Prevalence of Burnout among Plastic Surgeons and Residents in Plastic Surgery: A Systematic Literature Review and Meta-analysis

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Background: Few studies have demonstrated the prevalence of burnout in the specialty of plastic surgery. Therefore, the objective of this systematic literature review and meta-analysis was to analyze the prevalence of burnout among plastic surgeons and residents in plastic surgery.

Methods: The PRISMA statement for systematic reviews was followed, and the most relevant studies, published originally in any language until January 2018, were analyzed. The searches were conducted by 3 researchers in the following databases: the US National Library of Medicine (PubMed), Cochrane Central Register of Controlled Trials, Web of Science, and Scientific Electronic Library Online.

Results: The final sample consisted of 6 publications, including 2,670 plastic surgeons and 90 residents in plastic surgery. There was a prevalence of male subjects, with mean ages of 47.2 years for plastic surgeons and 28.4 years for residents. The prevalence rates of burnout were 32.32% among plastic surgeons and 36.66% among residents in plastic surgery, and high emotional exhaustion, depersonalization, and low personal accomplishment scores were considerably higher among residents in plastic surgery (37.78%, 35.56%, and 42.22%, respectively) than among plastic surgeons (25.84%, 19.15%, and 7.50%, respectively).

Conclusion: Given the high prevalence and fact that burnout syndrome correlates with the impairment of the professional and personal life of surgeons and residents in plastic surgery, and reduces quality in the care of patients, it is necessary to perform an early assessment and to regulate this phenomenon, with a focus on identifying, diagnosing, and providing appropriate treatment.

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INTRODUCTION

Burnout syndrome is characterized by high levels of emotional exhaustion and depersonalization, and a reduction in the level of personal accomplishment, which are all specifically related to stress at work.1,2 According to the Medscape National Physician Burnout & Depression Report 2018,3 burnout affects approximately 42% of physicians, reaching rates between 23% and 48% among the various specialties, and it is especially prevalent in surgical specialties, with general surgeons at the top of the ranking (43%).

This syndrome has severe adverse consequences, including substance abuse, disruptive behavior, absenteeism, fatigue, medical errors, patient dissatisfaction, strained interpersonal relations, divorce, depression, suicidal ideas, and even suicide.4–6 The assessment of burnout syndrome among physicians is performed in a standardized manner using the Maslach Burnout Inventory (MBI),7–9 a validated instrument consisting of 22 items that measure scores for 3 dimensions associated with burnout, which is characterized by high scores for emotional exhaustion and depersonalization, and/or low scores of personal accomplishment.4,9–12 The MBI has been used in studies that aim to analyze the prevalence of burnout syndrome, which has been reported as high in plastic surgeons, and in the modern era, there is a growing list of challenges that contribute to the increase in these statistics.13

Plastic surgeons, in particular, seem to have a high risk for developing burnout, mainly as a result of lengthy and...
unpredictable work days, difficulty in adequately reconciling work and personal life, demands from patients, and the technical challenges related to surgeries. Additionally, residents in plastic surgery may be predisposed to the development of burnout, as they need to associate learning and clinical productivity with academic and scientific development, have difficulty obtaining financing for research, have a considerable number of patients to be treated with frequently reduced resources, and need to reconcile personal and professional life with student expenses and demands.

However, even if the consequences of medical involvement by burnout can be significantly deleterious to the quality of one’s work, few studies have demonstrated the prevalence of burnout in the specialty of plastic surgery. Therefore, the objective of this study was to perform a systematic literature review and meta-analysis of the prevalence of burnout among plastic surgeons and residents in plastic surgery.

MATERIALS AND METHODS

To comply with the proposed objective, a methodology based on the PRISMA statement for systematic reviews was followed. We included the most relevant studies published originally in any language until January 2018 that were indexed in the following databases: US National Library of Medicine (PubMed), Cochrane Central Register of Controlled Trials, Web of Science, and Scientific Electronic Library Online. To select studies of scientific quality, we searched for publications referring to meta-analyses and randomized and controlled clinical studies in humans, without restriction regarding the publication year. The following keywords in different combinations were used: “burnout,” “plastic surgery,” “plastic surgeon,” “resident,” and “surgeons.” To identify the designs of the studies, the filters “randomized controlled trial,” “humans,” and/or “meta-analysis” were used in the searches. The inclusion and exclusion criteria applied are shown in Table 1.

