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Burnout in medical residents: a review

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OBJECTIVES This study aimed to review current knowledge on burnout in medical residents, including reported prevalence rates, and to establish which risk and resistance factors contribute to or prevent burnout in medical residents.

METHODS We conducted a comprehensive search of the literature published between 1975 and 2005, using the Medline, EMBASE (from 1989) and PsychINFO databases.

RESULTS A total of 19 studies met our inclusion criteria. Only 5 studies appeared to meet more than 2 of the Cochrane quality criteria. The different studies report widely varying burnout rates among medical residents, ranging from 18% to 82%. Predictors of burnout can be characterised as either occupational or individual. Inconsistent results were reported with regard to the effects of some of these factors on burnout. Four of the 16 occupational risk factors appeared to be strongly related to burnout. The 11 individual risk factors examined were only weakly or moderately related to burnout.

CONCLUSIONS Research on burnout among medical residents is scarce. The weak quality of the studies, the wide variety and limited predictive power of the predictor variables included and the inconsistent findings illustrate the need for a more systematic design with regard to future research among medical residents. A future research model should take account of the individual, occupational and training demands experienced by medical residents.

KEYWORDS review [publication type]; humans; male; female; burnout; professional/*etiology; *internship and residency; risk factors; health status; mental health; family relations; delivery of health care/standards.

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INTRODUCTION

The first published reports on burnout appeared in the USA in the mid-1970s.^{1,2} Between 1975 and 2005, 13 746 articles were published on burnout in general, according to searches of EMBASE, PsychINFO and Medline. Burnout has been described as 'a prolonged response to chronic emotional and interpersonal stressors on the job defined by 3 dimensions: emotional exhaustion, depersonalisation, and reduced personal accomplishment'.^{3–5} Emotional exhaustion refers to feelings of being overextended and depleted of one's emotional resources. Depersonalisation is characterised by a negative, cynical and detached response to other people, including colleagues and patients or clients. A reduction in personal accomplishment occurs when a person feels less competent in his or her work.⁵

Causes of burnout are specifically related to the work context. Occupational factors found to contribute to burnout are: quantitative work overload; work-related role problems, and deficiencies in job resources, such as a lack of social support or autonomy.³ Additional contributing factors are associated with emotionally demanding situations in the workplace, such as those that result from interactions with uncooperative, aggressive or distrustful patients or patients with unrealistic expectations, and confrontations with illness, death and dying.^{6,7} Individual factors have also been shown to affect the level of burnout.

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Overview

What is already known on this subject

Medical residents may be at increased risk for burnout. Their work situation is characterised by conflicting levels of dependency, responsibility and autonomy. Their personal situations may add to stresses perceived at work.

What this study adds

We present a critical review of studies on burnout in residents. Only 19 studies on burnout in residents have been published. Prevalence rates reported varied between 18% and 82%. Most risk and resistance factors examined related weakly to burnout and a few related moderately strongly.

Suggestions for further research

Well designed, model-based studies, that take account of residents' individual, occupational and educational challenges and resources, are needed to explain why some residents suffer from burnout and others do not.

Younger employees reported more burnout than older employees, suggesting that burnout appears early in a career.³ Inconsistent findings have been found with regard to the effect of gender on burnout. However, on measures of Depersonalisation, men consistently score higher than women, suggesting that men tend to be more instrumental and distant in their approaches to others than women.³ Burnout has significant effects on the health of the individual and on his or her job performance.³ Burnout has been associated with withdrawal, intention to leave the job, job turnover, loss of productivity and a reduction in the quality of patient care.³

Although burnout research has its roots in the caregiving and service occupations,³ research on burnout among medical residents is scarce.⁸ This is surprising, as the work situation can be described as being potentially very risky for burnout.^{8,9} A medical resident's job is quantitatively and qualitatively demanding. Residents are given great responsibility coupled with low levels of control, placing them at risk for role problems such as role ambiguity, role

conflicts or role overload. Moreover, medical residents are relatively young and at the beginning of their careers, which makes them vulnerable to burnout.³

This study reviews current knowledge on burnout in medical residents, addressing the following questions:

- 1 What do we know about the prevalence of burnout in medical residents?
- 2 What are the risk and resistance factors that contribute to or prevent burnout in medical residents?

