Evaluation of Burnout Among Anesthesiologists Working in Tibet, China: Altitude and Attitude

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\textbf{Objective} Burnout is a triad of emotional exhaustion, depersonalization, and reduced personal accomplishment resulting from job stress. Although with distinct regional and cultural characteristics, burnout among anesthesiologists in the Tibet has not been described. This study aimed to explore the prevalence of burnout among anesthesiologists in Tibet and the associated factors.

\textbf{Methods} A cross-sectional survey was conducted in Tibet, China, with an anonymous questionnaire. Social-demographic characteristics, work status, three dimensions of burnout assessed by the Maslach Burnout Inventory-Human Service Survey were collected and analyzed.

\textbf{Results} A total of 133 individuals from 17 hospitals completed the survey from March to June 2018. The prevalence of moderate- to high-level of emotional exhaustion, depersonalization, and burnout in personal accomplishment was 65.4\% (95\%CI, 57.0\%–72.9\%), 66.9\% (95\%CI, 58.5\%–74.3\%), and 83.5\% (95\%CI, 76.2\%–88.8\%), respectively. An annual caseload $\geq$ 500, frequent overtime work and fair to poor sleep quality were significantly associated with a higher level of emotional exhaustion (P<0.001, P=0.001, P<0.0001, respectively). 5–9 years of experiences were significantly associated with a high level of emotional exhaustion and depersonalization (P=0.002, P=0.003, respectively).

\textbf{Conclusion} More than half of anesthesiologists working in Tibet experience a moderate- to high- level of burnout in at least one dimensional scale. Anesthesiologists of 5–9 years of experience are more prone to
Burnout is defined as a syndrome characterized by high emotional exhaustion, high depersonalization, and reduced personal accomplishment that is experienced in response to chronic work-related stressors. Burnout contributes to poor health outcomes of health workers, as well as impairments in medical care and patient safety. In China, a previous study found that 69% of anesthesiologists presented with high scores on either emotional exhaustion or depersonalization, which was much higher than that in the US and European countries. However, the Tibet plateau area was not included in previous researches. This area needs special attention for several reasons. The Tibetan plateau is the highest region on the earth, with an average altitude of 3000 meters. Besides the unfavorable environmental condition, Tibet is also underdeveloped economically with limited health resources. Furthermore, Tibetan Buddhism has a profound influence on Tibet’s culture and society, including people’s perception of illness and death. Work-related stress of anesthesiologists in this region could likely have distinct characteristics. The objective of our study was to find the level of burnout in a cohort of anesthesiologists working in Tibet and to explore the associated factors.

**MATERIALS AND METHODS**

This study was a cross-sectional, electronic questionnaire-based survey involving anesthesiologists from the Tibet. Ethical approval for this study was obtained from the Ethical Committee of Peking Union Medical College Hospital, Beijing, China. A statement of the purpose of the study and consent to participate in the survey were included at the beginning of each questionnaire.

**Questionnaire distribution**

The electronic version of the questionnaire was built on the Diaochapai platform (http://www.diaochapai.com). Two questionnaires were used. Questionnaire A was distributed to the anesthesiology department chief early in March 2018 and addressed the hospital category, the number of anesthesiologists in the hospitals. Questionnaire B was distributed anonymously to all anesthesiologists during a regional anesthesiology conference in Lhasa in May 2018. Questionnaire B was composed of two parts. Part 1 consisted of 12 questions. The aim of part 1 was to gather information on gender, hospital category, title, years of experience in anesthesiology, the frequency of overtime work, case load per year, the frequency of perceived challenging cases, and hours and quality of sleep. Part 2 investigated burnout levels through the Maslach Burnout Inventory-Human Service Survey (MBI-HSS) test. Data collection was completed until June 10, 2018.

Most of the participants were anesthesiologists from hospitals in Tibet. The questionnaire was distributed via WeChat, which is a popular mobile social platform that is used by more than 90% of smartphone users in China. Each mobile phone was allowed to submit the questionnaire only once to prevent duplicates.

