Burnout Syndrome and Its Predictors in Dermatology Residents

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Abstract

Background: Burnout is a problem that is highly under-reported and under-recognized. Defined by three dimensions: emotional exhaustion (EE), cynicism or depersonalization (DP), and low personal feelings of achievement (PA). It is a prolonged response to chronic emotional and interpersonal stressors on the job. If unrecognized, the costs to the healthcare providers and to the health care system can be enormous. Previous studies reported various burnout rates during board training programs; yet, none focused on dermatology residents. This is the first study to assess burnout rate and possible predictors in dermatology residents in the middle east, and the second worldwide.

Methods: The Maslach Burnout Inventory, alongside the possible risk factors of burnout, was distributed to dermatology board training programs in all affiliated centers in Riyadh, Saudi Arabia, yielding a response rate of 96.2%.

Results: High EE was present in 41.2% of dermatology residents, a low sense of PA was present in 45.1%, while high DP was the least prevalent at 13.7%. Satisfaction with career was significantly associated with high risk of EE (OR = 0.61, P < 0.001), high risk of DP (OR = 0.34, P = 0.001) and low risk of PA (OR = 0.68, P < 0.001). The average number of sleeping hours was also associated with high risk of EE (OR = 0.87, P < 0.001), high risk of DP (OR = 0.76, P = 0.001) and low risk of PA (OR = 0.86, P < 0.001). Our findings report high burnout in 7.8% of the respondents.

Conclusions: The burnout phenomenon is a well-known issue that must be acknowledged by program directors in academic medicine. Protected time to pursue academic interests, e.g., research and teaching, and a fair distribution of on-call hours per month, as well as a number of clinics per week may explain the rate of burnout in our study. These findings can be applied in the development and improvement of training programs to reduce the burnout rate among future dermatologists.

Background

The “burnout” term has been described as ‘a prolonged response to emotional and personal stressors in the workplace, defined as a combination of cynicism (depersonalization, DP), a loss of enthusiasm for work (emotional exhaustion, EE), and a sense of low personal accomplishment (PA). The typical symptoms of burnout syndrome are fatigue, cognitive exhaustion, disengagement, low mood, and sleep disturbances [1–3]. Causes are specifically related to occupational factors, such as work overload, job-related problems, and lack of social support. Burnout differs from stress and depression, as it involves a person's relationship with work, unlike stress which may be experienced in many realms [4, 5]. Moreover, burnout may progress to clinical depression if generalized to the home environment, and aggravate or induce suicidal ideation [6, 7]. It can also lead to substance abuse, malpractice, negligence, medical errors, and a decrease in patient safety [7–9]. Burnout is associated with suboptimal patient care, decreased communication, significant effects on individual health, and a negative impact on job performance [10]. Studies found that it is associated with work withdrawal, lower productivity,
absenteeism, and intention to quit the job [10, 11]; as such, it is a public health issue of national proportions.

Many previous studies have reported that burnout affects medical professionals at all stages in different fields, including medical students, residents, nurses, specialists, and consultants; it also varies by specialty and gender [13–16]. Previously, dermatologists had one of the lowest burnout rates among medical specialties. [17–19]. In 2011, it had the highest rate of professional satisfaction of all evaluated specialties, ranking 23rd of 24th in burnout rate. However, from 2011 to 2014, a study conducted to measure burnout rate utilizing Maslach Burnout Inventory, demonstrated that dermatologists showed an increase in burnout rate from 32–57%, ranking the 9th highest of 24 specialties [19].

Worldwide, previous studies reported varied burnout rates during post-graduate medical education programs; however, none focused on dermatology residents [15, 17, 20–22]. Although there were published studies on the prevalence of burnout among other specialties in Saudi Arabia [14, 21, 23], to the best of our knowledge, there were no published studies on the prevalence of burnout or its risk factors in dermatology residents. As a result, there is a strong justification to conduct research on its prevalence and predictors. The aim of this study is to: 1) investigate the prevalence of burnout levels and predictors among dermatology residents in Riyadh, and 2) clarify the risk factors associated with burnout.