METHODS

A comprehensive search of the literature published between 1975 and 2005 was conducted using the Medline, EMBASE (from 1989) and PsychINFO databases. The keywords used were 'Internship-and-Residency', 'Burnout-Professional', 'Residency-Education', 'Burnout', 'Occupational-Stress', and 'Medical Residency'. This search was supplemented with manual searches of the extracted articles' reference lists. Publications were excluded if they were dissertation abstracts, comments, letters, not written in English, not clear about methods used, listed doubly or not specifically focused on burnout. The methodological quality of the studies was assessed using the Cochrane Library guidelines. Studies were considered methodologically strong or weak on the basis of:

- 1 design: longitudinal and prospective studies as well as studies in which the researchers tested hypotheses were considered to be methodologically stronger than cross-sectional and exploratory studies;
- 2 representativeness: studies with populations of > 100 respondents, studies with response rates > 75% and multisite studies were considered to be stronger;
- 3 instruments: studies that used valid and reliable ($\alpha > 0.60$) questionnaires were considered stronger than studies that used questionnaires for which validity and reliability were not sufficient or not reported; likewise, studies that reported on cut-off scores and use of reference groups were considered stronger, and
- 4 statistics: studies that used more advanced statistics were considered to be stronger than those that used descriptive statistics only.

RESULTS

The searches of EMBASE, PsychINFO and Medline showed that 122 articles on burnout in medical residents had been published between 1975 and 2005. Of these, 105 were excluded because they were: dissertation abstracts (5); summaries (2); comments (11); letters (8); not written in English (4); not specific about the methods used (19); listed twice (12), or did not measure burnout but focused on stress-related factors such as working hours (44). Manual searches of the reference lists identified 2 further articles that met the inclusion criteria. Therefore, 19 studies were included^{10–28} (Table 1).

Three articles based on the same database of family practice residents were published in the 1980s.^{14,17,18} Two publications appeared in the 1990s.^{21,26} The remaining papers^{10–13,15,16,19,20,22–25,27,28} were published between 2000 and 2005. The majority of studies^{10,12,14–16,20,22–27} had been conducted in the USA; 4 had been conducted in Europe,^{11,13,16,28} specifically in Switzerland, the Netherlands, the UK and Belgium; 2 had been conducted in Africa,^{19,21} namely, in Kenya and South Africa; and 1 had been conducted in Israel.²⁴

Family practice residents were the most frequent subjects of research studies, with 5 publications focusing on them.^{14,17,18,23,27} Other studies selected residents from internal medicine,¹⁰ obstetrics and gynaecology,²⁰ anaesthesia¹⁶ and orthopaedics.²⁵ Four studies included medical residents from more than 1 specialty.^{15,19,22,26} Six studies did not specify the responding medical residents' specialties.^{11,13,21,23,24,28} Five of the studies^{11,16,20,21,25} included attending doctors as well as medical residents. Four of these studies reported separate results for residents and attending doctors.^{11,20,21,25}

Quality of studies

According to the Cochrane criteria, the quality of the various studies was generally weak. None of the studies met all the Cochrane criteria. Only 5 studies met more than 2 criteria. The first of these tested hypotheses, included > 100 respondents, reported reliability figures and used more advanced statistical analyses.¹³ The second reported cut-off scores, used reference groups and had a response rate > 75%.¹⁸ The third tested hypotheses, was longitudinal in design, used more advanced statistical analyses and had a response rate > 75%.²² The fourth was longitudinal in design, included > 100 respondents,

used reference groups and used more advanced statistical analyses.²³ The fifth study was longitudinal and prospective in design, included > 100 respondents and used more advanced statistical analyses.²⁸ The reference numbers of methodologically stronger studies according to the Cochrane criteria are presented in the text in **bold** in order to distinguish them from methodologically poorer studies.

Design

In total, 12 studies used a cross-sectional^{10–12,13,14–17,18,19–21} and 7 a longitudinal design.^{22,23,24–27,28}

Eleven publications^{10–12,14–17,19,21,23,24} aimed to investigate the prevalence of burnout among medical residents, either with or without risk and resistance factors for burnout. These studies were exploratory descriptive studies. Five focused on testing theoretical models in relation to burnout.^{13,18,20,22,28} Three evaluated interventions aimed at reducing burnout.^{25–27} Seventeen studies used a quantitative approach.^{10,12,13,14–17,18,20,21,22,23,24–27,28} Two used quantitative as well as qualitative methods.^{11,19}

Representativeness

Eight studies were multisite^{14,17,18,20,23–25,28} and 11 were single-site studies. The number of residents included in the studies ranged from 21²⁰ to 1668.²⁸ Six studies included ≤ 50 residents.^{19–21,22,25,27} Six publications were based on samples of 50–100 respondents.^{11,14,17,18,24,26} Seven studies included > 100 medical residents.^{10,12,13,15,16,23,28} Only 6 publications reported a response rate > 75%.^{10,11,14,17,18,22} Eight^{12,13,15,16,20,21,25,28} presented response rates ranging from 35%¹⁵ to 63%.²⁸ The remaining 5 studies did not provide response rates.^{19,23,24,26,27}

Instruments and scoring methods

Fifteen of the 19 studies^{10,12,13,14–17,18,20,23,24–27,28} used a version of the Maslach Burnout Inventory (MBI).^{4,5} Three publications reported on scores assessed by the 'research edition' of the MBI.^{17,18,26} The second version of the MBI (1986)⁴ was used in 3 studies^{14,23,24} and the third (1996)⁵ was used in 6 studies.^{10,12,15,16,20,25} All consisted of 22 items encompassing 3 subscales: Emotional Exhaustion; Depersonalisation and Personal Accomplishment. The research edition used 2 scores, namely, 1 score representing the frequency and a second representing the perceived intensity of the item. The studies using the second and third versions of the MBI used

only the frequency score. The manuals of all versions report adequate validity and reliability. In the study carried out in the Netherlands,¹³ the Dutch version of the MBI was used. Only in this study¹³ did the authors report Cronbach's α reliability coefficients for the instrument within the assessed population; these figures were satisfactory.

