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Evaluation of the Dunning-Kruger Effects among Dental Students at an Academic Training Institution in UAE

Procjena Dunning-Krugerova efekta među studentima dentalne medicine u instituciji za akademsko usavršavanje u Ujedinjenim Arapskim Emiratima

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Abstract
The Dunning-Kruger effect (cognitive bias) is a psychological phenomenon that implies that individuals with a lack of knowledge and skills have an unrealistically optimistic image of their abilities compared to others. **Purpose:** The study aimed to examine the presence of the Dunning-Kruger effect in fifth (final) year dental undergraduate students at Gulf Medical University, UAE, in clinical domains related to pediatric dentistry. **Methods:** A longitudinal cohort study was conducted at Gulf Medical University, College of Dentistry, to evaluate cognitive bias among 5th-year dental students at GMU in the competency domains of communication, diagnosis, and clinical skills in Pediatric dentistry. **Results:** Overall, compared to the level of confidence of students in September, there was a decline in the level of confidence in January. With an increase in time, the percentage shifted to a higher level in May across all domains. **Conclusion:** Characteristic patterns of fluctuations in students' self-confidence during clinical exposure are observed. The research results prove that the Dunning-Kruger effect, the cognitive bias of the perception pattern, is present in the examined group of dental students.

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Introduction

The Dunning-Kruger effect (DK effect) (cognitive bias) is a psychological phenomenon which implies that individuals with lack of knowledge and skills have an unrealistically optimistic image of their abilities compared to others. This illusionary superiority is a form of cognitive bias. It is often called a "double curse" because individuals lack the ability to perform a task and recognize their incompetence, leading to unrealistic positive self-beliefs (Figure 1).

Dunning and Kruger, social psychologists who discovered the phenomenon claimed that people who have poorly developed skills or lack knowledge have an unrealistically

Uvod

Dunning-Krugerov efekt (DK-efekt) (kognitivna pristranost) psihološki je fenomen prema kojemu pojedinci s nedostatkom znanja i vještina imaju nerealno optimističnu sliku o svojim sposobnostima u usporedbi s drugima. Ta iluzorna superiornost oblik je kognitivne pristranosti. Često se naziva „dvostrukim prokletstvom" jer pojedincima nedostaje sposobnost za obavljanje zadatka i prepoznavanje svoje nesposobnosti, što rezultira nerealnim pozitivnim mišljenjem o sebi (slika 1.).

Dunning i Kruger, socijalni psiholozi koji su otkrili taj fenomen, tvrdili su da ljudi sa slabo razvijenim vještinama ili

optimistic image or illusion of superiority that develops as a consequence of misperception of others or as an overestimation of their own knowledge (1).

Most of the research that focuses on the DK effect confirms the occurrence of the phenomenon among certain groups of people. A study conducted by a group of authors in the United States confirmed that this phenomenon occurred in aviation students. Students in the examined group had low scores on grammar and professional knowledge tests, and the same students overestimated their knowledge. On the other hand, students who performed well on both tests underestimated their ability, a phenomenon known as the imposter syndrome (2). This pattern of overestimating one's knowledge was also observed among psychology students at an Ecuadorian university in the language (vocabulary) and logic tests (3). Yet another interesting study conducted in the United States of America concluded that individuals with limited knowledge about the causes of autism and its link with vaccines were the ones who were overconfident and showed less support for mandatory vaccination policies (4).

Studies have evaluated 'perceived stress' among students as a factor responsible for negatively impacting clinical and academic performance (5). On the contrary, there is limited evidence on the existence of cognitive bias and its impact on students' performance in various health science professions. The existing literature states that the prevalence of the DK effect among students may affect their clinical performance. Research by Fitzmaurice in 2020 shows that a student with poorer results during a continuous assessment shows a higher level of self-confidence than students with better results (6). These observations have significant ethical implications where less-skilled students may accept assignments for which they are unqualified because they are overestimating their skill set. The existence of the DK effect in students will result in poor communication in the student-child-parent communication triangle, misdiagnosis, and poorly performed clinical procedures. It cannot be emphasized enough how important it is to develop confidence in students' patient communication and clinical skills before beginning professional practice (7). Pena in 2010 stated that 'competence develops after having considerable experience (8)

Considering the minimal research on the DK effect among dental students globally, the present study aimed to examine the presence of the Dunning-Kruger effect in fifth (final) year dental undergraduate students at Gulf Medical University, UAE, in the clinical domains of pediatric dentistry. As per the existing dental curriculum of the universities in the UAE, pediatric dentistry is offered in either the fourth or fifth year. In our university pediatric dentistry is offered in the fifth (final year) only, therefore the authors were convinced to perform the present study only on final-year dental students. The clinical scope of pediatric dentistry includes different procedures such as restorative and preventive treatments (fluoride application and fissure sealants), endodontic treatments (pulpotomy and pulpectomy), and extractions in patients up to the age of 12 years. Furthermore, these students have had a similar experience with the same dental procedures in adult patients in various specialties of dentistry.

manjkom znanja imaju nerealno optimističnu sliku ili privid superiornosti koja nastaje kao posljedica pogrešne percepcije drugih ili kao precjenjivanje vlastita znanja (1).

U većini istraživanja koja se fokusiraju na DK-efekt potvrđena je pojavnost fenomena među određenim skupinama ljudi. Istraživanje koje je provela skupina autora u Sjedinjenim Američkim Državama potvrdilo je da se taj fenomen pojavljuje kod studenata zrakoplovstva. Studenti u ispitivanoj skupini dobili su niske ocjene iz testova znanja iz gramatike i stručnih predmeta, a također su precijenili svoje znanje. S druge strane, studenti koji su postigli dobre rezultate na oba testa podcijenili su svoje sposobnosti, što je fenomen poznat kao sindrom lažnjaka (2). Taj obrazac precjenjivanja vlastita znanja također je uočen među studentima psihologije na ekvadorskom sveučilištu u testovima jezika (vokabular) i logike (3). U još jednom zanimljivom istraživanju provedenom u Sjedinjenim Američkim Državama autori su zaključili da su pojedinci s ograničenim znanjem o uzrocima autizma i njegovoj povezanosti s cjepivima bili oni koji su bili previše samouvjereni i davali su manju potporu politici obveznoga cijepljenja (4).

