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IZVORNI ZNANSTVENI RAD
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Doživljaj stresa među dodiplomskim studentima dentalne medicine u odnosu na spol, kliničko obrazovanje i akademske uspjehe

Perceived Stress among Undergraduate Dental Students in Relation to Gender, Clinical Training and Academic Performance

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Sažetak

Cilj: Ovo istraživanje usmjereno je na procjenu uočenog stresa i njegovih izvora među studentima dodiplomskog studija dentalne medicine Sveučilišta Jazan u Saudijskoj Arabiji. **Materijali i metode:** U ovoj presječnoj studiji podatci su prikupljeni DES upitnikom. Ukupan rezultat stresa i rezultati po pojedinim područjima opisani su i analizirani različitim čimbenicima grupiranja – prema spolu, godini studija, bračnom stanju i prosjeku ocjena (GPA). **Rezultati:** Ukupno 366 studenata dentalne medicine pristalo je sudjelovati u ovom istraživanju. Među njima je bilo 57 posto žena. Ukupan DES iznosio je 1,67 ± 0,45. Studentice i oženjeni studenti pokazali su veći stres od svojih kolega. Stres se znatno povećavao na višim godinama studija. Suprotno tomu, pokazatelji stresa bili su niži kod sudionika s visokim GPA-om. Višestruke linearne regresijske analize pokazale su *stupanj studija* i *spol* kao važne neovisne determinante ukupnoga DES-a i većine područja stresa. Obje ove odrednice objasnile su 41 posto varijabilnosti u DES bodovima. **Zaključak:** DES među studentima dentalne medicine Sveučilišta Jazan umjeren je i neznatno povećan. Veći je među ženama i znatno se povećava na višim godinama studija. No studenti s višim GPA-om pokazali su nižu razinu stresa. **Kliničko značenje:** Smanjenje i/ili ublažavanje stresa među studentima dentalne medicine pozitivno će utjecati na njihov uspjeh u učenju, što će rezultirati boljim upravljanjem i brigom o pacijentu.

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Uvod

Stres se definira kao reakcija tijela na promjenu koja je fizički, mentalni ili emocionalni odgovor, a može biti pozitivan, što znači da potiče i motivira pojedince da bolje obave zadatke, ili negativan ako izaziva depresiju i smanjuje njihovu učinkovitost (1, 2).

Percepcija stresa uvelike se razlikuje i može, između ostaloga, biti pod utjecajem stajališta, mišljenja i zanimanja pojedinca. Školovanje na fakultetima stresno djeluje na upisane studente, posebno na medicinskim i stomatološkim. Nažalost, fakulteti dentalne medicine smatraju se vrlo stresnim okružjem za učenje i razina stresa među studentima viša je negoli u općoj populaciji (3 - 8).

Štoviše, na percipirani stres u dentalnoj medicini može se snažno utjecati tijekom dodiplomskog studija. Posebno kli-

Introduction

Stress is defined as the body's reaction to a change that entails a physical, mental or emotional response that may be positive, stimulating and motivating individuals to do the best, or be negative, depressing and reducing their performance (1,2). The perception of stress differs greatly among people and can be affected by, among others, the individual's beliefs, attitudes and occupation. Higher education poses stress over the enrolled students, more specifically the education related to health sciences. Unfortunately, dental schools are considered highly stressful learning environments and stress levels among dental students have been revealed to be higher than stress levels in general population (3-8). Moreover, the perceived dental environmental stress can be greatly influenced during the undergraduate study program. Clinical training,

ničko osposobljavanje može utjecati na performanse tih studenata zbog izloženosti različitim stresorima poput onih s kojima se suočavaju doktori dentalne medicine (9, 10).

Ne poduzmu li se nužne mjere, stres izazvan okolinom u dentalnoj medicini može negativno utjecati na dobrobit studenata. Ako se ništa ne promijeni, studenti možda neće moći nastaviti učiti, mogu imati poteškoće u interakciji s pacijentima te patiti od depersonalizacije, što znači da će se psihološki udaljavati od ostalih ljudi. U konačnici tim će se studentima pogoršati kvaliteta života i učinak na fakultetu (8, 11).

Zbog toga je vrlo važno odrediti čimbenike koji izazivaju stres. To će kreatorima politike, akademskom osoblju i administratorima pružiti potreban alat za promjenu nastavnog plana i/ili okoline tako da budu prilagođeniji studentima.

Svrha ovoga rada bila je procijeniti percipirani stres i njegove izvore među studentima dentalne medicine na stomatološkim fakultetima povezanima sa Sveučilištem Jazan u Saudijskoj Arabiji.

Materijali i metode

Ova deskriptivna presječna studija temeljena je na upitniku i provedena je tijekom prvog semestra akademske godine 2106./2017. Ciljalo se na sve studente dentalne medicine na Stomatološkom fakultetu Sveučilišta Jazan u Saudijskoj Arabiji. Istraživački tim dobio je prije provedbe odobrenje Etičkog povjerenstva te visokoškolske ustanove. Uz upitnik svim je sudionicima poslano i popratno pismo u kojemu su bili opisani objektivni ciljevi istraživanja, a bila je istaknuta i povjerljivost podataka te da je sudjelovanje dobrovoljno. Svi su potpisali pristanak.