Another study²⁸ used an abbreviated version of the MBI (9 of the 22 items), but gave no information on validity and reliability. Finally, 1 other study used the MBI, but did not indicate which version.²⁷

Four studies did not use the MBI. One of these¹¹ used the Hacker and Reinhold Stresses and Strains Screening in Human Services²⁹ (Beanspruchungs-Screening in Humandienstleistungen [BHD]) to measure burnout. The BHD consists of 5 subscales, 2 of which were used in that study¹¹ (Emotional Exhaustion and Aversion to Patients). The reported validity and reliability of the 2 subscales, according to the manual, were satisfactory. Another study²² used 2 subscales from the 30-item Staff Burnout Scale for Health Professionals (SBS-HP), specifically, the Dissatisfaction with Work and Unprofessional Patient Relationships subscales (referred to as job burnout and patient burnout, respectively). The manual reports that reliability and validity are satisfactory. The SBS-HP was reported to relate adequately to the construct of burnout as measured by the MBI.³⁰ One study²¹ quantitatively assessed burnout using the following question: 'Do you ever feel so emotionally exhausted that you feel negative about yourself and about your job and lose the feeling of concern for your patients?' The last study presented a definition of burnout to medical residents during an interview.¹⁹ Reactions were noted and respondents were asked to what extent they recognised that they suffered from burnout.

Five studies specified cut-off points used for classification on the 3 burnout subscales or for the diagnosis of burnout.^{10,12,16,18,27} Some of the researchers using the MBI used cut-off scores for each subscale to indicate levels of burnout complaints as low, moderate or high,^{14,17,18,27} although these cut-off scores were interpreted differently. Another study²⁰ divided each subscale into thirds, so that, for example, a score in the upper third of the range on Emotional Exhaustion and Depersonalisation and a score in the lower third of the range on Personal Accomplishment indicated elevated levels of burnout complaints. Two studies^{10,12} used cut-off scores for diagnosing burnout. The first study¹⁰ defined overall burnout by a high score on either Emotional

Exhaustion (> 27) or Depersonalisation (> 10); the second¹² defined overall burnout by a high score on both Emotional Exhaustion and Depersonalisation, plus a low score on Personal Accomplishment (< 33). A further study¹⁶ defined overall burnout as a high score on Emotional Exhaustion only but used a different cut-off score (> 29), probably because the study used a different scoring method. Two studies^{15,24} did not specify the method used to diagnose overall burnout. The remaining studies using the MBI did not present an overall burnout classification.

Five studies used norm or reference groups for comparison.^{14,17,18,20,23}

Prevalence of burnout

Four studies reported overall burnout percentages based on the MBI.^{10,12,15,16} Prevalence rates varied from 17.6%¹² to 76.0%.¹⁰ The qualitative study reported that 82% of medical residents were at least moderately affected by burnout.¹⁹ One study²⁴ used mean scores on the MBI as 'burnout scores'. However, no percentages were given, nor was a specification provided on how to interpret the scores.

Other studies reported scores on the 3 different burnout subscales separately, but did not mention an overall burnout score. Results were reported either as percentages or as classifications (i.e. high, moderate or low). Results for critical values ranged from 41%¹¹ to 50%²⁵ on Emotional Exhaustion and from 34%¹¹ to 70%²⁵ on Depersonalisation; 23% of residents scored low on Personal Accomplishment.²⁵

One study reported that residents scored high on Emotional Exhaustion²⁰ and 2 studies reported that they scored moderately.^{14,16} With regard to Depersonalisation, 2 studies reported high scores^{17,18} and 2 reported moderate scores.^{14,20} Finally, 2 studies reported moderate scores on Personal Accomplishment.^{14,20}

Five studies used comparison groups.^{14,17,18,20,23} Family practice residents reported moderate to high levels of burnout compared with the MBI normative sample, both on the frequency and intensity of all MBI subscales.^{14,18} Compared with American health care workers, residents showed high levels of burnout.²⁰ Residents scored significantly higher on Emotional Exhaustion and Depersonalisation, and lower on Personal Accomplishment, than did faculty members.^{17,20} A later study carried out among family practice residents reported significantly lower scores on Emotional Exhaustion and Depersonalisation²³

