

1 **DOI:** <https://doi.org/10.47391/JPMA.401>

2
3 **Physicians' job satisfaction, ethics and burnout in Makkah, Saudi**
4 **Arabia**

5
6 **Leena Rashad Baghdadi¹, Razan Rashad Baghdadi², Ruqayyah Sami**
7 **Kamal³, Elaf Faisal Obaid⁴, Maryam Farraj Aloqalaa⁵, Tharaa Waleed**
8 **Rambo⁶, Julnar Ayman Al-Fahmi⁷, Bayan Mutlaq Almasaoudi⁸, Shahad**
9 **Fuad Bin Afeef⁹, Maryam Talal Abusalamah¹⁰**

10 **1** Department of Family and Community Medicine, King Saud University and King Khalid
11 University Hospital, Riyadh, Saudi Arabia; **2-10** 7th Year MBBS Student, Umm Al Qura
12 University, Makkah, Saudi Arabia

13 **Correspondence:** Leena Rashad Baghdadi **Email:** lbaghdadi@ksu.edu.sa

14
15 **Abstract**

16 **Objectives:** To investigate the frequency of job satisfaction, burnout and ethics
17 among physicians across specialties with varied levels of experience and
18 seniority, in hospitals in Makkah, Saudi Arabia.

19 **Methods:** From April-May 2016, job satisfaction, burnout and ethics were
20 assessed in 136 physicians across specialties from six government hospitals in
21 Makkah. Data collection was via a self-administered questionnaire. SPSS was
22 used to obtain the likelihood ratio chi-square for all categorical bivariate
23 statistical analyses. P value <0.05 was considered significant.

24 **Results:** A total of 136 physicians participated in the study. Sixty-nine percent
25 physicians were male and 31% were female. Medical specialties varied between
26 genders. There was no significant difference by gender, in job satisfaction
27 among physicians (p-value 0.99). However, a high level of burnout was
28 statistically significant among physicians (51%, p-value <0.0001) and the level

29 of burnout was significantly higher among physicians willing to change their
30 specialty compared to those willing to repeat it (50% vs. 24%, p-value 0.02).
31 Physicians dissatisfied with their salary had double the scores of ethics
32 compared to satisfied physicians. Female physicians were better at resolving
33 ethical dilemmas.

34 **Conclusion:** This study provided the first evidence of high frequency of
35 burnout and career choice regret among physicians working in Makkah, Saudi
36 Arabia. Preventing physician burnout not only improves the quality of
37 healthcare but also ensures patient safety.

38 **Keywords:** Physician satisfaction, ethics, burnout, work stress, loss of
39 enthusiasm

40

41 **Introduction**

42 Ethics or moral philosophy involve developing, defending and recommending
43 concepts of right and wrong behavior.¹ Ethical dilemmas involving money,
44 patients, harm, life, and death arise regularly throughout a physician's career.²
45 The way physicians choose to deal with those dilemmas, reflects each
46 physician's individual values and manners, which might conflict with rigorous
47 professional standards.^{1,3} Physicians grapple with many wrenching decisions
48 throughout their medical careers.⁴ Some situations even involve decisions about
49 prolonging or ending patients' lives.⁵

50 A career in medical field brings significant challenges that might cause
51 substantial personal distress for individual physicians and their families.
52 Physician career satisfaction has recently received much attention.⁶ One of the
53 main aims of American Medical Association survey was to determine the most
54 important contributing factors for career satisfaction. Measures of personal
55 accomplishments and emotional resilience were found to be strongly associated
56 with career satisfaction.⁷ A recent cross-sectional survey conducted to determine
57 dissatisfaction and ascertain strategies to drive change, found that negative

58 physician mental health and burnout rates increase with physician
59 dissatisfaction.⁸ Considerable evidence suggested that dissatisfaction in medical
60 practice is increasing and affecting the quality of care.⁹ Furthermore,
61 dissatisfied physicians are thought to be at higher risk for professional burnout,
62 a potential barrier to successful healthcare performance.⁶

63 Globally, about one-third of physicians in varied specialties, suffer from at least
64 one form of burnout.¹⁰ There are many dimensions of burnout,
65 depersonalization, emotional exhaustion, and low personal accomplishment.¹¹

66 Burnout is defined as loss of enthusiasm for work, emotional exhaustion and
67 feeling a low sense of personal accomplishment (QD85) by the International
68 Classification of Diseases (ICD) code.¹¹ Discussing the goals of being a
69 physician gives a clear picture of their character and morals. A physician should
70 enjoy monetary rewards, and humanistic rewards, which are priceless.

