the COVID-19 pandemic. In detail, personal data included: the age of the student, gender, marital status, and whether they were a parent. With regard to the level of academic training, collected data were the type of diploma in progress (bachelor, certificate, midwife, specialization), the graduation year, having a student job and having a previous professional experience. For assessment of the influence of the COVID-19 pandemic, collected data were having sufficient personal protective equipment [PPE] to manage COVID-19, overtime during the last internship, exposure to death related to COVID-19 in the professional context, impact of COVID-19 on workload, personal status as a proven or possible carrier of SARS-CoV-2 and having a relative or friend who died secondary to COVID-19.

#### 3.5 | Validity, reliability and rigour

The MBI-SS showed good internal consistency both for the original version (i.e. Cronbach's alpha coefficient for the exhaustion, cynicism and academic efficacy were respectively 88, 90, 84,  $p < 0.05$ ) (Schaufeli et al., 2002) and the French version (Faye Dumanget et al., 2015). The cross-cultural validity of the latter has been tested in various continents with different populations of students (Campos & Maroco, 2012; Hu & Schaufeli, 2009; Schaufeli et al., 2002; Watson et al., 2008).

### 3.6 | Ethical considerations

Participation was voluntary, anonymous and did not involve any compensation. The protection of each participant's personal data was respected. The informed consent of each participant was required to participate in the study (objectives, confidentiality, expectations and rights, retention and protection of collected data). This information was communicated to the prospective participant through an informed consent form available via the URL link distributed for the study. Access to the online questionnaire was only possible after obtaining informed consent from each participant. All methods were performed in accordance with the relevant Belgian guidelines and regulations. Belgian Law does not require approval from an Ethical Board for an online survey with the general population. However, the study is covered by privacy regulations. All information related to respondents' consent and the GDPR is available upon request, in accordance with the law that is applicable, including regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC—General Data Protection Regulation.

### 3.7 | Data analysis

Statistical analyses were performed with Software for Statistics and Data Science (14.0, Texas). Means and standard deviations were used to describe symmetric variables, and median (Mdn) and Interquartile range (IQR) were used to describe asymmetric variables. No treatment for missing data was performed. For the descriptive statistics, valid percentages (i.e. not including missing data) were reported. For symmetric variables, ANOVA tests were used for mean comparisons and chi-squared tests for proportion comparisons. The assumptions for ANOVA, that the observations are independent and randomly selected from normal populations with equal variances, were assessed by looking at the plots of the residuals against the fitted values and the normal QQ plot of residuals. Univariate analysis and four multivariable logistic regression models were performed in order to test the associations between the overall risk of AB and other variables. The three categories (high, moderate and low) were compared, respectively. All variables included in the model were tested for collinearity. The Hosmer–Lemeshow test was used for assessing the goodness-of-fit and odds ratios (OR) and their corresponding 95% confidence intervals (95% CI) were calculated. All tests were two-tailed, and a p-value <0.05 was considered to be statistically significant.

## 4 | RESULTS/FINDINGS

### 4.1 | Characteristics of the respondents

A sample of 2275 students replied to the questionnaire on a voluntary basis (Table 1). Most of the respondents were female (88%). The average age of the respondents was  $23.3 \pm 5.7$  years.

The proportion of respondents who were single was 65% and 15% had at least one child. All levels of training were represented: certificate nurses (EFQ 5; 22%), bachelor-level nurses (EFQ 6; 61%), specialized nurses (6%) and midwives (11%). Among the respondents, 50% had a student job, and 37% had previous professional experience. Regarding the COVID-19 outbreak, 74% of respondents reported an increase in their clinical workload, 40% reported working overtime during the last internship, 45% were more frequently faced with death secondary to COVID-19, and 58% had sufficient PPE.

### 4.2 | Prevalence of the risk of AB

Based on the prevalence of overall AB risk, 50% (95% CI 48.5–53.1) of students obtained a high score in at least one of the three dimensions of the MBI-SS questionnaire (high AB risk) (Figure 1). Considering each dimension of the MBI-SS separately, the proportion of students at low, moderate and high risk of AB were 12%, 63%, 25% for EE; 53%, 39%, 8% for CY; and 2%, 70%, 28% for AE, respectively. Some of students scored high in one or more dimensions (Figure 2).

### 4.3 | Factors associated with the risk of AB

In univariate analysis, out of 15 factors explored, every selected variable except gender was significantly associated with a high risk of AB (Table 2).

Multivariate analyses confirmed that 9 factors were significantly associated with an increased overall risk of AB including personal and academic factors: (1) having a child (OR = 1.21, 95% CI 1.12–1.34), (2) having a certificate training level (OR = 1.26, 95% CI 1.06–1.70) and (3) having a student job (OR = 1.36, 95% CI 1.06–1.74), and factors related to the COVID-19 outbreak, including: (4) not having sufficient PPE for COVID-19 (OR = 1.26, 95% CI 1.06–1.42), (5) working overtime during the last internship (OR = 1.30, 95% CI 1.55–1.90), (6) having an increased workload during the pandemic (OR = 2.17, 95% CI 1.10–4.25), (7) being a proven carrier of SARS-CoV-2 (OR = 1.52, 95% CI 1.29–1.79), (8) being a possible carrier of SARS-CoV-2 (OR = 1.22, 95% CI 1.08–1.34) and (9) having a loved one who has died since the start of the pandemic (OR = 1.32, 95% CI 1.19–1.51) (Table 3).

Considering each dimension of the MBI-SS, the EE (emotional) dimension was more impacted by factors such as older age, female gender, having a student job, insufficient PPE, overtime during the last internship, increased workload during the pandemic and being a proven or possible carrier of SARS-CoV-2. Concerning the AE (academic efficacy) dimension, this item was more impacted by factors such as having a child, having a certificate training level (EFQ level 5) and having a loved one who has died since the start of the pandemic.

