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Surviving chaos : predictors of occupational stress and well-being in emergency nurses

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Chapter 1

Determinants and prevalence of burnout in emergency nurses: a systematic review of 25 years of research.

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Abstract:

Background: Burnout is an important problem in health care professionals and is associated with a decrease in occupational well-being and an increase in absenteeism, turnover and illness. Nurses are found to be vulnerable to burnout, but emergency nurses are even more so, since emergency nursing is characterized by unpredictability, overcrowding and continuous confrontation with a broad range of diseases, injuries and traumatic events.

Objectives: This systematic review aims (1) to explore the prevalence of burnout in emergency nurses and (2) to identify specific (individual and work related) determinants of burnout in this population.

Method: A systematic review of empirical quantitative studies on burnout in emergency nurses, published in English between 1989 and 2014.

Data sources: The databases NCBI PubMed, Embase, ISI Web of Knowledge, Informa HealthCare, Picarta, Cinahl and Scielo were searched.

Results: Seventeen studies were included in this review. On average 26% of the emergency nurses suffered from burnout. Individual factors such as demographic variables, personality characteristics and coping strategies were predictive of burnout. Work related factors such as exposure to traumatic events, job characteristics and organizational variables were also found to be determinants of burnout in this population.

Conclusions: Burnout rates in emergency nurses are high. Job demands, job control, social support and exposure to traumatic events are determinants of burnout, as well as several organizational variables. As a consequence specific action targets for hospital management are formulated to prevent turnover and burnout in emergency nurses.

1. INTRODUCTION

Several studies show that a positive experience of the work environment (low strain) is related to work engagement and professional commitment, while a negative perception (high strain) is related to a state of depletion of resources, called 'burnout' (Ahola, Toppinen-Tanner, HUUHTANEN, Oskinen, & Äänänen, 2009). In the early 70's of the last century, Freudenberger defined burnout as *'the extinction of motivation or incentive, especially where one's devotion to a cause or relationship fails to produce the desired results'* (Freudenberger, 1974). Shortly after, Christina Maslach defined burnout as a psychological state resulting from prolonged emotional or psychological stress on the job (Maslach & Jackson, 1981; Maslach & Jackson, 1981; Maslach, Schaufeli, & Leiter, 2001). Maslach sees burnout as an internal emotional reaction (illness) caused by external factors, resulting in loss of personal and/or social resources: *'Burnout is the index of the dislocation between what people are and what they have to do. It represents erosion in values, dignity, spirit, and will -- an erosion of the human soul. It's a malady that spreads gradually and continuously over time, putting people into a downward spiral from which it's hard to recover'* (Maslach & Leiter, 1997).

Burnout, as defined by Maslach, has three dimensions. The first dimension of the burnout syndrome is "emotional exhaustion". When the emotional reserves are depleted, employees feel that they are no longer able to provide work of good quality. They have feelings of extreme energy loss and a sense of being completely drained out of emotional and physical strength (Maslach & Jackson, 1981). The second dimension "depersonalization" is defined as the development of negative attitudes, such as cynicism and negativism, both in thinking as well as in behavior, in which coworkers and service recipients are approached with derogatory prejudices and treated accordingly (Maslach & Jackson, 1981). The third aspect is "lack of personal accomplishment". This is defined as lack of feelings regarding both job and personal competence and failure in achieving goals (McDonald-Fletcher, 2008; Maslach & Jackson, 1981). There is a general consensus in the literature that emotional exhaustion is the central or core dimension of burnout (Gaines & Jermier, 1983; Sonnentag, Kuttler, & Fritz, 2010).

The consequences of burnout are multiple. Apart from a decrease in the quality of care (in case of health care jobs), a relationship was found between burnout and the occurrence of musculoskeletal disorders, depression, obesity, insomnia, alcohol intake and drug abuse (Poghosyan, Clarke, Finlayson, & Aiken, 2010; Sorour & El-Maksoud, 2012; Iacovides, Fountoulakis, Moysidou, & Ierodiakonou, 1999; Moustaka & Constantinidis, 2010). Burnout also has a negative impact on the quality of life of the employee, with more intra-relational conflicts and aggression (Wu, Li, Wang, Yang, & Qiu, 2011). Finally, burnout can also lead to a significant economic loss through increased absenteeism, higher turnover rates and a rise in health care costs (Borritz, Rugulies, Christensen, Villadsen, & Kristensen, 2006).

The prevalence of burnout, assessed by use of a self-report instrument in a *general working population* in Western countries, ranges from 13% to 27% (Norlund et al., 2010; Lindblom, Linton, Fedeli, & Bryngelsson, 2006; Kant, Jansen, Van Amelsfoort, Mohren, & Swaen, 2004; Houtman, Schaufeli, & Taris, 2000; Aromaa & Koskinen, 2004). *Nurses* are known to be at higher risk for the development of burnout than other occupations (Maslach, 2003; Gelsema et al., 2006). Research showed that nurses indeed report high levels of work related stress (Hasselhorn, Tackenberg, & Müller, 2003; Smith, Brice, Collings, McNamara, & Matthews, 2000; Clegg, 2001; McVicar, 2003) and that 30% to 50% reach clinical levels of burnout (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Poncet et al., 2007; Gelsema et al., 2006). According to several authors, the demands that burden the nurses (in terms of work setting, task description, responsibility, unpredictability and the exposure to potentially traumatic situations) and the resources they can rely on, are strongly related to the content of their job and their nursing specialty (Browning, Ryan, Thomas, Greenberg, & Rolniak, 2007; Ergun, Oran, & Bender, 2005; Eriksen, 2006; Kipping, 2000; Mealer, Shelton, Berg, Rothbaum, & Moss, 2007). *Emergency (ER) nursing* is a specialty that differs from other nursing specialties: work in emergency departments is hectic, unpredictable and constantly changing. ER-nurses are confronted with a very broad range of diseases, injuries and problems. Moreover, due to the hectic work conditions and overcrowding, emergency nurses often have to move from one urgency to another, with often little recovery time (Alexander & Klein, 2001; Gates, Gillespie, & Succop, 2011). As a consequence, rates of burnout are found to be very high in emergency nursing settings (Hooper, Craig, Janvrin, Wetsel, & Reimels, 2010; Potter, 2006).

2. THE REVIEW

Aim

The aim of the present review is (1) to examine the level of burnout in ER-nurses and (2) to identify specific determinants of burnout in these nurses, including various individual and work-related factors.

Search methods

The databases NCBI PubMed, Embase, ISI Web of Knowledge, Informa HealthCare, Picarta, Cinahl and Scielo were searched in June 2014 for original research publications that were written or published in the last 25 years (1989-2014) in English, concerning exposure to occupational stress and its consequences in ER-nurses, in terms of burnout. Furthermore, the references of the retrieved papers were searched for additional links. For this search, combinations of the following keywords were used: *strain, stress*, occupational stress, work stress, work-stress, workplace stress, work environment, ER, E.R., trauma center, triage room, A&E, ambulance, critical care facility, emergency service, first aid, "Emergency Service, Hospital" [Mesh], "Emergency Medical Services" [Mesh], "Emergency Nursing" [Mesh], "Emergency Medicine" [Mesh], nurse*, "Nurses"[Mesh], nursing staff, health professional, paramedic, medical staff, critical incident, critical event, traumatic event, predictor, determinant*. The primary outcome key words were *burnout, exhaustion, fatigue, "Burnout, Professional" [Mesh] and M.B.I.* but

also the secondary outcomes *job satisfaction, turnover, mental health, occupational health, anxiety, depression, somatic, post-traumatic stress, secondary traumatic stress, "Stress Disorders, Post-Traumatic" [Mesh], PTSD and P.T.S.D* were taken into account.