71 Work-life balance is a major stressor for male and female physicians.¹²
72 Although gender might be an important factor in job satisfaction and burnout;
73 there are inconsistencies in published evidence. Studies reported no gender
74 differences,¹³ a higher incidence among males^{14,15} and a higher incidence among
75 females.^{10,12} The reported rate of burnout across specialities is 30-65%. The
76 highest burnout rates were seen in primary care physicians (40%),¹³ critical care
77 (53%)¹⁶ and emergency medicine (77%).¹⁷ In the USA, half of all family
78 physicians, internists, and general surgeons reported burnouts during their
79 careers,¹⁶ and this trend is increasing globally.¹⁸ In contrast, evidence about
80 physicians' burnout is lacking in Saudi Arabia. Therefore, this study aimed to
81 determine the rates of physicians' job satisfaction, commitment to professional
82 morals, and burnout (loss of enthusiasm) at Makkah, Saudi Arabia's general
83 hospitals.

84 **Methods**

85 In this observational, cross-sectional, questionnaire-based study, we recruited
86 physicians (residents, specialists, and consultants for professional diversity),

87 from all specialties working at six government hospitals (Al Noor Specialized
88 Hospital, Hera'a Hospital, King Abdul Aziz Hospital, King Faisal Hospital,
89 King Abdullah Hospital, and Maternal and Children Hospital) in Makkah, Saudi
90 Arabia. Data was collected from April-May 2016. Inclusion criteria were
91 physicians holding a current medical license and working at government
92 hospitals in Makkah city. Physicians working outside Makkah city, at military
93 and private hospitals, and those in Makkah city who refused participation were
94 excluded. The study was approved by Committee of Bio-Medical Ethics, Umm
95 Al-Qura University (Ethics Approval Number: HAPO-02-K-012-2018-10-275).
96 All eligible physicians were invited to participate. Participants gave written
97 consent and completed a self-administered questionnaire. Data collectors
98 informed all participants about purpose of the study. The participant's
99 confidentiality of data and anonymity was assured. After being informed about
100 study objectives, benefits and risks, participants had choice of participation,
101 refusal or withdrawal from the study at any point in time. No incentives or
102 rewards were given to participants and research was offered to all eligible
103 physicians with no obligation to participate.

104 The cross-sectional study design fitted the main aim of the study, which was to
105 determine the frequency of physicians' career satisfaction, commitment to
106 professional ethics, and burnout (loss of enthusiasm).¹⁹

107 The sample size was calculated based on the prevalence of physicians' burnout
108 published in previous studies.^{20,21} The prevalence of burnout used was 70%
109 assuming response rate 60%, and a confidence level of 95% with an acceptable
110 0.05 margin of error. This gave a minimum sample size of 290. We used a
111 random sample technique at all six government hospitals in Makkah. Six public
112 (i.e. government) regional hospitals were randomly selected using random
113 number tables. Questionnaires were administered to eligible doctors working in
114 these hospitals. Similarly, all doctors were chosen through random number
115 tables; these were based on doctors' medical licence number. However, due to

116 time constraints, the researchers had to limit the sample size to only 136
117 randomly selected practicing physicians.

118 Researchers collected data via a questionnaire, which included
119 sociodemographic information, detailed questions about burnout, satisfaction
120 and ethics. Satisfaction was assessed by three factors based on previous
121 published survey.¹⁰ Satisfaction about salary and current job, and whether the
122 physician would repeat the specialty (do it, all over again). For satisfaction
123 about the salary and current job, the response options were ‘Yes’ or ‘No.’
124 Participants who chose the same specialty again were considered to be satisfied
125 at work, whereas those who would consider another specialty were considered
126 to be dissatisfied at work.

127 Questions about burnout included factors perceived as causes of burnout. The
128 questionnaire used was adapted from the study tool used by previous survey
129 study examined burnout among primary health care doctors in Saudi Arabia.¹⁰
130 This validated questionnaire categorised burnout into 3 levels: high, moderate
131 and low level of burnout. The participants were asked whether they had
132 burnout. The next part included 13 factors of burnout. Each of the “Yes” or
133 “No” answers were added up to calculate the “score of burnout”. These scores
134 ranged from 2-110 and participants were classified into low (2-24), moderate
135 (25-60), or high (61-110) scores of burnout.¹⁰

136 Detailed questions about factors affecting ethics were classified into two parts.
137 The first part covered life, death, and pain. The second part covered money,
138 harm, and patients. Each question could be answered with “Agree” or
139 “Disagree”. Participants’ answers from both parts were added to calculate the
140 “score of ethics”. Participants were classified into low (0-15), moderate (16-30),
141 and high (31-38) scores of ethics.

142 Given the time constraints, the likelihood ratio chi-square (LHR chi-sq.) test
143 was used for all categorical bivariate statistical analyses to find statistically
144 significant relationships between two categorical variables. The LHR chi-sq is

145 used over other statistical tests for categorical variables (especially chi-square)
146 as it is robust and used when some expected values are <5 . P value <0.05 was
147 considered significant. Microsoft Office Excel (Version 16.0, USA) was used
148 for data entry, processing and storage. SPSS Virgin 16 for Windows (IBM
149 SPSS Statistics, Chicago, USA) was used to analyze raw data.

