

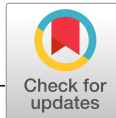
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## ORIGINAL ARTICLE

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# Burnout symptoms in forensic psychiatric nurses and their associations with personality, emotional intelligence and client aggression: A cross-sectional study

Peter de Looff<sup>1,2</sup> | Henk Nijman<sup>1,2</sup> | Robert Didden<sup>1,3</sup> | Petri Embregts<sup>4</sup><sup>1</sup>Behavioural Science Institute, Radboud University, Nijmegen, The Netherlands<sup>2</sup>Wier, Specialized and Forensic Care, Fivoor, Den Dolder, The Netherlands<sup>3</sup>Trajectum, Specialized and Forensic Care, Zwolle, The Netherlands<sup>4</sup>Department of Tranzo, Tilburg School of Social and Behavioral Sciences, Tilburg University, Tilburg, The Netherlands**Correspondence**

Peter de Looff, Wier, Specialized and Forensic Care, Fivoor, Den Dolder, The Netherlands.

Email: peterdelooff@gmail.com

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DForZo

**Accessible summary****What is known on the subject?:**

- Client aggression in forensic psychiatry is associated with burnout symptoms in nursing staff. It is unclear what mechanisms contribute to this relationship.
- The type and severity of aggression might be of importance in the association between client aggression and burnout symptoms, but also the personality characteristics and emotional intelligence of nursing staff.
- It is unknown whether wearable devices that measure arousal can be used to detect chronic stress and burnout symptoms.

**What does this paper add to existing knowledge?:**

- Especially, physical aggression as experienced by nursing staff is associated with staff's burnout symptoms (e.g., emotional exhaustion and depersonalization). Further research on the aggression questionnaire is necessary.
- The stress management skill of nursing staff is an important factor to consider in the association between burnout symptoms and client aggression.
- The wearable device was not useful for detecting burnout symptoms.

**What are the implications for practice?:**

- Nursing staff who experience (physical) aggression should be carefully monitored and should receive social support from their management to aid their well-being. Contrary to intuition, nurses who reported a higher number of stress management skills might have to be monitored more closely if necessary.

**Abstract****Introduction:** Aggressive behaviour of forensic clients is associated with burnout symptoms in nursing staff. The role of staff characteristics as moderators is unclear.**Aim:** We explored the association between type and severity of aggressive behaviour as experienced by nursing staff and staff's burnout symptoms. In addition, the moderating roles of personality characteristics and emotional intelligence (EI) were studied. Moreover, the usefulness of ambulatory skin conductance assessments in detecting arousal related to burnout symptoms was studied.

**Method:** A total of 114 forensic nursing staff members filled out questionnaires and wore an ambulatory device.

**Results:** Experiencing physical aggression was positively associated with staff's burnout symptoms. Stress management skills, a subscale of EI, but not personality, moderated this relationship. Skin conductance was not associated with burnout symptoms. Remarkably, the association between aggression and burnout symptoms was highest for staff reporting a higher number of stress management skills.

**Discussion:** Longitudinal research is necessary to establish causality between client aggression and staff burnout symptoms. In addition, further research is necessary on the validity of the aggression measure used in the current study.

**Implication for practice:** Nursing staff who experience physical aggression frequently should receive social support for this, and staff who report high stress management skills should be monitored more carefully after having been confronted with aggression.

#### KEYWORDS

aggression, forensic, health technology assessment, occupational mental health, social support

## 1 | INTRODUCTION

Burnout is the last stage of a chronic occupational exhaustion process (Schaufeli, 2017) and is characterized by exhaustion, cynicism and inefficacy (Leiter, Bakker, & Maslach, 2014). It is described as a stress-related syndrome which can have a major impact on the personal well-being of mental health nurses and quality of psychiatric care (McTiernan & McDonald, 2015; Volpe et al., 2014). Especially, psychiatric nurses have a higher risk of burnout than other nursing professions (Dennis & Leach, 2007; Gascon et al., 2013; Hanrahan, Aiken, McClaine, & Hanlon, 2010; Sahraian, Fazelzadeh, Mehdizadeh, & Toobae, 2008). Several questionnaires on burnout have been developed, but the most often used questionnaire describes burnout on three scales: emotional exhaustion, depersonalization and decreased levels of personal accomplishment (Maslach, Jackson, & Leiter, 1996; Schaufeli, Maslach, & Marek, 2017).

Besides the often found association between job stress and burnout (Doerr & Nater, 2017; Hsu, Chen, Yu, & Lou, 2010; Schulz et al., 2009), there is an increasing body of research on the association between burnout and aggression (Leiter et al., 2014; Winstanley & Whittington, 2002). Both the type and severity of aggression have to be taken into account (Hensel, Lunsky, & Dewa, 2012). One type of aggression that is frequently studied is physical aggression, although the number of studies on other forms of aggression has increased over the past decade as well (Campana & Hammoud, 2015). Reviews have indicated that both verbal and physical aggressions experienced by nurses are associated with negative psychological outcomes (Edward, Ousey, Warelow, & Lui, 2014; Edward et al., 2016). This association between aggression and negative outcomes has also been established with burnout as both physical and other

forms of aggression are associated with higher levels of emotional exhaustion (Evers, Tomic, & Brouwers, 2001; Gascon et al., 2013) and depersonalization (Leiter et al., 2014). Moreover, the severity of aggression has also been found to be associated with higher levels of emotional exhaustion (Hensel et al., 2012).