Studies were included only if the following criteria were met: the respondents under study ($N \geq 40$) were nurses, and a well-defined part of the respondents worked in an emergency unit or in ambulance care, (2) the focus of the study had to be on determinants/predictors of burnout, (3) the study had to be empirical and quantitative and (4) the response rate was higher than 25%.

Search outcome

The literature search (figure 1) in the different databases revealed 489 research papers but 142 duplicates were removed from the list. From the remaining 347 articles the titles and abstracts were screened and another 289 papers were excluded because (1) the research was qualitative, (2) the paper did not describe primary research or (3) the paper did not adequately report on the target population, determinants or outcomes. From the remaining 58 articles hard copies were acquired and checked according to the inclusion and exclusion criteria. Four additional articles were found by use of the snowball method. Eleven papers were excluded because there were no separate data for a subgroup of ER-nurses, five were excluded because the response rates were lower than 25% and five were excluded because the number of ER-nurses was lower than 40. From the remaining 41 studies seventeen focused on burnout as an outcome measure. Two of these were related to the same study sample (Escribà-Agüir, Martín-Baena, & Pérez-Hoyos, 2006; Escriba-Agüir & Pérez-Hoyos, 2007) and two studies presented cross-sectional and longitudinal results of the same sample (Van der Ploeg & Kleber, 2001; Van der Ploeg & Kleber, 2003). For the purpose of this systematic review, focusing on determinants of burnout, all 17 remaining studies were included. These can be found in alphabetical order in table 1.

3. RESULTS

Study population and study design

All of the 17 reviewed studies, except one (Van der Ploeg & Kleber, 2003), had a cross-sectional design. Self-report questionnaires were used for every study. The initial sample sizes ranged from 57 to 945 respondents (Median: 228) with response rates varying from 25.8% to 100%. Most of the researchers approached entire emergency care units. Two authors collected their data at conferences (Walsh, Dolan, & Lewis, 1998; Browning et al., 2007). The mean percentage of female respondents in the studies was 61.6 % (SD 29.7). Women worked significantly less in ambulance services than in in-hospital emergency services (Mn: 13.8 % vs. 77.5 % $t=6.21$ $p<.001$). One study did not mention gender nor age of the respondents (Walsh et al, 1998). The majority of the respondents were between 35 and 40 years old (range 18 to 67), with the exception of an Egyptian study that included younger ER-nurses (Sorour & El-Maksoud, 2012). The majority of the respondents were holder of a bachelor degree, and about 7 % had

a Master's degree. The mean seniority of the respondents in the different studies ranged from 6.5 to 13 years. Walsh *et al.* (1998) did not mention seniority.