## 5 | DISCUSSION

This study highlighted the high rate of AB risk in nursing and midwifery students during the COVID-19 pandemic. This work also identified associated factors that promote the occurrence of this psychological disorder. These factors were related to the academic field and the personal life of the student and work overload related to the COVID-19 pandemic was also identified as an important risk factor for AB. This work included a large sample of students and the socio-demographic characteristics of the participants were similar to those observed in other studies performed in Belgium (Ulenaers et al., 2021) in Europe (Deasy et al., 2020; Reverté-Villarroya et al., 2021; Valero-Chillerón et al., 2019) and in China (Wang et al., 2021).

To our knowledge, this study is the first in Europe to evaluate the risk of AB using specific questionnaires in nursing and midwifery students during the COVID-19 outbreak. In a recent study conducted in China during the pandemic with another assessment tool for AB (Wang et al., 2021), the authors reported that 39.29% of the nursing students in their sample showed some degree of AB. Another study of nursing students in Spain before and during the COVID-19 pandemic (Reverté-Villarroya et al., 2021) concluded that there was a significant mental health impact during the pandemic on nursing students.

The present study identified a 50% risk of AB in least one of the three dimensions of the MBI-SS in nursing and midwifery students. This value is higher than that observed in other studies (Faye-Dumanget et al., 2018) performed among students from various disciplines in the university training sector. Nursing students are in close contact with the hospital (Maslach et al., 1986) during their training and, very early in their professional life, they face many stress factors (Gibbons, 2010). Our results are close to the previous conclusions of a meta-analysis of studies on burnout in medical students suggesting that 50% of students suffer from AB, even before residency (Frajerman et al., 2019).

In the present work, we identified factors related to a student's personal life that could precipitate AB, such as having a child. One study conducted outside the pandemic context (Valero-Chillerón et al., 2019) found that "having a child" leads to more organizational stress and an additional risk of AB. Our findings may be explained by the fact that the children of nursing and midwifery students did not have access to childcare during lockdown (Circaire n°7515, 2020).

Regarding the nurse education programme specific to Belgium, this work found that students with a lower academic level were more likely to develop AB. Students in the EFQ5 training level do not have as advanced pedagogical supervision as students in the EFQ 6 programme. Moreover, nurse specialist candidates have a lower risk of AB. One hypothesis to explain this finding is that these students are more trained and feel less stressed facing the critical environment (Valero-Chillerón et al., 2019). From this point of view, students often report an increased need to be heard, prepared and supported during their training (Ulenaers et al., 2021). They ask for more interactions with teachers and nurses accompanying them on

TABLE 1 Characteristics of the respondents ( $n = 2275$ )

Age, year (missing 0%)	23.3 ± 5.7
Gender (missing 0%)	
Female	2017 (88)
Marital status (missing 0%)	
Single	1478 (65)
In a relationship	672 (29)
Married	113 (5)
Other	12 (1)
Have a child (missing 1%)	
Yes	338 (15)
Academic field (missing 0%)	
Nursing certificate	508 (22)
Bachelor	1385 (60)
Midwife	244 (11)
Specialist candidate	138 (6)
Graduation year (missing 0%)	
First	440 (19)
Second	577 (25)
Third	551 (24)
Fourth	552 (24)
Fifth	155 (7)
Student job (missing 0%)	
Yes	1137 (50)
Previous professional experience (missing 0.5%)	
Yes	841 (37)
Sufficient PPE for COVID-19 (missing 0%)	
Yes	1320 (58)
Overtime during the last internship (missing 23%)	
Yes	689 (40)
More frequently faced with death (missing 11%)	
Yes	910 (45)
Impact of COVID-19 on workload (missing 2%)	
Decreased	91(4)
Identical	500 (22)
Increased	1635 (74)
Proven carrier of SARS-CoV-2 (missing 0%)	
Yes	160 (7)
Possible carrier of SARS-CoV-2 (missing 0%)	
Yes	750 (33)
Friend/relative died since the start of the pandemic (missing 0%)	
Yes	477 (21)

Note: Descriptive statistics were performed after exclusion of missing data, absolute frequency (relative frequency), mean ± standard deviation.

internships. They do not always perceive a sense of belonging to the clinical environment and feel an increase in anxiety related to the internship that could negatively impact their learning (Ulenaers et al., 2021).

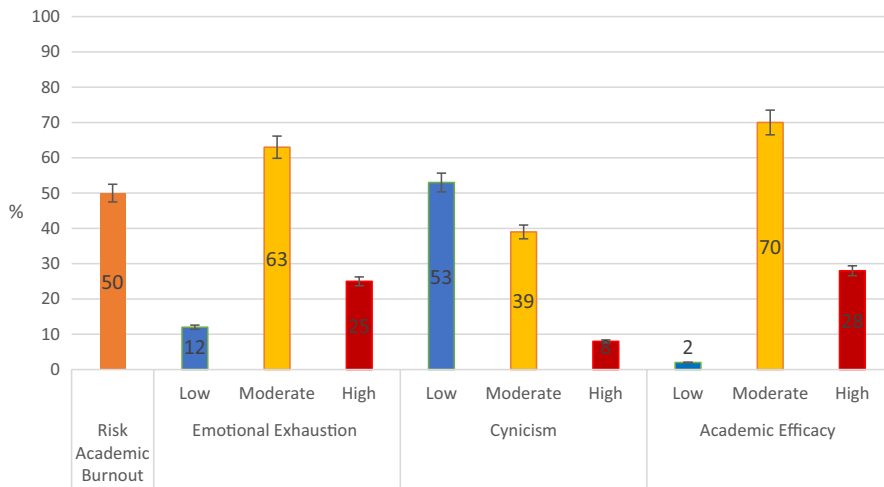


FIGURE 1 Prevalence of academic burnout risk, overall and according to dimension of MBI-SS