Istraživanja su otkrila 'percipirani stres' među studentima kao čimbenik odgovoran za negativan utjecaj na klinički i akademski uspjeh (5). Postoje ograničeni dokazi o kognitivnoj pristranosti i njezinu utjecaju na uspješnost učenika u različitim zdravstvenim zanimanjima. U dosadašnjoj literaturi navodi se da prevalencija DK-efekta među studentima može utjecati na njihov klinički učinak. Istraživanje Fitzmauricea iz 2020. pokazuje da učenik s lošijim uspjehom tijekom kontinuiranoga ocjenjivanja pokazuje višu razinu samopouzdanja od onoga s boljim uspjehom (6). Ta zapažanja imaju značajne etičke implikacije kada manje vješti studenti mogu prihvatiti zadatke za koje nisu kvalificirani jer precjenjuju svoje vještine. DK-efekt kod studenata rezultirat će lošom komunikacijom u komunikacijskom trokutu učenik – dijete – roditelj, pogrešnim dijagnozama i loše obavljenim kliničkim postupcima. Ne može se dovoljno istaknuti koliko je važno potaknuti povjerenje u komunikaciji s pacijentima i kliničke vještine studenata prije početka stručne prakse (7). Pena je 2010. izjavio da se 'kompetencija pojavljuje nakon značajnog iskustva (8).

Uzimajući u obzir minimalno istraživanje DK-efekta među studentima dentalne medicine u cijelom svijetu, svrha ovog istraživanja bila je ispitati prisutnost Dunning-Krugerova efekta kod studenata pete (završne) godine dodiplomskog studija dentalne medicine na Medicinskom sveučilištu Gulf u Ujedinjenim Arapskim Emiratima u kliničkim područjima povezanima s pedodoncijom. Prema postojećem stomatološkom nastavnom planu i programu sveučilišta u UAE-u, dječja stomatologija sluša se na četvrtoj ili petoj godini. Na našem se sveučilištu nastava iz pedodoncije održava samo na petoj (završnoj) godini i zato su autori odlučili provesti ovo istraživanje samo na studentima završne godine dentalne medicine. Klinički opseg dječje stomatologije obuhvaća različite postupke kao što su restaurativni i preventivni postupci (aplikacija fluora i sredstva za brtvljenje fisura), endodontski zahvati (pulpotomija i pulpektomija) te vađenje zuba pacijentima u dobi do 12 godina. Nadalje, ti su studenti imali slično iskustvo s istim stomatološkim zahvatima kod odraslih paci-

With the existing cognitive and psychomotor skills, the final year students can be categorized as 'competent' in accordance with the Dreyfus model (9).

Material and methods

The present study is a longitudinal cohort study that was conducted at Gulf Medical University, College of Dentistry, to evaluate cognitive bias among 5th-year dental students in the competency domains of communication, diagnosis, and clinical skills in Paediatric Dentistry.

Participants in the Study

Two different cohorts of the two academic years batch 2016 (N1= 69) and batch 2017 (N2= 64) with a total number of 133 students were offered to participate in the study, all the students consented to the study. No formal sample size was calculated; rather, all students during the two years study period were included in the analysis. The age range was 21-24 years. The total number of females from both academic years was 84, (N1=46 and N2 =38), and the total number of males was 49 (N1=23 and N2=26). The student participants were from diverse cultural backgrounds that reflect the multi-diverse culture existing in the UAE. The study was conducted from September through January until May consecutively in the academic years 2021 and 2022.

Inclusion criteria:

- Year 5 undergraduate dental students who consent to participate in the research

Exclusion criteria:

- Year 1, 2, 3 & 4 undergraduate dental students.
- Undergraduate dental students who do not consent to participate.

Instruments

Dependent variable:

- Dunning - Kruger effect (cognitive bias)

Independent variable:

- Level of competency

Procedure

Cognitive bias among 5th-year dental students at GMU in the competency domains of communication, diagnosis, and clinical skills in pediatric dentistry was evaluated using a questionnaire with three confidence levels [Not confident (L1), Moderately confident (L2), and Highly confident (L3)] (Table 1).

There are few possible methodological approaches for analyzing the Dunning-Kruger effect hypothesis test. The original research involving a spectrum of 4 abilities compared the self-assembly of the respondents with specific tasks that would enable a relevant interpretation of the results (6). Over the years, different abilities and skills have been used to analyze this effect (7, 10, and 11). The present study used a modified methodology of the original research with a spectrum of 3 variables.

A pilot study was carried out with 15 students to determine the validity and reliability of the questionnaire and ap-

jenata u različitim specijalnostima stomatologije. S postojećim kognitivnim i psihomotoričkim vještinama, studenti završne godine mogu se kategorizirati kao „kompetentni" kada je riječ o Dreyfusovu modelu (9).

Materijali i metode

Ovo je longitudinalno kohortno istraživanje koje je provedeno na Stomatološkom fakultetu Medicinskog sveučilišta Gulf, za procjenu kognitivne pristranosti među studentima 5. godine stomatologije u kompetenciji iz područja komunikacije, dijagnoze i kliničkih vještina u dječjoj stomatologiji.

Sudionici u istraživanju

Dvjema različitim skupinama s dviju akademskih godina – 2016. (N 1 = 69) i skupine iz 2017. (N 2 = 64) – s ukupnim brojem od 133 studenta ponuđeno je da sudjeluju u istraživanju i svi su pristali. Formalna veličina uzorka nije izračunata, nego su u analizu bili uključeni svi studenti tijekom dvogodišnjega razdoblja istraživanja. Raspon dobi bio je od 21 do 24 godine. Ukupan broj žena iz obiju akademskih godina bio je 84 (N 1 = 46 i N 2 = 38), a ukupan broj muškaraca 49 (N 1 = 23 i N 2 = 26). Studenti sudionici bili su iz različitih kulturnih sredina koje odražavaju raznoliku kulturu u Ujedinjenim Arapskim Emiratima. Istraživanje je provedeno u akademskoj godini 2021. i 2022. od rujna, tijekom siječnja do svibnja.