Figure 1: Flow diagram of strategy used to identify literature

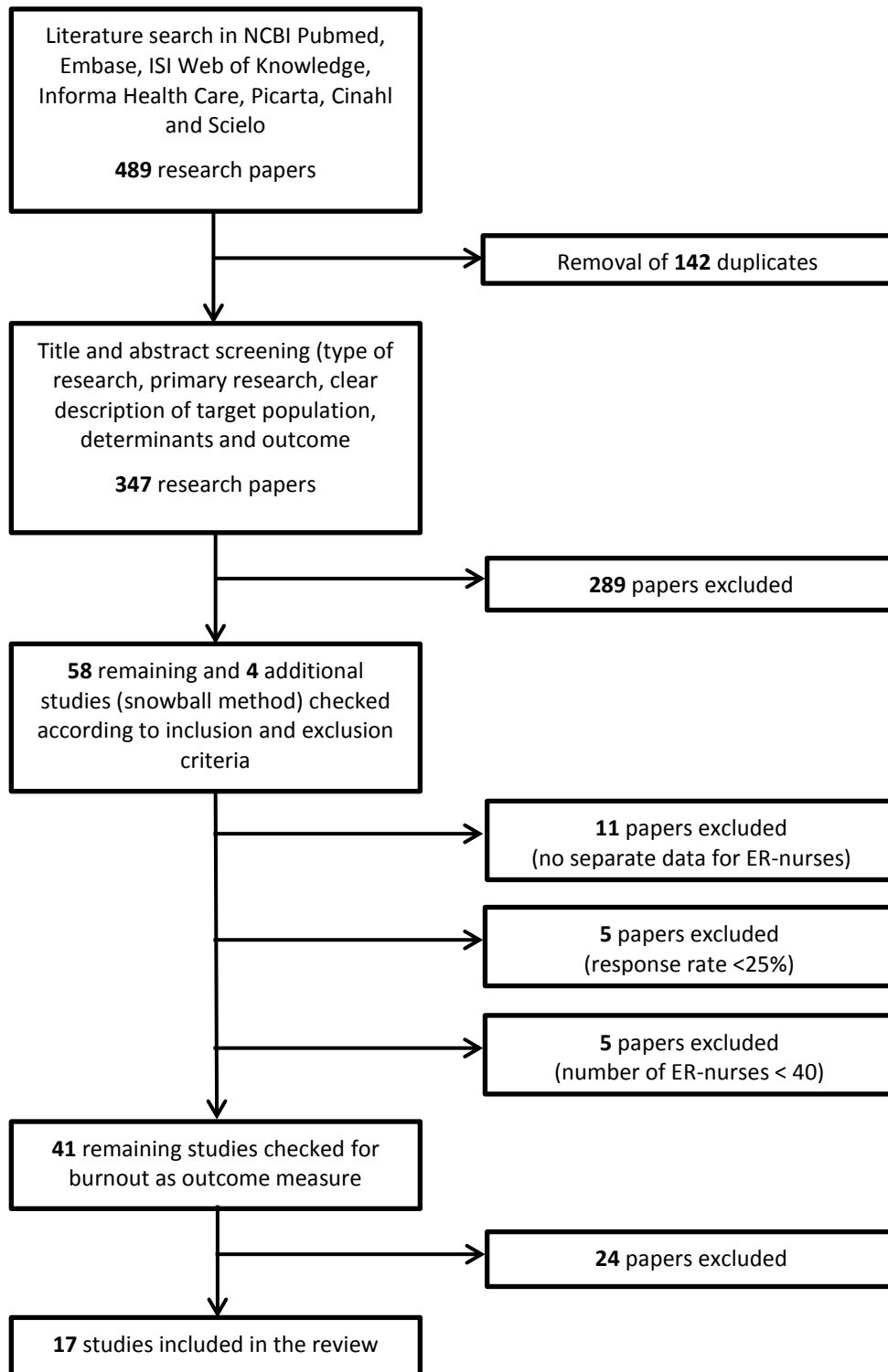


Table 1: Overview of the selected studies, the basic characteristics and results

| Author, year of publication and origin of the study | Design* | Approached (Ap) sample and Response rate & participants (Pt) | Measure of Burnout | Translation procedure | Measure of determinants & (instrument used) | EE | DP | PA |
|---|---------|---|--------------------|-----------------------|--|---|---|--|
| Adali & Priami (2002) Greece | CS | Ap: 414 nurses Pt: 233 nurses (56.2%) 99 nurses general ward 83 nurses ICU 51 ER nurses | MBI-HSS | T/BT-AA | Age Psychological demands (WES) Level of innovation (WES) Supervisor support (WES) Task orientation (WES) | R= 3.61 ** SE= 1.26 R= - 2.16 ** SE= 0.81 | R = 0.72* SE = 0.34 R = 0.91*** SE = 0.65 | R = 0.54 ** SE = 0.19 |
| Alexander & Klein (2001) Scotland | CS | Ap: 160 ambulance workers Pt: 110 ambulance workers (69%) 40 ER nurses 70 EMT | MBI-HSS | OVI | age hardiness (commitment) (HS) hardiness (feelings of control) (HS) hardiness (feelings of challenge) (HS) organizational satisfaction (workplace) | r = 0.12 ^{ns} r = - 0.51*** r = - 0.35*** r = - 0.26 ** r = - 0.29 ** | r = - 0.04 ^{ns} r = - 0.45 *** r = - 0.27 ** r = - 0.15 ^{ns} r = - 0.31 *** | r = - 0.29 ** r = 0.45 *** r = 0.37 *** r = 0.20 * |
| Ariapooran (2014) Iran | CS | Ap: 200 Pt: 173 hospital staff (86.5%) 84 ER-nurses 79 non-ER-nurses | ProQOL R-IV | NIP | Social support (peers & family) (MSPSS) | N.D. | N.D. | N.D. |
| Bernaldo-De-Quiros (2014) Spain | CS | Ap: 504 ER workers Pt: 441 ER workers (87.5%) 127 nurses 135 doctors 179 ER care assistants | MBI-HSS | TP-PP | Exposure to insults Exposure to threatening behavior Exposure to physical aggression | N.D. N.D. N.D. | N.D. N.D. N.D. | N.D. N.D. N.D. |
| Browning et al. (2007) United States | CS | Ap: 228 nurses (symposia) 88 ANP's 40 nurse managers 100 ER nurses Pt: 228 nurses (symposia) (100%) | MBI-HSS | OVI | Mastery (McDermott) Perceived control (McDermott) | r = - 0.19 ** | r = - 0.17 * r = - 0.12 * | N.D |
| Escriba-Aguir et al.(2006, 2007) Spain | CS | Ap: 945 staff ER Pt : 639 staff ER Ward (67.7%) 280 nurses 359 doctors | MBI-HSS | TP-PP | High psychological demands (JCQ) Low job control (JCQ) Low social support supervisor (JCQ) Low social support colleagues (JCQ) High static physical demands (JCQ) High dynamic physical demands (JCQ) | OR = 4.98 *** OR = 0.90 ^{ns} OR = 2.89 ** OR = 0.93 ^{ns} OR = 1.80 ^{ns} OR = 1.71 ^{ns} | N.D. | N.D. |
| Garcia-Izquierdo & Ríos-Rísquez (2012) Spain | CS | Ap: 262 ER nurses Pt: 191 ER nurses (73%) | MBI-GS | TP-PP | Interpersonal conflicts (NSS) Lack of resources (NSS) Excessive workload (NSS) Lack of social support (NSS) Exposure to traumatic events (NSS) | r = 0.35 * r = 0.17 ** r = 0.39 * r = 0.33 * r = 0.16 ** | r = 0.42 * r = 0.18 ** r = 0.34 * r = 0.38 * r = 0.09 ^{ns} | r = - 0.23 * r = - 0.12 ^{ns} r = - 0.10 ^{ns} r = - 0.21 * r = 0.05 ^{ns} |
| Helps (1997) United Kingdom | CS | Ap: 57 ER nurses Pt: 51 ER nurses (89.5%) | MBI-HSS | OVI | No relevant determinants | N.D. | N.D. | N.D. |

| | | | | | | | | |
|---|----|--|-------------|-------|---|---|--|---|
| Hooper et al. (2010) <i>United States</i> | CS | Ap: 138 nurses (different wards) Pt: 108 nurses (82%) 49 ER nurses 32 ICU nurses 16 Nephrology nurses 12 oncology nurses | ProQOL R-IV | OVI | No relevant determinants | N.D. | N.D. | N.D. |
| Lahr-Keller (1990) <i>United States</i> | CS | Ap: 532 nurses working in ER Pt: 137 ER nurses (25.8%) | MBI-HSS | OVI | Home/work interference (ENQ) Organizational stress (ENQ) | N.D. | N.D. | N.D. |
| O'Mahony (2011) <i>Ireland</i> | CS | Ap: 86 ER nurses Pt: 64 ER nurses (74%) | MBI-HSS | OVI | Nurse/physician collaboration (NWI-PES) Feelings of team spirit (NWI-PES) non-punitive management style (NWI-PES) quality of communication with management amount of quality assurance initiatives | r = - 0.21 * r = - 0.12 ** r = - 0.21 * r = - 0.34 ** r = - 0.26 * | r = - 0.22 * r = - 0.29 ** r = - 0.19 ^{ns} r = - 0.08 ^{ns} r = - 0.11 ^{ns} | N.D. |
| Sorour & El-Maksoud (2012) <i>Egypt</i> | CS | Ap: 58 ER nurses Pt: 58 ER nurses (100%) | MBI-HSS | NIP | No relevant determinants | N.D. | N.D. | N.D. |
| Stathopoulou et al. (2010) <i>Greece</i> | CS | Ap: 266 ER nurses Pt: 213 ER nurses (81%) | MBI-HSS | TP-PP | No relevant determinants | N.D. | N.D. | N.D. |
| Van der Ploeg & Kleber (2001) <i>The Netherlands</i> | CS | Ap: 393 ambulance workers Pt: 221 ambulance workers (56.2%) 127 nurses 94 EMT's | MBI-GS | TP-PP | Freq. of exposure traumatic events Avoidant behavior (IES) Psychological demands (QEAW) Lack of good communication (QEAW) Lack of financial reward (QEAW) Lack of adequate information (QEAW) Lack of social support colleagues (QEAW) Lack of social support supervisor (QEAW) Lack of autonomy (QEAW) | r = 0.26 *** r = 0.29 *** r = 0.32 *** r = 0.16 * r = 0.09 ^{ns} r = 0.25 *** r = 0.27 *** r = 0.35 *** r = 0.18 ** | r = 0.18 *** r = 0.26 *** r = 0.30 *** r = 0.28 *** r = 0.04 ^{ns} r = 0.28 *** r = 0.32 *** r = 0.43 *** r = 0.27 *** | r = -0.40 *** r = - 0.21 ** r = - 0.10 ^{ns} r = - 0.24 *** r = - 0.01 ^{ns} r = - 0.35 *** r = - 0.38 *** r = - 0.38 *** r = - 0.26 *** |
| Van der Ploeg & Kleber (2003) <i>The Netherlands</i> | L | Ap: 393 ambulance workers Pt: T1: 221 ambulance workers (56.2%) 127 nurses 94 EMT's T2: 123 ambulance workers (31%) subdivision not specified | MBI-GS | TP-PP | (predictor at baseline, outcome at follow up) Freq. of exposure traumatic events Psychological demands (QEAW) Lack of good communication (QEAW) Lack of financial reward (QEAW) Lack of social support colleagues (QEAW) Lack of social support supervisor (QEAW) Lack of autonomy (QEAW) Physical demands (QEAW) | r = 0.30 ** r = 0.27 ** r = 0.26 ** r = 0.09 ^{ns} r = 0.29 ** r = 0.41 *** r = 0.25 ** r = 0.35 *** | r = 0.20 * r = 0.26 ** r = 0.12 ^{ns} r = - 0.05 ^{ns} r = 0.27 ** r = 0.40 *** r = 0.18 ^{ns} r = 0.16 ^{ns} | r = - 0.18 ^{ns} r = - 0.14 ^{ns} r = - 0.09 ^{ns} r = 0.11 ^{ns} r = - 0.42 *** r = - 0.34 *** r = - 0.28 ** r = - 0.10 ^{ns} |
| Walsh et al (1998) <i>United Kingdom</i> | CS | Ap: 200 ER nurses (symposia) Pt: 134 ER nurses (67%) | MBI-HSS | OVI | Annual departmental patient throughput | N.D. | N.D. | N.D. |