Table 1 Studies examining burnout among medical residents

<i>Study* and design</i>	<i>Response rate</i>	<i>n</i>	<i>Specialty and year of training</i>
Biaggi <i>et al.</i> (2003) ¹¹ Cross-sectional quantitative study coupled with qualitative observations	87%	80 39 residents 21 chief residents (supervisors) 20 directing doctors/ medical directors	Specialty not defined Year of training not defined
Garza <i>et al.</i> (2004) ¹² Cross-sectional quantitative study	37%	136 residents	Obstetrics/gynaecology Year of training 1–4
Gelfand <i>et al.</i> (2004) ²⁵ Longitudinal quantitative study	69% → ; 26% → ;	33 26 residents 7 faculty members	Surgery Year of training 1–5
Geurts <i>et al.</i> (1999) ¹³ Cross-sectional field study	57%	166 residents	Specialty not defined Work experience < 1 year to > 4 years
Hillhouse <i>et al.</i> (2000) ²² Longitudinal quantitative study	85% 100% → ; 77% → ;	46 residents 18 surgery 28 internal medicine	Surgery Internal medicine Year of training 1–4
Lemkau <i>et al.</i> (1988) ¹⁴ Cross-sectional quantitative study	94%	67 residents	Family practice Year of training 1–3
Martini <i>et al.</i> (2004) ¹⁵ Cross-sectional quantitative study	35%	110 residents	Dermatology General surgery Internal medicine Family medicine Neurology Obstetrics/gynaecology Ophthalmology, Psychiatry Year of training 1, 2 and later (not defined)
McCue <i>et al.</i> (1991) ²⁶ Intervention study using control group, pre and post-intervention assessment	Not reported	64 residents	Medicine Paediatrics Year of training 1–4

Burnout instrument

Hacker and Reinhold Stresses and Strains
Screening in Human services; 17 items, 2 subscales:
Emotional Exhaustion
Aversion to Patients

Maslach Burnout Inventory (MBI), 3rd edn 22 items, 3 subscales:

Emotional Exhaustion
Depersonalisation
Personal Accomplishment

MBI for Health and Social Services (HSS),
3rd edn 22 items, 3 subscales:

Emotional Exhaustion
Depersonalisation
Personal Accomplishment

T1 = 1 week before implementation of 80-hour work week

T2 = 6 weeks after implementation of 80-hour work week

MBI, Dutch version 2 subscales:

Emotional Exhaustion
Depersonalisation

Staff Burnout Scale for Health Professionals

30 items, 2 subscales:

Dissatisfaction with Work
Unprofessional Patient Relationships

4 assessments, 1 every 4 months over 1 year of residency training

MBI, 2nd edn

25 items, 3 subscales:

Emotional Exhaustion
Depersonalisation
Personal Accomplishment

MBI, 3rd edn

Overall burnout

MBI, 1st edn, 3 subscales:

Emotional Exhaustion
Depersonalisation
Personal Accomplishment

T1 = 2 weeks before workshop

T2 = 6 weeks after workshop

Burnout

41% met critical values for Emotional Exhaustion

34% reported considerable Aversion to Patients

38% high on Emotional Exhaustion

47% high on Depersonalisation

19% reduced Personal Accomplishment

Overall: 18% burnout rate

T1:

50% high on Emotional Exhaustion

56% high on Depersonalisation

20% low on Personal Accomplishment

T2:

47% high on Emotional Exhaustion

70% high on Depersonalisation

23% low on Personal Accomplishment

No significant differences in Emotional Exhaustion,

Depersonalisation and Personal Accomplishment between T1 and T2

Mean score:

Emotional Exhaustion = 14.2 (SD 6.9)

Depersonalisation = 5.8 (SD 3.2)

No significant changes in burnout over time

Mean scores:

Emotional Exhaustion = 25 (SD 7.3)

Depersonalisation = 12 (SD 5.5)

Personal Accomplishment = 38 (SD 5.9)

Classification:

Emotional Exhaustion = moderate

Depersonalisation = high end of moderate range

Personal Accomplishment = low end of moderate range

49% met criteria for burnout

Intervention group ($n = 43$)

Emotional Exhaustion = pre 28.47, post +1.23

Depersonalisation = pre 14.16, post -0.26

Personal Accomplishment = pre 35.23, post -0.58

Non-intervention group ($n = 21$)

Emotional Exhaustion = pre 28.67, post -3.38

Depersonalisation = pre 14.00, post -1.09

Personal Accomplishment = pre 37.43, post -0.57

+ = positive change

- = negative change

Improved Emotional Exhaustion in intervention group after intervention

Worsened Emotional Exhaustion in non-intervention group

Negative change in Depersonalisation and Personal Accomplishment in both groups between T1 and T2