Kriteriji za uključivanje: studenti 5. godine dodiplomskoga studija dentalne medicine koji su pristali sudjelovati u istraživanju.

Kriteriji za isključivanje: studenti 1., 2., 3. i 4. godine dodiplomskoga studija dentalne medicine; studenti koji su odbili sudjelovati u istraživanju.

Instrumenti

Zavisna varijabla: Dunning-Krugerov efekt (kognitivna pristranost)

Nezavisna varijabla: stupanj kompetencije

Postupak

Kognitivna pristranost među studentima 5. godine stomatologije na GMU-u u područjima kompetencija iz komunikacije, dijagnoze i kliničkih vještina u dječjoj stomatologiji procijenjena je s pomoću upitnika s trima razinama uvjerenja [nisam siguran (L 1), umjereno siguran (L 2) i vrlo siguran (L 3)] (tablica 1.).

Nekoliko je mogućih metodoloških pristupa za analizu testa hipoteze o Dunning-Krugerovu efektu. Izvorno istraživanje koje je obuhvatilo spektar od četiriju sposobnosti uspoređivalo je rješavanje specifičnih zadataka koji bi omogućili relevantnu interpretaciju rezultata (6). Tijekom godina korištene su različite sposobnosti i vještine za analizu toga efekta (7, 10 i 11). U ovom istraživanju primijenjena je modificirana metodologija izvornoga istraživanja sa spektrom od tri varijable.

Provedeno je pilot-istraživanje s 15 studenata da bi se utvrdila valjanost i pouzdanost upitnika, a odobrila su ga dva

Table 1 Competency Domain Descriptions
Tablica 1. Opisi područja kompetencija

Competency Domain • Domena kompetencija	Competency Description • Opis kompetencije	Level of Competency - trustability (Applicable for all domains) • Razina kompetencije – pouzdanost (primjenjivo za sve domene)
A - Communication • Komunikacija	Thorough verbal communication with patient/parents/caregiver. Uses words, pace, tone, eye contact, and body language that show care and concern. • Temeljita verbalna komunikacija s pacijentom/roditeljima/njegovateljima. Koristi se riječima, zatim tu su tempo, ton, kontakt očima i govor tijela koji pokazuju brigu i skrb. Frequently checks to understand. Structures responses to the patient considering the patient's perspective. • Često provjerava da li razumije. Strukturira odgovore pacijentu uzimajući u obzir perspektivu pacijenta.	L1 – Not Confident • nije siguran The student did not have adequate skills/ knowledge about the procedure and required the faculty to perform the procedure. • Student nije imao odgovarajuće vještine/ znanja o zahvatu te je zahtijevao da ga obavi nadređeni. L2 – Moderately Confident • umjereno siguran The student has acceptable knowledge about the procedure. The faculty had to guide the student from time to time. • Student ima prihvatljivo znanje o postupku. Nadređeni ga je s vremena na vrijeme morao usmjeravati. L3 – Highly Confident • vrlo siguran The student performed the procedure safely without any faculty help. • Student je sigurno obavio postupak bez pomoći nadređenoga.
B - Diagnosis • Dijagnoza	Excellent and precise diagnosis. Highlight all the elements of the pathological condition. All possible options for differential diagnosis have been set. • Izvrsna i precizna dijagnoza. Istaknuti svi elementi patološkoga stanja. Postavljene su sve moguće opcije diferencijalne dijagnoze. Comprehensive identification/ discussion of signs and symptom • Sveobuhvatna identifikacija/rasprava o znakovima i simptomima	
C - Clinical skill - Pulp Therapy • Kliničke vještine – terapija pulpe	Local anesthesia administration; Access cavity design; Pulp extirpation/ removal/conservation; Medicament placement and restoration • Primjena lokalne anestezije; oblik trepanacijskoga otvora; ekstirpacija/uklanjanje/ konzervacija pulpe; postavljanje lijekova i restauracija	

Table 2 Questionnaire for assessment of the Dunning – Kruger Effect
Tablica 2. Upitnik za procjenu Dunning-Krugerova efekta

Question • Pitanje	Level of Response • Razina odgovora
Considering your overall experience with the pedodontics clinical training, please rate your self-confidence towards communication skills with pediatric patients/parents. (Domain A) • S obzirom na vaše cjelokupno iskustvo s kliničkom izobrazbom iz pedodoncije, ocijenite svoje samopouzdanje u komunikacijskim vještinama s dječjim pacijentima/roditeljima (Domena A)	Level 1 (L1) - Not Confident • Razina 1 (R 1) – nije siguran
	Level 2 (L2) - Moderate Confident • Razina 2 (R 2) – umjereno siguran
	Level 3 (L3) - Highly Confident • Razina 3 (R 3) – vrlo siguran
Considering your overall experience with the pedodontics clinical training, please rate your self-confidence towards a proper examination and providing a precise diagnosis. (Domain B) • S obzirom na vaše cjelokupno iskustvo s kliničkom izobrazbom iz pedodoncije, molimo vas da ocijenite vaše samopouzdanje za provođenje pravilnoga pregleda i postavljanje precizne dijagnoze (Domena B)	Level 1 (L1) - Not Confident • Razina 1 (R 1) – nije siguran
	Level 2 (L2) - Moderate Confident • Razina 2 (R 2) – umjereno siguran
	Level 3 (L3) - Highly Confident • Razina 3 (R 3) – vrlo siguran
Considering your overall experience with the pedodontics clinical training, please rate your self-confidence towards your overall clinical skills and performance at pulp therapy treatment. (Domain C) • Uzimajući u obzir vaše cjelokupno iskustvo s kliničkom izobrazbom iz pedodoncije, ocijenite svoje samopouzdanje kada je riječ o vašim ukupnim kliničkim vještinama i izvedbi u liječenju pulpe (Domena C)	Level 1 (L1) - Not Confident • Razina 1 (R 1) – nije siguran
	Level 2 (L2) - Moderate Confident • Razina 2 (R 2) – umjereno siguran
	Level 3 (L3) - Highly Confident • Razina 3 (R 3) – vrlo siguran

proval of the questionnaire was done by two external field experts from Hamdan Bin Mohammed College of Dental Medicine, Dubai, and the University of Nis, School of Medicine, Serbia, Europe.