Abbreviations: ICU: intensive care unit, EMT: emergency medical technician, ANP: advanced nurse practitioner, L: longitudinal, CS: cross-sectional, MBI-HSS: Maslach Burnout Inventory-Human Services Scale, MBI-GS: Maslach Burnout Inventory – General Survey, UBOS-A: Utrecht Burnout Scale – general, ProQOL R-IV: Professional Quality of Life scale, WES: Work Environment Scale, HS: Hardiness Scale, JCQ: Job Content Questionnaire, NSS: Nursing Stress Scale, NWI-PES: Practice Environment Scale of the Nursing Work Index, IES: Impact of Event Scale, ENQ: Emergency Nurse Questionnaire, QEAW: Questionnaire on the Experience and Assessment of Work, MSPSS: multidimensional scale of perceived social support. N.D.: No (adequate) data, R: multiple regression coefficient, OR: Odds Ratio, r: correlation coefficient, T1: baseline, T2: follow-up, OVI: original version of instrument, T/BT-AA: translation/back-translation by author of article, TP-PP: translation procedure described in previous publication, NIP: no information provided.

Global burnout scores of the respondents.

Fifteen out of 17 studies used the Maslach Burnout Inventory to quantify the level of emotional exhaustion, depersonalization and lack of personal accomplishment. Twelve studies used the MBI for human services (MBI-HSS) (Maslach, Jackson, & Leiter, 1996). Van der Ploeg & Kleber (2001) and Garcia-Izquierdo & Ríos-Rísquez (2012) both used the 16-item MBI-GS (Schaufeli, Leiter, Maslach, & Jackson, 1996). The MBI-HSS primarily focuses on professions, in which contact with other people is an essential part of the work content. The items explicitly refer to contacts with clients (Taris, Schreurs & Schaufeli, 1999). The MBI-GS is an MBI-HSS based instrument for the measurement of burnout in non-contactual professions. Several items of the GS-version are identical to the HSS-version, but for other items the source of the surveyed feelings is more related to the content of the work instead of the professional interpersonal contacts (Taris, Schreurs & Schaufeli, 1999). Maslach et al. state that the MBI-HSS and MBI-GS measure the same concept in different occupational groups, based on the same theoretical considerations (Maslach, Jackson, & Leiter in Zalaquett & Wood (eds), 1997). For the purpose of the second measurement of the longitudinal study by Van der Ploeg & Kleber (2003) a 15-item UBOS-A was used (Schaufeli & Van Dierendonck, 2000). Hooper et al (2010) and Ariapooran (2014) used the Professional Quality of Life: Compassion Satisfaction and Fatigue Subscales (ProQOL R-IV) (Stamm, 2010). This is a 30-item instrument using a 6-point likert scale (0=never to 5= very often). The total score of this instrument is used to define burnout, 3 sub-scores are distinguished.

The MBI-HSS cut-off scores for mental health workers (Maslach & Jackson, 1986) and for nurses and physicians (Maslach et al., 1996) can be found in table 2. Cut off points of the MBI (levels designated as limits for the different dimensions of burnout) were set arbitrary at the 33rd and 66th percentile by Maslach *et al.* (1986). The cut-off scores for the MBI-GS (Brenninkmeijer & Van Yperen, 2003), its Dutch version UBOS-A (Schaufeli & Van Dierendonck, 2000) and the ProQOL R-IV (Stamm, 2010) are also described in table 2. Normative values (Mn and SD) for nurses for the MBI-HSS (sample size 1542 nurses) were published by Schaufeli & Enzman (1998). Normative values for MBI-GS and UBOS-A for human services occupations (sample size 13076 respondents) were published by Schaufeli & Van Dierendonck (2000). Normative data for the ProQOL R-IV were provided in the manual of the instrument (Stamm, 2010).

Table 2: cut-off scores for the MBI-HSS, MBI-GS and UBOS-A for human services occupations

| MBI-HSS | Target respondents | Cut off | Normative values |
|-------------------------|---|---------|---|
| emotional exhaustion | Mental Health personnel ⁽¹⁾ | ≥ 21 | Mn (SD) = 23.80 (11.80) |
| | Nurses & physicians ⁽²⁾ | ≥ 26 | |
| depersonalization | Mental Health personnel ⁽¹⁾ | ≥ 8 | Mn (SD) = 7.13 (6.25) |
| | Nurses & physicians ⁽²⁾ | ≥ 9 | |
| personal accomplishment | Mental Health personnel ⁽¹⁾ | ≤ 28 | Mn (SD) = 13.53 (8.15) |
| | Nurses & physicians ⁽²⁾ | ≤ 33 | |
| MBI-GS / UBOS-A | | | |
| emotional exhaustion | Human services personnel ⁽³⁾ | ≥ 2.38 | Mn (SD) = 1.78 (0.99) |
| depersonalization | Human services personnel ⁽³⁾ | ≥ 1.60 | Mn (SD) = 1.12 (0.77) |
| personal accomplishment | Human services personnel ⁽³⁾ | ≤ 3.70 | Mn (SD) = 4.21 (0.80) |
| ProQOL R-IV | | | |
| Burnout (general score) | Professional care giver ⁽⁴⁾ | ≥ 27 | Male: Mn (SD) = 48.99 (9.75) Female: Mn (SD) = 50.37 (10.26) |

Cut-off scores for MBI-HSS ⁽¹⁾ Maslach & Jackson, 1986; ⁽²⁾ Maslach, Jackson & Leiter, 1996), MBI-GS/UBOS-A ⁽³⁾ Schaufeli & van Dierendonck, 2000) and ProQOL R-IV ⁽⁴⁾ Stamm, 2010)

The means, SD's and percentages of caseness for burnout (whether or not a subject has the condition of interest) for the different studies can be found in table 3. Seven out of 17 studies in this review reported percentages of respondents exceeding the cut off scores for the burnout measures. Five studies, using the MBI-HSS, reported high levels of emotional exhaustion ranging from 9 to 67%, high levels of depersonalization ranging from 13 to 59% and low levels of personal accomplishment ranging from 16 to 42% (Alexander & Klein, 2001; Bernaldo-De-Quiros et al., 2014; Escribà-Agüir et al., 2006; Lahr Keller, 2014; O'Mahony, 2011). The study of Sobhy Sorour & El-Maksoud (2012) reported 37.9% caseness for burnout, but the authors used a scale different from the conventional scale of the MBI-HSS instrument. The study of Van der Ploeg & Kleber (2001), that used the MBI-GS and UBOS-A, reported 11.7%, 17.7% and 16.3% of respondents exceeding the cut off for emotional exhaustion, depersonalization and lack of personal accomplishment respectively. Hooper *et al.* (2010) and Ariapooran (2014) found 22.4% and 19.2% of respondents with high levels of burnout respectively.