150

151 **Results**

152 The questionnaire was administered only to 136 physicians due to time
153 constraints for researchers. Questionnaires were administered to 200 physicians
154 working in one of the six hospitals. Of 200 eligible participants, 136 were
155 willing to participate and 64 doctors were excluded from this study because of
156 their unwillingness to participate. All participants filled in and returned the
157 questionnaires. There were some missing answers ($\leq 20\%$). The participants'
158 ages were 25-65 years and majority were male (69% vs. 31%; $p= 0.04$). General
159 surgery and internal medicine were significantly prevalent specialty chosen by
160 male physicians recording 84% and 70%, respectively ($p= 0.003$). Statistical
161 analyses for gender with all other variables found statistically significant
162 relationships between gender and four other variables (Age, specialty, exercise,
163 and the toughest ethical dilemma) (Table 1).

164 However, there are no significant relationships with other variables (nationality,
165 marital status, number of children, smoking, health status, current salary and job
166 satisfaction, doing it all over again, a private clinic, hours of patient contact per
167 week, the most rewarding aspects of the job, burnout, scores of burnout, and
168 scores of ethics).

169 There is a statistically significant relationship between gender and age (Table
170 1). Across age groups, there are twice as many male physicians as female
171 (L.H.R. Chi-sq. = 8.32, degrees of freedom [d.f.] = 3, $p = 0.04$), except in the
172 oldest age group (55-65 years), which has no female physicians.

173 There is a statistically significant relationship between gender and specialty
174 (Table 1). There are twice as many male physicians in medicine, and four times
175 as many male surgeons compared to female surgeons. However, there are equal
176 numbers of male and female pediatricians, and four times as many female
177 physicians in obstetrics and gynaecology (L.H.R. Chi-sq. = 13.69, d.f. = 3, p =
178 0.003). Gender and exercise are also statistically significant. Male physicians
179 exercised more frequently than females in all categories of exercise (L.H.R.
180 Chi-sq. = 11.79, d.f. = 4, p = 0.02). Gender was statistically significant for the
181 variable, “toughest ethical dilemma” (L.H.R. Chi-sq. = 10.41, d.f. = 3, p = 0.02)
182 (Table 1). Almost equal numbers of male and female physicians withhold care
183 due to high cost while in other three categories of toughest ethical dilemmas;
184 male physicians’ responses were 3-4 times higher than female physicians were.
185 There are no statistically significant relationships between gender and
186 satisfaction with salary or repeating a specialty (Table 2). The percentage of
187 males and females in both categories for both variables are almost equal,
188 indicating that changing specialties is not linked with salary satisfaction
189 Table 3 shows statistically significant relationships between scores of burnout
190 and the burnout variables, “most rewarding aspect of my job”, and “if I have to
191 do it all over again” (p < 0.001, p = 0.02, p = 0.02, respectively). However, there
192 are no statistically significant relationships between scores of burnout and other
193 variables in the study. There is a highly significant relationship between burnout
194 and scores of burnout, the physicians’ self-assessment as burnout in all
195 categories (L.H.R. Chi-sq. = 21.53, d.f. = 2, p < 0.001).
196 Table 3 shows a statistically significant relationship between scores of burnout
197 and “the most rewarding aspect of the job,” (L.H.R. Chi-sq. = 21.37, d.f. = 10, p
198 = 0.02). For “the most rewarding aspect of the job”, physicians’ scores were
199 mostly moderate for scores of burnout. For “proud being a physician”,
200 physicians scored moderate or high scores of burnout. However, for “the most

201 rewarding aspect of the job,” most physicians who replied “Nothing” were in
202 high (90%) and moderate (10%) burnout categories.

203 There is a statistically significant relationship between scores of burnout and
204 variable “if I have to do it all over again” (L.H.R. Chi-sq. = 8.41, d.f. = 2, p =
205 0.02). There are over twice as many physicians who would choose same
206 specialty again, who are moderately burned-out compared to highly burned-out
207 physicians (Table 3). However, physicians who would change specialties scored
208 almost the same in moderate and high burned-out categories.

209 The frequency distribution for scores of ethics showed that only two physicians
210 scored low. Therefore, low and moderate categories were combined into
211 ‘moderate’ category. Statistical analyses between scores of ethics and all other
212 variables found statistically significant relationships only between scores of
213 ethics and nationality (L.H.R. Chi-Sq.= 4.13, d.f. = 1, p = 0.04) and salary
214 satisfaction (L.H.R. Chi-Sq. = 3.93, d.f. = 1, p = 0.03) (Table 4). Most Saudis
215 and non-Saudis graded ‘moderate’ for scores of ethics. Only 11% Saudis and
216 24% non-Saudis graded ‘high’ for scores of ethics. Physicians dissatisfied with
217 their salary graded ‘high’ for scores of ethics compared to physicians satisfied
218 with their salaries having moderate scores of ethics.