After obtaining ethical approval for the research from the Institutional Review Board of the university and student consent for participation, the questionnaire (Table 2) was distributed to students at three different time points: the beginning of the IXth semester (September), at the end of the IXth semester (January), and the end of the Xth semester (May), the cycle was repeated once among the students of the batch 2016 and once among the students of batch 2017. The Cronbach's alpha was calculated and presented a good performance val-

vanjska terenska stručnjaka sa Stomatološkog fakulteta Hamdan Bin Mohammed iz Dubaija i Medicinskog fakulteta Sveučilišta u Nišu, Srbija, Europa.

Nakon etičkoga odobrenja za istraživanje dobivenoga od Institucijskog odbora za reviziju sveučilišta i pristanka studenata na sudjelovanje, upitnik (tablica 2.) je podijeljen studentima u trima različitim vremenskim točkama: na početku IX. semestra (rujan), na kraju IX. semestra (siječanj) i na kraju X. semestra (svibanj). Ciklus je ponovljen jedanput među skupinom studenata 2016. i jedanput među skupinom studenata 2017. Cronbachova alfa izračunata je i pokazala je dobru izvedbu vrijednost od 0,958 za rujan, 0,979 za siječanj i 0,922 za svibanj. U upitniku su sudjelovale sve skupine, a

ue of 0.958 for September, 0.979 for January, and 0.922 for May. All batches participated in the questionnaire, and the average age was 20-22 years old.

Competency domain evaluation was performed in the clinical setting in September, January, and May by two subject experts using a standardized rubric, parallel to the questionnaire distribution. All three domains in the range of level 1 to level 3 were assessed (level of trustability). The results were then correlated with the student's responses to the questionnaire (Figure 2).

Statistical analysis

Data are presented as frequencies and percentages. The McNemar-Bowker test compares students' September, January, and May responses. The chi squared test and Somer's d correlation coefficient evaluated the association between investigated parameters. The p-value was set at 0.05. Comparisons between groups were made on transformed data using a Chi-squared test with correction for multiple comparisons. Bonferroni correction was applied to take multiple testing into account and p value thresholds were set at 0.002 (0.05/27). Statistical analyses were performed in the R statistical language (version 4.1.3).

Results

In September, approximately every fifth of students was non-confident (21.1%) in communications, 15.8% were non-confident in diagnosis, and 14.3% were non-confident in clinical skills. In January, 38.3% of students were non-confident in communications, 41.4% were non-confident in diagnosis, and 46.6% were non-confident in clinical skills. In May, 7.5% of students were non-confident in communications, 11.3% were non-confident in diagnosis, and 5.3% were non-confident in clinical skills (Figure 3).

A cross-tabulation of responses in September, January, and May detailed the changes in the confidence level of students in communications, diagnosis, and clinical skills (Ta-

prosječna dob bila je od 20 do 22 godine.

Procjena područja kompetencija provedena je u kliničkom okruženju u rujnu, siječnju i svibnju, a to su učinila dva predmetna stručnjaka koristeći se standardiziranom rubrikom, paralelno s distribucijom upitnika. Procijenjene su sve tri domene u rasponu od razine 1 do razine 3 (razina pouzdanosti). Rezultati su zatim povezani s odgovorima učenika u upitniku (slika 2.).

Statistička analiza

Podatci su prikazani kao frekvencije i postotci. McNemar-Bowkerovim testom uspoređeni su odgovori učenika u rujnu, siječnju i svibnju. Hi-kvadrat testom i Somerovim D-koeficijentom korelacije procijenjena je povezanost između ispitivanih parametara. P-vrijednost postavljena je na 0,05. Usporedbe između skupina obavljene su na transformiranim podatcima korištenjem hi-kvadrat testa s korekcijom za višestruke usporedbe. Primijenjena je Bonferronijeva korekcija da bi se uzelo u obzir višestruko testiranje, a pragovi p-vrijednosti postavljeni su na 0,002 (0,05/27). Statističke analize obavljene su u programu R statistical language (verzija 4.1.3).

Rezultati

U rujnu otprilike svaki peti student nije bio siguran u području komunikacije (21,1 %), 15,8 % nije bilo sigurno u području dijagnoze, a 14,3 % nije bilo sigurno u kliničke vještine. U siječnju je 38,3 % studenata bilo sigurno u području komunikacije, 41,4 % nije bilo sigurno kad je riječ o dijagnozi, a 46,6 % nije bilo sigurno u kliničke vještine. U svibnju 7,5 % studenata nije bilo sigurno u području komunikacije, 11,3 % nije bilo sigurno u području dijagnoze, a 5,3 % nije bilo sigurno u kliničke vještine (slika 3.).

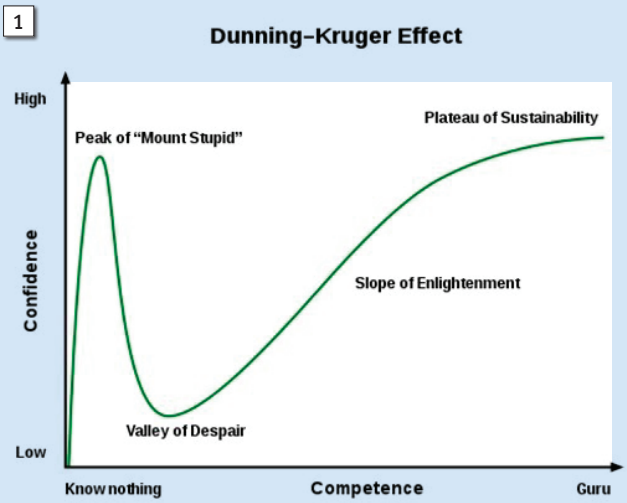
Križna tablica odgovora u rujnu, siječnju i svibnju detaljno je pokazala promjene u razini sigurnosti studenata u komunikaciji, dijagnozi i kliničkim vještinama (tablica 3.).