Za bolje razumijevanje korištena je prilagođena dvojezična (arapski i engleski) verzija upitnika o nastanku dentalnoga stresa (engl. Dental Environment Stress – DES). Osim demografskih podataka, obuhvaćena je 41 stavka, a sve su grupirane u sedam domena izazivača stresa kako slijedi: mišljenje o samopouzdanju (devet stavki), fakultet i administracija (deset stavki), radno opterećenje (šest stavki), liječenje bolesnika (četiri stavke) klinička praksa (četiri stavke), opterećenje pri izvedbi (tri stavke) i socijalni stresori (pet stavki) (12).

No te domene u podijeljenim upitnicima nisu bile dostupne sudionicima. Odgovori na svaku stavku u upitniku uneseni su u Likertovu ljestvicu od tri točke: 1 = bez stresa, 2 = umjereni stres i 3 = jaki stres. Četvrti mogući odgovor (0 = nije primjenjiv) dodan je kada stresna situacija, postavljena u pitanju, nije bila primjenjiva na sudionika.

Popunjeni upitnici s kodiranim podatcima uneseni su u SPSS verziju 21 (IBM Corp., Armonk, NY, SAD). Prema potrebi bili su prikazani kao frekvencije s omjerima ili aritmetičkim sredinama sa standardnim devijacijama (SD). Sažeti rezultati pojedinačnih domena i ukupnoga DES-a prikazani su kao aritmetičke sredine i SD te su smatrani zavisnim varijablama. Normalna raspodjela ovih varijabli ispitana je Kolmogorov-Smirnovljevim testom.

Spol, bračno stanje, prosječna ocjena (GPA) i godina studija smatrani su nezavisnim varijablama. Ovisno o normalnosti podataka, razlike prema spolu analizirane su Mann-Whitneyje-

in particular, can affect dental students' performance due to their exposure to different patient-related stressors which are similar to the ones faced by dental practitioners (9,10).

Unless necessary steps are taken, the dental environment-induced stress can negatively affect the students' well-being. If stress persists, students may be unable to continue working, may find difficulty to interact with their patients, and may suffer from depersonalization, which means that they will be psychologically distancing from others. Ultimately, elevated levels of stress can deteriorate academic achievement and reduce career options and life style choices (8, 11).

In this regard, determining the provoking-stress factors is very important. It will arm the policy makers, academic staff and administrators with the required weapons to modify the teaching curriculum or/and environment in a way that is more beneficial to the students. The aim of this study, therefore, was to evaluate the perceived stress and its sources among undergraduate dental students at dental college affiliated to Jazan University in Saudia Arabia.

Materials and methods

This descriptive questionnaire-based, cross-sectional study was conducted in the first semester of 2106/2017 academic year. It targeted all dental students at College of Dentistry, Jazan University, Saudi Arabia. A prior ethical approval was obtained by the Ethics and Research Committee of the College. For subject consent, the questionnaire was accompanied by a covering letter describing the objectives of the study, stressing the confidentiality of data, and voluntary participation and finally concluding with mandatory signature from the participant's for his/her inclusion.

For better understanding, a bi-language (Arabic and English) modified version of Dental Environment Stress (DES) questionnaire was used. Apart from the demographic data, it comprised 41 items grouped under seven stress-provoking domains as follows: self-efficacy beliefs (nine items), faculty and administration (ten items), workload (six items), patient treatment (four items), clinical training (four items), performance pressure (three items), and social stressors (five items), (12). However, these domains were not displayed to the students in the distributed questionnaires. The responses to each item in the questionnaire were modified into a three-point Likert scale with 1 = no stress, 2 = moderate stress, and 3 = severe stress A fourth possible response (0 = not applicable) was added where the stress situation under question was not applicable to the participant.

Completed questionnaires with coded data were entered into SPSS version 21 (IBM Corp., Armonk, NY, USA). The study data were presented as frequencies with proportions or means with standard deviations (SDs), as appropriate. The summary scores of individual domains and of overall DES, presented as means and SDs, were considered dependent variables. Normal distribution of these variables was tested using Kolmogorov-Smirnov test. Gender, marital status, Grade Point Average (GPA) and the level of study were considered independent variables. Depending on the normality of the data, differences by gender were analyzed by Mann-

vim U testom ili neovisnim t-testom, a razlike u nižoj ili višoj godini studija te GPA kategorije ispitane su Kruskal-Wallisovim testom ili jednosmjernom ANOVA-om. Usporedbe po parovima bile su provedene kad god su Kruskal-Wallisov test ili jednosmjerna ANOVA otkrili značajne razlike. Obavljene su i višestruke linearne regresijske analize sa svrhom da se odrede neovisne odrednice ukupnoga stresa i stresa po pojedinim domenama. P-vrijednost manja od 0,05 smatrala se značajnom.