Venn diagram: relations between MBI-SS sets

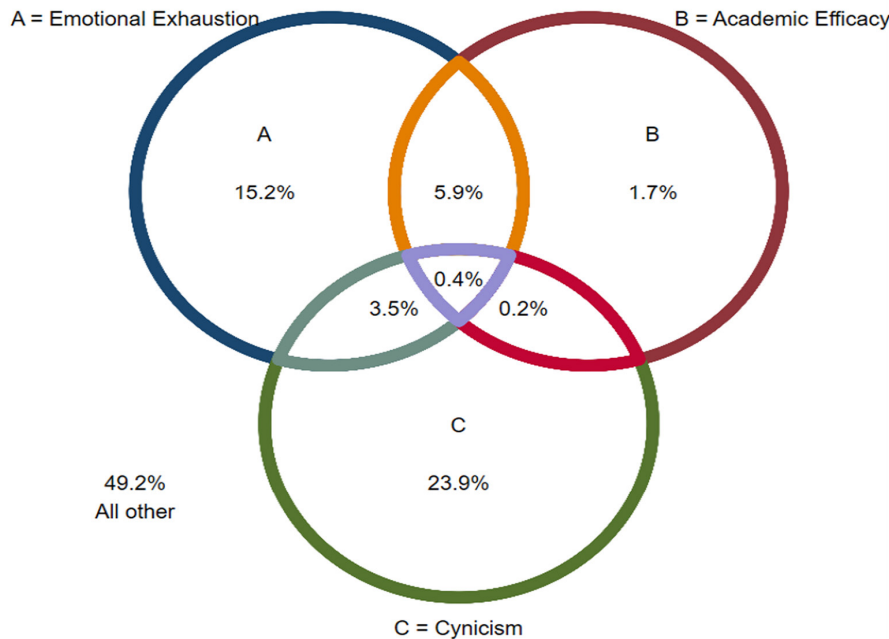


FIGURE 2 Proportion of students who scored high in 1, 2 or 3 dimensions of MBI-SS

Concerning the risk factors of AB related to the COVID-19 pandemic, this work highlighted that the shortage of PPE increased the risk of EE and overall AB. In Belgium, a shortage of PPE (e.g. masks, gloves and hydroalcoholic liquid) was observed at the start of the COVID-19 pandemic (Thornton, 2020; World Health Organization, 2020). This lack of PPE was still reported by 42% of students during the second wave. Obviously, a lack of PPE leads to a fear of contracting the virus and transmitting it to patients and to one's own loved ones. Moreover, this work has shown that the overload of work from the pandemic was a risk factor for AB. The impact of COVID-19 on nurse workload has been previously highlighted (Rosaline & Anggraeni, 2020). Front-line exposure to COVID-19, social isolation (Reverté-Villarroya et al., 2021), lack of preparation (Hernández-Martínez et al., 2021; Ulenaers et al., 2021) and the lack of PPE generated a fear of contracting the virus (Reverté-Villarroya et al., 2021).

This study suggests several implications for education and research. Regarding implications for education: this study confirmed a problematic mental health situation among nursing and midwifery students. It also identified the need for additional preventive measures to avoid AB among these students. Specific measures to reduce the workload of training programmes, including lowering the number of internship hours, could help in this regard. Other improvements can also be proposed. For example, it would be appropriate to make a place for productive teaching environments and techniques (Panda et al., 2021), such as health simulation (Sullivan et al., 2019) and clinical debriefing (Servotte et al., 2020). Programmes could also optimize the pedagogical support of students, in particular by improving working conditions and increasing human resources (clinical staff and instructor support) in the field (Panda et al., 2021). This work showed that nursing students who benefit from a more advanced teaching programme are less susceptible to developing AB.