Table 1 Continued

<i>Study* and design</i>	<i>Response rate</i>	<i>n</i>	<i>Specialty and year of training</i>
McManus <i>et al.</i> (2004) ²⁸ Prospective longitudinal quantitative study	63%	1668 residents	Specialties not defined Functions present in study: Senior house officers Special registrars General practitioners
Michels <i>et al.</i> (2003) ²³ Longitudinal quantitative study	Not reported	350 residents	Family practice Year of training 1–3 First-year residents over-represented
Nyssen <i>et al.</i> (2003) ¹⁶ Cross-sectional quantitative study	48%	151 119 residents 32 senior anaesthesiologists	Anaesthesia Year of training 1–5
Ospina-Kammerer & Figley (2003) ²⁷ Pre/post-test quantitative study with a quasi-experimental design	Not reported	24 residents	Family practice Year of training 1–3
Purdy <i>et al.</i> (1987) ¹⁷ Cross-sectional quantitative study	94% → ; 100% → ;	67 residents 18 faculty members	Family practice Faculty members Year of training 1–3
Rafferty <i>et al.</i> (1986) ¹⁸ Cross-sectional quantitative study	94% → ; 100% → ;	67 residents 18 faculty members	Family practice Faculty members Year of training 1–3
Raviola <i>et al.</i> (2002) ¹⁹ Cross-sectional study with quantitative and qualitative aspects	Not reported	50 residents	Paediatrics Obstetrics/gynaecology Surgery Medicine Year of training 3 or 4

Burnout instrument

MBI abbreviated version 9 items, 3 subscales:

Emotional Exhaustion
Depersonalisation
Personal Accomplishment

MBI, 2nd edn, 3 subscales:

Emotional Exhaustion
Depersonalisation
Personal Accomplishment

MBI, 3rd edn, 1 subscale:

Emotional Exhaustion
(9 items, scoring possibilities
1–7 instead of 0–6 as used in the original MBI)

MBI 22 items, 1 subscale:

Emotional Exhaustion

T1 = prior to intervention

T2 = after intervention

Duration of intervention

once a week for 4 weeks

MBI research edition 22 items, 3 subscales:

Emotional Exhaustion
Depersonalisation
Personal Accomplishment

MBI research edition

25 items, 3 subscales:

Emotional Exhaustion
Depersonalisation
Personal Accomplishment

Residents were given a definition of burnout and asked to report the level to which they felt they were by affected burnout as described

Burnout

Emotional Exhaustion and Depersonalisation were associated with: surface-disorganised approach to work, the perceived workload
Emotional Exhaustion was associated with: choice independence
Depersonalisation associated with: a supportive-receptive work climate
Multiple regressions showed significant relationships between: Emotional Exhaustion and Neuroticism and Extroversion; Depersonalisation and Neuroticism and Agreeableness

Men: mean scores:

Emotional Exhaustion = 19.5 (SD 10.5)

Depersonalisation = 9.6 (SD 5.7)

Personal Accomplishment = 38.7 (SD 6.7)

Women: mean scores:

Emotional Exhaustion = 18.9 (SD 9.2)

Depersonalisation = 7.2 (SD 5.1)

Personal Accomplishment = 38.5 (SD 8.1)

Cut-off criteria used:

Emotional Exhaustion = high > 29

Emotional Exhaustion = moderate = 18–29

Emotional Exhaustion = low = 9–18

A moderate level of burnout (assessed as Emotional Exhaustion only) was found for the whole group (including staff) (mean score: 27 [range 10–59])
Anaesthesia residents <30 years of age showed the highest scores on Emotional Exhaustion compared with other respondents

Cut-off criteria used:

Emotional Exhaustion = high \geq 27

Emotional Exhaustion = moderate = 17–26

Emotional Exhaustion = low = 0–16

Scores for Intervention group ($n = 14$):

Emotional Exhaustion high: pre $n = 6$, post $n = 2$

Emotional Exhaustion moderate: pre $n = 5$, post $n = 6$

Emotional Exhaustion low: pre $n = 3$, post $n = 6$

Scores for non-intervention group ($n = 10$):

Emotional Exhaustion high: pre $n = 4$, post $n = 3$

Emotional Exhaustion moderate: pre $n = 5$, post $n = 4$

Emotional Exhaustion low: pre $n = 1$, post $n = 3$

The 2 groups did not differ on pre-test Emotional Exhaustion

The 2 groups differed significantly on post-test Emotional Exhaustion

Respiratory One Method treatment had a positive effect on lowering Emotional Exhaustion

Mean scores frequency:

Emotional Exhaustion = 25.3 (SD 7.3)

Depersonalisation = 12.2 (SD 5.5)

Personal Accomplishment = 37.6 (SD 5.9)

Mean scores intensity:

Emotional Exhaustion = 31.9 (SD 8.9)

Depersonalisation = 15.4 (SD 6.3)