Several personality characteristics have also been associated with burnout. A meta-analysis by Swider and Zimmerman (2010), for instance, revealed that four of the big-five personality characteristics are associated with burnout (i.e., not openness). Swider and Zimmerman (2010) found a positive association between burnout and neuroticism, and negative associations between burnout and extraversion, conscientiousness and agreeableness. It is argued that the moderating role of personality characteristics in association with burnout should be investigated (Schaufeli et al., 2017). A study on nursing staff who work with clients with intellectual disabilities (Chung & Harding, 2009) also found associations between burnout and personality characteristics such as higher neuroticism, lower extraversion and higher conscientiousness. Besides personality, a recent review reported that emotional intelligence (EI) and burnout dimensions were negatively associated (Mérida-López & Extremera, 2017). Also, studies on stress in nursing staff caring for clients with intellectual disabilities indicated that high EI is a protective factor for burnout (Gerits, Derksen, Verbruggen, & Katzko, 2005). Indeed, research has shown a negative association between EI and burnout (Beauvais, Andreychik, & Henkel, 2017; Zysberg, Orenshtein, Gimmon, & Robinson, 2017), which was mediated by job stress. The role of personality and EI in the burnout-aggression association was investigated in the current study (Hensel, Lunsky, & Dewa, 2015).

Another recent review suggested that measures of autonomic nervous system activity like heart rate and skin conductance (SC)

can be used as indicators of acute or chronic stress and fatigue in nurses (Khanade & Sasangohar, 2017). As burnout is a possible outcome of chronic job stress, this study investigates the association between the autonomic nervous system and burnout symptoms. Heart rate and heart rate variability have been linked to burnout before (see, e.g., Henning et al., 2014; Jönsson et al., 2015; Lennartsson, Jonsdottir, & Sjörs, 2016; Moya-Albiol, Serrano, & Salvador, 2010; Teisala et al., 2014). However, to our knowledge, no research has been conducted on the association between SC and burnout.

In sum, this study examined the association between burnout symptoms in forensic nursing staff and aggressive behaviour of clients with intellectual disabilities admitted to a forensic psychiatric hospital. A review showed that aggression is associated with burnout (Hastings, 2002), but it is largely unknown what factors contribute to this mechanism (Hensel et al., 2015). In addition, this study examined whether SC was associated with burnout symptoms as research indicates that autonomic nervous system markers might be useful in detecting burnout (Khanade & Sasangohar, 2017).

The following three research questions were studied:

1. Client aggression as experienced by nursing staff is positively associated with burnout symptoms reported by staff.
2. This association is moderated by personality traits and EI.
3. Can ambulatory assessments of skin conductance be useful for detecting burnout symptoms in nursing staff?

## 2 | METHOD

### 2.1 | Participants and setting

We included 114 nursing staff members (59% female) of whom 105 completed all questionnaires (92% participation rate). They worked in four Dutch forensic psychiatric hospitals for clients with intellectual disabilities and severe challenging behaviours, such as aggressive behaviour. Comorbid disorders of the clients consist of, but are not restricted to, schizophrenia, depression, autism, substance abuse and anger-related issues. The forensic hospitals are located across the Netherlands. Clients are referred to the hospitals if treatment in general treatment facilities are ineffective. The goal of admission is rehabilitation through prolonged treatment on behavioural outcomes, social skills, substance abuse, vocational training, etc.

### 2.2 | Ethical approval and conduct

Approval for the current study was granted by the scientific committee and committee of ethics of the Faculty of Social Sciences of the Radboud University at Nijmegen (ECSW2015-1901-282). All participants were treated in accordance with the Declaration of Helsinki for research on human participants.

### 2.3 | Procedure

A power analysis for a multiple regression analysis with 95% power, alpha set at 0.05 and an effect size of 0.2 on four predictor variables revealed that we needed at least 98 participants. We managed to include 114 participants in our sample. Nursing staff members were initially invited and informed about the aim of the study through email, posters and flyers. Written informed consent was obtained for all participants after they received all necessary information on the study. To be included in the study, participants had to work on the forensic psychiatric units and work during a day and/or evening shift.

First, participants were asked to complete a personality and an EI questionnaire. Next, staff wore a wristband called the Empatica E4 which measured SC during a full day or evening shift (night shifts were excluded). Following SC assessment, participants were invited to complete questionnaires on burnout symptoms, job stress (generally perceived job-related stress) and clients' aggressive behaviour (as perceived during the last six months).