**Maslach Burnout Inventory-Human Service Survey**

The MBI-HSS has become the gold standard to measure burnout in health-related fields. The MBI-HSS evaluates three dimensions of burnout—emotional exhaustion, depersonalization, and a reduced level of personal accomplishment. The MBI-HSS consists of 22 questions, of which 9 evaluate emotional exhaustion, 5 evaluate depersonalization, and 8 evaluate personal accomplishment. Subjects provided their answers on a 7-point Likert scale (encoded using the integers 0 to 6), and scores for the three different dimensions were calculated and categorized as low, moderate, or high. The ranges of the three subgroups scoring are as follows: emotional exhaustion, 0–16 (low), 17–26 (moderate), and ≥27 (high); depersonalization, 0–6 (low), 7–12 (moderate), and ≥13 (high); and personal accomplishment, 0–31 (high), 32–38 (moderate), and ≥39 (low).

**Data analysis**

The characteristics of the respondents were summarized using sample statistics. Enumeration data were expressed with count, proportion and 95%CI. Measurement data with normal distribution were presented with the mean and standard deviation. Non-normal measurement data were expressed with median (25%, 75% percentile). We also performed sub-analyses on the three-level of burnout components (emotional ex-
haustion, depersonalization, and low personal accomplishment) according to demographic characteristics and work status. For data with normal distribution, two independent samples tests were used to detect differences between the two samples. Comparisons between three or more groups were made with an ordinary one-way ANOVA and Tukey’s multiple comparisons test. Otherwise, non-parametric methods and Kruskal-Wallis test were used. P values <0.05 were considered statistically significant. Date analyses were completed using Microsoft Excel 2019 and IBM SPSS Statistics 25.0 (IBM Corp., Armonk, NY, USA).

RESULTS

Burnout situation in Tibet

The data were collected from March 28, 2018 to June 10, 2018. In total, seventeen hospitals participated in the survey. Of the 163 anesthesiologists in the participating hospitals, 133 completed the survey (response rate 82%). Figure 1 presents the results of the three burnout dimensions for all 133 respondents. Of all the anesthesiologists, 87 anesthesiologists (65.4%; 95% CI, 57.0%–72.9%) experienced moderate-to-high level of emotional exhaustion, 89 (66.9%; 95% CI, 58.5%–74.3%) showed a moderate to high level of depersonalization, and 111 (83.5%; 95% CI, 76.2%–88.8%) experienced a moderate to high level of burnout in personal accomplishment. Basic descriptive statistics of those who responded are shown in Table 1. Since the Tibet plateau is a major Tibetan-inhabited minority area in China, the individual results of Tibetan and non-Tibetan respondents were listed. Comparing the sociodemographic characteristics and three dimensions of burnout, there was no significant difference between Tibetan and non-Tibetan anesthesiologists (P>0.05).

Factors associated with burnout in Tibet

To further explore the factors related to each burnout dimension, we performed subgroup analyses, as shown in Table 2. Factors significantly associated with a higher level of emotional exhaustion were an annual caseload ≥500 (P<0.001), frequent overtime work (P=0.001), and fair to poor sleep quality (P<0.0001). Two significant factors associated with a higher depersonalization score were less than 7 hours of sleep (P=0.027) and fair to poor sleep quality (P=0.012). As for the personal accomplishment score, none of the factors in our study was found to be related to a reduced level of personal accomplishment.

Notably, anesthesiologists with different years of experience presented significantly different levels of emotional exhaustion and depersonalization (P=0.002 and P=0.003, respectively). Anesthesiologists with 5–9 years of experience reported higher emotional exhaustion and depersonalization scores than other groups (Table 2).

DISCUSSION

This study suggests that the frequency of moderate- to high-level burnout in anesthesiologists working in the Tibet plateau area of China was 65% for emotional exhaustion, 67% for depersonalization, and 84% for burnout in personal accomplishment. Anesthesiologists with more working load and worse sleep quality reported higher scores on emotional exhaustion. Anesthesiologists with less sleep and worse sleep quality scored higher on depersonalization. What’s more, anesthesiologists with 5–9 years of experience presented higher emotional exhaustion and depersonalization scores than other groups.