The selection of publications was initially performed through the analysis of titles and abstracts of the studies obtained in the searches (step 1), according to the elimination of duplicate results obtained in different researched databases (step 2). Subsequently, the full version of the publications was read, with the application of the inclusion and exclusion criteria (step 3), to establish the final selection of publications to be included in the study sample. Three researchers conducted the searches and the selection of the sample individually. A consensus was reached at the end of the individual selections to obtain a final sample. It should be emphasized that all searches that enabled the identification of data concerning the prevalence of burnout specifically associated with surgeons or residents of plastic surgery were included in this study sample, excluding studies that included plastic surgeons in their samples but made it impossible to collect these data because they presented the data/results together with other specialties.

Data regarding the number, age, and sex of the plastic surgeons or residents in plastic surgery in the publications were collected, in addition to the prevalence of burnout among them and the incidence of emotional exhaustion, depersonalization, and personal accomplishment. These data were subjected to a meta-analysis for the formulation of the results of this study.

RESULTS

The searches in different databases resulted in 326 publications, which were reduced to 87 after the first stage of analysis (title and abstract), 23 after the second stage (removal of duplicates), and finally, 6 publications (Table 2), which fulfilled the inclusion and exclusion criteria established, after the third step (analysis of the full content of articles).

Of the 6 studies included in this meta-analysis sample, 2 were related to the prevalence of burnout in residents in plastic surgery, 15,16 and 4 were related to the prevalence of burnout in plastic surgeons.10,11,18,19 It should be pointed out that among these last 4 studies, 2 studies11,19 were performed specifically on plastic surgeons, whereas the other 2 studies10,18 included plastic surgeons in their samples but analyzed the prevalence of burnout in other specialties as well.

As shown in Tables 3 and 4, 2,670 plastic surgeons and 90 plastic surgery residents were evaluated; there was a prevalence of male subjects with mean ages of 47.2 years for plastic surgeons and 28.4 years for residents.

The prevalence rates of burnout were 32.32% among plastic surgeons and 36.66% among residents in plastic surgery, as shown in Tables 5 and 6; the percentages of high emotional exhaustion, high depersonalization, and low personal accomplishment were considerably higher among residents in plastic surgery (37.78%, 35.56%, and 42.22%, respectively) than among plastic surgeons (25.84%, 19.15%, and 7.50%, respectively).

DISCUSSION

Given the relevance of burnout studies in the medical sciences, the analysis of its prevalence among students, physicians, and surgeons has received greater attention in academia which justified the current study. Although several studies have used nonvalidated instruments for the analysis of the prevalence of burnout in the medical area, the majority of them used the MBI; all

Table 1. Inclusion and Exclusion Criteria of Publications

| Inclusion Criteria | Experimental design | Sample | Intervention | Publication period | Language | Exclusion criteria | Experimental design | Publication type |
|--------------------|---------------------|--------|--------------|--------------------|----------|-------------------|---------------------|------------------|
|                    | RCCS                |        |              |                    |          |                   |                    | Only abstracts    |
|                    | Meta-analysis       |        |              |                    |          |                   |                    | Literature review |
|                    | Assessment of the prevalence of burnout |        |              |                    |          |                   |                    | Case report       |
|                    | Not specified       |        |              |                    |          |                   |                    | Poorly explained and/or incomprehensible methodology |
|                    | Not defined         |        |              |                    |          |                   |                    | Not specified     |

RCCS, randomized and controlled clinical studies.
studies included in the present study sample\textsuperscript{16,11,15,16,18,19} used this instrument and cited it as the most appropriate instrument for the study of burnout among plastic surgery professionals.