Rezultati

Ukupno 366 studenata dentalne medicine prosječne dobi od 21,8 + 1,6 godina pristalo je sudjelovati u ovom istraživanju. Do 57 posto sudionika bile su žene i među njima je 14 posto bilo u braku. Uzorak je podjednako raspoređen (oko 20 %) među različitim godinama studija. Većina studenata (84 %) imala je prosjek ocjena (GPA) veći od 3,5 (tablica 1.). Od ukupno 3, ukupni rezultat DES-a bio je 1,67 ± 0,45. Najveći udjel stresa pripisuje se domenama R*adno opterećenje*

Whitney U test or independent t-test, while differences by study levels and by GPA categories were analyzed by Kruskal Wallis or one-way ANOVA. Pairwise comparisons were followed whenever Kruskal Wallis or one-way ANOVA revealed significant differences. The multiple linear regression analyses were performed to determine the independent determinants of the overall stress, and stress by individual domains. A *P*-value of less than 0.05 was considered significant.

Results

A total of 366 dental students, with a mean age of 21.8 + 1.6 years, agreed to take part in this study. Up to 57% of the participants were females and 14% were married. The sample was equally distributed (approximately 20%) among different levels of study. Most of students (84%) obtained a GPA higher than 3.5 (Table 1).

Out of 3, the overall DES score was 1.67 ± 0.45. The highest fraction of this stress was attributed to "Workload" (2.21

Tablica 1. Socijalno-demografske karakteristike ispitanika
Table 1 Socio-demographic characteristics of the participants

Varijable • Variables	N (%)
Spol • Gender (N=366)	
Muški • Male	157 (42.9%)
Ženski • Female	209 (57.1%)
Dob • Age (N=351)	
Aritmetička sredina • Mean (± S.D)	21.78 (±1.59)
Median	22.00
Raspon • Range	7 (19-26)
Bračno stanje • Marital status (N=361)	
U braku • Married	52 (14.4%)
Izvan braka • Unmarried	309 (85.6%)
Godina studiranja • Study year (N=366)	
Druga godina • Second year	74 (20.2%)
Treća godina • Third year	73 (19.9%)
Četvrta godina • Fourth year	76 (20.8%)
Peta godina • Fifth year	76 (20.8%)
Šesta godina • Sixth year	67 (18.3%)
Prosjek ocjena • GPA (N=351)	
<2.5	5 (1.4%)
2.5-3.5	39 (10.7%)
> 3.5-4.5	167 (45.6%)
>4.5	140 (38.3%)

Tablica 2. Stupanj značajnosti domena DES-a u usporedbi sa spolom
Table 2 Level of significance of DES domains with gender

Domene • Domains	Spol • Gender		Ukupno • Total	P- Vrijednost* • P-Value*
	Muški • Male	Ženski • Female		
Mišljenja o samopouzdanju • Self-efficacy beliefs	1.79 (0.49)	1.85 (0.60)	1.79 (0.55)	0.029
Nastavnici i administracija • Faculty and administration	1.46 (0.51)	1.61 (0.57)	1.53 (0.54)	0.01
Radno opterećenje • Workload	2.13 (0.48)	2.27 (0.45)	2.21 (0.47)	0.004
Terapija pacijenta • Patient treatment	1.48 (0.90)	1.73 (0.94)	1.62 (0.93)	0.003
Kliničke vježbe • Clinical training	1.49 (0.74)	1.74 (0.82)	1.62 (0.79)	0.001
Opterećenje zbog uspjeha • Performance pressure	1.98 (0.60)	2.14 (0.58)	2.07 (0.59)	0.012
Socijalni stresori • Social stressors	0.80 (0.41)	0.87 (0.71)	0.82 (0.58)	0.33
Ukupni DES • Total DES	1.58 (0.41)	1.75 (0.47)	1.66 (0.44)	0.001†

*: Mann-Whitneyev U test – osim ako nije navedeno drukčije • Mann Whitney U unless otherwise indicated.
†: Neovisni t-test • Independent t-test test.

(2,21 ± 0,46) i *Pritisak zbog učinka* (2,07 ± 0,59). Uz iznimku domene *Socijalni stresori*, studentice su pokazale više stresa od studenata (tablica 2.). Slično tomu, oženjeni sudionici bili su u većem stresu od neoženjenih, osim kad je bila riječ o domenama *Samopouzdanje* i *Socijalni stresori* (tablica 3.).

Ukupni stres ili stres po pojedinim područjima znatno je povećan na višim godinama studija (tablica 4.). Suprotno tomu, pokazani stres bio je niži kod sudionika s visokim GPA-om, osim u domeni *Socijalni stresor* (tablica 5.).

Višestruke linearne regresijske analize pokazale su da su godina studija i spol važne neovisne determinante ukupnoga DES-a i većine stresnih domena. Obje odrednice objasnile su 41 posto varijabilnosti u ukupnim DES bodovima. Konkretnije, objasnile su 41 posto u *Fakultetu i upravi*, 13 posto u *Radnom opterećenju*, 46 posto u *Liječenju pacijenata*, 40 posto u *Kliničkim vježbama* i 26 posto u *Pritisku zbog izvedbe varijabilnosti*. Iako nije bila važna, GPA je bila važna neovisna odrednica stresa vezana uz domene *Samoefikasnost* i *Socijalni stresori*. Bračno stanje također se smatra važnom nezavi-

± 0.46) and "Performance pressure" (2.07 ± 0.59). With the exception of "Social Stressors" domain, females scored higher stress than males (Table 2). Similarly, married participants scored higher stress levels than singles except for "Self-efficacy beliefs" and "Social stressors" domains (Table 3).