Methods

A cross-sectional study was conducted between December 2019 and February 2020; included all dermatology residents (n = 53) in the Saudi Board Dermatology Training Program in Riyadh, Kingdom of Saudi Arabia. Participation was voluntary and written informed consent was obtained before the study. The survey was completed by 51 dermatology residents, a 96.2% response rate.

Survey Instruments

An online questionnaire was distributed to dermatology residents, and included two sections:

1. Demographic and Residency-related Factors

The first part of the questionnaire included demographic characteristics, such as age, gender, marital status, smoking status, and residency level. Three items were included to assess satisfaction with career, salary, and life/work balance. One question was used to assess whether residents ever failed any (promotion and/or part of) exams. Participants were also asked about their average number of on-calls/month, sleeping hours, hospital working hours, clinics/weeks, and patients under daily care. Two questions assessed whether residents considered quitting or changing the program. An additional two questions assessed whether residents considered psychiatric visits or taking antidepressants. Thoughts regarding professional and personal life after residency were assessed with two other questions: the
perceived benefit of the relationship with their mentors and whether the residents also mentored any students.

2. Maslach Burnout Inventory (MBI-HS)

The MBI-HS includes 22 questions to assess three domains of burnout: emotional exhaustion (EE, 9 questions), which measures feelings of being emotionally overextended and exhausted by work; depersonalization (DP, 5 questions), which measures lack of feelings and impersonal responses toward recipients, care treatment or instruction, and finally, a low sense of personal accomplishment (PA, 8 questions), measuring a sense of competence and achievement with work. High EE and DP scores are associated with higher burnout, whereas higher PA scores are associated with lower burnout. High EE was defined as a score > 26, while high DP was defined as a DP score > 12. Low PA was defined as a score < than 32. Two-dimensional burnout coexisted with high EE and high DP, while three-dimensional burnout was defined as low PA, high EE, and high DP. We adopted the criteria (three-dimensional characterization) suggested by the developer of the instrument for burnout syndrome [24].

Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS ver.20 Chicago, IL, USA). We used counts and percentages to summarize the participants' demographics. Quantitative continuous variables were summarized using mean ± standard deviation, while categorical variables were summarized using number & percentage. Burnout dimensions (emotional exhaustion, depersonalization, low sense of personal accomplishment) and overall burnout were analyzed as quantitative and categorical variables (based on previously mentioned cut-off criteria). Likert scale items (satisfaction with job salary, life/work balance, satisfaction with dermatology as a career choice) were summarized with counts and percentages. Bar plots were used to visualize responses for Likert-scale items.

Pearson Chi-square test was used to assess the association between categorical variables. Binary logistic regression assessed the predictors of dichotomized versions of the three burnout dimensions, as well as overall burnout. The dichotomized versions of burnout dimensions were dependent variables (DV). Unadjusted odds ratios (ORs) were calculated and tested for statistical significance using univariate binary logistic regression.

Multivariate binary logistic regression was used to estimate the adjusted odd ratio (OR) for each predictor and Confidence intervals (CIs). The logistic regression model was aligned with Firth's bias reduction method (penalization of the log-likelihood). Confidence intervals (CIs) for regression coefficients were computed by a penalized profile likelihood, a backward approach was used for variable selection (using a criterion of p value for the Wald Chi-square statistics of < .1). Satisfaction with aspects of the job were treated as quantitative variables. Two-tailed hypothesis testing was performed at α (.05).