In recent years, the problem of occupational stress and burnout in anesthesiologists has gained
attention and awareness in different countries.\textsuperscript{[10, 11]} Burnout prevalence among anesthesiologists varied greatly from country to country.\textsuperscript{[7]} To our knowledge, there has been no previous research till now on the burnout level of anesthesiologists from high altitude areas, where the ecological condition and sociodemographic factors are different. Unlike high-income countries, we found limited surveys from other lower- and middle-income countries using the MBI-HSS scale to evaluate burnout in anesthesiologists. In an Egyptian study, 62% of participants experienced emotional exhaustion; 56% experienced depersonalization, and 58% reduced personal accomplishment.\textsuperscript{[12]} In Pakistan, a high rate of burnout was also identified in anesthesiologists. 39% of participants showed moderate- to high-level emotional exhaustion, 68.4% showed a moderate to high level of depersonalization, and 50.3% showed a moderate to high level of burn-

| Items                                | Tibetan    | Non-Tibetan | Total    |
|--------------------------------------|------------|-------------|----------|
| n                                    | 79 (59%)   | 54 (41%)    | 133 (100%) |
| Hospital category                    |            |             |          |
| Tertiary hospitals                  | 58 (73%)   | 41 (76%)    | 97 (73%) |
| Nontertiary hospitals               | 21 (27%)   | 13 (24%)    | 36 (27%) |
| Gender                               |            |             |          |
| Male                                 | 31 (39%)   | 23 (43%)    | 54 (41%) |
| Female                               | 48 (61%)   | 31 (57%)    | 79 (59%) |
| Title                                |            |             |          |
| Resident                             | 47 (59%)   | 27 (50%)    | 74 (56%) |
| Attending                            | 22 (28%)   | 18 (33%)    | 40 (30%) |
| Academic professor                   | 5 (6%)     | 6 (11%)     | 11 (8%)  |
| Others                               | 5 (6%)     | 3 (6%)      | 8 (6%)   |
| Years of experience in anesthesiology |          |             |          |
| <5                                   | 37 (47%)   | 28 (52%)    | 65 (49%) |
| 5-9                                  | 17 (22%)   | 8 (15%)     | 25 (19%) |
| 10-19                                | 20 (25%)   | 9 (17%)     | 29 (22%) |
| >20                                  | 5 (6%)     | 9 (17%)     | 14 (11%) |
| Cases of anesthesia per year         |            |             |          |
| <500                                 | 56 (71%)   | 28 (52%)    | 84 (63%) |
| 500-999                              | 15 (19%)   | 20 (37%)    | 35 (26%) |
| 1000-1999                            | 4 (5%)     | 5 (9%)      | 9 (7%)   |
| >2000                                | 4 (5%)     | 4 (7%)      | 5 (4%)   |
| Frequency of overtime work           |            |             |          |
| Never–sometimes                      | 22 (28%)   | 16 (30%)    | 38 (29%) |
| Frequently–everyday                  | 57 (72%)   | 38 (70%)    | 95 (71%) |
| Hours of sleep                       |            |             |          |
| ≤6                                   | 26 (33%)   | 18 (33%)    | 44 (33%) |
| >7                                   | 53 (67%)   | 36 (67%)    | 89 (67%) |
| Sleep quality                        |            |             |          |
| Excellent–good                       | 45 (57%)   | 23 (43%)    | 68 (51%) |
| Fair–poor                            | 34 (43%)   | 31 (57%)    | 65 (49%) |
| Maslach Burnout Inventory            |            |             |          |
| Emotional exhaustion                 | 20.5 ± 8.7 | 21.9 ± 11.1 | 20 (14, 28) |
| Depersonalization                    | 9 (6, 12)  | 8 (5, 11.3) | 9 (5.5, 12) |
| Personal accomplishment              | 34 (28, 37)| 32.5 (26, 37)| 33 (26.5, 37)|

Data are presented as n (% of column), mean ± SD and median (25%, 75% percentile).
out in personal achievements. In comparison, our results were 65%, 67%, and 84%. In a recent Zambian survey, high emotional exhaustion was present in 66.3% of respondents, high level of depersonalization in 45% of respondents, and a high level of burnout in personal accomplishment in 23.8% of respondents.

While in our study, the prevalence of a high level of the three burnout dimensions was 29%, 22%, and 43% respectively. The most notable problem among anesthesiologists in Tibet was the high prevalence of reduced personal accomplishment. The reason for this may be that Tibetan medicine is more popular and perceived as more authoritative in Tibet. Surgery and anesthesiology are relatively under-developed and lack of recognition from patients, which could affect the personal accomplishment in anesthesiologists. Raising public awareness and social status of anesthesiologists in Tibet may improve the situation.