219

220 **Discussion**

221 This cross-sectional study revealed a statistically significant level of burnout
222 among physicians from various medical specialties in Makkah, Saudi Arabia. It
223 showed that burnout affects physicians’ satisfaction and their decision to
224 continue or change specialties. However, two-thirds of both, satisfied and
225 unsatisfied physicians had moderate scores for ethics, regardless of nationality.

226 The highly significant relationship between the variables “are you burned-out”
227 and score of burnout demonstrated that factors selected to calculate score of
228 burnout and score of ethics are appropriate, weightage of these factors in

229 calculating the two scores is correct and classification of scores into two
230 categories each is appropriate too.

231 This highly significant relationship demonstrated that participants were honest
232 in their answers with a good self-understanding of 'burnout'. Our findings about
233 physician burnout are consistent with other studies, despite variations in
234 geographic location, work environment, experience, annual income, and
235 cultures.^{6,21,22} Family physicians in British Columbia had a higher rate of self-
236 reported burnout (61%) and depression (29%).²¹ However, burnout among
237 physicians in the later study might be underestimated because it was self-
238 reported by family physicians at a city centre. A higher prevalence is possible, if
239 physicians from other specialties or rural areas were included. Stress, job
240 overload, 'on-calls' and lack of facilities (especially in rural areas) might
241 influence the level of burnout. The self-understanding of burnout²⁹ and
242 tolerance levels of work-related stress could also indirectly affect physicians'
243 decision about burnout levels.

244 Although gender is an important factor that affects burnout, published evidence
245 is inconsistent.¹³⁻¹⁵ Emerging evidence suggested that male physicians are more
246 likely to suffer from burnout than females.⁶ Studies underpowered and exposed
247 to a non-response bias due to a low response rate could result in
248 underestimation of prevalent burnout among male physicians. Consistent with
249 published studies, our study showed the prevalence of male physicians to be
250 twice that of female physicians, which might be related to more male physicians
251 in challenging fields such as surgery.¹⁰ Gender difference, especially in Saudi
252 Arabia, could be related to cultural and traditional habits.¹⁰ Our study sample
253 had fewer women physicians. There were no female physicians in oldest age
254 group (55-65 years) compared with younger physicians aged 25-34 years (0%
255 vs. 31%, $p=0.04$). This could be a revolutionary cultural acceptance of female
256 physicians in Saudi Arabia. Thus, male physicians could be at a higher risk of
257 suffering from high-level burnout compared to female counterparts. Burnout

258 was statistically significant and higher among male surgeons (48.9% vs. 34.2%,
259 $p=0.04$).²³

260 Moreover, our study showed a statistical relationship between gender and
261 speciality. There were twice as many male physicians in internal medicine and
262 four times as many in surgery. In obstetrics and gynaecology, female physicians
263 were four times higher, mirroring the working medical environment in Saudi
264 Arabia. These variations may be influenced by cultural, Islamic and social
265 norms in Saudi Arabia.^{24,25} For example, female patients might be more
266 comfortable with female physicians, especially in obstetrics and gynaecology.

267 Another difference by gender was frequency of exercise; overall, male
268 physicians exercised more (Table 1). This could reflect community dogma and
269 lifestyle limitations for women in Makkah, Saudi Arabia and is consistent with
270 other studies.^{26,27} Despite emerging evidence that physical activity could
271 influence the level of burnout to some degree,²⁷ high quality longitudinal or
272 interventional studies are lacking. It could be possible that male physicians were
273 more stressed, experience symptoms of burnout, and exercise more to alleviate
274 this stress.²⁸

275 Gender was statistically related to “the toughest ethical dilemma.” All
276 physicians were almost equal in their response to “withhold care due to high
277 cost’. While in other categories (pressured to provide unneeded therapy to
278 patients, disclose or withhold therapy for patients who harm others, and suspect
279 domestic abuse and unable to take action), male physicians’ responses were 3-4
280 times higher than female physicians’. This gender diversity might be related to
281 socialization and nature of duties assigned to male physicians, especially in
282 Saudi society, where they are more exposed to ethical dilemmas compared to
283 female physicians; and/or female physicians are more sensitive in resolving
284 ethical dilemmas.^{29,30} Although gender differences for ethical dilemmas are still
285 arguable, emerging evidence from a recent meta-analysis, showed that gender
286 plays a major role in moral reasoning among medical professionals.²⁸

287 For scores of ethics and nationality, non-Saudi physicians scored twice that of
288 Saudi physicians. Scores of ethics and salary satisfaction were also statistically
289 significant. Physicians dissatisfied with their salary had higher scores of ethics
290 compared to those satisfied with their salary. This result is contrary to logic and
291 expectation, as physicians satisfied with their salary should have higher scores
292 of ethics.^{31,32}