Nine out of 17 studies reported means and standard deviations for the different dimensions of burnout (Adali & Priami, 2002; Alexander & Klein, 2001; Helps, 1997; O'Mahony, 2011; Stathopoulou, Karanikola, Panagiotopoulou, & Papathanassoglou, 2011; Walsh et al., 1998; Garcia-Izquierdo & Rios-Risquez, 2012; Van der Ploeg & Kleber, 2001; Van der Ploeg & Kleber, 2003). Browning *et al.* (2007) reported adjusted means (without SD). Regarding the studies that used the MBI-HSS, Alexander & Klein (2001) reported the lowest mean values for emotional exhaustion and depersonalization while O'Mahony (2011) reported the highest emotional exhaustion and Walsh *et al.* (1998) reported the highest depersonalization. For personal accomplishment, the lowest mean value was reported by Stathopoulou *et al.* (2011) and the highest mean was described by Browning *et al.* (2007). Concerning the use of MBI-GS or UBOS-A, Garcia-Izquierdo & Ríos-Rísquez (2012) reported the highest mean for all of the three dimensions of burnout, while Van der Ploeg & Kleber (2001) reported the lowest values for all these dimensions.

Table 3: Means and standard deviations of the dimensions of burnout and the (estimated ⁽¹⁾) percentage of respondents exceeding cut off for these dimensions.

| Study & number of respondents | N° of resp. | Scale | EE Mn(SD) | DP Mn(SD) | PA Mn(SD) | Total burnout BO% > cut off |
|---|-------------|-------------|---------------------------|---------------------------|--------------------------|-----------------------------|
| | | | EE % > cut off | DP % > cut off | PA % < cut off | |
| Adali & Priami (2002) | N=233 | MBI-HSS | 26.53 (11.29) | 9.12(5.3) | 35.14(10.99) | |
| | | | High 45.1% ⁽¹⁾ | High 49.0% ⁽¹⁾ | Low 41.2% ⁽¹⁾ | |
| Alexander & Klein (2001) | N=40 | MBI-HSS | 17.2 (10.7) | 8.4 (6.7) | 34.5 (7.8) | |
| | | | High 20% ⁽¹⁾ | High 26% ⁽¹⁾ | Low 36% ⁽¹⁾ | |
| Ariapooran (2014) | N=94 | ProQOL R-IV | N.D. | N.D. | N.D. | 19.2% |
| | | | N.D. | N.D. | N.D. | |
| Bernaldo-De-Quiros et al. (2014) | N=127 | MBI-HSS | N.D. | N.D. | N.D. | |
| | | | High 9.5% | High 13.2% | Low 16.1% | |
| Browning et al. (2007) | N=100 | MBI-HSS | 26.81 | 11.98 | 37.90 | |
| | | | N.C | N.C | N.C. | |
| Escriba-Aguir et al. (2006,2007) | N=280 | MBI-HSS | N.D. | N.D. | N.D. | |
| | | | High 19% | High 33.9% | Low 46.5% | |
| Helps (1997) | N=51 | MBI-HSS | 21.34 (9.7) | 8.09 (6.19) | 36.09 (5.47) | |
| | | | High 29.8% ⁽¹⁾ | High 43.9% ⁽¹⁾ | Low 28.1% ⁽¹⁾ | |
| Hooper et al. (2010) | N=49 | ProQOL R-IV | N.D. | N.D. | N.D. | 22.4% |
| | | | N.D. | N.D. | N.D. | |
| Lahr-Keller (1990) | N=137 | MBI-HSS | N.D. | N.D. | N.D. | |
| | | | High 36% | High 40% | Low 42% | |
| O'Mahony (2011) | N=64 | MBI-HSS | 30.6 (9.8) | 11.35 (5.9) | N.D. | |
| | | | High 67% ⁽¹⁾ | High 59% ⁽¹⁾ | N.D. | |
| Statophoulou et al. (2011) | N= 213 | MBI-HSS | 22.76 (11.12) | 9.13 (6.01) | 32.68 (8.65) | |
| | | | High 41.8% ⁽¹⁾ | High 50.7% ⁽¹⁾ | Low 49.3% ⁽¹⁾ | |
| Walsh et al. (1998) | N=134 | MBI-HSS | 21.78 (10.86) | 12.05 (6.76) | 35.06 (7.18) | |
| | | | High 32.8% ⁽¹⁾ | High 64.9% ⁽¹⁾ | Low 35.8% ⁽¹⁾ | |
| Garcia-Izquierdo & Ríos-Rísquez (2012) | N=191 | MBI-GS | 1.88 (1.44) | 1.49 (1.32) | 5.13 (1.04) | |
| | | | High 37.2% ⁽¹⁾ | High 45.5% ⁽¹⁾ | Low 9.4% ⁽¹⁾ | |
| Sobhy Sorour & El-Maksoud (2012) ⁽²⁾ | N=58 | MBI-HSS | N.D. | N.D. | N.D. | 37.9% |
| | | | N.D. | N.D. | N.D. | |
| Van der Ploeg & Kleber (2001) | N=127 | MBI-GS/ | 1.2 (0.89) | 1.1 (0.88) | 4.4 (0.87) | |
| | | | High 11.7% ⁽¹⁾ | High 17.7% ⁽¹⁾ | Low 16.3% ⁽¹⁾ | |
| Van der Ploeg & Kleber (2003) | N=123 | UBOS-A | 1.3 (1.0) | 1.4 (1.1) | 4.5 (0.85) | |
| | | | High 15.4% ⁽¹⁾ | High 38.2% ⁽¹⁾ | Low 20.3% ⁽¹⁾ | |

Abbreviations: EE = emotional exhaustion, DP = depersonalization, PA = lack of personal accomplishment, BO = burnout, N.C. = not computable, N.D. = No (adequate) data.

⁽¹⁾: data for determination of percentage of respondents exceeding the cut offs were generated with reversed sampling statistics (Minitab® 16.2.4).

⁽²⁾: the scale used for this study is different from the conventional scale of the instrument.