The overall stress, or stress by individual domains increased significantly in higher academic levels (Table 4). Inversely, the scored stresses were lower for participants with high GPA, with except for "Social stressor" domain (Table 5).

Multiple linear regression analyses revealed "Study level" and "Gender" as significant independent determinants of overall DES and most of the stress domains. Both determinants explained 41% of the variability in the overall DES scores. More specifically, they explained 41%, 13%, 46%, 40% and 26% of the variabilities in "Faculty and administration", "Workload", "Patients treatment", "Clinical training" and "Performance pressure" domains, respectively. Although GPA played a minor role, it was a significant independent determinant of stress related to "Self-efficacy" and "Social

Tablica 3. Stupanj značajnosti domena DES-a i bračnog statusa
Table 3 Level of significance of DES domains with marital status

Domene • Domains	Bračni status • Marital Status		P-Vrijednost* • P-Value*
	U braku • Married	Izvan braka • Unmarried	
Mišljenja o samopouzdanju • Self-efficacy beliefs	1.76 (0.63)	1.80 (0.54)	0.616
Nastavnici i administracija • Faculty and administration	1.70 (0.48)	1.50 (0.55)	0.011
Radno opterećenje • Workload	2.33 (0.44)	2.19 (0.47)	0.021
Terapija pacijenta • Patient treatment	2.08 (0.70)	1.54 (0.94)	< 0.001
Kliničke vježbe • Clinical training	1.90 (0.68)	1.57 (0.80)	0.006
Opterećenje zbog uspjeha • Performance pressure	2.19 (0.62)	2.05 (0.59)	0.061
Socijalni stresori • Social stressors	1.15 (0.75)	0.77 (0.53)	< 0.001
Ukupni DES • Total DES	1.83 (0.45)	1.63 (0.43)	0.011†

*: Mann-Whitneyev U test – osim ako nije navedeno drukčije • Mann Whitney U unless otherwise indicated.
†: Neovisni t-test • Independent t-test test.

Tablica 4. Domene DES-a prema godini studija
Table 4 DES domains across different study levels

Domene • Domain	Stupanj učenja • Study level					P-Vrijednost* • P-Value*
	2. • 2nd	3. • 3rd	4. • 4th	5. • 5th	6. • 6th	
Mišljenja o samopouzdanju • Self-Efficacy	1.70^{a} (0.61)	1.70^{a} (0.55)	$1.78^{a,b}$ (0.54)	$1.87^{a,b}$ (0.48)	1.98^{b} (0.56)	0.021
Nastavnici i administracija • Faculty	0.98^{a} (0.42)	1.25^{b} (0.43)	1.67^{c} (0.43)	1.81^{d} (0.35)	1.96^{e} (0.47)	< 0.001
Radno opterećenje • Workload	1.99^{a} (0.44)	2.02^{a} (0.53)	2.37^{b} (0.32)	2.33^{b} (0.42)	2.36^{b} (0.45)	< 0.001
Terapija pacijenta • Patient treatment	0.68^{a} (0.78)	0.83^{a} (0.86)	2.13^{b} (0.44)	2.25^{b} (0.38)	2.18^{b} (0.48)	< 0.001
Kliničke vježbe • Clinical training	0.71^{a} (0.72)	1.31^{b} (0.69)	2.05^{c} (0.43)	2.03^{c} (0.50)	2.06^{c} (0.54)	< 0.001
Opterećenje zbog uspjeha • Performance	1.63^{a} (0.48)	1.73^{a} (0.58)	2.37^{b} (0.46)	2.32^{b} (0.45)	2.31^{b} (0.50)	< 0.001
Socijalni stresori • Social stressors	0.64^{a} (0.45)	$0.72^{a,b}$ (0.50)	$0.70^{a,b}$ (0.47)	0.82^{b} (0.50)	1.34^{c} (0.78)	< 0.001
Ukupni DES • Total DES	1.24^{a} (0.36)	1.37^{a} (0.35)	1.80^{b} (0.29)	$1.87^{b,c}$ (0.28)	2.00^{c} (0.43)	< 0.001†

*: Kruskal-Wallisov test – osim ako nije navedeno drukčije • Kruskal Wallis test unless otherwise indicated.
†: test ANOVA • ANOVA test.
Aritmetičke sredine (a) s različitim slovima u superskriptu statistički su značajne • Means with (a) different superscript lowercase letter(s) are statistically different.