The MBI consists of 22 Likert-type questions with 7 points that include 9 items related to emotional exhaustion, 5 items related to depersonalization, and 8 items relating to personal accomplishment. Individuals who attain a high score in emotional exhaustion and depersonalization or a low score in personal achievement are considered as having the symptom of burnout.\textsuperscript{9} However, because the scores for personal accomplishment are considered less important for determining whether the surgeons or residents exhibit burnout,\textsuperscript{2,9,12,16} all the studies included in the current study characterized burnout in their samples with high scores in emotional exhaustion and depersonalization\textsuperscript{10,11,15,16,18,19}.

As this was a meta-analysis, which depends on the data available in the literature, it became impossible to determine some factors associated with plastic surgeons or residents in plastic surgery who presented with burnout in publications included in the sample, such as age, sex, marital status, medical experience, workload, and work characteristics. Some studies did not specify these data in their findings, particularly those that analyzed other medical specialties\textsuperscript{10,16} and one that examined residents only in plastic surgery.\textsuperscript{15} However, it can be inferred that there are specific characteristics that may predispose plastic surgery professionals to burnout, as some studies\textsuperscript{11,16,19} demonstrated some correlations. In general, personal characteristics do not seem to have much influence on burnout as the characteristics of employment, both in plastic surgeons\textsuperscript{11,19} and residents in plastic surgery.\textsuperscript{16}

Streu et al.\textsuperscript{19} did not find significant correlations between the occurrence of burnout in plastic surgeons with sex, marital status, number of children, involvement in education for residents, or holidays; this corroborates, in part, with the research findings of Qureshi et al.,\textsuperscript{11} as it was demonstrated that surgeons who have children seem to have less burnout. Still, regarding personal characteristics, Streu et al.\textsuperscript{19} verified that the good general health status of plastic surgeons positively impacts the development of burnout.

### Table 2. Publications Included in the Meta-analysis Sample

| Authors         | Year | Country       | Objective(s)                                                                                                                                                                                                 | Method of Analysis of the Prevalence of Burnout |
|-----------------|------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Balch et al.\textsuperscript{18} | 2011 | United States | To analyze the correlations between burnout, depression, and professional satisfaction among surgeons in 14 specialties.                                                                                       | MBI                                           |
| Streu et al.\textsuperscript{19} | 2014 | United States | To analyze the prevalence of burnout in a large national sample of plastic surgeons and to identify associated factors.                                                                                       | MBI                                           |
| Chaput et al.\textsuperscript{16} | 2015 | France        | To determine the prevalence of burnout in plastic surgery residents and to identify potentially protective factors.                                                                                           | MBI                                           |
| Qureshi et al.\textsuperscript{11} | 2015 | United States | To quantify the incidence of burnout in plastic surgeons in the United States, to determine its risk factors, and to assess its impact on quality of life.                                                 | MBI                                           |
| Aldress et al.\textsuperscript{15} | 2017 | Saudi Arabia  | To develop a more comprehensive explanation and understand the prevalence and factors associated with burnout in residents of the Residency Program in Plastic Surgery in Saudi Arabia.             | MBI                                           |
| Haik et al.\textsuperscript{10}   | 2017 | Israel        | To assess the prevalence of burnout and work fatigue in clinicians with burnout in Israel.                                                                                                                     | MBI                                           |

### Table 3. Number, Sex, and Mean Age of Plastic Surgeons

| Study          | Sample (n) | Sex (n) | Mean Age (y) |
|----------------|------------|---------|--------------|
| Balch et al.\textsuperscript{18} | 458        | 391 M 67 F | 50.8          |
| Streu et al.\textsuperscript{19} | 505        | 250 M 255 F | —            |
| Qureshi et al.\textsuperscript{11} | 1,691      | 1,243 M 425 F | 50.8          |
| Haik et al.\textsuperscript{10}   | 16         | 14 M 2 4 | 40            |
| Total          | 2,670      | 1,884 M 747 F | 47.2          |

F, female; M, male; —, data not present in the study.