Results
The survey was completed by 51 dermatology residents. Females were more prevalent than males (66.7% vs. 33.3%). Married residents represent 43.1% (n = 22) of the study sample. Residents aged 25–27 years and 28–30 years represent 64.7% (n = 33) and 29.4% (n = 15), respectively. Most of the residents did not smoke 90.2% (n = 46). The average number of working (hours/day) in the hospital was (8.94 ± 5.63), while the average number of on-calls was (6.96 ± 6.19) (days/month). The average number of sleeping (hours/day) was (6.71 ± 1.59) hours. The average number of (clinics/week) was (5.08 ± 2.77), while the average number of patients under the daily care of each resident was (7.37 ± 5.61) patients. Approximately half the residents considered a psychiatric visit 45.1% (n = 23) and less than half considered taking antidepressants 39.2% (n = 20). One quarter of the residents also considered quitting the program 25.5% (n = 13) [Table 1].
Table 1
Descriptive statistics for the study sample (n = 51)

| Age (n, %) |        |
|------------|--------|
| < 25       | 2 (3.92%) |
| 25–27      | 33 (64.7%) |
| 28–30      | 15 (29.4%) |
| 31–33      | 1 (1.96%)  |

| Gender (n, %) |        |
|---------------|--------|
| Female        | 34 (66.7%) |
| Male          | 17 (33.3%) |

| Marital status (n, %) |    |
|-----------------------|----|
| Unmarried             | 29 (56.9%) |
| Married               | 22 (43.1%) |

| Residency level (n, %) |    |
|------------------------|----|
| R1                     | 11 (21.6%) |
| R2                     | 16 (31.4%) |
| R3                     | 13 (25.5%) |
| R4                     | 11 (21.6%) |

| Do you smoke? (n, %) |    |
|---------------------|----|
| No                  | 46 (90.2%) |
| Yes                 | 5 (9.8%) |

| Average hours of sleep/day (Mean ± SD) |    |
|---------------------------------------|----|
|                                        | 6.71 (1.59) |

| Average number of on-call/month (Mean ± SD) |    |
|---------------------------------------------|----|
|                                            | 6.96 (6.19) |

| Average number of hours working in the hospital/day (Mean ± SD) |    |
|----------------------------------------------------------------|----|
|                                                                 | 8.94 (5.63) |

| Average number of clinics/week (Mean ± SD) |    |
|--------------------------------------------|----|
|                                            | 5.08 (2.77) |

| Average number of patients under daily care (Mean ± SD) |    |
|--------------------------------------------------------|----|
|                                                         | 7.37 (5.61) |

| Mentor for other residents/students? |    |
|-------------------------------------|----|
| No                                  | 25 (49.0%) |
| Yes                                 | 26 (51.0%) |
| Age (n, %)                                                                 |
|---------------------------------------------------------------------------|
| Benefit from your relationship with mentor?                                |
| No                          | 5 (23.8%)                     |
| Yes                         | 16 (76.2%)                    |
| Ever failed your (promotion and/or part) exams?                           |
| No exams                    | 11 (21.6%)                    |
| Never                       | 25 (49.0%)                    |
| Once                        | 12 (23.5%)                    |
| Twice                       | 2 (3.92%)                     |
| >Twice                      | 1 (1.96%)                     |
| Likelihood of getting a fair job after residency?                         |
| Very unlikely               | 1 (1.96%)                     |
| Unlikely                    | 11 (21.6%)                    |
| Neutral                     | 19 (37.3%)                    |
| Likely                      | 12 (23.5%)                    |
| Very likely                 | 8 (15.7%)                     |
| Likelihood of professional and personal life improvement after residency? |
| Neutral                     | 3 (5.88%)                     |
| Likely                      | 9 (17.6%)                     |
| Very likely                 | 39 (76.5%)                    |
| Ever given serious thoughts to quitting?                                 |
| No                          | 38 (74.5%)                    |
| Yes                         | 13 (25.5%)                    |
| Ever considered taking antidepressant?                                   |
| No                          | 31 (60.8%)                    |
| Yes                         | 20 (39.2%)                    |
| Ever considered a psychiatrist visit?                                    |
| No                          | 28 (54.9%)                    |
| Yes                         | 23 (45.1%)                    |
Results showed that 90.2% of residents were satisfied with their career and that 60.8% were satisfied with their income. Only 31.4% of included residents acknowledged that they were satisfied with their work/life balance [Figure 1].