Table 3. A cross-tabulation of students' responses - McNemar-Bowker`s test for the confidence level of the students in all three domains (NC - Non-Confident; MC – Moderate Confident; HC - Highly Confident)

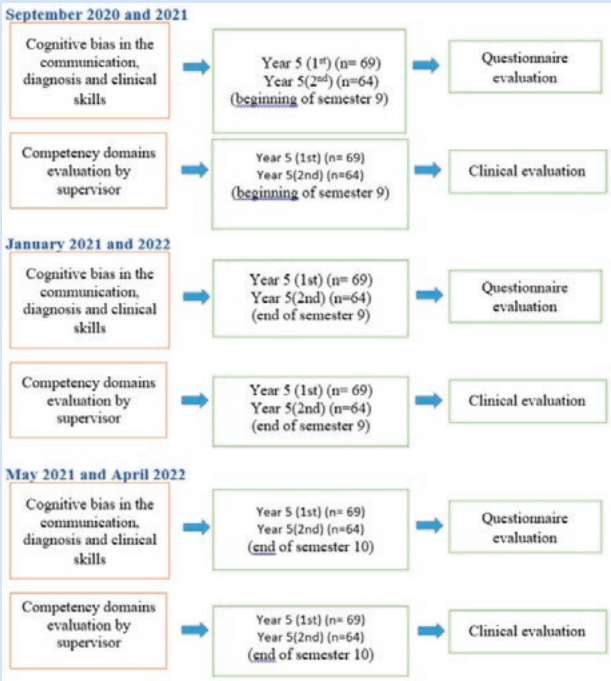
Tablica 3. Križna tablica odgovora učenika – McNemar-Bowkerov test za razinu sigurnosti učenika u svim trima domenama (NC – nije siguran; MC – umjereno siguran; HC – vrlo siguran)

		Communication • Komunikacija						p1
		January • Siječanj			May • Svibanj			
	Category • Kategorija	NC	MC	HC	NC	MC	HC	
September • Rujan	NC	100%	0	0	35.7%	64.3%	0	S vs. J p<0.001
	MC	39.7%	60.3%	0	0	34.5%	65.5	S vs. M p<0.001
	HC	0	29.8%	70.2%	0	0	100	J vs. M p<0.001
September • Rujan	Diagnosis • Dijagnoza							
	NC	100%	0	0	71.4%	28.6%	0	S vs. J p<0.001
	MC	70.8%	29.2%	0	0	35.4%	64.6%	S vs. M p<0.001
	HC	0	56.3%	43.8%	0	0	100%	J vs. M p<0.001
September • Rujan	Clinical skills • Kliničke vještine							
	NC	100%	0	0	36.8%	63.2%	0	S vs. J p<0.001
	MC	63.2%	36.8%	0	0	0	100%	S vs. M p<0.001
	HC	0	30.4%	69.6%	0	0	100%	J vs. M p<0.001
	Answers slide to a lower level • Odgovori padaju na nižu razinu		The answers match • Odgovori se podudaraju		The answers slide to a higher level • Odgovori rastu na višu razinu			

1



2



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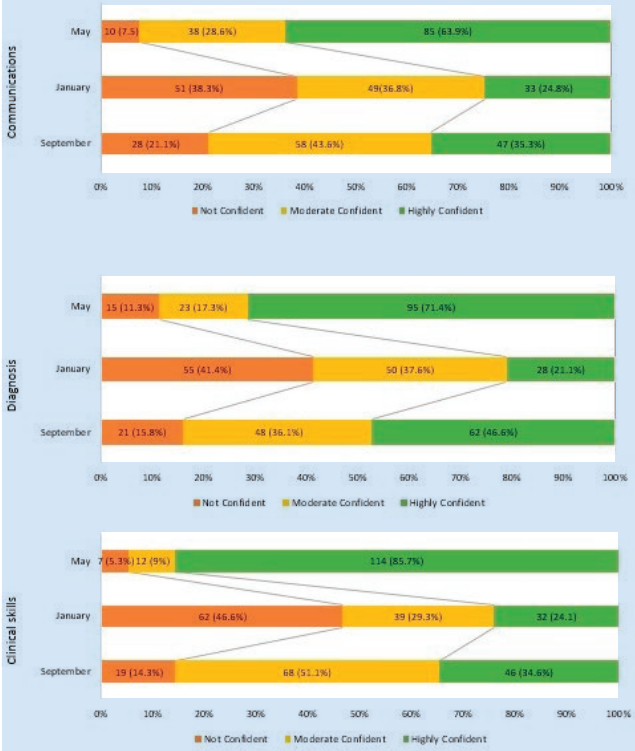

4

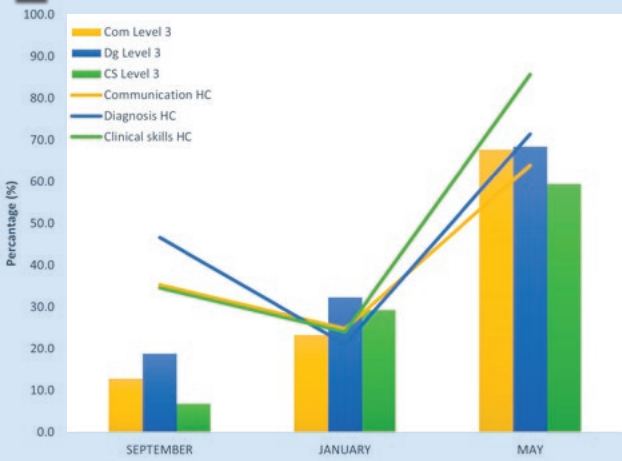

Figure 1 A graph depicts how confidence in speaking on a subject grows with experience and knowledge. People tend to overestimate their cognitive ability until/unless their competence increases to the point where they become aware of their shortcomings, according to the Dunning–Kruger effect (Creative Commons CC0 1.0 Universal Public Domain Dedication – Can be copied, modified, distributed, and perform the work, even for commercial purposes, all without asking permission: https://commons.wikimedia.org/wiki/File:Dunning–Kruger_Effect_01.svg).