TABLE 2 Univariate analysis of risk factors according to dimension of the MBI-SS

Variable	Risk of academic burnout OR (95% CI)	Cynicism OR (95% CI)	Emotional exhaustion OR (95% CI)	Academic efficacy OR (95% CI)
Age, year	1.01 (0.99–1.03)	1.00 (0.97–1.03)	<b>0.96 (0.94–0.98)*</b>	<b>1.05 (1.03–1.07)**</b>
Gender, ref = male				
Female	1.20 (0.90–1.59)	0.97 (0.58–1.62)	<b>1.53 (1.07–2.20)**</b>	0.94 (0.68–1.28)
Marital status, ref = single				
In a relationship	<b>1.35 (1.10–1.65)*</b>	1.17 (0.82–1.68)	<b>1.29 (1.03–1.62)*</b>	1.24 (0.99–1.54)
Married	1.34 (0.85–2.10)	1.45 (0.70–2.98)	0.76 (0.43–1.33)	<b>2.11 (1.34–3.37)**</b>
Have a child				
Yes	<b>1.36 (1.06–1.75)***</b>	1.12 (0.69–1.79)	1.22 (0.90–1.64)	<b>1.47 (1.41–1.69)***</b>
Academic field, ref = Bachelor				
Nursing certificate	<b>1.31 (1.05–1.64)***</b>	0.87 (0.57–1.31)	0.79 (0.61–1.03)	<b>1.92 (1.52–2.44)***</b>
Midwife	0.85 (0.63–1.15)	0.86 (0.49–1.5)	1.102 (0.72–1.43)	0.80 (0.56–1.15)
Specialist candidate	<b>0.65 (0.44–0.97)*</b>	1.15 (0.60–2.23)	0.89 (0.56–1.40)	<b>0.54 (0.32–0.92)**</b>
Graduation year, ref = first				
Second	0.82 (0.92–1.09)	1.65 (0.89–3.07)	1.37 (0.96–1.97)	<b>0.60 (0.44–0.82)**</b>
Third	1.09 (0.82–1.45)	<b>2.11 (1.15–3.98)**</b>	<b>1.76 (1.24–2.50)**</b>	<b>0.67 (0.49–0.90)**</b>
Fourth	1.28 (0.96–1.70)	<b>2.17 (1.19–3.98)**</b>	<b>1.85 (1.30–2.62)**</b>	0.86 (0.64–1.16)
Fifth	0.71 (0.47–1.09)	<b>2.19 (1.09–4.82)*</b>	<b>1.62 (1.03–2.75)*</b>	<b>0.40 (0.24–0.68)***</b>
Student job, ref = no				
Yes	<b>1.25 (1.04–1.49)**</b>	1.03 (0.74–1.44)	1.03 (0.84–1.28)	<b>1.39 (1.12–1.70)**</b>
Previous professional experience, ref = no				
Yes	<b>1.28 (1.06–1.55)*</b>	1.07 (0.76–1.51)	1.14 (0.92–1.42)	<b>1.70 (1.38–2.10)***</b>
Sufficient PPE for COVID-19, ref = yes				
No	<b>0.88 (0.51–0.97)*</b>	<b>0.49 (0.35–0.70)***</b>	<b>0.52 (0.47–0.73)***</b>	1.23 (0.98–1.54)
Overtime during the last internship, ref = no				
Yes	<b>1.52 (1.25–1.85)***</b>	0.79 (0.56–1.17)	<b>0.59 (0.47–0.73)***</b>	0.92 (0.74–1.15)
More frequently faced with death, ref = no	–	–	–	–
Yes	<b>1.41 (1.12–1.78)*</b>	1.26 (0.82–1.93)	<b>1.41 (1.07–1.87)**</b>	1.15 (0.88–1.50)
Impact of COVID-19 on workload, ref = decreased				
Identical	1.28 (0.75–2.17)	0.74 (0.29–1.88)	0.82 (0.43–1.60)	1.36 (0.74–2.52)
Increased	<b>1.93 (1.17–3.19)*</b>	1.09 (0.46–2.58)	<b>1.80 (1.07–3.34)*</b>	1.34 (0.74–2.41)
Proven carrier of SARS-CoV-2, ref = no				
Yes	<b>1.54 (1.06–2.23)*</b>	<b>2.30 (1.37–3.82)**</b>	<b>2.11 (1.45–3.07)***</b>	1.05 (0.70–1.56)
Possible carrier of SARS-CoV-2, ref = no				
Yes	<b>1.23 (1.02–1.50)*</b>	<b>1.99 (1.43–2.79)***</b>	<b>1.70 (1.36–2.11)***</b>	<b>0.75 (0.60–0.93)**</b>
Deceased friend/relative since the start of the pandemic, ref = no				
Yes	<b>1.45 (1.16–1.82)**</b>	0.97 (0.65–1.47)	<b>1.33 (1.04–1.71)*</b>	<b>1.28 (1.01–1.63)*</b>

Note: Value in bold: significant.

Abbreviations: MBI-SS, Maslach burnout inventory student survey; PPE, personal protection equipment; ref, reference.

\* $p$ -value < 0.05; \*\* $p$ -value < 0.01; \*\*\* $p$ -value < 0.001.

TABLE 3 Multivariate analysis of risk factors according to dimension of the MBI-SS

Variable	Risk of academic burnout	Cynicism	Emotional exhaustion	Academic efficacy
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age, year	0.98 (0.95–1.02)	0.98 (0.92–1.04)	<b>0.94 (0.89–0.98)*</b>	1.02 (0.98–1.06)
Gender, ref = male				
Female	1.29 (0.89–1.86)	0.81 (0.43–1.50)	<b>1.69 (1.06–2.72)*</b>	1.02 (0.67–1.54)
Marital status, ref = single				
In a relationship	1.20 (0.93–1.56)	1.22 (0.78–1.88)	1.21 (0.91–1.62)	1.04 (0.77–1.39)
Married	0.92 (0.46–1.84)	2.56 (0.86–7.68)	1.10 (0.47–2.58)	1.13 (0.55–2.32)
Have a child				
Yes	<b>1.21 (1.12–1.34)**</b>	1.18 (0.58–2.41)	0.93 (0.59–1.47)	<b>1.39 (1.22–1.52)**</b>
Academic field, ref = Bachelor				
Nursing certificate	<b>1.26 (1.06–1.70)*</b>	1.20 (0.59–2.46)	0.76 (0.53–1.08)	<b>1.88 (1.37–2.58)***</b>
Midwife	0.87 (0.57–1.33)	0.67 (0.59–2.47)	1.07 (0.67–1.71)	0.64 (0.37–1.10)
Specialist candidate	0.66 (0.16–2.66)	1.20 (0.59–2.45)	0.51 (0.11–2.30)	0.63 (1.13–3.07)
Graduation year, ref = first				
Second	0.82 (0.49–1.33)	0.90 (0.36–2.25)	1.08 (0.59–1.99)	0.74 (0.43–1.28)
Third	0.94 (0.57–1.55)	0.73 (0.28–1.89)	1.25 (0.68–2.32)	0.77 (0.45–1.34)
Fourth	1.31 (0.78–2.22)	1.32 (0.51–3.43)	1.39 (0.73–2.65)	1.16 (0.66–2.06)
Fifth	1.14 (0.27–4.80)	1.76 (0.17–17.4)	2.37 (0.49–11.3)	0.92 (0.18–4.61)
Student job, ref = no				
Yes	<b>1.36 (1.06–1.74)**</b>	1.10 (0.72–1.69)	<b>1.42 (1.07–1.89)**</b>	1.18 (0.90–1.57)
Previous professional experience, ref = no				
Yes	0.76 (0.56–1.02)	1.01 (0.62–1.66)	0.79 (0.58–1.10)	0.80 (0.59–1.10)
Sufficient PPE for COVID-19, ref = Yes				
No	<b>1.26 (1.06–1.42)*</b>	<b>1.46 (1.28–1.66)***</b>	<b>1.43 (1.25–1.57)***</b>	1.18 (0.89–1.56)
Overtime during the last internship, ref = no				
Yes	<b>1.30 (1.55–1.90)*</b>	1.08 (0.69–1.67)	<b>1.44 (1.13–1.51)*</b>	0.87 (0.65–1.13)
More frequently faced with death, ref = no				
Yes	1.03 (0.96–1.11)	0.96 (0.69–1.67)	1.05 (0.97–1.15)	1.04 (0.97–1.13)
Impact of COVID-19 on workload, ref = decreased				
Identical	1.67 (0.83–3.34)	0.73 (0.23–2.33)	0.90 (0.38–2.14)	1.81 (0.76–4.35)
Increased	<b>2.17 (1.10–4.25)*</b>	0.54 (0.35–3.01)	<b>1.82 (1.52–2.10)*</b>	1.59 (0.68–3.73)
Proven carrier of SARS-CoV-2, ref = no				
Yes	<b>1.52 (1.29–1.79)*</b>	<b>1.62 (1.30–1.89)**</b>	<b>1.56 (1.36–1.73)**</b>	1.14 (0.51–1.45)
Possible carrier of SARS-CoV-2, ref = no				
Yes	<b>1.22 (1.08–1.34)*</b>	<b>1.47 (1.29–1.79)**</b>	<b>1.36 (1.05–1.46)*</b>	1.21 (0.91–1.68)
Deceased friend/relative since the start of the pandemic, ref = no				
Yes	<b>1.32 (1.19–1.51)**</b>	0.98 (0.60–1.62)	0.82 (0.60–1.14)	<b>1.29 (1.12–1.48)**</b>