Personal Accomplishment = 38.2 (SD 6.7)

Overall:

Emotional Exhaustion: moderate

Depersonalisation: high

Personal Accomplishment: moderate

Mean scores frequency:

Emotional Exhaustion = 25.3 (SD 7.3) (cut-off criterion: moderate = 18–29)

Depersonalisation = 12.2 (SD 5.5) (cut-off criterion: high \leq 12)

Personal Accomplishment = 37.6 (SD 5.9) (cut-off criterion: moderate = 39–34)

Mean scores intensity:

Emotional Exhaustion = 31.9 (SD 8.9) (cut-off criterion: moderate = 26–39)

Depersonalisation = 15.4 (SD 6.3) (cut-off criterion: high \leq 15)

Personal Accomplishment = 38.2 (SD 6.7) (cut-off criterion: moderate = 43–37)

82% reported being at least moderately affected by burnout

Table 1 Continued

Study* and design	Response rate	n	Specialty and year of training
Sargent <i>et al.</i> (2004) ²⁰ Cross-sectional quantitative study	Not reported	21 residents 25 faculty members	Orthopaedic surgery residents Orthopaedic faculty members Year of training not reported
Schweitzer B (1993) ²¹ Cross-sectional quantitative study	36.8%	126 including 36 medical residents	Specialty not defined Year of training not defined
Shanafelt <i>et al.</i> (2002) ¹⁰ Cross-sectional quantitative study	76%	115 residents	Internal medicine Year of training 1–3
Tzischinsky <i>et al.</i> (2001) ²⁴ Longitudinal quantitative study	Not reported	78 residents	Specialty not defined, residents from 15 medical departments Year of training 1 and 2

* Studies are listed in alphabetical order
MBI = Maslach Burnout Inventory; SD = standard deviation

than reported in an earlier study of family practice residents.¹⁴ Men reported higher levels of Depersonalisation than women and the general norm population.²³ Finally, both male and female residents reported significantly higher scores on Personal Accomplishment than the general norm population.²³

Two intervention studies found that residents who followed a burnout intervention programme had significantly lower scores on Emotional Exhaustion than the control group, which had not followed the programme.^{26,27} However, the intervention seems to have only worked on Emotional Exhaustion. Scores on Depersonalisation increased and those on Personal Accomplishment decreased in both the intervention and non-intervention groups.²⁶ The third intervention study showed that a reduction in work hours did not affect burnout levels.²⁵

Risk factors

Fifteen of the 19 studies reported effects of occupational and/or individual factors on resident burnout. In examining these effects, we found the following types of risk factor.

Occupational risk factors

Thirteen studies examined the effect of 16 occupational risk factors on burnout. Inconsistent results were found on the effect of years of training on burnout. One study reported that first-year residents scored significantly higher on burnout than residents who were further in their training.¹⁵ Another study¹⁷ reported a pattern of high levels of Depersonalisation and moderate levels of Emotional Exhaustion and Personal Accomplishment in first-year residents. A longitudinal study showed that residents reported significantly more Depersonalisation in their second and third years than they had in their first.²³

One study reported a strong relationship between burnout and quantitative work overload,¹¹ whereas a second failed to find such a relationship¹³ and a third showed that medical residents' scores on Emotional Exhaustion were related to high workload as presently perceived and also as it had been perceived 5 years earlier.²⁸ However, each study measured workload differently: the first study¹¹ used the Experienced Work Intensity Scale, the second¹³ a Work Pressure Scale and the third²⁸ used the Workplace Climate Questionnaire.

Burnout instrument

MBI, 3rd edn
22 items, 3 subscales:
Emotional Exhaustion
Depersonalisation
Personal Accomplishment

Perceived burnout was assessed with the question:
Do you ever feel so emotionally exhausted that
you feel negative about yourself and about your job
and lose the feeling of concern for your patients?

MBI, 3rd edn 22 items, 3 subscales:
Emotional Exhaustion
Depersonalisation
Personal Accomplishment

MBI, 2nd edn 22 items

3 assessments:
T1 = start of residency
T2 = 1 years after start
T3 = 2 years after start

Burnout

Mean scores:
Emotional Exhaustion = 27.7 (SD 9.7)
Depersonalisation = 15.1 (SD 6.3)
Personal Accomplishment = 36.3 (SD 5.3)
Classification of scores found:
Emotional Exhaustion in upper third
Depersonalisation in upper third
Personal Accomplishment in mid third
55% of the medical residents reported burnout

76% ($n = 87$) of the residents met the criteria for burnout
53% high score on Emotional Exhaustion (cut-off criterion: ≥ 27)
64% high on Depersonalisation (cut-off criterion: ≥ 10)
31% low score on Personal Accomplishment (cut-off criterion: ≤ 33)
Overall:
Emotional Exhaustion = moderate ($M = 26.4$)
Depersonalisation = high ($M = 12.7$)
Personal Accomplishment = moderate ($M = 36.2$)
Burnout increased significantly between start of residency and
12 months later, and significantly decreased after 2 years of residency