For the purpose of this study and with the aim to estimate the prevalence of burnout among ER-nurses, we used reverse sampling statistics (Minitab[®] 16.2.4, Pennsylvania) to generate random data for the seven studies that reported only means and standard deviations for the MBI-dimensions. For this reverse sampling method we assumed, based on previous findings, that the reported data of the burnout dimensions had a normal distribution (Schaufeli, Martinez, Marques Pinto, Salanova, & Bakker, 2002; Langelaan, Bakker, Schaufeli, Van Rhenen, & Van Doornen, 2007; Campos & Maroco, 2012). The cut off scores for the respective instruments were used to determine the percentage of respondents with high emotional exhaustion, high depersonalization and low personal accomplishment. The results of these analyses are reported in table 3. A weighted average percentage of caseness for emotional exhaustion, depersonalization and lack of personal accomplishment was calculated. Based upon the scores for the reversely generated samples and the originally reported cut off percentages, on average 25.9% of the respondents exceeded the cut off scores for emotional exhaustion, 34.8% exceeded the cut off for depersonalization and 27.2% exceeded the cut off for lack of personal accomplishment. Considering the general consensus that emotional exhaustion is the core dimension of burnout, this review shows that 26% of the respondents in the selected studies suffered from burnout.

Determinants for burnout in emergency nurses

The studies that were included in this review used a variety of determinants. For the purpose of this review we categorized these determinants in terms of 'individual factors' and 'job related factors', based on an overview of burnout by Maslach *et al.* (2001). For each category, a general introduction is given, followed by the description of the results for the selected studies on burnout in emergency nurses. The results of these studies can be found in table 1.

1. Individual factors

Demographic characteristics

In general populations, younger age was found to be related to a higher risk of burnout. Gender was also found to be predictive of burnout in several studies but the results were not uniform. Some studies found higher levels of burnout in women, others found the opposite and some studies did not find a difference. Higher levels of education were related to higher levels of burnout but the link is still unclear (Maslach et al., 2001).

In the selected studies on ER-nurses, the age of the respondents was found to be related to burnout. Adali & Priami (2002) reported that higher age was related to higher levels of personal accomplishment ($p=.006$). Alexander & Klein (2001) found an inverse relationship: higher seniority was related to lower personal accomplishment. Both studies found no significant relationship between age and emotional exhaustion or depersonalization. Walsh et al (1998), Sobhy Sorour & El-Maksoud (2012) nor Hooper et al (2010) found significant relationships between age, seniority or gender and burnout dimensions.

Personality characteristics

In the job stress literature on a broad set of populations, personality characteristics, such as neuroticism, extraversion, agreeableness, conscientiousness and openness, also called 'The Big Five' personality traits (McCrae & Costa, 1987), were found to be associated with burnout (Zellars, Perrewé, & Hochwarter, 2000; Bakker, Van der Zee, Lewig, & Dollard, 2006; Swider & Zimmerman, 2010; Shimizutani et al., 2008; Maslach et al., 2001). Low levels of hardiness (less involvement in daily activities, a lower sense of control over events, and less openness to change) were also related to higher levels of emotional exhaustion (Maslach et al., 2001).

In the ER-nurses studies, included in the present review, personality characteristics were not frequently reported as potential determinants of burnout. Alexander et al found persons with a hardy personality to view events more as meaningful (leading to higher levels of commitment), challenging and under their control than their colleagues. This study reports a strong negative correlation between the level of commitment, perceived control, job challenge and emotional exhaustion. Also for depersonalization negative relationships were found with commitment and control. Personal accomplishment was positively related to commitment, control and challenge (Alexander & Klein, 2001). Lack of flexibility, stubbornness, judgmental behavior and difficulty in adaptation were also reported as potential determinants of burnout (Walsh et al., 1998).

Coping strategies

In studies on occupational well-being in nurses, coping strategies were found to be related to well-being and performance. Active problem focused coping was found to be related to lower levels of emotional exhaustion and depersonalization and to higher personal accomplishment. Passive avoidant and emotional coping strategies, especially when used alone or as a dominant mode of coping, were found to be ineffective in dealing with stress (Shirey, 2006; Shimizutani et al., 2008; Maslach et al., 2001; Semmer, 2003).

In the selected studies in ER-nurses, Van der Ploeg & Kleber (2001) found significant positive correlations between avoidant behavior and emotional exhaustion and depersonalization and reported a negative correlation with personal accomplishment. They state that avoidant behavior after exposure to traumatic events is not a good long term coping strategy for ER-nurses. Browning et al. (2007) found feelings of mastery to be a mediator between occupational stressors in ER-nurses and depersonalization with higher levels of mastery leading to lower levels of depersonalization.

Job attitudes

Studies in different populations show that the expectations that employees have in respect to their job are related to the level of burnout. Higher expectations and higher goal setting were expected to lead to higher occupational efforts and thus to higher levels of emotional exhaustion and depersonalization. The empirical results over the last decades were however not uniform (Maslach et al., 2001).

In none of the studies in ER-nurses, included in this review, job attitudes and goal setting were investigated as a predictor of burnout in ER-nurses.

2. Work related factors

Exposure to traumatic events

Repetitive professional exposure to traumatic events, such as confrontation with severe injuries, death, suicide, aggression and suffering, was reported to be related to the development of Post-Traumatic Stress Syndrome (PTSD) and burnout in various nurses' populations (Donnelly & Siebert, 2009; Mealer, Burnham, Goode, Rothbaum, & Moss, 2009; Collins & Long, 2003).

In one of the studies included in the present review, Alexander & Klein (2001) reported that ER-nurses who were exposed to traumatic events in the previous 6 months had higher levels of caseness for high emotional exhaustion (23% vs. 5%, $p = .03$) and high depersonalization (32% vs. 0%, $p=.003$) but they found no differences for caseness of low personal accomplishment (33% vs. 35%, $p= .89$), compared to non-exposed ER-nurses. They reported that 69% of the exposed ER-nurses mentioned that they 'never' had sufficient time to recover emotionally between traumatic events (Alexander & Klein, 2001). Van der Ploeg & Kleber (2001) found the number of traumatic events to be positively correlated to posttraumatic stress symptoms, emotional exhaustion and depersonalization. In their longitudinal study (2003) they found a positive long term relationship between frequency of exposure at baseline and emotional exhaustion and depersonalization at follow up. Garcia-Izquierdo & Ríos-Rísquez (2012) reported a positive correlation between frequency of confrontation with death and suffering and emotional exhaustion. Bernaldo-De-Quiros et al. (2014) found nurses who were exposed more frequently to violence (insults, threats and physical violence) to report higher levels of emotional exhaustion and depersonalization.

Job characteristics

One of the most popular theoretical occupational stress models is the Job Demand Control Support Model (JDCS), developed by Karasek & Theorell (1990). This model defines three dimensions as predictors of occupational stress: 'job demand' as a burden and 'job control' and 'social support' as potential resources or buffers. Job demand is defined as the psychological work load in terms of time pressure, role conflict and quantitative workload. Job control, also called decision latitude, is the amount of freedom that a worker has, to control and plan his/her work activities. This dimension has in turn two sub-dimensions that are however interrelated: skill discretion and decision authority. Skill discretion is the range of skills and competences that a worker needs to fulfill his working tasks and is also related to the (future) opportunities of the worker to acquire new skills, expand his/her knowledge in the job or get promotion. Decision authority, or autonomy, is the amount of freedom that a worker has, to choose and to plan his tasks and is closely related to participation and involvement. The third dimension of the JDCS-model,

social support, is defined as the amount of psychological and instrumental help and support that a worker can count on at work. It also has two sub-dimensions: social support provided by the colleagues or co-workers and social support provided by the supervisor. Previous research in multiple occupational groups showed relationships between JDCS-variables and burnout (Mark & Smith, 2008). Research in nurses also revealed relationships between JDCS-variables and burnout (Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010; Gelsema et al., 2006). In those studies, burnout was seen as an end-stage of adaptation failure resulting from the long-term imbalance between job demands and resources (McSherry, Pearce, Grimwood, & McSherry, 2012).