### 2.4 | Materials and measures

Burnout symptoms were assessed with a validated Dutch version of the Maslach Burnout Inventory (Maslach et al., 1996) which consists of 20 items divided over three subscales: emotional exhaustion (e.g., "I feel exhausted because of my work"), depersonalization (e.g., "I have increasing feelings of indifference towards other people since I have this job") and personal accomplishment (e.g., "I feel that I have a positive influence on the lives of other people because of my work"). Emotional exhaustion and depersonalization are positively correlated with burnout, while personal accomplishment is negatively correlated with burnout. Items are rated on a seven-point Likert-type scale ranging from 0 (never) to 6 (every day). The cut-off for clinical levels of burnout for each scale is as follows: depersonalization  $\geq 2$ , personal accomplishment  $\leq 3.66$  and emotional exhaustion  $\geq 2.2$  (Van Doornen et al., 2009). To establish the level of burnout, scores for each subscale are usually combined and compared to normative data from mental health nurses resulting in low, medium or high burnouts (Schaufeli & Dierendonck, 2000). Cronbach's alpha coefficients for the three subscales of the Dutch version are 0.64, 0.81 and 0.86, respectively (Schaufeli, Bakker, Hoogduin, Schaap, & Kladler, 2001), which is considered questionable to good.

Client aggression was assessed with items on frequency and intensity of different types of aggressive behaviour as they were experienced by the nursing staff on the ward during the last 6 months. We constructed this scale based on the items used in the Modified Overt Aggression Scale+ (Crocker et al., 2006) and the Modified Overt Aggression Scale (Oliver, Crawford, Rao, Reece, & Tyrer, 2007). The items addressed verbal aggression, physical aggression, aggression against objects, autoaggression and sexual aggression. For each item, we asked staff how many times (frequency, ranging from never to very often) and how intense (intensity, ranging from not severe to very severe) these types of aggression were experienced at work

during the past 6 months resulting in a number between 1 and 10 for each type of aggression (i.e., participants rate all items on a scale of 1–10 for both the frequency and intensity scales). In this study, Cronbach's alpha coefficients for both frequency and intensity scales were 0.73 and 0.77, respectively, which is considered acceptable. Severity of aggression is defined as the product of frequency and intensity.

Personality was assessed with a validated Dutch version of the NEO Five-Factor Inventory, a 60-item version of the Big-Five Personality Inventory (Costa & McCrae, 1992). The scale measures five personality traits: neuroticism, extraversion, conscientiousness, openness and agreeableness. Each item is scored on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Cronbach's alpha coefficients for the five subscales of the Dutch version ranged from 0.64 to 0.88 (Hoekstra, Ormel, & Fruyt, 1996), which is considered questionable to good. Each subscale is standardized to stanines with a mean of 5 ( $1\ SD = 2$ ). Stanines are standardized scores ranging from 1 to 9 and are particularly useful for comparing scores to a normal distribution.

Emotional intelligence was assessed using a validated Dutch 133-item version of the Bar-On Emotional Quotient Inventory (Bar-On, 2006). The items were scored on a five-point Likert scale ranging from 5 (very often true) to 1 (very seldom true). The questionnaire results in one general EQ score and five subscale scores related to intrapersonal ability, intrapersonal skills, amount of adaptability, stress management skills and general mood. The Cronbach's alpha coefficients for the five subscales ranged from 0.69 to 0.86 (Zijlmans, Embregts, & Bosman, 2013), which is considered questionable to good. None of the participants in this study was excluded based on the so-called inconsistency index above 12, which indicates unreliable answering tendencies (Zijlmans et al., 2013). Each subscale is standardized to a mean of 100 ( $SD = 15$ ).

Job-related stress was assessed using an item of the Demands and Support Questionnaire developed by Rose (1999). The questionnaire was developed on the basis of the occupational model of stress (Payne, 1979) to identify possible sources of job stress for people working with clients with intellectual disabilities. As no Dutch version was available, the instrument was translated independently by three of the authors of this paper, after which differences in wording were discussed and solved in consensus. Cronbach's alpha coefficients for the two subscales were 0.84 and 0.62, respectively, which is considered questionable to good. A five-point Likert-type scale on the perceived job stress in general was included in the analysis (i.e., "How much stress do you generally experience in your job?").

Skin conductance was obtained during shifts by means of the Empatica E4 (Garbarino, Lai, Bender, Picard, & Tognetti, 2014). This is a wristband designed to measure SC, heart rate, body temperature and movements. SC was measured in  $\mu$ Siemens, and the data were corrected for artefacts created by movement with the use of a program called Eda Explorer developed by MIT (Taylor et al., 2015). The MIT research team also provided a Python 2.7 peak detection script. Based on recommendations made by Boucsein (2012), the following parameters were extracted: SC response, rise time, decay time,

amplitude, width, non-specific responses per minute and SC level. All SC data were controlled for by body temperature as a possible confounder, as the humidity and temperature between days vary and influence the SC. Responses with an amplitude of  $0.02\ \mu$ Siemens were considered for the analyses.