293 Results for scores of burned-out and changing specialty, showed that physicians
294 who would choose the same specialty again were moderately burned-out
295 compared to highly burned-out physicians who would change specialty.
296 Although there is good evidence indicating that physicians' burnout and
297 satisfaction is associated with poor medical decisions and high job
298 relocation,^{6,18,21} one study claimed otherwise.²² This could be exposure to
299 response bias as a result of exaggeration in self-reported outcomes to seek
300 attention and change health system or it could be location variation as it was
301 conducted in rural Canada. Moreover, physicians willing to change specialties
302 were almost equal in number for moderate and high burnout. In comparison,
303 however, the prevalence of dissatisfied physicians almost doubled in the high
304 burnout category.

305 Thus, the scores of burnout affect physicians' intent to continue or change
306 specialties. Consistent with our findings, emerging evidence showed a
307 significant association between level of burnout and probability of changing
308 professions among surgeons (37.5%, p-value= 0.01).²³

309 The main strength of this study is the comprehensive assessment of physicians'
310 satisfaction, ethics, and burnout. A cross-sectional study allowed examination of
311 multiple endpoints with one relevant data collection.¹⁹ Additionally, as
312 participants were randomly selected, it indicated high validity of the study. The
313 diversity in physicians' specialities and seniority gives a valid estimation of
314 subjects' characteristics,³³ creating an externally valid representative sample.

315 Limitations of our study include small sample size and possibility of being
316 underpowered to identify smaller average differences in analysis as well as
317 large percentage of male participants (70%). Although this is an imbalanced
318 study sample, it could be representative of distribution of gender at hospitals in
319 Saudi Arabia. Two hundred questionnaires were to be administered to
320 physicians working at six government hospitals in Makkah, however, sample
321 size was reduced to 136 due to time constraints. One of the limitations of our
322 study is related to the external validity; this study was conducted in Saudi
323 Arabia, where medical practice might be slightly different from practice in other
324 countries. Additionally, cultural norms vary between populations. Thus,
325 findings must be interpreted with caution as it cannot be generalized to another
326 population with different culture. Although using questionnaires has been
327 associated with a low response rate,¹⁹ all (136) participants completed the
328 questionnaire. Information was missing only for a few questions, recording an
329 acceptable non-response rate of $\leq 20\%$.

330

331 **Conclusion**

332 In conclusion, our study provided the first evidence of high frequency of
333 burnout and career choice regret among physicians working in Makkah, Saudi
334 Arabia. This study mirrors medical community in Saudi Arabia, where two-
335 thirds are male physicians working in internal medicine and surgery. Female
336 physicians work mostly in obstetrics and gynaecology.

337 Findings from this study would help in establishing a feasible approach in
338 reducing emotional exhaustion and burnout among physicians not only in
339 Makkah city but also nationwide. Addressing physicians' burnout would have a
340 positive impact on professional efficacy and improve their job satisfaction.

341 Thus, it will create a highly productive and positive work environment. Further
342 research is warranted to confirm these findings in different regions in Saudi
343 Arabia and establish whether physician burnout affects quality of healthcare

344 nationwide. To ensure well-being of physicians in Saudi Arabia, it is vital to
345 establish strategies to reduce burnout levels and promote job satisfaction.

346

347 **Acknowledgement**

348 We thank the following medical students for assistance with the questionnaire
349 and/or data management: Ebtehal H. Al-thobaiti; Shahad A. Magboul; Asma F.
350 Basakran; Taghreed A. Khan; Rawabi A. Alharbi; Khadijah S. Banjar; Basmah
351 A. Alharbi; Sumayah A. Fallatah; Moroj F. Alreheli; Taghreed A. Nour-Aldein;
352 Amani S. Al-Ghamdi; Rehab S. Almajnooni. We also thank Ebtehal H. Al-
353 thobaiti, Shahad A. Magboul, Rawabi A. Alharbi, Khadijah S. Banjar, Basmah
354 A. Alharbi, Sumayah A. Fallatah, Asma F. Basakran for their comments on
355 different sections of the manuscript. We are grateful to Dr Soleman A. Mirdad
356 (deceased on 27/05/2018) for supervising the students during their community
357 medicine undergraduate course. Special thanks for support from the College of
358 Medicine Research Center, Deanship of Scientific Research, King Saud
359 University Riyadh, Saudi Arabia.

360

361 **Disclaimer:** This study has not been presented or published in a conference, or
362 published in an abstract book or any other relevant information.

363 **Conflict of interest:** The authors have no conflict of interests to declare.

364 **Funding disclosure:** This study was not supported or funded by any drug
365 company or other commercial company.

366

367 **References**

368 1. Serour GI. What is it to practise good medical ethics? A Muslim's
369 perspective. J Med Ethics 2015;41:121-124. doi: 10.1136/medethics-2014-
370 102301.