As demonstrated in [Table 2], high emotional exhaustion (EE) was present in 41.2% (n = 21) of dermatology residents, while low sense of personal achievement (PA) was present in 45.1% (n = 23). A high level of depersonalization (DP) was least prevalent across all burnout dimensions 13.7% (n = 7). A high level of burnout was present in 7.84% (n = 4) of dermatology residents. The average EE score was (24 ± 11.2) lower than the cut-off for high EE (> 26), while the average PA score was (31.4 ± 9.17) which is also lower than the suggested cut-off point (< 32). Moreover, the average DP score was (6.25 ± 5.57) lower than the suggested cut-off point (> 12).

| EE (Mean ± SD)       | 24 ± 11.2 |
|----------------------|-----------|
| DP (Mean ± SD)       | 6.25 ± 5.57 |
| PA (Mean ± SD)       | 31.4 ± 9.17 |

- High emotional exhaustion (n; %)
  - No: 30 (58.8%)
  - Yes: 21 (41.2%)

- High depersonalization (n; %)
  - No: 44 (86.3%)
  - Yes: 7 (13.7%)

- Low personal accomplishment (n; %)
  - No: 28 (54.9%)
  - Yes: 23 (45.1%)

- Burnout (n; %)
  - No: 47 (92.2%)
  - Yes: 4 (7.84%)

*DP, depersonalization; EE, emotional exhaustion; PA, personal accomplishment.*

*SD, Standard deviation*
Univariate analysis indicated that satisfaction with income was significantly associated with EE (OR = 0.39, p = 0.007). The odds of high EE decreased by 61% for each unit increase in satisfaction with salary. Satisfaction with career was also associated with EE (OR = 0.33, p = 0.018), demonstrating that the odds of high EE decrease by 67% for each unit increase in career satisfaction. Satisfaction with work/life balance was significantly associated with EE (OR = 0.35, p = 0.003), meaning that the odds of high EE decrease by 65% for each unit increase in satisfaction with work life balance. [Table 3]. Multivariate logistic regression showed that only satisfaction with career (OR = 0.61, p < 0.001) and average number of sleeping hours/day (OR = 0.87, P < 0.001) were significantly associated with the risk of EE. A higher average number of sleeping hours was associated with a low risk of EE. For each hour increase for average daily sleeping, the odds of EE were expected to decrease by 13% [Table 4].
### Table 3
Univariate association of demographic and work-related factors with burnout dimensions