### Table 4. Number, Sex, and Mean Age of Residents in Plastic Surgery

| Study          | Sample (n) | Sex (n) | Mean Age (y) |
|----------------|------------|---------|--------------|
| Chaput et al.\textsuperscript{16} | 52         | 26 M 26 F | 28.9          |
| Aldress et al.\textsuperscript{15} | 38         | 28 M 10 F | 28            |
| Total          | 90         | 54 M 36 F | 28.4          |

F, female; M, male.

### Table 5. Prevalence of Burnout Syndrome among Plastic Surgeons

| Authors         | N   | Burnout | Emotional Exhaustion | Depersonalization | Personal Accomplishment |
|-----------------|-----|---------|----------------------|-------------------|-------------------------|
|                 |     |         | Low | Moderate | High | Low | Moderate | High | Low | Moderate | High |
| Balch et al.\textsuperscript{16} | 458 | 171     | —   | —       | —    | —   | —       | —    | —   | —       | —    |
| Streu et al.\textsuperscript{19} | 505 | 228     | 213 | 146     | 146  | 329 | 94      | 82   | 25  | 31      | 449  |
| Qureshi et al.\textsuperscript{11} | 1,691 | 460   | 615 | 584     | 397  | 719 | 564     | 322  | 133 | 210     | 1,260 |
| Haik et al.\textsuperscript{10}   | 16  | 4       | —   | —       | —    | —   | —       | —    | —   | —       | —    |
| Total (n)       | 2,670 | 863    | 828 | 730     | 543  | 1,048 | 658    | 404  | 158 | 241     | 1,709 |
| %              | 100.00 | 32.52  | 39.41 | 34.75 | 25.84 | 49.67 | 31.18  | 19.15 | 7.50 | 11.43   | 81.07 |

—, Data not supplied by the study.
In contrast, it has been demonstrated that the plastic surgeons’ work characteristics correlate with the development of burnout, especially the type of practice (academic or private, working alone or in groups, and association between reconstructive and cosmetic cases), provision of emergency services, and weekly workload.11 In addition, a correlation was found between the development of burnout with a workload of more than 70 hours per week, staying on night shifts more than 2 nights a week, and dissatisfaction with financial income.11

In the case of plastic surgery residents, the personal characteristics, including age, marital status, and the involvement in sports activities or leisure, showed less influence on the development of burnout. The factors with the highest positive correlation were also professional and included being in the first years of training, feeling dissatisfied with career plans, and working in units not visited by senior surgeons or where staff meetings do not occur.10 It is important to emphasize that the findings of this study related to residents in plastic surgery are still incipient since only 2 studies were found with this population target; we obtained a considerably smaller sample of residents in plastic surgery (n = 90) than plastic surgeons (n = 2,670).

In general, a high prevalence of burnout was found in both residents in plastic surgery (36.66%) and plastic surgeons (32.32%), especially considering that this latter value is considerably higher than the number revealed by the Medscape National Physician Burnout & Depression Report 2018,3 which reported a burnout prevalence of 23% in plastic surgeons. Regardless, given that burnout correlates with high probabilities of self-reported medical errors, an increased risk of conflicts between work and home, and greater predisposition to depression,11 it is emphasized that an early and regular assessment of burnout among residents and surgeons in plastic surgery is essential, mainly because this is a reversible phenomenon.4

Moreover, it is suggested that preventive actions can be adopted to reduce the occurrence of burnout among plastic surgeons and residents in plastic surgery. In general, the studies included in this review showed that unstable routine work, high hourly workloads, and reduced time for family and leisure, in addition to the great difficulty to seek professional help, are the most important factors that predispose respondents to burnout.10,11,15,16,18,19 Thus, changes of habits among plastic surgeons, residents, and medical institutions are required so that a standardization of hourly workloads may be set, as this seems to be a more effective protective factor against burnout.6,10,15

Creating support groups is important, where professionals and students can exchange experiences, receive information that will help them recognize the signs and symptoms of burnout, besides strategies that help deal with severe burnout.10,15 Furthermore, the implementation of frequent interviews and psychological assessments can also be used as a good tool for screening and prevention of burnout among plastic surgeons and residents in plastic surgery.10

**CONCLUSIONS**

Burnout syndrome had prevalence rates of 32.32% among plastic surgeons and 36.66% among residents in plastic surgery. There was a greater incidence of scores of high emotional exhaustion, high depersonalization, and low personal accomplishment among residents in plastic surgery.