371 2. Fadlallah R, Nas H, Naamani D, El-Jardali F, Hammoura I, Al-Khaled L,
372 et al. Knowledge, Beliefs and Attitudes of Patients and the General Public

- 373 towards the Interactions of Physicians with the Pharmaceutical and the Device
374 Industry: A Systematic Review. PLoS One 2016;11:1-34. doi:
375 10.1371/journal.pone.. eCollection 2016.
- 376 3. Gaudine A, LeFort SM, Lamb M, Thorne L. Clinical ethical conflicts of
377 nurses and physicians. Nurs Ethics 2011;18:9-19. doi:
378 0.1177/0969733010385532.
- 379 4. Jansky M, Marx G, Nauck F, Alt-Epping B. Physicians' and nurses'
380 expectations and objections toward a clinical ethics committee. Nurs Ethics
381 2013;20:771-783. doi: 10.1177/0969733013478308. Epub 2013 May 28.
- 382 5. Vogel R, McGraw C, Orlando A, Bourg P, Dreiman C, Peck L, et al.
383 Examining satisfaction of older adult patients and their caregivers following
384 traumatic injury: a cross-sectional study of three level I trauma centres. BMJ
385 Open 2019;9:1-9. doi: 10.1136/bmjopen-2019
- 386 6. Gan Y, Jiang H, Li L, Yang Y, Wang C, Liu J, et al. Prevalence of
387 burnout and associated factors among general practitioners in Hubei, China: a
388 cross-sectional study. BMC Public Health 2019;19: 1607. doi: 10.186/s12889-
389 019-7755-4.
- 390 7. Friedberg MW, Chen PG, Van Busum KR, Aunon F, Pham C, Caloyeras
391 J, et al. Factors Affecting Physician Professional Satisfaction and Their
392 Implications for Patient Care, Health Systems, and Health Policy. Rand Health
393 Q 2014;3: 1. eCollection 2014 Winter.
- 394 8. Liu J, Yu W, Ding T, Li M, Zhang L. Cross-sectional survey on job
395 satisfaction and its associated factors among doctors in tertiary public hospitals
396 in Shanghai, China. BMJ Open 2019;9: e023823. doi: 10.1136/bmjopen-2018.
- 397 9. Rosta J, Aasland OG, Nylenna M. Changes in job satisfaction among
398 doctors in Norway from 2010 to 2017: a study based on repeated surveys. BMJ
399 Open 2019;9: e027891. doi: 10.1136/bmjopen-2018.

- 400 10. Selaihem A. Prevalence of burnout amongst physicians working in
401 primary care in Riyadh military hospital, Saudi Arabia. *Int J Med Sci Public*
402 *Health* 2013;2:410-420.
- 403 11. Romani M, Ashkar K. Burnout among physicians. *Libyan J Med*
404 2014;9:23556. eCollection 2014.
- 405 12. Rangel EL, Lyu H, Haider AH, Castillo-Angeles M, Doherty GM, Smink
406 DS. Factors Associated With Residency and Career Dissatisfaction in
407 Childbearing Surgical Residents. *JAMA Surg* 2018;153: 1004-11. doi:
408 10.1/jamasurg.2018.571.
- 409 13. Dyrbye LN, Burke SE, Hardeman RR, Herrin J, Wittlin NM, Yeazel M,
410 et al. Association of Clinical Specialty With Symptoms of Burnout and Career
411 Choice Regret Among US Resident Physicians. *JAMA* 2018;320: 1114-30. doi:
412 10.001/jama.2018.12615.
- 413 14. Kumar S. Burnout and Doctors: Prevalence, Prevention and Intervention.
414 *Healthcare (Basel)* 2016;4.(pii):healthcare4030037. doi: 10.3390/healthcare.
- 415 15. West CP, Dyrbye LN, Erwin PJ, Shanafelt TD. Interventions to prevent
416 and reduce physician burnout: a systematic review and meta-analysis. *Lancet*
417 2016;388:2272-2281. doi: 10.1016/S0140-6736(16)31279-X. Epub 2016 Sep
418 28.
- 419 16. Sinsky CA, Dyrbye LN, West CP, Satele D, Tutty M, Shanafelt TD.
420 Professional Satisfaction and the Career Plans of US Physicians. *Mayo Clin*
421 *Proc* 2017;92: 1625-35. doi: 10.016/j.mayocp.2017.08.017. Epub Nov 1.
- 422 17. Wu YF, Wang PC, Chen YC. Gender Differences and Work-Family
423 Conflicts among Emergency Physicians with Intention to Leave. *Emerg Med Int*
424 2018;2018: 3919147.(doi):10.1155/2018/3919147. eCollection 2018.
- 425 18. Peckham C. Lifestyle and Burnout: A Bad Marriage. *Medscape* 2013.
- 426 19. Belbasis L, Bellou V. Introduction to Epidemiological Studies. *Methods*
427 *Mol Biol.* 2018; 1793:1-6.(doi):10.1007/978-1-4939-7868-7_1.