Two similar studies were conducted in Chinese people years ago. In a multi-center, cross-sectional survey from six provinces, the prevalence of moderate to high level of burnout on emotional exhaustion, depersonalization, and personal accomplishment were 13%, 15%, and 35% respectively.

Table 2. Analyses of each burnout dimension of respondents according to demographic and working characteristics

| Factors                        | n  | Emotional exhaustion (score) | P value | Depersonalization (score) | P value | Personal accomplishment (score) | P value |
|--------------------------------|----|------------------------------|---------|---------------------------|---------|-------------------------------|---------|
| Nationality                    |    |                              |         |                           |         |                               |         |
| Tibetan                        | 79 | 20.5 ± 0.9                   | 0.422   | 9 (6, 12)                 | 0.379   | 34 (28, 37)                   | 0.630   |
| Non-Tibetan                    | 54 | 21.9 ± 1.5                   |         | 8 (5, 11.3)               | 0.755   | 32.5 (26, 37)                 |         |
| Gender                         |    |                              |         |                           |         |                               |         |
| Male                           | 54 | 20.4 ± 1.2                   | 0.484   | 8 (5, 12)                 | 0.755   | 33 (26, 37)                   | 0.783   |
| Female                         | 79 | 21.6 ± 1.2                   |         | 9 (5.8, 11.3)             |         | 34 (26.8, 37)                 |         |
| Hospital category              |    |                              |         |                           |         |                               |         |
| Tertiary hospitals             | 99 | 21.9 ± 1.0                   | 0.066   | 9 (6, 12)                 | 0.213   | 32 (26, 37)                   | 0.182   |
| Nontertiary hospitals          | 34 | 17 (13, 23)                  | 8.2 ± 0.8| 34.5 (28, 37.3)          |         |                               |         |
| Title                          |    |                              |         |                           |         |                               |         |
| Resident                       | 82 | 20.7 ± 1.1                   | 0.552   | 9 (5.8, 12)               | 0.997   | 34 (26, 37.3)                 | 0.433   |
| Other titles                   | 51 | 21.7 ± 1.3                   |         | 9.0 ± 0.7                 |         | 33 (27, 37)                   |         |
| Years of practice              |    |                              |         |                           |         |                               |         |
| <5 years                       | 65 | 18.2 ± 8.0                   | 0.002   | 8.46 ± 4.5                | 0.003   | 33 (26.5, 37)                 | 0.784   |
| 5–9 years                      | 25 | 26.5 ± 9.9                   |         | 12.6 ± 6.3                |         | 32.9 ± 6.9                    |         |
| 10–19 years                    | 29 | 22.7 ± 10.3                  |         | 8.1 ± 4.9                 |         | 30.7 ± 7.8                    |         |
| ≥20 years                      | 14 | 21.0 ± 11.2                  |         | 8.4 ± 4.6                 |         | 33 (27.3, 37)                 |         |
| Cases of anesthesia per year   |    |                              |         |                           |         |                               |         |
| <500                           | 84 | 19.0 ± 0.9                   | <0.001  | 8 (5.3, 11)               | 0.220   | 33.5 (28, 37)                 | 0.116   |
| ≥500                           | 49 | 24.7 ± 1.6                   |         | 10.0 ± 0.8                |         | 31 (25, 37)                   |         |
| Frequency of overtime work     |    |                              |         |                           |         |                               |         |
| Never–sometimes                | 38 | 17 (12, 20.3)                | 0.001   | 8 (6, 10.3)               | 0.243   | 33.5 (27.5, 37)               | 0.606   |
| Frequently–everyday            | 95 | 22.7 ± 1.0                   |         | 9.5 ± 0.6                 |         | 32 (26, 37)                   |         |
| Frequency of perceived        |    |                              |         |                           |         |                               |         |
| Never–sometimes                | 90 | 20.1 ± 0.9                   | 0.096   | 8 (5, 11)                 | 0.066   | 34 (28, 37)                   | 0.201   |
| Frequently–everyday            | 43 | 23.1 ± 1.7                   |         | 9 (7, 13)                 |         | 29.9 ± 1.4                    |         |
| Hours of sleep                 |    |                              |         |                           |         |                               |         |
| <6                             | 44 | 22.5 ± 1.6                   | 0.218   | 10.5 ± 0.8                | 0.027   | 29.4 ± 1.6                    | 0.057   |
| ≥7                             | 89 | 20.3 ± 1.0                   |         | 8 (4.5, 11)               |         | 32.3 ± 0.7                    |         |
| Sleep quality                  |    |                              |         |                           |         |                               |         |
| Excellent–good                 | 68 | 17.7 ± 0.9                   | <0.0001 | 8 (4, 11)                 | 0.012   | 33.5 (28, 37)                 | 0.274   |
| Fair–poor                      | 65 | 24.6 ± 1.3                   |         | 10.2 ± 0.6                |         | 32 (25, 37)                   |         |