Given the high prevalence and fact that burnout correlates with the impairment of the professional and personal life of surgeons and residents in plastic surgery, in addition to reducing the quality of patient care, it is essential to perform an early and regular assessment, with an aim of preventing, identifying, diagnosing, and providing appropriate treatment.

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**REFERENCES**

1. McCray LW, Cronholm PF, Bogner HR, et al. Resident physician burnout: is there hope? Fam Med. 2008;40:626–632.
2. Shanafelt TD, Bradley KA, Wipf JE, et al. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med*. 2002;136:358–367.
3. Medscape National Physician Burnout & Depression Report 2018. 2018 Available at: https://www.staging.medscape.com/slideshow/2018-lifestyle-burnout-depression-6009235. Accessed January 18, 2018.
4. Dyrbye LN, Shanafelt TD, Balch CM, et al. Relationship between work-home conflicts and burnout among American surgeons: a comparison by sex. *Arch Surg*. 2011;146:211–217.
5. Shanafelt TD, Balch CM, Bechamps G, et al. Burnout and medical errors among American surgeons. *Ann Surg*. 2010;251:995–1000.
6. Shanafelt TD, Balch CM, Dyrbye L, et al. Special report: suicidal ideation among American surgeons. *Arch Surg*. 2011;146:54–62.
7. Martini S, Arfken CL, Balon R. Comparison of burnout among medical residents before and after the implementation of work hours limits. *Acad Psychiatry*. 2006;30:352–355.
8. Martini S, Arfken CL, Churchill A, et al. Burnout comparison among residents in different medical specialties. *Acad Psychiatry*. 2004;28:240–242.
9. Maslach C, Jackson S, Leiter M. *Maslach Burnout Inventory*. Palo Alto, Calif.: Consulting Psychologists Press; 1996.
10. Haik J, Brown S, Liran A, et al. Burnout and compassion fatigue: prevalence and associations among Israeli burn clinicians. *Neuropsychiatr Dis Treat*. 2017;13:1533–1540.

11. Qureshi HA, Rawlani R, Mioton LM, et al. Burnout phenomenon in U.S. plastic surgeons: risk factors and impact on quality of life. *Plast Reconstr Surg*. 2015;135:619–626.

12. Shanafelt TD, Balch CM, Bechamps GJ, et al. Burnout and career satisfaction among American surgeons. *Ann Surg*. 2009;250:463–471.

13. Prendergast C, Ketteler E, Evans G. Burnout in the plastic surgeon: implications and interventions. *Aesthet Surg J*. 2017;37:363–368.

14. Pulcrano M, Evans SR, Sosin M. Quality of life and burnout rates across surgical specialties: a systematic review. *JAMA Surg*. 2016;151:970–978.

15. Aldrees T, Hassouneh B, Alabdulkarim A, et al. Burnout among plastic surgery residents. National survey in Saudi Arabia. *Saudi Med J*. 2017;38:832–836.

16. Chaput B, Bertheuil N, Jacques J, et al. Professional burnout among plastic surgery residents: can it be prevented? Outcomes of a national survey. *Ann Plast Surg*. 2015;75:2–8.

17. Moher D, Liberati A, Tetzlaff J, et al.; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med*. 2009;6:e1000097.

18. Balch CM, Shanafelt TD, Sloan JA, et al. Distress and career satisfaction among 14 surgical specialties, comparing academic and private practice settings. *Ann Surg*. 2011;254:558–568.

19. Streu R, Hansen J, Abrahamse P, et al. Professional burnout among US plastic surgeons: results of a national survey. *Ann Plast Surg*. 2014;72:346–350.