|                | EE OR     | EE p     | DP OR [95% CI]       | DP p     | PA OR [95% CI]       | PA p     |
|----------------|-----------|----------|----------------------|----------|----------------------|----------|
| **Demographic characters** |           |          |                      |          |                      |          |
| **Age:**       |           |          |                      |          |                      |          |
| <28            | Ref.      | Ref.     | Ref.                 | Ref.     | Ref.                 | Ref.     |
| 28+            | 1.17 [0.34;3.95] | 0.806 | 1.17 [0.34;3.95] | 0.806 | 0.36 [0.01;2.50] | 0.340    |
| **Gender:**    |           |          |                      |          |                      |          |
| Female         | Ref.      | Ref.     | Ref.                 | Ref.     | Ref.                 | Ref.     |
| Male           | 1.00 [0.29;3.33] | 0.996 | 1.00 [0.29;3.33] | 0.996 | 0.81 [0.09;4.45] | 0.815    |
| **Marital status:** |           |          |                      |          |                      |          |
| Unmarried      | Ref.      | Ref.     | Ref.                 | Ref.     | Ref.                 | Ref.     |
| Married        | 0.98 [0.31;3.09] | 0.976 | 0.98 [0.31;3.09] | 0.976 | 0.51 [0.06;2.75] | 0.444    |
| **Residency:** |           |          |                      |          |                      |          |
| R1             | Ref.      | Ref.     | Ref.                 | Ref.     | Ref.                 | Ref.     |
| R2             | 1.98 [0.38;12.6] | 0.423 | 1.98 [0.38;12.6] | 0.423 | 0.40 [0.04;3.19] | 0.388    |
| R3             | 2.17 [0.39;14.6] | 0.384 | 2.17 [0.39;14.6] | 0.384 | 0.25 [0.01;2.62] | 0.264    |
| R4             | 2.11 [0.35;15.0] | 0.421 | 2.11 [0.35;15.0] | 0.421 | 0.30 [0.01;3.18] | 0.338    |
| **Smoking status:** |           |          |                      |          |                      |          |
| No             | Ref.      | Ref.     | Ref.                 | Ref.     | Ref.                 | Ref.     |
| Yes            | 0.97 [0.10;6.95] | 0.974 | 0.97 [0.10;6.95] | 0.974 | 0 [0, 10] | 0.995    |
| **Exercise:**  |           |          |                      |          |                      |          |
| No             | Ref.      | Ref.     | Ref.                 | Ref.     | Ref.                 | Ref.     |
| Yes            | 0.64 [0.20;2.04] | 0.43 | 0.64 [0.20;2.04] | 0.43 | 1.81 [0.33;15.3] | 0.509    |
| Residency related factors   | EE           |             | DP           |             | PA           |             |
|----------------------------|--------------|-------------|--------------|-------------|--------------|-------------|
| Sleeping hours             | 0.73 [0.47;1.15] | 0.174       | 0.73 [0.47;1.15] | 0.174       | 0.59 [0.27;1.28] | 0.183       |
| On-call/month              | 1.02 [0.93;1.12] | 0.650       | 1.02 [0.93;1.12] | 0.650       | 1.02 [0.90;1.15] | 0.777       |
| Working hours              | 1.36 [0.92;1.99] | 0.121       | 1.36 [0.92;1.99] | 0.121       | 0.84 [0.49;1.44] | 0.523       |
| Clinics/Week               | 1.19 [0.94;1.49] | 0.148       | 1.19 [0.94;1.49] | 0.148       | 0.83 [0.64;1.08] | 0.171       |
| Patients/clinic            | 1.09 [0.98;1.22] | 0.099       | 1.09 [0.98;1.22] | 0.099       | 0.91 [0.77;1.08] | 0.291       |
| Study hours/week           | 1.02 [0.96;1.09] | 0.445       | 1.02 [0.96;1.09] | 0.445       | 1.07 [0.98;1.17] | 0.107       |

| Satisfaction               |              |             |              |             |              |             |
|----------------------------|--------------|-------------|--------------|-------------|--------------|-------------|
| Salary                     | 0.39 [0.20;0.77] | **0.007**  | 0.39 [0.20;0.77] | **0.007**  | 0.36 [0.14;0.91] | **0.030**  |
| Career                     | 0.33 [0.13;0.83] | **0.018**  | 0.33 [0.13;0.83] | **0.018**  | 0.24 [0.08;0.75] | **0.014**  |
| Balance                    | 0.35 [0.18;0.69] | **0.003**  | 0.35 [0.18;0.69] | **0.003**  | 0.51 [0.21;1.21] | 0.127       |

OR: Odds ratio; CI: Confidence interval; DP, depersonalization; EE, emotional exhaustion; PA, personal accomplishment.
Continuous variables are presented as mean(SD), categorical variables are presented as count (%).