Tablica 5. Domene DES-a kroz stupnjeve kategorija prosjeka ocjena (GPA)
Table 5 DES Domains across the categorized grade point average

Domene • Domains	GPA				P-Vrijednost* • P-Value*
	<2.5	2.5 - 3.5	3.6 - 4.5	> 4.5	
Mišljenja o samopouzdanju • Self-efficacy beliefs	2.08[a,b] (0.48)	1.90[a] (0.51)	1.88[a] (0.52)	1.67[b] (0.59)	0.005
Nastavnici i administracija • Faculty and administration	1.68[a,b] (0.29)	1.72[a] (0.52)	1.60[a] (0.52)	1.41[b] (0.58)	0.004
Radno opterećenje • Workload	2.20[a,b] (0.39)	2.36[a] (0.47)	2.22[a] (0.47)	2.15[b] (0.45)	0.028
Terapija pacijenta • Patient treatment	2.05[a,b] (0.51)	1.85[a] (0.98)	1.81[a] (0.81)	1.30[b] (0.98)	< 0.001
Kliničke vježbe • Clinical training	1.80[a,b] (0.41)	1.75[a] (0.69)	1.79[a] (0.68)	1.38[b] (0.90)	0.001
Opterećenje zbog uspjeha • Performance pressure	2.40[a,b] (0.68)	2.23[a] (0.54)	2.15[a] (0.57)	1.93[b] (0.59)	0.001
Socijalni stresori • Social stressors	0.36[a] (0.35)	0.85[b] (0.49)	0.90 (0.63)	0.79 (0.60)	0.064
Ukupni DES • Total DES	1.78[a] (0.30)	1.80[a] (0.39)	1.74 (0.42)	1.53 (0.47)	< 0.001[†]

*: Kruskal-Wallisov test, osim ako nije navedeno drukčije • Kruskal Wallis test unless otherwise indicated.
†: test ANOVA • ANOVA test.
Aritmetičke sredine (a) s različitim slovima u superskriptu statistički su značajne • Means with (a) different superscript lowercase letter(s) are statistically different

Tablica 6. Analiza regresije između domena DES-a i neovisnih varijabli
Table 6 Regression analysis between domains of DES and independent variables

Neovisne varijable • Independent Variables	B	Granice pouzdanosti • Confidence Interval	Korigiran R-kvadrat • Adjusted R-Square	P-Vrijednost* • P-Value*
Mišljenja o samopouzdanju • Self – Efficacy				
GPA	- 0.12	- 0.21; - 0.03	0.052	0.009
Godina učenja • Study level	0.05	0.004 ; 0.095		0.032
Spol • Gender	0.12	0.003; 0.24		0.045
Nastavnici i administracija • Faculty and Administration				
Godina učenja • Study level	0.25	0.21; 0.28	0.408	< 0.001
Spol • Gender	0.17	0.08; 0.27		< 0.001
Radno opterećenje • Workload				
Godina učenja • Study level	0.11	0.07; 0.14	0.125	< 0.001
Spol • Gender	0.15	0.06; 0.25		0.002
Terapija pacijenta • Patient treatment				
Godina učenja • Study level	0.46	0.4; 0.51	0.463	< 0.001
Spol • Gender	0.29	0.145; 0.44		< 0.001
Kliničke vježbe Clinical training				
Godina učenja • Study level	0.36	0.31; 0.40	0.399	< 0.001
Spol • Gender	0.26	0.128; 0.393		< 0.001
Opterećenje zbog uspjeha • Performance pressure				
Godina učenja • Study level	0.21	0.17; 0.25	0.256	< 0.001
Spol • Gender	0.18	0.07; 0.29		0.001
Socijalni stresori • Social stressors				
Godina učenja •Study level	0.14	0.099; 0.19	0.143	< 0.001
Bračni status • Marital status	0.30	0.136; 0.466		< 0.001
GPA	0.09	0.003; 0.18		0.043
Ukupni DES • Overall DES				
Godina učenja • Study level	0.20	0.17; 0.23	0.405	< 0.001
Spol • Gender	0.17	0.095; 0.253		< 0.001

*: Stupnjevana multilinearna analiza regresije; uključene neovisne varijable su spol, bračno stanje, godina studija i prosječna vrijednost ocjena – GPA • Stepwise multi-linear regression analyses. The included independent variables were: Gender, Marital status, Study level and GPA.

snom odrednicom stresa povezanom sa socijalnim stresorima (tablica 6.).

stressors" domains. Marital status was also seen to be a significant independent determinant of stress related to "Social stressors" domain (Table 6).

Rasprava

Korištene su različite ljestvice za istraživanje stresa među studentima dentalne medicine kao što su stresna stanja dentalnog okružja (DES) (13), Maslach burnout inventar (MBI) (14) i inventar psihosocijalnog stresa (PSSI). No znanstvenici se najčešće koriste DES-om. (16). Najvažnije je znati razinu stresa s kojom žive studenti dentalne medicine. To obično omogućuje kreatorima politike te administrativnom i akademskom osoblju da olakša takve stresore, prihvati strategije suočavanja sa stresom među studentima te prilagodi nastavni plan i program kako bi se ublažio percipirani stres.