Mean MBI
T1 = 2.3 (SD 1.3)
T2 = 2.8 (SD 1.4)
T3 = 2.0 (SD 1.3)

Four studies examined the relationship between working hours and burnout.^{11,12,24,25} Two studies^{11,12} showed that the number of work hours was not significantly related to burnout. One study²⁵ showed that a reduction in work hours was unrelated to burnout. The fourth study²⁴ claimed to evaluate the impact of long working hours on daily and yearly burnout among medical residents by measuring the number of hours residents slept. Sleep duration was found to be unrelated to burnout. However, it is questionable whether the number of hours slept can be seen as an indication of the number of hours worked. Burnout also related to work-related stress,²⁰ increased perceptions of stress,^{20,22} decreased career and job satisfaction,^{10,18} and low scores on clinical competency.²² Financial pressure caused by anticipated debt on completion of training²⁰ and longer periods of time between undergraduate work and medical school¹⁰ were also found to be related to burnout. Residents who experienced an increase in work-home conflict^{13,20} reported higher levels of burnout.

Social support at work and satisfying work relationships appeared to affect burnout. Burnout was found in those who felt greater dependency on

their superiors¹³ and had more stressful relationships with faculty members, senior residents or nursing staff.^{15,20} Scores on Personal Accomplishment increased when levels of satisfaction derived from talking with colleagues increased.²⁰ A supportive-receptive workplace appeared to be associated with lower levels of Depersonalisation and higher levels of Personal Accomplishment.²⁸ A low level of autonomy in the job was significantly related to burnout.¹¹

No significant effect was found regarding type of specialty on burnout.¹⁵ Remarkable differences were reported within individual specialties: for example, burnout rates ranged from 18%¹² to 75%¹⁵ in obstetrics and gynaecology residents, and from 63%¹⁵ to 76%¹⁰ in internal medicine residents. The differences in percentages can be explained by the different assessment methods used in the determination of overall burnout in the various studies.

Of these occupational risk factors, 4 showed a strong correlation with burnout (correlation coefficient ≥ 0.60 ³¹), namely, a quantitative work overload,¹¹ increased perception of work as stressful,²⁰ an

increase in anticipation of debt at the end of training²⁰ and increased conflict between work and home.^{13,20} The remaining factors were weakly (correlation coefficients < 0.30) or moderately strongly (correlation coefficients $0.30-0.50$ ³¹) related to burnout.

Individual risk factors

Nine studies examined the effect of 11 individual risk factors on burnout. Men reported significantly more job- and patient-related burnout than women.²² Emotional Exhaustion was significantly more prevalent in women.^{12,13} With regard to race, White residents reported significantly more Depersonalisation than African-American residents.²³ Younger age was associated with more Emotional Exhaustion among anaesthesia residents.¹⁶

Residents' personal situations or backgrounds seemed to affect burnout as well. Higher rates of burnout were found in unmarried residents, residents experiencing family-related stress,¹⁵ those who were more dissatisfied with support systems,¹⁴ those whose spouses worked part-time or were unemployed¹⁴ and those whose partners worked overtime.¹³ Residents whose fathers were or had been doctors reported less Emotional Exhaustion and Depersonalisation.²⁰ Emotional Exhaustion decreased when time alone with the spouse increased.²⁰ Being a parent and being more satisfied with talking with friends and family about concerns both affected Personal Accomplishment positively.²⁰ Personality was found to affect burnout²⁸ in that residents who reported more Emotional Exhaustion scored higher on neuroticism and were more introverted; more Depersonalisation was found to be related to lower levels of agreeableness, and higher levels of Personal Accomplishment were associated with greater extroversion and deeper approaches to study and learning.

Although these individual risk factors were found to be related to burnout, none of the relationships were strong.

Effects on resident health

Medical residents diagnosed with burnout also reported other problems, most of which were health-related. Associations were found between burnout and poorer health,²² mood disturbances^{15,22} a tendency towards psychotic thinking and psychotic depression,^{10,14} somatisation,¹⁴ dysthymia,¹⁴ alcohol abuse,¹⁴ general anxiety,¹⁴ and anxiety about clinical competence.²⁰

Effects on patient care

Two studies revealed relationships between burnout and patient care. Residents suffering from burnout reported more incidences of suboptimal patient care practices at least several times a year, or even monthly.¹⁰ The second study reported that those who experienced a more intense need to distance themselves from their patients evaluated themselves as being more burned out.¹⁷

DISCUSSION

Our search reveals that $< 1\%$ of the burnout literature focuses on burnout among medical residents. That so little has been published on burnout among medical residents is surprising, given that medical residents are relatively young and work in demanding environments characterised by heavy patient loads and long, irregular working hours, are highly dependent on supervisors' evaluations to finish their training, and have high levels of responsibility but low levels of autonomy, which they often combine with demanding home situations.¹³ However, the amount of attention focused on burnout among medical residents appears to be on the increase: 13 studies have been published during the last 5 years.