* p < 0.1, **p < 0.05
### Table 4
Multivariate logistic regression analysis results for burnout and burnout dimensions

|                | EE |       | DP |       | PA |       | Burnout |       |
|----------------|----|-------|----|-------|----|-------|---------|-------|
|                | OR | p     | OR | p     | OR | p     | OR      | p     |
|                | [95% CI] |       | [95% CI] |       | [95% CI] |       | [95% CI] |       |
| **Residency related factors** |                |       |       |       |       |       |         |       |
| Sleeping hours | 0.87 | 0.005 | 0.76 | 0.029 | 0.86 | .001  | 0.64    | 0.05  |
| [0.54, 3.88]   |       |       | [0.5, 1.41] |       | [0.52, 6.1] |       | [0.3, 5.12] |       |
| On-call/month  |       |       |       |       |       |       |         |       |
| Working hours  |       |       |       |       |       |       |         |       |
| Clinics/Week   |       |       |       |       |       |       |         |       |
| Patients/clinic|       |       |       |       |       |       |         |       |
| Study hours/week|       |       |       |       |       |       |         |       |
| **Satisfaction** |                |       |       |       |       |       |         |       |
| Salary         |       |       |       |       |       |       |         |       |
| Career         | 0.61 | <0.001| 0.34 | 0.001| 0.68 | <0.001|         |       |
| [0.15, 22.3]   |       |       | [0.08, 0.316] |       | [0.17, 16.8] |       |         |       |
| Balance        | 0.87 | 0.005 |       |       |       |       |         |       |
| [0.54, 3.88]   |       |       |       |       |       |       |         |       |

OR: Odds ratio; CI: Confidence interval; DP, depersonalization; EE, emotional exhaustion; PA, personal accomplishment.

Only variables included in the final model (using stepwise backward elimination) are displayed

* p < 0.1, **p < 0.05

### Depersonalization (DP)

By univariate logistic regression analysis, higher satisfaction with income (OR = 0.36, P < 0.05) and career (OR = 0.24, p < 0.05) were associated with a lower incidence of DP. [Table 3]. Using backward stepwise multivariate logistic regression analysis, the only significant predictors of DP were career satisfaction and average daily sleeping hours, after adjusting for other factors. Higher satisfaction with career was significantly associated with low DP (adjusted OR = 0.34, p = 0.001) and increase in average daily sleeping hours was significantly associated with low DP (adjusted OR = 0.76, p = 0.029). [Table 4].
**Personal Accomplishment (PA)**

By univariate regression analysis, higher average daily sleeping hours (OR = 0.65, p < 0.1), higher satisfaction with income (OR = 0.48, p < 0.05), satisfaction with dermatology as a career (OR = 0.41, p < 0.05), and work/life balance (OR = 0.59, p = 0.05) were associated with lower odds of PA [Table 3]. By multivariate analysis, the only significant predictors were career satisfaction and sleeping hours. After adjusting for other factors, higher satisfaction with career was associated with lower risk of PA (adjusted OR = 0.68, p < 0.05) and also higher average daily sleeping hours was associated with lower risk of PA (adjusted OR = 0.86, p = 0.001) [Table 4].

**Overall Burnout**

Univariate analysis showed that higher satisfaction with salary (OR = 0.21, P < 0.05), career (OR = 0.04, P < 0.05), and work/life balance (OR = 0.12, P = 0.05) were associated with lower odds of burnout [Table 5]. After using multivariate logistic regression, average daily sleeping hours showed a statistically significant association with high risk of burnout (OR = 0.64, P = 0.05) [Table 4]. Figure 2 summarizes burnout in a three-dimensional characterization, and overall burnout on two- and three-dimensional scales.
Table 5
Univariate association of demographic and work-related factors with burnout.