## 2.5 | Design and statistical analyses

The first research question regarding the positive association between client aggression as experienced by nursing staff and staff's burnout symptoms was addressed using Pearson's correlations and bias-corrected and accelerated (BCa) bootstrap confidence intervals (Field, 2013). Potential confounders were controlled for with partial correlations: staff's gender, job stress, job-related satisfaction, age in years, years employed in health care, years employed at this facility and years employed on the ward. The second research question was addressed using a moderated mediation model (model 8; Hayes, 2013) with the PROCESS macro in SPSS v24, and several predictors were included in this model. The sum score of emotional exhaustion and depersonalization was used as a measure of burnout symptoms in the moderated mediation model. Moderated mediation is a regression-based approach known as conditional process analysis. The models can be used to test both mediation and moderation effects. Personality and EI were added as moderators in the association between client aggression and burnout, while job stress was added as a mediator. The results of the analysis can be reported in a path-based model (Hayes, 2013). For answering the third research question on the usefulness of SC assessments in association with burnout symptoms, Spearman's rhos were calculated between the outcomes of the burnout scales and the parameters of SC.

## 3 | RESULTS

### 3.1 | Participants

The age of participants ranged from 21 to 59 years (mean = 35.2,  $SD = 9.7$ ), and the mean number of years that staff members were employed on the wards was 4.2 ( $SD = 3.9$ ). On average, there were 12 clients residing on each ward ( $SD = 3.2$ ). On average, the participants completed the questionnaires within 2 days of wearing the device (mean = 2.4 days;  $SD = 10$ ; range = 0–44 days). Data were collected between June 2015 and January 2016.

### 3.2 | Client aggression as experienced by nursing staff and staff's burnout symptoms

Two-tailed Pearson's correlations with 95% BCa bootstrap confidence intervals were calculated between clients' aggressive behaviour and staff's burnout symptoms (Table 1). Two results are worth noting. First, *intensity* of physical aggression is significantly correlated with emotional exhaustion and depersonalization. Second, *frequency* of physical aggression is significantly correlated with depersonalization. Both aggression–depersonalization effects in Table 1

	Frequency of aggression	Intensity of aggression	Severity (combined)
Emotional exhaustion			
Physical aggression	0.07 [-0.13, -0.26]	0.35** [0.15, 0.53]	0.24* [0.03, 0.44]
Verbal aggression	-0.02 [-0.29, -0.25]	0.16 [-0.05, 0.35]	0.09 [-0.15, 0.32]
Aggression against objects	0.02 [-0.20, 0.21]	0.17 [0.00, 0.34]	0.11 [-0.09, 0.30]
Autoaggression	0.11 [-0.10, 0.32]	0.14 [-0.06, 0.34]	0.14 [-0.05, 0.34]
Sexual aggression	0.17 [-0.01, 0.35]	0.16 [-0.03, 0.36]	0.18 [-0.03, 0.37]
Depersonalization			
Physical aggression	0.21* [0.01, 0.40]	0.24* [0.03, 0.42]	0.25** [0.05, 0.43]
Verbal aggression	0.05 [-0.15, 0.25]	-0.06 [-0.24, 0.13]	-0.01 [-0.19, 0.18]
Aggression against objects	0.07 [-0.12, 0.26]	0.05 [-0.15, 0.25]	0.07 [-0.14, 0.27]
Autoaggression	0.08 [-0.11, 0.29]	0.09 [-0.10, 0.29]	0.09 [-0.11, 0.30]
Sexual aggression	0.10 [-0.10, 0.29]	0.15 [-0.05, 0.34]	0.14 [-0.04, 0.33]
Personal accomplishment			
Physical aggression	-0.09 [-0.25, 0.09]	-0.14 [-0.30, 0.06]	-0.13 [-0.29, 0.03]
Verbal aggression	0.08 [-0.07, 0.23]	0.03 [-0.17, 0.23]	0.05 [-0.13, 0.24]
Aggression against objects	-0.01 [-0.20, 0.18]	-0.07 [-0.28, 0.17]	-0.05 [-0.24, 0.15]
Autoaggression	0.00 [-0.18, 0.17]	-0.02 [-0.20, 0.16]	-0.01 [-0.19, 0.18]
Sexual aggression	-0.13 [-0.31, 0.06]	-0.06 [-0.26, 0.15]	-0.10 [-0.30, 0.09]

$N = 106$ , \* $p < 0.05$ , \*\* $p < 0.01$ .

Pearson's correlations with 95% bias-corrected and accelerated bootstrap CIs reported in brackets.

diminished after controlling for job stress. However, the correlation between the intensity of physical aggression and emotional exhaustion remained significant. In addition, the other (controlled for) variables did not alter the significant aggression–burnout association reported in Table 1. Thus, after controlling for confounding variables with partial correlations, there is a positive association between physical aggression as experienced by staff and burnout symptoms (e.g., emotional exhaustion and depersonalization). Multicollinearity was checked for and VIF was  $< 10$ .