Kad je riječ o studentima, ako su svjesni okolnosti i ponašanja koja izazivaju stres, to im pomaže da usvoje više pozitivnih strategija u suočavanju s tom tegobom. U ovom istraživanju ocijenili smo stresore i njihovu snagu te kako ih percipiraju studenti dentalne medicine na Sveučilištu Jazan u odnosu na mnoge važne čimbenike, kao što su spol, bračni status, godina studija i prosjek ocjena u semestru prije. Alat za mjerenje – DES, bio je donekle modificiran kako bi odgovarao lokalnoj kulturi, dentalnom studiju te nastavnom planu i programu. Program dentalne medicine u Saudijskoj Arabiji traje dulje negoli drugdje u svijetu jer, osim uobičajenog petogodišnjeg studija, postoji i pripremna godina te godina stažiranja. Bez dvojbe, kad je riječ o tako jedinstvenom programu teško je procijeniti je li on uzrok dodatnoga stresa u usporedbi s dentalnim školovanjem negdje drugdje. Još jedna jedinstvena značajka visokog obrazovanja u Saudijskoj Arabiji jest rodno razdvajanje. Ipak, teško je ocijeniti može li to pridonijeti trenutačnom stresu.

Ukupna razina DES-a u ovoj studiji bila je umjerena do nešto viša (1,67 ± 0,45). Pri pregledavanju literature pronađeno je nekoliko studija u kojima je izračunata ukupna razina DES-a. Abu-Ghazaleh i suradnici (17) te Murphy i njegovi kolege (18) izvijestili su o ukupnom DES-u između jordanskih (2,4 ± 0,50 bodova) i američkih (2,39 ± 0,40 bodova) studenata dentalne medicine. Maksimalna ljestvica ocjena korištena u tim istraživanjima bila je 4 – u rasponu od 1 do 4 u jordanskom istraživanju te od 0 do 4 u američkome. Naša maksimalna ljestvica bila je 3, u rasponu od 0 do 3. Ako se uzmu u obzir te razlike, može se uočiti da je ukupna razina DES-a približno jednaka ili nešto niža od one objavljene u dva spomenuta istraživanja. No važno je da je ukupni DES u ovom istraživanju niži od onoga objavljenoga u istraživanju provedenom u Saudijskoj Arabiji 2010. godine (19). Tada je ukupni stres iznosio 2,23 ± 0,31. Ova razlika u rezultatima može se pripisati razlici u nastavnom planu i/ili trajanju dentalnog programa. U načelu, stres koji percipiraju studenti dentalne medicine varira od zemlje do zemlje, pa čak i unutar jedne od njih.

Kad je riječ o pojedinim domenama, najstresnije su bile *Radno opterećenje* i *Pritisak tijekom izvedbe*. Obje su vezane uglavnom za raspoloživost vremena, težinu dodijeljenog rada te na dobivene ocjene i ispite. Ove dvije domene također su bile istaknute kao najjači izazivači stresa u mnogim drugim istraživanjima (20 – 26). U sklopu domene *Radno opterećenje* najdjelotvornija stavka stresora bila je *premalo vremena za opuštanje*, a u sklopu *Pritiska tijekom izvedbe* naj-

Discussion

Various scales have been used to investigate the stress among dental students such as: Dental Environment Stress scale (DES), (13), Maslach Burnout Inventory (MBI), (14), and Psychosocial Stress Inventory (PSSI), (15). However, DES is the most frequently used scale (16). An understanding of stress levels is of paramount importance to provide professional bodies with relevant information on students' well-being. Typically, it will enable the policy makers, and administrative and academic staff to reduce stressors, to adopt stress-coping strategies among students, and to modify teaching curriculum and teaching environment in order to alleviate perceived stresses. Regarding students, being aware of the stress-inducing circumstances and behaviors will motivate them to adopt more positive coping strategies. In the current study, we assessed the stressors and their levels as perceived by dental students at Jazan University with regard to many important factors such as gender, marital status, study level, and a GPA based on the grades they earned during the previous semester. The measurement tool, DES, was slightly modified to be suitable for the local culture, dental environment and curriculum. Dental program in Saudi Arabia takes longer journey than elsewhere; in addition to ordinary five years, there is a preparatory year and an internship year. Without doubt, such a unique program adds extra stress compared to dental education elsewhere. Another unique feature of higher education in Saudi Arabia is a general policy of gender segregation. Nevertheless, it is difficult to judge whether the above mentioned facts might add to the current stress.

The overall DES level reported in this study was moderate to slightly elevated. (1.67±0.45). From the literature review, we have learned that few studies have been found calculating the overall DES level. Abu-Ghazaleh et al. (17) and Murphy et al. (18) have reported the overall DES among Jordanian (2.4±0.50 point) and American (2.39±0.40 point) dental students, respectively. The maximum rating scale used in these studies was 4, ranging from 1 to 4 in the Jordanian study and from 0 to 4 in the American study. Our maximum rating scale was 3, ranging from 0 to 3. Taking these differences into consideration, it can be noted that our overall DES level is approximately the same, or slightly lower than that reported in other two studies. Noteworthy, however, is that the overall DES in the current study is lower than that reported in a previous study conducted in Saudi Arabia in 2010 (19), where the overall stress was 2.23±0.31. These differences in results might be attributed to the difference in teaching curricula and/or duration of dental program. In general, stress perceived by dental students is variable in different countries and even within a country.