|                | No      | Yes | OR       | [95% CI]  | p       |
|----------------|---------|-----|----------|-----------|---------|
|                | N = 47  | N = 4 |          |           |         |
| **Categorical variables** |         |       |          |           |         |
| Age:           |         |       |          |           |         |
| < 28           | 32 (68.1%) | 3 (75.0%) | Ref.      | Ref.      | 0.838   |
| 28+            | 15 (31.9%) | 1 (25.0%) | 0.77 [0.03;7.29] | 0.838   |
| Gender:        |         |       |          |           |         |
| Female         | 30 (63.8%) | 4 (100%) | Ref.      | Ref.      |         |
| Male           | 17 (36.2%) | 0 (0.00%) | 0.04 [0;445] | 1        |
| Marital status:|         |       |          |           |         |
| Unmarried      | 26 (55.3%) | 3 (75.0%) | Ref.      | Ref.      | 0.512   |
| Married        | 21 (44.7%) | 1 (25.0%) | 0.45 [0.02;4.23] | 0.512   |
| Residency      |         |       |          |           |         |
| R1             | 10 (21.3%) | 1 (25.0%) | Ref.      | Ref.      |         |
| R2             | 15 (31.9%) | 1 (25.0%) | 0.68 [0.02;28.5] | 0.815   |
| R3             | 12 (25.5%) | 1 (25.0%) | 0.84 [0.02;35.6] | 0.917   |
| R4             | 10 (21.3%) | 1 (25.0%) | 1.00 [0.02;42.7] | 1.000   |
| Smoking status:|         |       |          |           |         |
| No             | 42 (89.4%) | 4 (100%) | Ref.      | Ref.      |         |
| Yes            | 5 (10.6%) | 0 (0.00%) | 0.06 [0;298] | 1        |
| Exercise       |         |       |          |           |         |
| R1 and R2      | 20 (42.6%) | 1 (25.0%) | Ref.      | Ref.      |         |
| R3 and R4      | 27 (57.4%) | 3 (75.0%) | 2.03 [0.22;61.2] | 0.561   |
| **Continuous variables** |         |       |          |           |         |
| Sleeping hours | 6.79 (1.63) | 5.75 (0.50) | 0.47 [0.16;1.38] | 0.168   |
| On-call/month  | 6.70 (6.10) | 10.0 (7.39) | 1.07 [0.94;1.21] | 0.322   |
| Working hours  | 9.00 (5.86) | 8.25 (0.50) | 0.96 [0.71;1.30] | 0.804   |
| No            | Yes            | OR             | p    |
|---------------|----------------|----------------|------|
| Clinics/Week  | 5.09 (2.76)    | 5.00 (3.37)    | 0.99 [0.69;1.43] | 0.953 |
| Patients/clinic | 7.38 (5.64)    | 7.25 (6.13)    | 1.00 [0.83;1.20] | 0.963 |
| Study hours/week | 16.1 (9.57)    | 23.2 (7.80)    | 1.08 [0.97;1.21] | 0.170 |

**Satisfaction**

| No            | Yes            | OR             | p    |
|---------------|----------------|----------------|------|
| Salary        | 3.77 (0.94)    | 2.50 (1.00)    | 0.21 [0.05;0.91] | 0.037 |
| Career        | 4.57 (0.58)    | 3.00 (0.82)    | 0.04 [0.00;0.49] | 0.011 |
| Balance       | 2.89 (1.13)    | 1.50 (0.58)    | 0.12 [0.02;0.88] | 0.037 |

*OR: Odds ratio; CI: Confidence interval; DP, depersonalization; EE, emotional exhaustion; PA, personal accomplishment.*

Continuous variables are presented as mean (SD), categorical variables are presented as count (%)

*p < 0.1, **p < 0.05

**Discussion**

Little is known about burnout among dermatology residents. To our knowledge, this is the first study to assess burnout syndrome in dermatology residents in the middle east, and the second worldwide. Our results show that emotional exhaustion was present in 41.2%, low PA was present in 45.1%, and depersonalization was the least prevalent across all burnout dimensions 13.7%. Studies have shown that burnout syndrome (especially depersonalization) has a significant impact on patient care [25]. According to a 2015 Mayo Clinic study, dermatologists had the highest increase in burnout rate, which can be attributed to the increased burden of governmental regulations, insurance company struggles, and increased patient volume [19, 26, 27]. A survey-based study, assessing burnout among dermatologists, reported that the major issue was excessive documentation and time spent on electronic medical records [28].