Slika 1. Grafikon prikazuje kako samopouzdanje u govoru o nekoj temi raste s iskustvom i znanjem; ljudi su skloni precijeniti svoje kognitivne sposobnosti sve dok/osim ako se njihova kompetencija ne poveća do točke u kojoj postanu svjesni svojih nedostataka, prema Dunning–Krugerovu efektu (Creative Commons CC0 1.0 Univerzalna javna domena – može se kopirati, mijenjati, distribuirati i obavljati posao, čak i u komercijalne svrhe, a da se ne traži dopuštenje: https://commons.wikimedia.org/wiki/File:Dunning–Kruger_Effect_01.svg)

Figure 2 Study work plan.

Slika 2. Studijski plan rada

Figure 3 Changes in the confidence levels of students during the period of September, January and May.

Slika 3. Promjene u razinama samopouzdanja studenata tijekom rujna, siječnja i svibnja

Figure 4 Graphical representation of student responses (% of highly confident -HC) and supervisor evaluation (% of level 3 of trustability).

Slika 4. Grafički prikaz odgovora učenika (% vrlo sigurni – HC) i evaluacija supervizora (% razine 3 pouzdanosti)

ble 3). The p-values of the McNemar-Bowker`s test for the confidence level of the students for all comparisons in communications, diagnosis, and clinical skills were p <0.001, indicating the difference in responses in September, January, and May was statistically significant and quite large even after correction for multiple comparisons.

In the competency domain of communication, out of the students who were highly confident in September, 29.8% of students showed a decline in their level of confidence (Moderate confidence) in January, which these students regained by the end of May. Out of the students who were moderately confident in September, 39.7% of students showed a decline in their level of confidence (Not confident) in January. By the end of May, 65.5% of the students who were Moderately Confident in September showed an increase in their level of confidence (Highly Confident).

In the competency domain of Diagnosis, out of the highly confident students in September, 56.3% of students showed a decline in their level of confidence (Moderate confidence) in January, which these students regained by the end of May. Out of the students who were moderately confident in September, 70.8% of students showed a decline in their level of confidence (Not confident) in January. By the end of May, 64.6% of the students who were Moderately Confident in September showed an increase in the level of confidence (Highly Confident).

In the competency domain of Clinical Skills, out of the highly confident students in September, 30.4% of students showed a decline in their level of confidence (Moderate confidence) in January, which these students regained by the end of May. Out of the students who were moderately confident in September, 63.2% of students showed a decline in their confidence level (Not confident) in January. By the end of May, 100% of the students who were MC in September showed an increase in their level of confidence (Highly Confident).

Overall, compared to the level of confidence of students in September, there was a decline in the level of confidence in January. With an increase in time, the percentage shifted to a higher level in May across all domains.

The χ2-test and Somers' D correlation coefficient were done to evaluate the strength and direction of association between the student's confidence level and skill assessment. Somers'D correlation coefficient showed a statistically significant positive association between student level of confidence in communication and diagnosis versus skill assessment in all three timeline measurements (Table 4). The correlation between student level of confidence in the clinical skill domain and skill assessment is also statistically significant. It shows a

P-vrijednosti McNemar-Bowkerova testa za razinu pouzdanosti studenata za sve usporedbe u komunikaciji, dijagnozi i kliničkim vještinama bile su p < 0,001, što upućuje na to da je razlika u odgovorima u rujnu, siječnju i svibnju bila statistički značajna i prilično velika čak i poslije korekcije za višestruku usporedbu.

Kada je riječ o kompetenciji u području komunikacije, od studenata koji su u rujnu bili visoko samopouzdani, kod njih 29,8 % u siječnju je pala razina samopouzdanja (umjereno samopouzdanje), no vratila se do kraja svibnja. Od studenata koji su bili umjereno sigurni u rujnu, njih 39,7 % u siječnju je pokazalo pad razine samopouzdanja (nisam siguran). Do kraja svibnja 65,5 % studenata koji su u rujnu bili umjereno sigurni povećali su razinu samopouzdanja (visoko sigurni).

Kada je riječ o kompetenciji u domeni dijagnoze, od studenata s visokim samopouzdanjem u rujnu, kod njih 56,3 % u siječnju je pala razina samopouzdanja (umjereno sigurni), no vratila se do kraja svibnja. Od studenata koji su bili umjereno sigurni u rujnu, kod njih 70,8 % u siječnju se dogodio pad razine samopouzdanja (nisu sigurni). Do kraja svibnja 64,6 % studenata koji su bili umjereno sigurni u rujnu pokazali su povećanje razine samopouzdanja (vrlo sigurni).

U vezi s kompetencijom u području kliničkih vještina, od studenata s visokim samopouzdanjem u rujnu, kod njih 30,4 % u siječnju je pala razina samopouzdanja (umjereno sigurni), no vratila se do kraja svibnja. Od studenata koji su bili umjereno sigurni u rujnu, kod njih 63,2 % dogodio se u siječnju pad razine sigurnosti (nisam siguran). Do kraja svibnja kod 100 % studenata koji su bili umjereno sigurni u rujnu povećala se razina samopouzdanja (vrlo sigurni).

Sve u svemu, uspoređujući razine sigurnosti studenata u rujnu, u siječnju je zabilježen njezin pad. S odmakom vremena postotak je rastao u svibnju u svim područjima.