- 428 20. Aldrees TM, Aleissa S, Zamakhshary M, Badri M, Sadat-Ali M.
429 Physician well-being: prevalence of burnout and associated risk factors in a
430 tertiary hospital, Riyadh, Saudi Arabia. *Annals of Saudi Medicine*.
431 2013;33(5):451-6.
- 432 21. Thommasen HV, Lavanchy M, Connelly I, Berkowitz J, Grzybowski S.
433 Mental health, job satisfaction, and intention to relocate. Opinions of physicians
434 in rural British Columbia. *Can Fam Physician* 2001;47:737-744.
- 435 22. Mahmood JI, Grotmol KS, Tesli M, Moum T, Andreassen O, Tyssen R.
436 Life satisfaction in Norwegian medical doctors: a 15-year longitudinal study of
437 work-related predictors. *BMC Health Serv Res. Med Care* 2019;19: 729. doi:
438 10.1186/s12913-019-4599-7.
- 439 23. Malik AA, Bhatti S, Shafiq A, Khan RS, Butt UI, Bilal SM et al. Burnout
440 among surgical residents in a lower-middle income country - Are we any
441 different? *Ann Med Surg (Lond)* 2016;9:28-
442 32.(doi):10.1016/j.amsu.2016.05.012. eCollection Aug.
- 443 24. Shamrani H. A Cross-sectional Survey of Women's Provider Gender
444 Preferences for Gynecology and Obstetrics Care at King Abdulaziz University
445 Hospital. *J Women's Health Care* 2016;5:347-350.
- 446 25. Baqi S, Albalbeesi A, Iftikhar S, Baig-Ansari N, Alanazi M, Alanazi A.
447 Perceptions of gender equality, work environment, support and social issues for
448 women doctors at a university hospital in Riyadh, Kingdom of Saudi Arabia.
449 *PLoS One* 2017;12:e0186896. doi: 10.1371/journal.pone. eCollection 2017.
- 450 26. Gerber M, Brand S, Elliot C, Holsboer-Trachsler E, Puhse U, Beck J.
451 Aerobic exercise training and burnout: a pilot study with male participants
452 suffering from burnout. *BMC Res Notes* 2013;6:78.(doi):10.1186/756-0500-6-
453 78.
- 454 27. Naczenski LM, Vries JD, Hooff M, Kompier MAJ. Systematic review of
455 the association between physical activity and burnout. *J Occup Health*
456 2017;9:477-494. doi: 10.1539/joh.17-0050-RA. Epub 2017 Oct 7.

- 457 28. Von Haaren B, Ottenbacher J, Muenz J, Neumann R, Boes K, Ebner-
458 Priemer U. Does a 20-week aerobic exercise training programme increase our
459 capabilities to buffer real-life stressors? A randomized, controlled trial using
460 ambulatory assessment. *Eur J Appl Physiol* 2016;116:383-394.
- 461 29. Moosavi S, Borhani F, Mohsenpour M. Ethical attitudes of nursing
462 students at Shahid Beheshti University of Medical Sciences, Iran. *Indian J Med*
463 *Ethics Nurs* 2017;2: 14-9. doi: 0.20529/IJME.2017.003. Epub 2016 Sep 7.
- 464 30. You D, Maeda Y, Bebeau MJ. Gender Differences in Moral Sensitivity:
465 A Meta-Analysis. *Ethics & Behavior* 2011;2:263-282.
- 466 31. Hoff T, Young G, Xiang E, Raver E. Understanding U.S. Physician
467 Satisfaction: State of the Evidence and Future Directions. *J Healthcare Manag*
468 2015;60:409-427.
- 469 32. Singh T, Kaur M, Verma M, Kumar R. Job satisfaction among health care
470 providers: A cross-sectional study in public health facilities of Punjab, India. *J*
471 *Family Med Prim Care* 2019; 3268-75. doi: 10.4103/jfmprc.jfmprc_600_19.
- 472 33. Kukull WA, Ganguli M. Generalizability: the trees, the forest, and the
473 low-hanging fruit. *Neurology* 2012;78:1886-1891. doi:
474 10.212/WNL.0b013e318258f812.