### 3.3 | EI, personality and job stress in the conditional process analysis

One hundred and eight staff members filled out the job stress scale and items on client aggression as experienced by nursing staff. Results indicate that job stress is positively correlated with the intensity of physical aggression (Table 2). Moreover, job stress is associated with verbal aggression and aggression against objects for both intensity and frequency. As for burnout symptoms, job stress is significantly correlated with emotional exhaustion ( $r = 0.52$ ,  $p < 0.001$ ), depersonalization ( $r = 0.24$ ,  $p < 0.05$ ) and personal accomplishment ( $r = -0.26$ ,  $p < 0.01$ ).

In all models, the burnout symptoms were calculated as the sum score of emotional exhaustion and depersonalization as these were significantly correlated with client aggression. The moderated

**TABLE 1** Unadjusted Pearson's correlations between burnout symptoms and frequency and intensity of aggression

mediation model we tested was model 76 (Hayes, 2013; Figure 1), which represents the hypothesized model. The separate scales for personality and EI were entered one by one. Remarkably, the models did not show significant interaction effects for the personality factors (not reported here), except for extraversion on the physical aggression–job stress association. In addition to extraversion, of the five EI subscales and total EI, only stress management skill was a moderator in the hypothesized model. Neither the other personality factors nor total EI resulted in significant interactions.

Next, extraversion and stress management skills were added to the model as moderators. However, of these two moderators, extraversion was non-significant and was therefore left out of the analysis. Lastly, model 8 (Hayes, 2013) with stress management as a moderator was fitted (Figure 2). As is standard practice (Hayes, 2013), in the final model all variables were mean-centred and unstandardized coefficients were used. We drew 10,000 bias-corrected bootstrapped samples. The statistical model resulting from these procedures is presented in Figure 3.

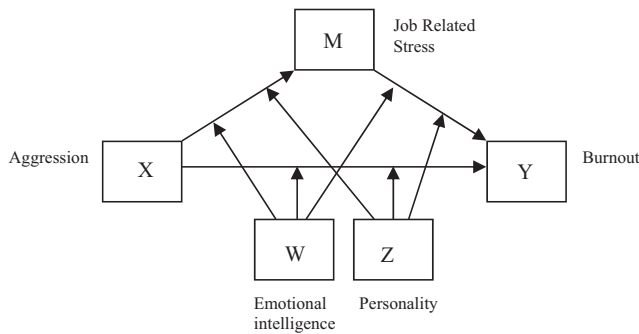
As is shown in Figure 3 and Table 3, the effect of physical aggression (X) on job stress (M) is dependent on the interaction between physical aggression (X) and stress management skills (W). This interaction is negative and non-significant (a3). The effect of physical aggression (X) on job-related stress (M) is dependent on the amount of stress management skills (W) reported by nursing staff. Staff who reported to have better stress management skills

	Frequency	Intensity	Severity (combined)
Physical aggression	0.17 [-0.04, 0.37]	0.37** [0.19, 0.52]	0.31** [0.12, 0.49]
Verbal aggression	0.25** [0.06, 0.43]	0.23* [0.06, 0.39]	0.27** [0.08, 0.43]
Aggression against objects	0.27** [0.09, 0.44]	0.20* [0.02, 0.37]	0.26** [0.07, 0.43]
Autoaggression	0.14 [-0.07, 0.34]	0.16 [-0.05, 0.36]	0.16 [-0.05, 0.36]
Sexual aggression	0.15 [-0.07, 0.35]	0.15 [-0.07, 0.34]	0.16 [-0.06, 0.35]

**TABLE 2** Pearson's correlations between job stress and 6-month frequency, intensity and combination of aggression

N = 108, \*p < 0.05, \*\*p < 0.01.

Pearson's correlations with 95% bias-corrected and accelerated bootstrap CIs reported in brackets.



**FIGURE 1** A conceptual model (76) of the assumed hypothesis

(W) report lower levels of job stress (M). Job stress (M) positively mediates ( $b, p < 0.001$ ) the relationship between physical aggression (X) and burnout (Y). This indicates that higher levels of job stress (M) are associated with higher levels of burnout symptoms (Y).

The *direct* effect between physical aggression and burnout symptoms can also be derived from Table 3 ( $c'3, p = 0.003$ ). The effect of physical aggression (X) on burnout symptoms (Y) is dependent on stress management skills (W) but independent of job stress (M).