Note: Value in bold: significant.

Abbreviations: MBI-SS, Maslach burnout inventory student survey; PPE, personal protection equipment; ref, reference.

\* $p$ -value < 0.05; \*\* $p$ -value < 0.01; \*\*\* $p$ -value < 0.001.



This stresses the need to harmonize nurse training programmes, particularly in Belgium. Also, it may help to facilitate the organization of studies in parallel with personal life by offering various public services to students (e.g. shuttle to remote internships, childcare and meals). Aiming to optimize nurse training, one could reduce the gap between theoretical education and clinical practice (Panda et al., 2021; Ulenaers et al., 2021). Monitoring the risk of AB and implementing interventions to prevent and manage this psychological disorder is important among nursing and midwifery students.

Regarding implications for research: Further studies are needed (1) to assess the effect of preventive and curative actions, (2) to better understand the associated external factors promoting AB through mixed and multidisciplinary approaches and (3) to extend and compare the prevalence of AB risk to other student populations.

## 5.1 | Limitations

This study also has limitations. Although the sample of participants was very large, the present work was based on a convenience sample (voluntary participation). Another limitation was related to the design of this study. These results could be underestimated because some students in the investigated population may suffer from AB and did not respond at the time of the study. We only conducted one measurement of the prevalence of AB risk in French-speaking Belgium and do not have a pre-pandemic benchmark in this population for comparison. With regard to our diagnostic tool, the MBI-SS is a tool to estimate the risk of AB but does not diagnose AB formally. In this work, only students with a high-risk score of AB were taken into account to calculate the overall risk. No study has shown this so far. Although this study was carried out in a single country, Belgium, the results obtained can likely be extrapolated to other countries.

## 6 | CONCLUSIONS

This study has demonstrated a significant risk of AB (50%) among nursing and midwifery students in French-speaking Belgium during the second wave of the COVID-19 pandemic. This risk was related to previously described personal life factors and those associated with factors related to education, such as the academic field. These factors exist even in the absence of a pandemic, providing justification for taking long-term preventive measures. Other risk factors of AB specifically related to the COVID-19 pandemic were identified in this work such as the additional workload related to this viral infection and the lack of means of protection for transmission. Having identified this risk, specific measures must now be taken to prevent AB such as partnership development between students, teachers, health professionals and Belgian and European policy administrators.

## AUTHOR CONTRIBUTIONS

Each researcher put their research expertise to work in carrying out the study during the various stages of research and publication.

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## CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

## DATA AVAILABILITY STATEMENT

Data available on request from the authors.

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## REFERENCES

- Aiken, L. H., Smeus, W., van den Heede, K., Sloane, D. M., Busse, R., McKee, M., Bruyneel, L., Rafferty, A. M., Griffiths, P., Moreno-Casbas, M. T., Tishelman, C., Scott, A., Brzostek, T., Kinnunen, J., Schwendimann, R., Heinen, M., Zikos, D., Sjetne, I. S., Smith, H. L., & Kutney-Lee, A. (2012). Patient safety, satisfaction, and quality of hospital care: Cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *BMJ (Online)*, 344(7851), 5. <https://doi.org/10.1136/bmj.e1717>
- Aloba, O., Awe, O., Adelola, A., Olatunji, P., & Aloba, T. (2018). Psychometric adaptation of the Beck hopelessness scale as a self-rated suicide risk screening instrument among Nigerian university students. *Journal of the American Psychiatric Nurses Association*, 24(5), 433–443. <https://doi.org/10.1177/1078390318762054>
- Boutou, A., Pitsiou, G., Sourla, E., & Kioumis, I. (2019). Burnout syndrome among emergency medicine physicians: An update on its prevalence and risk factors. *European Review for Medical and Pharmacological Sciences*, 23(20), 9058–9065. [https://doi.org/10.26355/eurrev\\_201910\\_19308](https://doi.org/10.26355/eurrev_201910_19308)
- Bruyneel, A., Gallani, M. C., Tack, J., d'Hondt, A., Canipel, S., Franck, S., Reper, P., & Pirson, M. (2021). Impact of COVID-19 on nursing time in intensive care units in Belgium. *Intensive and Critical Care Nursing*, 62, 102967. <https://doi.org/10.1016/j.iccn.2020.102967>
- Bruyneel, A., Smith, P., Tack, J., & Pirson, M. (2021). Prevalence of burnout risk and factors associated with burnout risk among