475

476

477

478

479 **Table 1: Relationships between gender and age, speciality, exercise, and ethical dilemma**

Variables	Categories	Gender (n) %		Total	Chi-sq.	†d.f.	p-value
		Male	Female				
Age (years)	25 – 34	(44) 69%	(20) 31%	(64) 47%	8.33	3	0.04
	35 – 44	(27) 63%	(16) 37%	(43) 32%			
	45 – 54	(14) 74%	(5) 26%	(19) 14%			
	55 – 65	(10) 100%	(0) 0%	(10) 7%			
	Total	(95) 70%	(41) 30%	(136) 100%			
Specialty	Medicine	(43) 70%	(18) 30%	(61) 46%	13.69	3	0.003
	Surgery	(42) 84%	(8) 16%	(50) 37%			
	Pediatrics	(9) 50%	(9) 50%	(18) 13%			
	Obstetrics and Gynaecology	(1) 20%	(4) 80%	(5) 4%			
	Total	(95) 71%	(39) 29%	*(134) 100%			
Exercise	No	(35) 55%	(28) 45%	(63) 47%	11.79	4	0.02
	Daily	(14) 88%	(2) 12%	(16) 12%			
	Once a week	(13) 77%	(4) 23%	(17) 12%			
	Twice a week	(22) 79%	(6) 21%	(28) 20%			
	5 times a week	(10) 83%	(2) 17%	(12) 9%			
	Total	(94) 69%	(42) 31%	(136) 100%			
Toughest Ethical Dilemma	Withhold care due to high cost	(16) 52%	(15) 48%	(31) 26%	10.42	3	0.02
	Pressured to provide therapy to patients that they do not need	(22) 69%	(10) 31%	(32) 26%			
	Disclose or withhold therapy for patients who harm others	(8) 73%	(3) 27%	(11) 9%			
	Suspect domestic abuse and unable to take action	(40) 85%	(7) 15%	(47) 39%			
	Total	(86) 71%	(35) 29%	*(121) 100%			

480 †d.f.= degrees of freedom; * Missing answers for 15 participants; * Missing speciality for two physicians

481

482

483

484

485

Table 2: Relationship between gender and the variables “If I have to do it all over again” and “Satisfied with salary”

Variables	Categories	Gender (n) %		Total	Chi-Sq.	†d.f.	p-value
		Male	Female				
If I have to do it all over again	I'll choose the same specialty	(65) 69%	(29) 31%	(94) 69%	0.000	1	0.99
	I'll choose another specialty	(29) 69%	(13) 31%	(42) 31%			
	Total	(94) 69%	(42) 31%	(136) 100%			
Satisfied with salary	Yes	(54) 68%	(25) 32%	(79) 58%	0.003	1	0.95
	No	(39) 68%	(18) 32%	(57) 42%			
	Total	(93) 68%	(44) 32%	(136) 100%			

†d.f., degrees of freedom

486

487

488

489

490

491

Table 3: Relationship between scores of burnout and the variables “Most Rewarding Aspect of My Job”, and “If I have To Do It All Over Again”

Variables	Categories	Burnout (n) %			Total	Chi-Sq.	†d.f.	p-value
		Low	Moderate	High				
Burned-out	Yes	(1) 2%	(22) 47%	(24) 51%	(47) 45%	21.54	2	0.000
	No	(13) 22%	(36) 62%	(9) 16%	(58) 55%			
	Total	(14) 13%	(58) 55%	(33) 31%	*(105) 100%			
Most rewarding aspect of the job	Professional at work	(7) 13%	(34) 63%	(13) 24%	(54) 41%	21.37	10	0.02
	Good relations with patients	(2) 9%	(11) 48%	(10) 43%	(23) 17%			
	Valuable person in the community	(3) 11%	(18) 64%	(7) 25%	(28) 21%			
	Earn a good income	(1) 12%	(6) 76%	(1) 12%	(8) 6%			
	Proud to be a	(0) 0%	(5) 50%	(5) 50%	(10) 8%			

	physician						
	Nothing	(0) 0%	(1) 11%	(8) 89%	(9) 7%		
	Total	(13) 10%	(75) 57%	(44) 33%	*(132) 100%		
If I have to do it all over again	Choose the same specialty	(11) 12%	(60) 64%	(23) 24%	(94) 69%	8.41	2
	Choose another specialty	(3) 7%	(18) 43%	(21) 50%	(42) 31%		
	Total	(14) 10%	(78) 57%	(44) 33%	(136) 100%		

492 †d.f., degrees of freedom, *there were missing answers for 'yes' or 'no' questions but not for the burnout score (non-response rate ≤
 493 20%).
 494
 495 -----
 496
 497

Table 4: Relationships between scores of ethics and nationality and salary satisfaction

Variables	Categories	Ethics (n) %		Total	Chi-Sq.	†d.f.	p-value
		Moderate	High				
Nationality	Saudi	(56) 89%	(7) 11%	(63) 46%	4.13	1	0.04
	Non-Saudi	(56) 76%	(18) 24%	(74) 54%			
	Total	(112) 82%	(25) 18%	(137) 100%			
Satisfied with salary	Yes	(68) 87%	(10) 13%	(78) 58%	3.93	1	0.03
	No	(42) 74%	(15) 26%	(57) 42%			
	Total	(110) 82%	(25) 18%	(135) 100%			

498 †d.f., degrees of freedom
 499