Regarding individual domains, the most stressful ones were "workload" and "performance pressure." Both are related mostly to the availability of time, difficulty of assigned class work and to grades obtained and examinations. These two domains were also reported the most stress-provoking in many other studies (20-26). Regarding the "workload" domain, the most individual stressor item was "lack of time for relaxation". With the "performance pressure" domain, the

učinkovitija stavka stresora bila je *Ispitivanje i kvizovi*. Točnije, te dvije domene bile su znatno više kod žena negoli kod muškaraca. Razlika uočena za domenu *Radno opterećenje* također je znatno veća među studentima u braku. To se može pripisati dodatnim odgovornostima (neakademskim) koje imaju ti studenti. Slično, DES prijavljen po domeni bio je znatno različit između godina studija. To može biti zato što viša godina studija znači i veću odgovornost u učenju te kliničku odgovornost.

Općenito, studenti na kliničkim godinama (4., 5. i 6.) imali su veću razinu stresa u usporedbi s onima na pretkliničkim godinama (2. i 3.). Ovaj rezultat u skladu je s drugim presječnim istraživanjima provedenima među studentima dentalne medicine (17, 19, 21, 27). Većina frakcija ove razlike pripisuje logičnim razlikama u dvjema glavnim domenama – *Liječenje pacijenata* i *Kliničke vježbe*. Pretklinički studenti još nisu bili izloženi kliničkim vježbama ili liječenju bolesnika. Druge domene pokazale su veći stres među studentima na višim godinama studija, ali razlike nisu bile tako očite. Općenito, odgovornost prema pacijentima, blizina diplome i razmišljanje o profesionalnoj budućnosti nameću studentima sve veće opterećenje i odgovornost.

Osim u domeni *Socijalni stresor* koja se prema spolu nije znatno razlikovala, studentice su pokazale više stresa od svojih kolega. To obuhvaća različite oblike suočavanja sa stresnim okolnostima i upućuje na to koliko se studenti pozitivno suočavaju s poteškoćama i koliko su izdržljivi. Najstresnija stavka za studentice bila je *Ispiti i kvizovi*, a slijedi *Nedostatak vremena za opuštanje*. Za studente je najveći stresor bio *Ispiti i kvizovi* a nakon toga *završetak studija*. Utvrđeno je da su ove stavke ocijenjene višom vrijednošću kod studentica u odnosu na studente. O sličnim rodnim varijacijama već su izvijestili autori nekoliko istraživanja (17, 28 – 30). U skladu s našim rezultatima, dosadašnja istraživanja u Saudijskoj Arabiji nisu otkrila znatniju razliku među spolovima u vezi s domenom *Socijalni stresor* (12). Naprotiv, Telang i suradnici u istraživanju među malezijskim studentima dentalne medicine nisu pronašli veće razlike između studentica i studenata u većini domena DES-a (31).

Slično tomu, studenti dentalne medicine u braku u ovom istraživanju percipiraju visoku razinu stresa u usporedbi sa svojim kolegama izvan braka, u odnosu na ukupni rezultat DES-a te za pojedinačne domene, osim one o samopouzdanju. Ovi nalazi nisu slični dosadašnjima u istraživanjima u Saudijskoj Arabiji u kojima su autori izvijestili o značajnim razlikama između studenata u braku i onih izvan braka u samo nekoliko područja (12, 19). Zapravo, samo 2,5 posto studenata prijavilo je da je u braku, prema 23,5 posto studentica (podatci nisu prikazani). Tako se uloga bračnog statusa, kao što je već istaknuto, može itekako pripisati rodnoj razlici.

No ne možemo zanemariti činjenicu da osobe u braku imaju veću odgovornosti od onih izvan braka. Brak se ne može zanemariti ni kao izvor stresa, što očito utječe na znatnu razliku u domeni *Socijalni stresori* u korist studenata u braku. Ovaj rezultat poduprt je višestrukom linearnom regresijom u kojoj je uloga bračnog statusa bila važna samo s obzirom na domenu *Socijalni stresori*. Jednostavno, poznato je da se braku dodaju društvene odgovornosti prema njezinoj/njegovoj obitelji.

most individual stressor item was "Examination and quizzes". More specifically, these two domains were significantly higher in female than in male students. The difference reported for the "workload" domain was also significantly higher among married students. This can be attributed to additional responsibilities (non-academic) that married students have. Similarly, DES reported by domain was significantly different between study levels. Typically, the higher the year of study the more the responsibilities encountered by the students.

Generally, students in clinical years (4th, 5th and 6th) scored higher levels of stress compared to students in preclinical years (2nd and 3rd). This result is in concordance with other cross sectional studies conducted among dental students (17, 19, 21, 27). This difference is mostly attributed to logical differences in the following main domains: "Patients treatment" and "Clinical training". Pre-clinical students had not yet been exposed to clinical training or patient treatment. Other domains revealed higher stress levels among final year dental students, but those differences were not significant. In general, responsibility toward their patients, proximity to graduation and thinking about their future plans and goals are the factors affecting work-life balance amongst male and female dental students.