- ICU nurses during the COVID-19 outbreak in French speaking Belgium. *Intensive and Critical Care Nursing*, 65, 103059. <https://doi.org/10.1016/j.iccn.2021.103059>
- Bruyneel, A., Tack, J., Droguet, M., Maes, J., Wittebole, X., Miranda, D. R., & di Pierdomenico, L. (2019). Measuring the nursing workload in intensive care with the nursing activities score (NAS): A prospective study in 16 hospitals in Belgium. *Journal of Critical Care*, 54, 205–211. <https://doi.org/10.1016/j.jcrrc.2019.08.032>
- Campos, J. A. D. B., & Maroco, J. (2012). Adaptação transcultural Portugal-Brasil do Inventário de Burnout de Maslach para estudantes. *Revista de Saúde Pública*, 46(5), 816–824. <https://doi.org/10.1590/S0034-89102012000500008>
- Chen, R., Sun, C., Chen, J., Jen, H., Kang, X. L., Kao, C., & Chou, K. (2021). A large-scale survey on trauma, burnout, and posttraumatic growth among nurses during the COVID-19 pandemic. *International Journal of Mental Health Nursing*, 30(1), 102–116. <https://doi.org/10.1111/inm.12796>
- Chernomas, W. M., & Shapiro, C. (2013). Stress, depression, & anxiety among undergraduate nursing students. *International Journal of Nursing Education Scholarship*, 10(1), 255–266. <https://doi.org/10.1515/ijnes-2012-0032>
- Circulaire n°7515. (2020). [https://www.gallilex.cfwb.be/fr/cir\\_res\\_03.php?ncda=46765&referant=l01](https://www.gallilex.cfwb.be/fr/cir_res_03.php?ncda=46765&referant=l01)
- Crary, P. (2013). Beliefs, behaviors, and health of undergraduate nursing students. *Holistic Nursing Practice*, 27(2), 74–88. <https://doi.org/10.1097/HNP.0b013e318280f75e>
- de Brito Gomes Lima, B. V., Pedrosa Trajano, F. M., Chaves Neto, G., Santos Alves, R., Alves Farias, J., & Fernandes Braga, J. E. (2017). Evaluation of anxiety and self-esteem in students concluding the nursing graduation course. *Journal of Nursing UFPE on Line*, 11(11), 4326–4333. <https://doi.org/10.5205/1981-8963-v11i11a13440p4326-4333-2017>
- Deasy, C., O Loughlin, C., Markey, K., O'Donnell, C., Murphy Tighe, S., Doody, O., Tuohy, D., Hussey, M., O'Brien, B., & Meskell, P. (2020). Effective workforce planning: Understanding final-year nursing and midwifery students' intentions to migrate after graduation. *Journal of Nursing Management*, 29, 220–228. <https://doi.org/10.1111/jonm.13143>
- Dzau, V. J., Kirch, D. G., & Nasca, T. J. (2018). To care is human—Collectively confronting the clinician-burnout crisis. *The New England Journal of Medicine*, 378(4), 312–314. <https://doi.org/10.1056/NEJMP1715127>
- ECDC. (2020). Rapid risk assessment: Coronavirus disease 2019 (COVID-19) pandemic: increased transmission in the EU/EEA and the UK – seventh update. <https://www.ecdc.europa.eu/en/publications-data/rapid-risk-assessment-coronavirus-disease-2019-covid-19-pandemic>
- Faye Dumanget, C., le Borgne, M., Carré, J., & Boudoukha, A. (2015). Validation en français de l'échelle Maslach Burnout Inventory-Student Survey (MBI-SS). [https://www.researchgate.net/publication/277669320\\_Validation\\_en\\_francais\\_de\\_l'echelle\\_Maslach\\_Burnout\\_Inventory-Student\\_Survey\\_MBI-SS](https://www.researchgate.net/publication/277669320_Validation_en_francais_de_l'echelle_Maslach_Burnout_Inventory-Student_Survey_MBI-SS)
- Faye-Dumanget, C. (2018). L'épuisement étudiant: approche clinique, psychopathologique, épidémiologique et psychothérapeutique TCC du syndrome du burnout académique [Nantes]. <https://www.theses.fr/2018NANT2050>
- Faye-Dumanget, C., Belleil, J., Blanche, M., Marjolet, M., & Boudoukha, A. H. (2018). Academic burnout among students: Effect of socio-demographic variables on burn-out levels. *Annales Medico-Psychologiques*, 176(9), 870–874. <https://doi.org/10.1016/j.amp.2017.09.012>
- Frajerman, A., Morvan, Y., Krebs, M. O., Gorwood, P., & Chaumette, B. (2019). Burnout in medical students before residency: A systematic review and meta-analysis. *European Psychiatry*, 55, 36–42. <https://doi.org/10.1016/j.eurpsy.2018.08.006>
- Gibbons, C. (2010). Stress, coping and burn-out in nursing students. *International Journal of Nursing Studies*, 47(10), 1299–1309. <https://doi.org/10.1016/j.ijnurstu.2010.02.015>