The *indirect* (mediation) effect of physical aggression on burnout symptoms through job stress depends on stress management skills. Table 4 shows the estimation of the conditional indirect effect at three values of W. Note that the indirect effect of job stress is positive, with higher levels of job stress being associated with higher levels of burnout on all three values of stress management skills (W). This *indirect* effect increases when people report lower levels of stress management skills (the line depicted with squares in Figure 4). The *direct* effect of physical aggression on burnout symptoms shows an opposite pattern (the line depicted with triangles in Figure 4). In case a staff member reports to have high stress management skills, the effect of physical aggression, if experienced, has a *stronger* influence on burnout symptoms than if the staff member reports to have a lower amount of stress management skills.

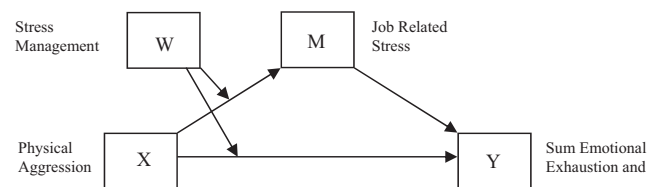
**3.4 | Correlation between job-related stress and skin conductance**

SC was not normally distributed; therefore, Spearman's rank correlations were used to test the association between burnout symptoms and SC. There were no significant effects between any of the SC

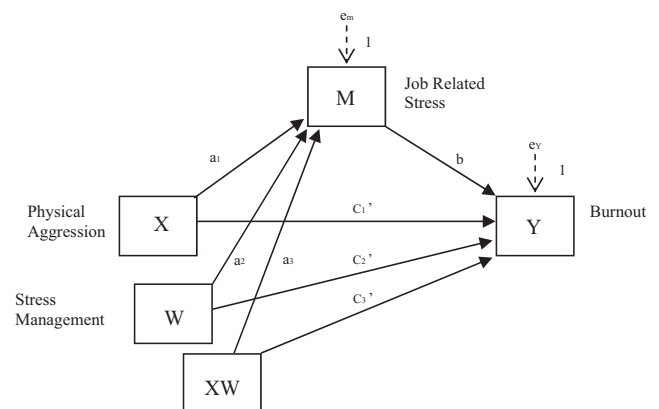
parameters (see Method section) and burnout symptoms subscales. After controlling for temperature, the results remained non-significant.

**4 | DISCUSSION**

The present study investigated the association between clients' aggression as experienced by nursing staff and burnout symptoms in nursing staff caring for clients with intellectual disabilities in forensic psychiatric hospitals. More specific associations between client aggression, burnout symptoms and personality, EI and SC were studied. There are three main findings. First, physical aggression as experienced by nursing staff is the only type of aggressive behaviour that was related to burnout symptoms reported by nursing staff. Second, job stress mediates the relationship between clients' aggressive behaviour and staff's burnout symptoms (i.e., emotional exhaustion and depersonalization) and only stress management skills acted as a moderator. Third, there was no association between burnout symptoms and SC in nursing staff.



**FIGURE 2** A conceptual model (8) of the refined hypothesis



**FIGURE 3** Statistical model of the conditional process (model 8)

**TABLE 3** Model coefficients for the conditional process model (model 8)

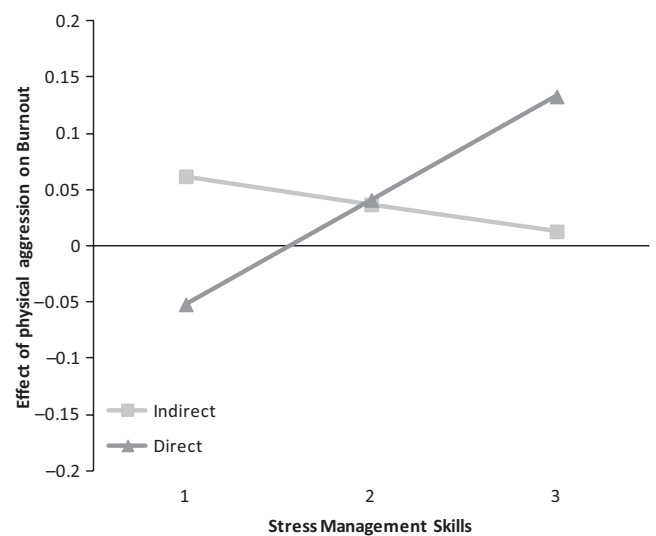
Antecedent	Consequent							
	M (job-related stress)				Y (burnout)			
	Coeff.	SE	p	Coeff.	SE	p		
X (physical aggression)	<i>a</i> 1	0.053	0.016	0.002	<i>c</i> '1	0.041	0.03	0.145
M (job-related stress)					<i>b</i>	0.711	0.163	<0.001
W (stress management skills)	<i>a</i> 2	-0.005	0.002	0.047	<i>c</i> '2	-0.011	0.004	0.005
X*W	<i>a</i> 3	-0.001	0.001	0.055	<i>c</i> '3	0.003	0.001	0.003
Constant	<i>i</i> 1	2.917	0.067	<0.001	<i>i</i> 2	0.637	0.487	0.194
R <sup>2</sup> = 0.174 F <sub>3,101</sub> = 7.1, p < 0.001				R <sup>2</sup> = 0.328 F <sub>4,100</sub> = 12.2, p < 0.001				