Apart from "Social stressor" domain which was not significantly different regarding genders, female students scored higher stress levels compared to their male counterparts. This implies different styles of coping with stressful circumstances and indicates the extent to which positive coping and endurance are exerted by male students. The most stressor items for females were as follows: "Examinations and quizzes" followed by "Lack of time for relaxation". For male subjects, however, the most stressor items were: "Examinations and quizzes" followed by "Late ending day". These items were found to be scored higher in female students compared to male students. Similar gender variations were also reported earlier by few studies (17, 28-30). In line with our results, a previous study conducted in Saudi Arabia didn't reveal a significant gender difference regarding the "Social stressor" domain (12). To the contrary, Telang et al. in their study on Malaysian dental students found no significant differences between male and female students in most of DES domains (31).

Similarly, married dental students in the current study perceived higher levels of stress when compared to their single colleagues regarding the total DES score and, also, regarding individual domains except for the "self-efficacy beliefs" domain. These findings are not similar to previous studies from Saudi Arabia, where they reported significant differences between married and single students for only few domains (12, 19). In fact, only 2.5% of male students reported to be married in contrast to 23.5% of females (Data not shown). Therefore, the role of marital status can be strongly attributed to gender difference instead, as highlighted above. However, we cannot overlook the fact that married persons have more responsibilities than single ones. Being married cannot be overlooked as a source of stress as reflected obviously by the significant difference in "Social stressors" domain in favor of married students. This result was supported by the multi-

Još jedan zanimljiv nalaz bio je da su studenti, koji su u posljednjoj procjeni ocijenjeni visokim prosjekom GPA ocjena, pokazali nižu razinu stresa od svojih kolega. To upućuje na to da su izvrsni studenti sigurniji i učinkovitiji u ophođenju, suočavanju i prevladavanju različitih domena stresa. Ovaj nalaz u skladu je s rezultatima drugih istraživanja koja su pokazala da su studenti s niskim prosjekom ocjena osjetljiviji na izloženost stresu (19, 32, 33).

Važno ograničenje ovog istraživanja jest njegova izvedba poprečnog presjeka. Zbog toga rezultati ne mogu pokazati uzročno-posljedični učinak procijenjenih nezavisnih varijabli i domene stresa DES-a. Drugo je ograničenje da je provedeno na jednom fakultetu dentalne medicine, pa bi se rezultati možda razlikovali da su bili uključeni i drugi. Zato autori sugeriraju da bi se trebalo provesti sveobuhvatnu longitudinalnu studiju kako bi dobili važniji rezultati.

Zaključak

DES je među studentima dentalne medicine Sveučilišta Jazan umjeren i neznatno povišen. Viši je među studenticama i znatno se povećava na višim godinama studija. Važno je napomenuti da studenti s većim GPA-om pokazuju nižu razinu stresa i obrnuto.

Sukob interesa

Autori nisu bili u sukobu interesa.

ple linear regression where the role of marital status was only significant with regard to "Social stressors" domain. Simply, marriage is known to add social responsibilities to one's own toward her/his family.

Another interesting finding was that dental students, who scored high GPA in their most recent assessment, scored lower levels of stress than their peers. This indicates that academically brilliant dental students are more confident and more efficient in handling, coping with and overcoming different domains of stress. This finding is consistent with findings of other studies which showed that students with low grades are more susceptible to exhibit more stress (19, 32, 33).

An important limitation of the current study is its cross sectional design. Consequently, the findings may not portray the cause and effect relationship between the assessed independent variables and the stress domains of DES. Another limitation is that it was carried out in one dental school. In this way, the results might have been different if more dental schools had been included. Hence, the authors suggest that a comprehensive study with a longitudinal design should be performed in future to report more remarkable findings.

Conclusion

In conclusion, DES among dental students at Jazan University is moderate or slightly elevated. It is higher among females and increases significantly with study progression. It is worth mentioning that students who earn higher GPAs have lower levels of stress, and vice versa.

Conflict of interest

None declared

Abstract

Aim: This study aimed at evaluating the perceived stress and its sources among undergraduate dental students at Jazan University, Saudi Arabia. **Materials and Methods:** In this cross-sectional study, the data were collected using the DES questionnaire. The overall score of stress and scores by individual domains were described and analyzed by different grouping factors: gender, study level, marital status and GPA. **Results:** A total of 366 dental students agreed to take a part in this study. Up to 57% of the participants were females. The overall DES score was 1.67 ± 0.45. Female students and married students scored higher stress levels than their counterparts. Stress increased significantly among students as their educational level increased. Inversely, the stress levels were lower in participants with high GPA. Multiple linear regression analyses revealed that "Study level" and "Gender" were significant independent determinants of overall DES and, also, most of the stress domains. Forty one percent of the variability in DES score can be explained by these determinants. **Conclusion:** DES among dental students in Jazan University is moderate and slightly higher. It is higher among females and increases significantly with study progression. However, students who had higher GPA showed lower levels of stress. **Clinical significance:** Reduction and/or relief of stress among dental students will reflect positively on persistence and academic achievement, which will lead to better management and care of patients.

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