- Guixia, L., & Hui, Z. (2020). A study on burnout of nurses in the period of COVID-19. *Psychology and Behavioral Sciences*, 9(3), 31. <https://doi.org/10.11648/j.pbs.20200903.12>
- Hernández-Martínez, A., Rodríguez-Almagro, J., Martínez-Arce, A., Romero-Blanco, C., Jesús García-Iglesias, J., & Gómez-Salgado, J. (2021). Nursing students' experience and training in healthcare aid during the Covid-19 pandemic in Spain. *Journal of Clinical Nursing*, 2.
- Hu, D., Kong, Y., Li, W., Han, Q., Zhang, X., Zhu, L. X., Wan, S. W., Liu, Z., Shen, Q., Yang, J., He, H. G., & Zhu, J. (2020). Frontline nurses' burnout, anxiety, depression, and fear statuses and their associated factors during the COVID-19 outbreak in Wuhan, China: A large-scale cross-sectional study. *EClinicalMedicine*, 24, 100424. <https://doi.org/10.1016/j.eclinm.2020.100424>
- Hu, Q., & Schaufeli, W. B. (2009). The factorial validity of the Maslach Burnout Inventory-Student Survey in China 1. *Psychological Reports*, 105, 394–408. <https://doi.org/10.2466/PRO.105.2.394-408>
- Jalili, M., Niroomand, M., Hadavand, F., Zeinali, K., & Fotouhi, A. (2020). Burnout among healthcare professionals during COVID-19 pandemic: A cross-sectional study. *medRxiv*, 20. <https://doi.org/10.1101/2020.06.12.20129650>
- Jouck, P., Vivet, V., Delvaux, A., Durand, C., Mahieu, T., Miermans, P.-J., & Steinberg, P. (2019). Infirmiers sur le marché du travail. Cellule Planification de l'offre des professions des soins de santé. [https://organesdeconcertation.sante.belgique.be/sites/default/files/documents/infirmiers\\_sur\\_le\\_marche\\_du\\_travail\\_2017.pdf](https://organesdeconcertation.sante.belgique.be/sites/default/files/documents/infirmiers_sur_le_marche_du_travail_2017.pdf)
- KCE. (2020). Dotation infirmière pour des soins (plus) sûrs dans les hôpitaux aigus 2019. <https://kce.fgov.be/report/325B>
- Kong, L. N., Yang, L., Pan, Y. N., & Chen, S. Z. (2021). Proactive personality, professional self-efficacy and academic burnout in undergraduate nursing students in China. *Journal of Professional Nursing*, 37(4), 690–695. <https://doi.org/10.1016/j.profnurs.2021.04.003>
- Maslach, C., Jackson, S. E., Leiter, M. P., Schaufeli, W. B., & Schwab, R. L. (1986). Maslach burnout inventory manual, general survey, human services survey, educators survey ad scoring guides. (Mind Garden, Ed.).
- Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology*, 52(1), 397–422. <https://doi.org/10.1146/annurev.psych.52.1.397>
- Molenberghs, G., Faes, C., Aerts, J., Theeten, H., Devleeschauwer, B., Sierra, N. B., Braeye, T., Renard, F., Herzog, S., Lusyne, P., van der Heyden, J., van Oyen, H., van Damme, P., & Hens, N. (2020). Belgian COVID-19 mortality, excess deaths, number of deaths per million, and infection fatality rates (8 March – 9 May 2020). *medRxiv*, 1–18. <https://doi.org/10.1101/2020.06.20.20136234>
- Oliveira Silva, G., Aredes, N. D. A., & Galdino-Júnior, H. (2021). Academic performance, adaptation and mental health of nursing students: A cross-sectional study. *Nurse Education in Practice*, 55, 103145. <https://doi.org/10.1016/j.nepr.2021.103145>
- Panda, S., Dash, M., John, J., Rath, K., Debata, A., Swain, D., Mohanty, K., & Eustace-Cook, J. (2021). Challenges faced by student nurses and midwives in clinical learning environment – A systematic review and META-synthesis. *Nurse Education Today*, 104875, 12. <https://doi.org/10.1016/j.nedt.2021.104875>
- Reverté-Villarroya, S., Ortega, L., Lavedán, A., Masot, O., Burjalés-Martí, M. D., Ballester-Ferrando, D., Fuentes-Pumarola, C., & Botigüé, T. (2021). The influence of COVID-19 on the mental health of final-year nursing students: Comparing the situation before and during the pandemic. *International Journal of Mental Health Nursing*, 30, 695. <https://doi.org/10.1111/inm.12827>
- Rosaline, M. D., & Anggraeni, D. T. (2020). Factors related to academic stress during the covid-19 pandemic in nursing students of UPN veteran Jakarta. In *International Conference of Health Development. Covid-19 and the Role of Healthcare Workers in the Industrial Era*