Data are presented as mean ± SD or median (25% and 75% percentiles).
depersonalization, and personal accomplishment was 39%, 25%, and 65% respectively. However, Tibet was not included in this survey. In another regional study conducted in the Beijing–Tianjin–Hebei region of China, which was an economically developed area, the corresponding percentages were 84%, 83%, and 88%.

In Tibet, anesthesiologists had a higher rate of burnout than the all-anesthesiologists average in China. Although the Chinese government has been committed to reform and optimize the healthcare system in the past decade, disequilibrium of health resources still exists among low, middle, and high-income provinces, and anesthesia would be disproportionately affected. Shortage of anesthesiologists, limited career opportunities, and insufficient resources make anesthesiologists in Tibet more susceptible to burnout. Considering participants in our study were mostly native, the effects of environment and altitude were reflected in culture, economics and medical development. In our survey, the percentage of anesthesiologists with a workload of ≥1000 cases per year was 10%, while the percentage in the study by Li et al. in Beijing–Tianjin–Hebei region of China was more than 52%. Since workload is a common factor related to burnout, respondents in our survey were no more likely to experience burnout than anesthesiologists in Beijing–Tianjin–Hebei region of China.

In the present study, the possible factors associated with higher emotional exhaustion include more caseloads per year, overtime working frequently, and poor sleep quality. Anesthesiologists with less than 7 hours of sleep and poor sleep quality are prone to develop depersonalization. These results further confirmed that the influence of straining work patterns on anesthesiologists’ burnout found in several studies in China and other countries. Strained work has an inevitably negative effect on sleep quality and sleep time. And these two factors were shown to be related to a higher level of burnout in depersonalization. Other factors including hospital category, gender, age, and title in our survey were not associated with burnout.

In our survey, we observed an association of burnout with years of experience in anesthesiology. It is known that burnout may peak during the initial stages of an anesthesiology career as a result of facing challenging situations with a lack of adequate support. However, we found that anesthesiologists with 5–9 years of practice were more prone to experiencing emotional exhaustion and depersonalization compared to anesthesiologists in other age groups. The situation is quite different from that in developed countries in which residents have the highest burnout rate. In China, anesthesiologists with less than five years of experience usually work under the supervision of an experienced physician. On the other hand, anesthesiologists with 5–9 years of practice are generally attending physicians facing the responsibility of patient safety and the pressure of academic promotions. In economically developed regions of China, the most vulnerable group to burnout was physicians from 30–39 years of age, and 60% of them were attending physicians.

This survey had several limitations. Firstly, the survey was confined to Tibet in China. These findings may not be generalizable to other regions. Secondly, this is a preliminary study to explore the burnout of anesthesiologists in the Tibet plateau area of China. Several potential influencing factors may be overlooked, such as parenthood, income, and alcohol consumption. We failed to perform logistic analysis to reveal factors associated with burnout. Thus, further studies on the causes of burnout should be conducted in the future.

In conclusion, this survey suggests that more than half of anesthesiologists working in Tibet experience a moderate- to high- level of burnout in at least one of the three dimensional scales. Anesthesiologists of 5–9 years of experience are more prone to emotional exhaustion and depersonalization. Working load and sleep patterns are associated with burnout of anesthesiologists in Tibet. Efforts to decrease burnout through reducing the working load and raising the social recognition of anesthesiologists in Tibet should be considered.

**Conflict of Interests Statement**
The authors declare no conflict of interest.

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