χ^2-test i Someov D koeficijent korelacije učinjeni su da bi se procijenila snaga i smjer povezanosti između razine samopouzdanja i procjene vještina. Somerov D koeficijent korelacije pokazao je statistički značajnu pozitivnu povezanost između razine sigurnosti studenata u komunikaciju i dijagnozi u odnosu prema procjeni vještina u svim trima mjerenjima vremenske ljestvice (tablica 4.). Korelacija između razine sigurnosti studenata u području kliničkih vještina i procjene vještina također je bila statistički značajna. Pokazuje pozitivan odnos u svim trima usporedbama, uz nešto slabiju korelaciju u svibnju.

Postotak najviše razine samopouzdanja prikazan je u usporedbi s najvišim stupnjem evaluacije supervizora na slici 4. Kompetencija studenata stalno je rasla u razdoblju rujan –

Table 4 Association between the perception of students` confidence levels and skills assessment
Tablica 4. Povezanost između percepcije razine samopouzdanja studenata i procjene vještina

	Skills assessment • Procjena vještina					
	September • Rujan		January • Siječanj		May • Svibanj	
	Somers`D	p-value • p-vrijednost	Somers`D	p-value • p-vrijednost	Somers`D	p-value • p-vrijednost
Communication • Komunikacija	0.752	<0.001	0.782	<0.001	0.908	<0.001
Diagnosis •Dijagnoza	0.657	<0.001	0.670	<0.001	0.887	<0.001
Clinical skill • Kliničke vještine	0.603	<0.001	0.729	<0.001	0.482	<0.001

positive relationship in all three comparisons with a slightly weaker correlation in May.

The percentage of the highest level of self-confidence is plotted against the highest degree of supervisors' evaluation in Figure 4. Students' competence constantly increases in the period September-May. High-level self-confidence decreases in the September-January and increases in the period January-May. Figure 4 indicates that a constant increase in all domains of students' competence is not followed by constant self-confidence in the period September-May.

svibanj. Visoka razina samopouzdanja opada u razdoblju rujan – siječanj, a raste u razdoblju siječanj – svibanj. Slika 4. pokazuje da konstantan porast u svim domenama kompetencija studenata nije praćen konstantnom razinom samopouzdanja u razdoblju rujan – svibanj.

Discussion

Dunning - Kruger effect has been defined as 'A hypothetical cognitive bias stating that people with low ability at a task overestimate their own ability (self-competence) and people with high ability at a task underestimate their own ability (self-competence)' (12) or as a 'failure to recognize incompetence among the incompetent' (7). With regards to the changing confidence levels of students in the three competency domains, we observed that the number of students who believed that they were highly confident (level 3) in the competency domains of communication, diagnosis, and clinical skills in September (47/133) (62/133) and (46/133), decreased in January to (33/133), (28/133) and (32/133) followed by a significant increase in May (85/100), (95/133) and (114/133) [Graph 1] [p<0.001].

These results can be explained by the Dreyfus model, the theory of cognitive bias, and confirmation bias. Novices (students at the beginning of the 9th semester) who were exposed to the competency domains of communication, diagnosis, and clinical skills in the pediatric clinics for the first time would have overestimated themselves and neglected evidence that contradicted them merely to arrive at a diagnosis and perform the needed clinical procedure refusing to consider an alternative diagnosis, a manifestation of 'denial' resulting from sub-optimal social and self-awareness (13, 14). Students at this level exhibit 'illusory superiority' wherein they consider themselves better than others. Mazor and Fleming have described this overconfidence of low performers as a 'metacognitive deficiency' (16). As quoted by Confucius, students failed to understand that 'real knowledge is to know the extent of one's ignorance (1). Dunning and Kruger reported a similar observation wherein participants who had scored in the bottom quartile (12th percentile) on tests of humour, grammar, and logic grossly overestimated their test performance and ability to be in the 62nd percentile (16). With increased exposure, students were able to recognize their social and intellectual deficits and hence, chose to learn more which can be correlated to the decrease in the number of highly confident students in January in all the three competency domains. With increased learning and clinical exposure in the paediatric clinics, the number of highly confident students increased dramatically by the end of May. On the contrary, there could also be a possibility that high performers would have underestimated themselves and settled for level 2 in the questionnaire (moderately confident), explained as the 'undue modesty of the top performers' (6).

Rasprava

Dunning-Krugerov efekt definiran je kao 'hipotetska kognitivna pristranost koja kaže da ljudi s niskom sposobnošću u nekom zadatku precjenjuju vlastitu sposobnost (samokompetencija), a ljudi s visokom sposobnošću u zadatku podcjenjuju vlastitu sposobnost (samokompetencija)' (12) ili kao 'nepriznavanje nekompetencije među nekompetentnima' (7). S obzirom na promjenjive razine samopouzdanja studenata u trima područjima kompetencija, uočili smo da se broj onih koji su vjerovali da imaju visoko samopouzdanje (razina 3) u domenama komunikacije, dijagnoze i kliničkih vještina u rujnu (47/133) (62/133) i (46/133), smanjio u siječnju na (33/133), (28/133) i (32/133) nakon čega je slijedio značajan porast u svibnju (85/100), (95 /133) i (114/133) [graf 1.] [p < 0,001].