W	Indirect effect		Direct effect		
	$\omega = (a1 + a3W)b$	95% bias corrected Bootstrap CI	$\theta_{x \rightarrow y} = c'1 + c'3W$	SE $\theta_{x \rightarrow y}$	p
-28.148	0.06	[0.03, 0.11]	-0.05	0.04	0.23
0	0.04	[0.02, 0.07]	0.04	0.03	0.15
28.148	0.01	[-0.02, 0.05]	0.13	0.04	<0.001

**TABLE 4** Model coefficients for the conditional process model on the mean and  $\pm 1$  SD level of the moderator stress management skills (W)

The first research question on the positive association between aggressive behaviour as experienced by nursing staff and burnout symptoms was established only for physical aggression with emotional exhaustion and depersonalization. Although the correlations are modest, this result suggests that being confronted with physical aggression during work increases the risk of developing burnout symptoms. The expected association between physical aggression and exhaustion was confirmed. However, we expected associations of burnout symptoms with verbal aggression as well (Evers et al., 2001; Gascon et al., 2013; Hensel et al., 2012). The correlations between client aggression and intensity of aggression were higher than the correlations between client aggression and frequency of aggression, as was expected (Hensel et al., 2015). A possible reason for the low associations between burnout symptoms and the other types of aggression is that the current sample did not experience some of the other types of client aggression that often. For instance, sexual aggression has a median frequency and intensity of 3, as opposed to physical aggression with a median of 6 and 7, respectively, which implies that sexual aggression occurs relatively seldom. Another reason might be that physical aggression in particular is a threat to the physical and emotional safety of staff members who experience this behaviour. This does imply that nursing staff who experience physical aggression should be monitored carefully and receive proper social support if necessary, especially if they experienced physical aggression. This could lower the risk of developing burnout as social support is considered a protective factor for burnout (Leiter et al., 2014; Schaufeli et al., 2017).

The second hypothesis, whereby EI and personality would moderate the association between aggressive behaviour and burnout symptoms (i.e., emotional exhaustion and depersonalization), was only partially confirmed. As expected, the association between client aggression as experienced by nursing staff and their burnout symptoms was mediated by job stress. Surprisingly, no support was found for the hypothesized moderating effect of personality (Schaufeli et al., 2017; Swider & Zimmerman, 2010). Moreover, in



**FIGURE 4** A visual representation of the conditional indirect and direct effects of accumulating physical aggression on burnout as a function of stress management skills



contrast to Chung and Harding (2009), who reported on an association between burnout and neuroticism, extraversion and conscientiousness, we only found a moderating effect of extraversion on the direct effect between aggression and burnout symptoms. However, this effect was partially accounted for by the amount of stress management skills.

As we expected to replicate the personality–burnout association (Swider & Zimmerman, 2010), two reasons can be given for this deviating finding. First, none of the participants in the current sample were classified with clinical levels of burnout (i.e., exceeding cut-off values on the three subscales of burnout) as used by Van Doornen et al. (2009). Forensic nurses with clinical levels of burnout might already be absent or unwilling to participate in this study. Second, the items of challenging behaviour, which were used in an earlier study by Chung and Harding (2009), differ from the items of aggressive behaviour in the current study.

Contrary to our expectations (see, e.g., Gerits et al., 2005; Mérida-López & Extremera, 2017), only stress management skill was a significant moderator in the association between aggressive behaviour, job stress and burnout symptoms. Again, the fact that none of the nurses could be classified with clinical burnout might be a reason for this negative finding. The correlations between aggression and job stress do indicate a significant association with both physical and verbal aggressions in contrast to the correlation between verbal aggression and burnout. As expected, the indirect effect indicates that the effect of physical aggression on job stress is highest for people with lower levels ( $-1$  SD) stress management skills. Surprisingly, the direct effect of physical aggression on burnout symptoms is stronger for people with higher levels ( $+1$  SD) of self-reported stress management skills. Care must be taken when interpreting these results. First, no causality claim can be made, and future research should employ a longitudinal design to replicate this finding. Second, as Maxwell, Cole, and Mitchell (2011) point out, potential mediators in cross-sectional research might be lost in longitudinal models. However, it is interesting to note that the impact of physical aggression might be more substantial in cases where people believe their own stress management skills are higher.

Finally, the third research question on the usefulness of SC to detect burnout symptoms (Khanade & Sasangohar, 2017) was not confirmed. This is not in line with the hypothesized association, nor in line with previous findings that (the amount of) non-specific SC responses are a valid indicator of emotional strain (Boucsein & Backs, 2000) or chronic stress or fatigue (Khanade & Sasangohar, 2017) as reflected in burnout symptoms. In the current study, however, SC was assessed during only one shift, which may not be long enough to establish a possible relationship between burnout and SC. Moreover, although the time between assessment of burnout and SC was 2 days on average, there was variation in the length of the time frame, which could have led to the non-findings. Thus, SC measures might not yet be suited to detect burnout, but further research on this topic is warranted. The questions on the burnout questionnaire describe a larger time frame and do not represent specific stressful

tasks or situations. As the parameters of SC vary considerably between people (Boucsein, 2012), it would be interesting to monitor nursing staff over longer periods of time.