A number of studies, included in this review on ER-nurses report JDCS-variables to be related to burnout. The results are described by JDCS-variable.

Psychological demands (work/time pressure) was found to be related to burnout and its dimensions. Adali & Priami (2002) found work pressure to be a significant positive predictor for emotional exhaustion. Escriba-Aguir & Pérez-Hoyos (2007) found high psychological demands to be predictive of high levels of emotional exhaustion. Garcia-Izquierdo & Ríos-Rísquez (2012) found excessive workload to be related to higher emotional exhaustion and depersonalization but found no relationship with personal accomplishment. Van der Ploeg & Kleber (2001) report positive correlations between emotional demands and emotional exhaustion and depersonalization but did not find any relationship with personal accomplishment. In their longitudinal study emotional demands at baseline were positively related to emotional exhaustion and depersonalization at follow-up (Van der Ploeg & Kleber, 2003). One study reported an inverse relationship: an increase in the job demand score was related to a decrease in the general burnout score ($r = 0.34, p < .01$) (Sorour & El-Maksoud, 2012). *Physical demands* in ER-nurses showed no relationship (dynamic nor static) with burnout in the study of Escriba-Aguir & Pérez-Hoyos (2007). However, this variable was found to be predictive for higher emotional exhaustion in longitudinal analysis (Van der Ploeg & Kleber, 2003).

The level of *Job Control* was negatively related to emotional exhaustion and depersonalization and positively related to personal accomplishment (Alexander & Klein, 2001). In the study of Browning *et al.* (2007), perceived control moderated the relationship between work stressors on the one hand and emotional exhaustion and depersonalization on the other hand. Escriba-Aguir & Pérez-Hoyos (2007) did not find a relationship between control and emotional exhaustion. Van der Ploeg & Kleber (2001) found lack of autonomy, as a sub-dimension of control, to be positively related to emotional exhaustion, depersonalization and negatively to personal accomplishment. In their longitudinal study (2003) lack of autonomy at baseline was related to higher emotional exhaustion and lower personal accomplishment at follow up, but no significant relationship with depersonalization was found.

In the study of Garcia-Izquierdo & Ríos-Rísquez (2012) lack of *social support* in general was found to be predictive for higher depersonalization and lower personal accomplishment. Escriba-Aguir & Pérez-Hoyos (2007) found low supervisor social support to be related to higher emotional exhaustion while no relationship was found between co-worker social support and emotional exhaustion. Van der Ploeg & Kleber (2001) found lack of supervisor social support to be positively related to emotional exhaustion, depersonalization and negatively to personal accomplishment. Lack of social support from colleagues was also positively related to emotional exhaustion, depersonalization and negatively to personal accomplishment. In contrast, Adali & Priami (2002) found a rise in supervisor social support to be related to an increase in depersonalization. In their longitudinal study, Van der Ploeg & Kleber (2003) found lack of supervisor social support at baseline to be related to higher emotional exhaustion and depersonalization and to lower personal accomplishment at follow up. Also lack of social support from colleagues at baseline showed significant correlations with higher emotional exhaustion and depersonalization and lower personal accomplishment at follow up. Interpersonally conflicts, that can be very disturbing for the team cohesion, were found to be positively related to emotional exhaustion, depersonalization and negatively to personal accomplishment in ER-nurses (Garcia-Izquierdo & Rios-Risquez, 2012). Ariapooran (2014) found higher levels of social support from peers and family to be related to lower levels of burnout.

Organizational factors

Next to job characteristics, organizational and environmental characteristics, such as personnel and material resources, procedures, policies, organizational culture and reward, proved to be associated with the employees' wellness in several study populations (Maslach et al., 2001; Poncet et al., 2007).

In one of the studies included in the present review (O'Mahony, 2011) 53% of the ER-nurses rated their work environment as unfavorable. In another study (Alexander & Klein, 2001) dissatisfaction was associated with higher scores on emotional exhaustion and depersonalization. The existing literature on ER-nurses mentions various organizational factors as determinants for burnout. These are described below.

Communication and collaboration with other professional disciplines was taken into account in a number of studies. O'Mahony (2011) reported nurse/physician collaboration to have a negative correlation with emotional exhaustion and depersonalization. The experience of working as a team was also negatively related to depersonalization (O'Mahony, 2011). Another study found the level of interpersonal conflicts to be positively related to emotional exhaustion and depersonalization and negatively related to personal accomplishment (Garcia-Izquierdo & Rios-Risquez, 2012). The quality of work place communication and information provision was found to be negatively related to burnout: O'Mahony (2011) reported quality of communication between hospital management and hospital employees, as a function of listening and responding, to be predictive of lower levels of emotional exhaustion. Van der

Ploeg & Kleber (2001) report a relationship between poor communication and higher emotional exhaustion and depersonalization and lower personal accomplishment. In their follow up study they found a relationship between poor communication at baseline and higher levels of emotional exhaustion at follow-up (Van der Ploeg & Kleber, 2003).

Staffing issues were taken into account in two studies: quality of staffing, adequacy of work schedules and shift work were significantly correlated with fatigue and decreased concentration, what in turn was related to burnout (Walsh et al., 1998). Understaffing was mentioned as an important predictor of stress and burnout in ER-nurses (Helps, 1997). Permanent night shift was related to a decrease in feelings of personal accomplishment ($F(3,185)=3.06$ $p<.05$) (Garcia-Izquierdo & Rios-Risquez, 2012). *Lack of material resources* was found to be related to higher emotional exhaustion and depersonalization (Garcia-Izquierdo & Rios-Risquez, 2012). *Organizational culture* was also taken into account. A more innovative culture on the ward was found to be related to lower levels of emotional exhaustion (Adali & Priami, 2002). O'Mahony (2011) reported that a perceived lack of quality assurance initiatives in the institution was associated with higher levels emotional exhaustion. *Financial reward* was not found to be predictive of any dimension of burnout in ER-nurses (Van der Ploeg & Kleber, 2003).

4. DISCUSSION

In the present study the research on burnout, conducted in the past 25 years in ER-nurses, was examined. This review focuses on (1) the prevalence of burnout in nurses working in ER-settings and (2) the identification of the determinants of burnout in terms of individual factors (demographic characteristics, personality factors, coping strategies and job attitudes) and work related factors (exposure to traumatic incidents, job characteristics and organizational factors). We analyzed the results of 17 empirical studies published between 1989 and 2014. All of these quantitative studies had a study sample of at least 40 ER-nurses, with a response rate higher than 25% and burnout as an outcome measure.