- (ICHHD 2020) (pp. 374–379). Atlantis Press. <https://doi.org/10.2991/ahsr.k.201125.064>
- Rotenstein, L. S., Torre, M., Ramos, M. A., Rosales, R. C., Guille, C., Sen, S., & Mata, D. A. (2018). Prevalence of burnout among physicians a systematic review. *JAMA - Journal of the American Medical Association*, 320(11), 1131–1150. American Medical Association. <https://doi.org/10.1001/jama.2018.12777>
- Savitsky, B., Findling, Y., Erel, A., & Hendel, T. (2020). Anxiety and coping strategies among nursing students during the covid-19 pandemic. *Nurse Education in Practice*, 46, 102809. <https://doi.org/10.1016/j.nepr.2020.102809>
- Schaufeli, W. B., Leiter, M. P., & Maslach, C. (2009). Burnout: 35 years of research and practice. *Career Development International*, 14(3), 206–220. <https://doi.org/10.1108/13620430910966406>
- Schaufeli, W. B., Martínez, I. M., Pinto, A. M., Salanova, M., & Barker, A. B. (2002). Burnout and engagement in university students a cross-national study. *Journal of Cross-Cultural Psychology*, 33(5), 464–481. <https://doi.org/10.1177/0022022102033005003>
- Sermeus, W., Aiken, L. H., van den Heede, K., Rafferty, A. M., Griffiths, P., Moreno-Casbas, M. T., Busse, R., Lindqvist, R., Scott, A. P., Bruyneel, L., Brzostek, T., Kinnunen, J., Schubert, M., Schoonhoven, L., & Zikos, D. (2011). Nurse forecasting in Europe (RN4CAST): Rationale, design and methodology. *BMC Nursing*, 10(1), 6. <https://doi.org/10.1186/1472-6955-10-6>
- Service Public Fédéral Belge. (2020). Coronavirus: mesures renforcées | Belgium.be. [https://www.belgium.be/fr/actualites/2020/coronavirus\\_mesures\\_renforcees](https://www.belgium.be/fr/actualites/2020/coronavirus_mesures_renforcees)
- Servotte, J.-C., Welch-Horan, T. B., Mullan, P., Piazza, J., Ghuyssen, A., & Szyld, D. (2020). Development and implementation of an end-of-shift clinical debriefing method for emergency departments during COVID-19. *Advances in Simulation*, 5(1), 32. <https://doi.org/10.1186/s41077-020-00150-0>
- Shaban, I. A., Khater, W. A., & Akhu-Zaheya, L. M. (2012). Undergraduate nursing students' stress sources and coping behaviours during their initial period of clinical training: A Jordanian perspective. *Nurse Education in Practice*, 12(4), 204–209. <https://doi.org/10.1016/j.nepr.2012.01.005>
- Shechter, A., Diaz, F., Moise, N., Anstey, D. E., Ye, S., Agarwal, S., Birk, J. L., Brodie, D., Cannone, D. E., Chang, B., Claassen, J., Cornelius, T., Derby, L., Dong, M., Givens, R. C., Hochman, B., Homma, S., Kronish, I. M., Lee, S. A. J., ... Abdalla, M. (2020). Psychological distress, coping behaviors, and preferences for support among New York healthcare workers during the COVID-19 pandemic. *General Hospital Psychiatry*, 66, 1–8. <https://doi.org/10.1016/j.genhosppsych.2020.06.007>
- Sullivan, N., Swoboda, S. M., Breymier, T., Lucas, L., Sarasnick, J., Rutherford-Hemming, T., Budhathoki, C., Kardong-Edgren, S. S. (2019). Emerging evidence toward a 2:1 clinical to simulation ratio: A study comparing the traditional clinical and simulation settings. *Clinical Simulation in Nursing*, 30, 34–41. <https://doi.org/10.1016/j.ecns.2019.03.003>
- Thornton, J. (2020). Covid-19: Care homes in Belgium and Spain had "alarming living conditions," says MSF report. *BMJ (Clinical Research Ed.)*, 370, m3271. <https://doi.org/10.1136/bmj.m3271>
- Timmins, F., & Kaliszer, M. (2002). Aspects of nurse education programmes that frequently cause stress to nursing students—Fact-finding sample survey. *Nurse Education Today*, 22(3), 203–211. <https://doi.org/10.1054/nedt.2001.0698>
- Ulenaers, D., Grosemans, J., Schrooten, W., & Bergs, J. (2021). Clinical placement experience of nursing students during the COVID-19 pandemic: A cross-sectional study. *Nurse Education Today*, 99, 104746. <https://doi.org/10.1016/j.nedt.2021.104746>
- Valero-Chillerón, M. J., González-Chordá, V. M., López-Peña, N., Cervera-Gasch, Á., Suárez-Alcázar, M. P., & Mena-Tudela, D. (2019). Burnout syndrome in nursing students: An observational study. *Nurse Education Today*, 76, 38–43. <https://doi.org/10.1016/j.nedt.2019.01.014>
- van de Voorde, C., Lefèvre, M., Mistiaen, P., Detollenaere, J., Kohn, L., & van den Heede, K. (2020). Gestion de la capacité hospitalière en Belgique durant la première vague de la pandémie de COVID-19 – Synthèse. [www.kce.fgov.be](http://www.kce.fgov.be)
- van den Heede, K., Bruyneel, L., Beeckmans, D., Boon, N., Bouckaert, N., Cornelis, J., Dossche, D., van de Voorde, C., & Sermeus, W. (2019). KCE reports 325—Safe nurse staffing levels in acute hospitals. <https://kce.fgov.be/en/safe-nurse-staffing-levels-in-acute-hospitals>
- Vandenbroucke, J. P., von Elm, E., Altman, D. G., Gøtzsche, P. C., Mulrow, C. D., Pocock, S. J., Poole, C., Schlesselman, J. J., & Egger, M. (2007). Strengthening the reporting of observational studies in epidemiology (STROBE): Explanation and elaboration. *Epidemiology*, 18(6), 805–835. <https://doi.org/10.1097/EDE.0b013e3181577511>
- Wang, J., Bu, L., Li, Y., Song, J., & Li, N. (2021). The mediating effect of academic engagement between psychological capital and academic burnout among nursing students during the COVID-19 pandemic: A cross-sectional study. *Nurse Education Today*, 102, 104938. <https://doi.org/10.1016/j.nedt.2021.104938>
- Wang, M., Guan, H., Li, Y., Xing, C., & Rui, B. (2019). Academic burnout and professional self-concept of nursing students: A cross-sectional study. *Nurse Education Today*, 77, 27–31. <https://doi.org/10.1016/j.nedt.2019.03.004>
- Watson, R., Deary, I., Thompson, D., & Li, G. (2008). A study of stress and burnout in nursing students in Hong Kong: A questionnaire survey. *International Journal of Nursing Studies*, 45(10), 1534–1542. <https://doi.org/10.1016/j.ijnurstu.2007.11.003>
- Wei, H., Dorn, A., Hutto, H., Corbett, R. W., Haberstroh, A., & Larson, K. (2021). Impacts of nursing student burnout on psychological well-being and academic achievement. *Journal of Nursing Education*, 60(7), 369–376. <https://doi.org/10.3928/01484834-20210616-02>
- WHO. (2020). Timeline of WHO's response to COVID-19. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline>
- World Health Organization. (2020). Critical shortage or lack of personal protective equipment in the context of COVID-19.

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