This study has several strengths and limitations. A particular strength is that we managed to monitor SC of nursing staff during a regular working day using ambulatory devices. Although ambulatory monitoring is a promising avenue for future research as naturally occurring stressors might be assessed, it is challenging to distinguish between different emotional states such as anger, happiness and sadness based on ambulatory psychophysiological recordings (Boucsein, 2012). In addition, another strength is the multicentre design of the study.

#### 4.1 | Limitations

The current study also has several limitations. First, no causality can be claimed considering the cross-sectional, correlational design of the study. Arguably, higher levels of burnout symptoms lead to higher levels of physical aggression as experienced by nursing staff or vice versa. To answer this question, longitudinal data are needed. This point was also made by Winstanley and Whittington (2002). The authors concluded that aggressive encounters were associated with an increase in burnout, most notably on the emotional exhaustion and depersonalization scales. However, an alternative explanation might be that elevated burnout symptoms might lead to susceptibility of victimization. Second, the scales from the questionnaires on personality, EI, burnout and job-related stress have questionable reliability (between 0.6 and 0.7) which is reason for concern. However, Aron and Aron (2003) point out that a good questionnaire should have an internal consistency of at least 0.6 as is the case in this study. Third, the aggression questionnaire might be biased. The amount of time that nurses work on a weekly basis might influence the severity of aggression that is experienced by the nurses, although most nurses work more than 24 hr per week. On the other hand, the fact that staff members who do not work full time may on average experience less client aggression may not be a problem, as one of the things we want to study is what the impact of the amount of aggression experienced is on burnout symptoms. The differences in the amount of aggression experienced may be associated with various variables, such as the type of clients that are on the ward and also the amount of time spent working on the ward, but it is the absolute difference in aggression experiences between staff members (as expressed in the number and the severity of the aggression experiences) that we are interested in. However, the problem remains that one severe incident (i.e., frequency = 1, intensity = 10, severity = 10) may not have the same impact as 10 incidents with low intensity (i.e., frequency = 10, intensity = 1, severity = 10). Further research is necessary to establish the validity of the aggression questionnaire and the way the overall burden of reported aggression can be calculated. Fourth, the generalizability of the results of the current study is limited as the study was conducted in wards which cared for people with intellectual disabilities and severe challenging behaviours. These are specialist services not representative of other forensic psychiatric units. In addition, the

convenience-based recruitment strategy might have an effect on the representativeness of the sample. It is conceivable that nurses with heightened levels of burnout symptoms or who experienced much aggression were inclined to participate in the study resulting in a sample bias. As for SC, in future studies, we need to monitor nursing staff for a longer period of time as SC does seem to vary quite substantially on a day-to-day basis. A final limitation is that the ambulatory devices are artefact prone. For instance, when the wristband is not worn tightly enough, contact with the skin can be lost occasionally. A last point of concern is the fact that the wrist may not be the most suitable location for detecting emotion-related data like stress. It was suggested to be more closely related to thermoregulatory indices of the body (Payne, Schell, & Dawson, 2016). Considering the high burnout, sick leaves and attrition rates among psychiatric nursing professionals, we feel that more research on the direct impact of working with aggression-prone forensic psychiatric patients of stress is warranted. As for the physiological measures, the expectations on the use of ambulatory technologies in health care are high, and these expectations are warranted according to recent research (Khanade & Sasangohar, 2017). However, we did not find an association between burnout symptoms and SC.

## 4.2 | Implications for mental health nursing

Physical aggression as experienced by nursing staff increases the risk of developing burnout symptoms. This implies that nursing staff who are confronted with physical aggression should be monitored carefully and receive social support which could lower the risk of developing burnout. The effect of client physical aggression on burnout symptoms is stronger for staff members who report higher levels of stress management skills. The implication is, contrary to intuition, that nursing staff with better stress management skills may be more prone to developing burnout symptoms, if they experience physical aggression.

## 5 | RELEVANCE STATEMENT

The rates of burnout and attrition from the psychiatric nursing profession are high. The association between client aggression and burnout symptoms was investigated in the current study, and important moderators were considered. Furthermore, this is the first study to investigate the association between SC and burnout symptoms in direct care staff. The study shows that there is a need for social support for nursing staff who experience aggression frequently to aid their well-being. Nursing staff should be monitored carefully following aggression. Longitudinal research is necessary to investigate the causality of the relationship.

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## ETHICAL STATEMENT

All research with participants was conducted in line with the Declaration of Helsinki for studies on human subjects.

## ORCID

Peter Looff  <http://orcid.org/0000-0002-0950-3419>

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