The weighted average percentage of respondents exceeding the cut-off for the different dimensions of burnout was 26% for emotional exhaustion, 35% for depersonalization and 27% for lack of personal accomplishment. These results are alarming and need attention of all stakeholders. The broad range of caseness between the selected studies can be partly explained by the small sample sizes in several studies. However, previous research in other nursing populations also showed significant cross-national differences in the scores on the MBI-dimensions. North-American nurses were found to have higher levels of emotional exhaustion and depersonalization than their Dutch colleagues (Schaufeli & Van Dierendonck, 1995). Significant differences in emotional exhaustion and depersonalization were also found between Irish, Greek, Italian, Polish, Dutch and British nurses (O'Mahony, 2011; Pisanti, Van der Doef, Maes, Lazzari, & Bertini, 2011; Schaufeli & Janczur, 1994). Several explanations can be given for

this finding. First of all, there are important differences in the professional status and the role of nurses in the health care system across the world (McGonagle et al., 2013; Pisanti et al., 2011). This implies differences in work pace, amount of professional autonomy, span of control and interdisciplinary collaboration and communication. Besides, responses on well-being measures were found to be different between cultures and nationalities. Schaufeli & Van Dierendonck (1995) advised therefore to be cautious with cross-national comparison of burnout results. Poghosyan *et al.* (2009) also showed significant differences in the factor loadings and inter-correlations of the MBI-items across countries. Transnational differences in the perception and scoring of the MBI-items might have resulted in differences in the composite scores on the burnout dimensions (Poghosyan, Aiken, & Sloane, 2009). All these issues point at important methodological flaws in cross-cultural research. As pointed out by Squires et al. (2013) even translation/back-translation of an instrument such as e.g. the MBI, is not a sufficient guarantee for the comparability of the results. Characteristics of the health care system, mastery of professional language, relevance to health care workers in different countries, and quality of professional research infrastructure are other sources of instrumental bias. Another aspect that may hamper the comparison of the burnout scores for the selected studies in this review is the fact that three different instruments were used (MBI-HSS, MBI-GS and ProQOL R-IV).

The sample size and the response rate of certain studies included in this review is low, which may have influenced the results of the study. Differences in composition of the study samples may also have influenced the results. It is remarkable that the two highest and the two lowest rates of caseness for emotional exhaustion and depersonalization are respectively reported by the study samples with the highest and the lowest proportions of female nurses. Two authors collected their data at conferences because of the availability of potential respondents (Walsh et al., 1998; Browning et al., 2007). This can have caused bias (healthy worker effect) since people who go to congresses are less likely to suffer from burnout. Finally, the study of Sobhy Sorour & El-Maksoud (2012) used a different scale than the conventional MBI-HSS instrument, making comparison of the prevalence results with other studies impossible. Nevertheless, the average caseness for burnout in ER-nurses is high and requires the attention of hospital management and policy makers, as burnout is directly related to job satisfaction (Rheajane, Labrague, & Rosales, 2013), nurses' well-being (Burke, Koyuncu, & Fiksenbaum, 2010), nurse turnover (Leiter & Maslach, 2009), patient safety (Halbesleben, Wakefield, Wakefield, & Cooper, 2008) and quality of care (Poghosyan, Clarke, Finlayson, & Aiken, 2010). High rates of caseness for burnout were also found in studies in non-ER nursing disciplines: 42% in a general nurses population (Ball, Pike, Griffiths, Rafferty, & Murrells, 2012), 33 % in critical care (ICU) nurses (Poncet et al., 2007), 31% in chronic hemodialysis nurses (Flynn, Thomas-Hawkins, & Clarke, 2009), 40% in hospital nurses (Vahey, Aiken, Sloane, Clarke, & Delfino, 2004), 59% in mental health nurses (Goalder & Schultz, 2008) and 51% in primary care nurses (Imai, Nakao, Tsuchiya, Kuroda, & Katoh, 2004).

Several studies emphasize the need of a good person-environment fit in the prevention of burnout (Maslach & Leiter, 2008; Leiter, Gascòn, & Martinez-Jarreta, 2010; Bakker, Demerouti, & Euwema, 2005; Mark & Smith, 2008). This implies that a complex set of work related and person related variables has to be taken into account. However, the majority of the 17 studies on occupational stress and burnout in ER-nurses in the present review lack a theoretical background. Most studies only measure some work stressors and some outcomes, without taking into account the perception of the stressor by the ER-nurse. Additionally, often different measures were used to assess a common concept. The lack of similarity across the different studies in terms of determinants, instruments and outcomes is an obstacle to conduct a meta-regression analysis, what makes a proper statistical summary impossible. Moreover, 16 out of 17 studies had a cross-sectional design. All these issues are quite unfortunate because (1) only small parts of variance can be explained, (2) interrelationships between determinants cannot be adequately investigated, (3) results from different studies on the same concept cannot be compared and (4) causal relationships between determinants and outcomes cannot be drawn. A more preferable approach is the use of a longitudinal design based on an information processing approach which takes into account the consequences over time of individual appraisal and coping of work stress (Perrewé & Zellars, 1999; Mackintosh, 2007).

Starting from the abovementioned methodological strengths and weaknesses, the results of Van der Ploeg & Kleber (2001, 2006), Escriba-Aguir & Pérez-Hoyos (2007) and Garcia-Izquierdo & Ríos-Rísquez (2012) provide the strongest evidence concerning burnout and its determinants in ER-nurses. These studies show that the JDCS-variables are strong determinants of burnout in ER-nurses. Van der Ploeg & Kleber (2001, 2006) and Garcia-Izquierdo & Ríos-Rísquez (2012) also showed the deleterious (long term) effect of repetitive exposure to traumatic events on the development of burnout in ER-nurses. Finally, seven out of 15 studies indicate the importance of good communication, interdisciplinary collaboration and team spirit to prevent burnout (Adali & Priami, 2002; Escriba-Agüir & Pérez-Hoyos, 2007; Escriba-Agüir & Pérez-Hoyos, 2007; Escriba-Agüir et al., 2006; Garcia-Izquierdo & Rios-Risque, 2012; O'Mahony, 2011; Van der Ploeg & Kleber, 2001; Van der Ploeg & Kleber, 2003). On the other hand, personality characteristics, coping strategies and job attitudes (goal orientation) were underinvestigated in the selected studies. Future research should take these aspects into account.

5. IMPLICATIONS FOR NURSING

Although several studies suffer from methodological weaknesses and flaws, the present systematic review offers ideas for burnout prevention and nurse retention policy in ER-nurses. Interventions could focus on (1) the promotion of adequate professional autonomy (in terms of clinical decision making, interdisciplinary consultation and collaboration), (2) the creation of a good team spirit and sufficient peer support in ER-departments, (3) qualitative leadership of nursing supervisors (in terms of social support,

coaching, transparent communication and provision of opportunities for innovation and quality assurance), (4) reduction of repetitive exposure to traumatic events, (5) creating time-out facilities for (exposed) ER-nurses, (6) provision of counseling for exposed nurses and (7) training of ER-nurses in anticipatory coping skills. As there is currently, to our knowledge, no evaluation study of such interventions in ER-nurses, future intervention research should examine the validity of these suggestions.

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