Six main risk factors that predict burnout were previously mentioned in the literature: workload, fairness, reward, community, values, and absence of control [29, 30]. Our low burnout rate may be justified, as the Saudi Dermatology program ascribes to advantage points in terms of fair on-call schedules, working hours, and the number of clinics per week. Residents in the Saudi Dermatology program have two academic half days per week in addition to a half day weekly for research. These can also be considered as contributing factors to the low level of burnout rate in our sample. This is supported by the findings of Dorrell et al., i.e., which showed that the second most common factor linked to burnout was lack of time for academic interests, research, and teaching [28]. A Canadian national appraisal found that dermatology residents desire more mentorship from faculty members [31]. Most of our study residents benefitted from a relationship with their mentor.
Residents-in-training are susceptible to fatigue and chronic sleep deprivation, with exposure to prolonged work hours and rotating shift schedules [32]. Sleep deprivation was shown to alter performance, increase high levels of stress, and overall burnout rate; this included depressive symptoms, ultimately compromising patient care [33, 34]. In this study, higher average daily sleeping hours were associated with lower odds of burnout, DP, EE, and low PA.

The literature suggests that another potential trigger for burnout was enrollment in a certain specialty for the wrong reasons, including income and prestige; these people seem to experience burnout faster than others. Physicians feel little or no enjoyment in their professional role, and the increase in regulations and patient pressures were factors that contributed to burnout [35]. In our study, residents who had higher satisfaction with life/work balance, career choice, and salary were associated with lower burnout rates.

Our study provides valuable knowledge of burnout rates in dermatology residents, and possible risk factors that both precipitate and predict burnout. One of the limitations of our study is its cross-sectional nature. Despite a good response rate, the small sample size is another limitation. Nevertheless, this was a multi-center study in Riyadh, the largest city in Saudi Arabia, and contains most of the dermatology residents in the country. Understanding individual components of burnout and its predictors can help to determine the source. These findings must be better assessed to enhance training programs that facilitate the minimization of burnout among future dermatologists.

**Conclusion**

Our study provides an overview of burnout rates and its risks among dermatology residents in Riyadh, Saudi Arabia: EE and feelings of low PA were seen at a high rate among dermatology residents, while DP was the least prevalent across all burnout dimensions. Average daily sleeping hours showed a statistically significant association with DP, PA, EE, and overall burnout. Satisfaction with life/work balance, career, and salary were associated with lower burnout rates. Fair on-call schedules, equitable working hours, and a reasonable number of clinics per week were considered contributing factors to the low level of burnout. Medical residents will be future specialists, responsible for patient care quality. Residents must acquire more coping mechanisms towards improved wellness, engagement in the workplace, and decreased burnout symptoms. The authors encourage dermatology training programs to foster awareness of burnout and incorporate instruction and interventions in the training of resident physicians.

**Abbreviations**

(cynicism/depersonalization, DP), (emotional exhaustion, EE), (personal accomplishment, PA).

**Declarations**

Consent was obtained by all participants in this study. King Abdulaziz City for Science and Technology KACST, KSA issued the ethics approval. All authors have confirmed the submission and that this study
did not involve animal subjects or tissue. The authors certify no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. The questionnaire used and/or analyzed during the current study are not publicly available due to it is copyright status. License to Reproduce was obtained from www.mindgarden.com. Allows us to administer the MBI via our paper and survey.

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Figures
Figure 1

Satisfaction with career, salary, and life/work balance
Figure 2

Prevalence of burnout across dermatology residents 2 Dim: Two-dimensional burnout; 3 Dim: Three-dimensional burnout.