The quality of the 19 studies included in this review appears to be low: only 5 studies meet more than 2 of the Cochrane quality criteria. However, using the Cochrane criteria can be limiting in that qualitative studies, which may present excellent work, will not meet many of the criteria (e.g. hypothesis-testing). The majority of the studies included here were exploratory descriptive studies; only a few used a well formulated theoretical model to test hypotheses. A second major problem is that, although most studies used the MBI to measure burnout, it is difficult to make comparisons between the various studies because different versions of the MBI were used, and relevant information on the content, number of items, scoring methods and cut-off scores used is missing. Furthermore, different methods were used to diagnose clinical burnout in medical residents. This affects the strength of the conclusions drawn in most of the studies.

The most effective way of diagnosing burnout seems to involve using a system of scoring on Emotional Exhaustion and Depersonalisation (high scores on both Emotional Exhaustion and Depersonalisation, or a high score on Emotional Exhaustion combined with a low score on Personal Accomplishment).³²

Scores $\geq 75\%$ are considered high and scores $\leq 25\%$ are considered low. However, none of the included studies used this criterion. The 'second best' criterion of high scores on both Emotional Exhaustion and Depersonalisation and a low score on Personal Accomplishment was found to diminish the chance of a false positive score on burnout to zero,³² but was also found to result in a very conservative estimate of burnout percentages. This criterion was used by Garza *et al.*,¹² which may imply that the burnout percentage of 17.6% is an underestimation of the prevalence of burnout in that population. Diagnosing burnout by using only a high score on Emotional Exhaustion gives a high chance of resulting in a false positive (15.9%).³² Shanafelt *et al.*¹⁰ applied this rule and additionally assessed burnout by examining scores on Depersonalisation. Taking into account the chance of a false positive, the burnout rate of 76% of the study population in that study may be an overestimation of the true rate. As long as the quality of measurements of burnout remains under discussion, it is difficult to draw explicit conclusions about the extent of burnout among medical residents. Therefore, more research should be performed on how to best assess and diagnose burnout.

Moreover, comparisons between results of burnout studies performed in different countries are difficult as findings may differ as a result of differences in cultural, educational and organisational backgrounds.

The predictors of burnout focused on in the various studies can be described as either occupational or individual factors. Inconsistent results on the effects of some of these factors on burnout were reported. The only strong correlation in a methodologically stronger study¹³ was that between an occupational risk factor, namely work-home interference, and burnout. The remaining stronger correlations (a quantitative work overload, increased perception of work as stressful, an increase in anticipation of debt at the end of training, and increased conflict between work and home) were found in weaker studies.^{11,20}

In general, none of the individual risk factors studied were found to be strongly related to burnout. Whereas relationships were found between socio-demographic and family characteristics, personality and a supportive environment and burnout, they were only weakly correlated with burnout in the studies included. Curiously, no study reported on significant differences between male and female residents in levels of Depersonalisation, as

described in more general studies on burnout. Furthermore, having to combine the demands of work, training and home simultaneously is a characteristic of residency. No study specifically examined the possible effects of the training demands that must be met in order to become a medical specialist.

Some of the studies reported on the consequences of burnout for medical residents. Burnout was found to be associated with health-related problems. Only 2 studies^{10,17} focused on the relationship between burnout and quality of patient care. These studies reported that burnout among medical residents may negatively affect the quality of patient care. However, the reliability of these findings is questionable because of the definition of burnout used in 1 of the studies, and because the questionnaire used to assess patient care practices in the same study was self-constructed and had not been validated.¹⁰ Lastly, with regard to the quality of patient care, 1 study¹⁷ reported that those who experienced a more intense need to distance themselves from their patients evaluated themselves as being more burned out. This is not surprising as among the factors leading to burnout is a high level of depersonalisation towards patients.

The studies examining risk and resistance factors associated with burnout among medical residents paint a very multicausal picture. The causal nature of burnout among medical residents could not be established because of the design of the studies. The wide diversity of the different studies in this review illustrates the need for more systematic design in future research among medical residents. A future study should comprise a well focused theoretical model that includes the individual, occupational and training demands that medical residents experience.

Medical residents are future medical specialists who will be responsible for the quality of care of patients not only now, but also in the future. Their training as medical specialists may be hampered by having to overcome feelings of burnout. We do not know how many residents who start training leave early because of burnout. Self-selection may occur, with those who are able to cope with the different demands completing their training. Future research might examine if and to what extent self-selection takes place and if it is possible to identify characteristics for which candidates for medical residency positions could be screened in order to avoid personal tragedy and the loss of investment.

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