Ovi se rezultati mogu objasniti Dreyfusovim modelom, teorijom kognitivne pristranosti i pristranosti potvrde. Početnici (studenti na početku 9. semestra) koji su prvi put bili izloženi kompetencijskim domenama komunikacije, dijagnoze i kliničkih vještina u kliničkom okruženju, precijenili bi sebe i zanemarili proturječne dokaze samo da bi došli do dijagnoze i proveli su potrebnu kliničku proceduru odbijajući razmotriti alternativnu dijagnozu, što je manifestacija 'poricanja' koja proizlazi iz neoptimalne društvene svijesti i samosvijesti (13, 14). Studenti na toj razini pokazuju 'iluzornu superiornost' pri čemu sebe smatraju boljima od drugih. Mazor i Fleming opisali su to pretjerano samopouzdanje onih koji imaju loš učinak kao 'metakognitivni nedostatak' (16). Kao što je citirao Konfucije, studenti nisu uspjeli shvatiti da je 'pravo znanje znati opseg vlastita neznanja (1). Dunning i Kruger izvijestili su o sličnom opažanju – sudionici koji su postigli rezultate u donjem kvartilu (12. percentil) na testovima humora, gramatike i logike uvelike su precijenili svoje odgovore na testu i sposobnost da budu u 62. percentilu (16). Uz povećanu izloženost, studenti su mogli prepoznati svoje socijalne i intelektualne nedostatke i zato su odlučili učiti više, što se može povezati sa smanjenjem broja studenata s visokim samopouzdanjem u siječnju u svim trima područjima kompetencija. S povećanim učenjem i kliničkom izloženošću u pedijatrijskim klinikama, broj studenata s visokim samopouzdanjem drastično se povećao do kraja svibnja. Naprotiv, također bi mogla postojati mogućnost da bi se oni s dobrim rezultatima podcijenili i zadovoljili drugom razinom u upitniku (umjerena sigurnost), što se objašnjava kao „pretjerana skromnost najboljih" (6).

The data presented in graph one was cross-tabulated, which determined a statistically significant change in student responses across all domains and time points (p <0.001) [Table 1]. The cross-tabulation of responses in the domain of communication skills indicates that after the initial high level of self-confidence, it decreases significantly in the second measurement to rises sharply again in the last measure in May. (Table 1 – Communication Skills). In our opinion, communication skills are particularly sensitive and largely depend on personality, heritage, and social environment (15). Considering that students have been exposed to patients in the previous years of their curriculum and have had the opportunity to develop communication skills, it is not surprising to observe an initial enthusiasm for their abilities. After exposure to paediatric patients and understanding the complexity of communication in the dentist-patient-parent communication triangle, they become aware of their shortcomings. After weeks of clinical training, students improve by developing special skills that are important for communicating with children and parents, significantly contributed by a standardized protocol for the patient's anamnestic dental data, and a modified Calgary-Cambridge-type checklist used during their clinical training (16).

A similar trend was observed in the domain of diagnostic skills. Initial enthusiasm faded in January with greater student exposure to different clinical cases which required increased learning to arrive at a final diagnosis considering the various differentials (Table 1 Diagnosis) (p <0.001). The longitudinal learning process, which included Team-Based Learning (TBL), and adequate and effective clinical training, significantly contributed to the increase in students' self-confidence demonstrated in May (17).

In the domain of clinical skills, the same patterns of student responses were observed (Table 1 - Clinical skills). A high level of student self-confidence during the survey in May is noticeable (p<0.001), which can be explained by the intensive clinical training and enhanced psychomotor skills. Yet another factor responsible for the increase in self-confidence is their previous clinical exposure to the different clinical branches of dentistry. Motor (manual) skills are an essential component of the capabilities required of dentists. They must be developed longitudinally with an adequate number of cases that allow crafting this skill (18).

Results show a significant association between students' communication confidence and skill assessment in all three measurements and between students' diagnosis confidence and skill assessment (Table 2) (p<0.001). It is known that the age of the respondents can affect the results of the Dunning-Kruger analysis. Older respondents show greater caution when assessing their abilities, which is in line with their greater experience (19). The cohort examined did not have age variability. Therefore, age cannot be attributed to the observed results. The predictable tendency of students' self-confidence to increase during clinical training proves the importance of repeating clinical procedures as an essential part of skills development. Literature research emphasizes that on-site evaluation and real-time feedback by supervisors confirm the efficiency and justification of the current teaching approach (20).

Podatci u grafikonu križno su tablično prikazani, što je pokazalo statistički značajnu promjenu u odgovorima studenata u svim područjima i vremenskim točkama (p < 0,001) (tablica 1.). Križna tablica odgovora u području komunikacijskih vještina pokazuje da poslije početne visoke razine samopouzdanja ona značajno opada u drugom mjerenju da bi ponovno naglo porasla u posljednjem mjerenju u svibnju (tablica 1. – Komunikacijske vještine). Prema našem mišljenju, komunikacijske vještine posebno su osjetljive i uvelike ovise o osobnosti, naslijeđu i društvenom okruženju (15). Uzimajući u obzir da su studenti bili *izloženi* pacijentima u proteklim godinama svojega nastavnog plana i programa te da su imali mogućnost razviti komunikacijske vještine, ne iznenađuje početni entuzijazam u vezi s njihovom sposobnosti. Nakon rada s pedodontskim pacijentima i razumijevanja kompleksnosti komunikacije u komunikacijskom trokutu stomatolog – pacijent – roditelj, oni postaju svjesni svojih nedostataka. Nakon tjedana kliničkih vježbi studenti se usavršavaju u razvijanju posebnih vještina važnih za komunikaciju s djecom i roditeljima, čemu znatno pridonosi standardizirani protokol za anamnestičke podatke pacijenta te modificirana kontrolna lista tipa Calgary-Cambridge koja se koristi tijekom njihovih kliničkih vježbi (16).

Sličan trend uočen je i u domeni dijagnostičkih vještina. Početni entuzijazam pao je u siječnju s većom izloženošću studenata različitim kliničkim slučajevima koji su zahtijevali više učenja da bi se postavila konačna dijagnoza nakon što se uzmu u obzir različiti čimbenici (tablica 1. – Dijagnoza) (p < 0,001). Longitudinalni proces učenja, koji je uključivao timsko učenje (TBL) te adekvatne i učinkovite kliničke vježbe, značajno je pridonio povećanju samopouzdanja studenata koje se pokazalo u svibnju (17).

U području kliničkih vještina uočeni su isti obrasci studentskih odgovora (tablica 1. – Kliničke vještine). Zabilježena je visoka razina samopouzdanja studenata tijekom anketiranja u svibnju (p < 0,001), što se može objasniti intenzivnim kliničkim vježbama i pojačanom psihomotorikom. Još jedan čimbenik odgovoran za povećanje samopouzdanja jest njihova prethodna klinička izloženost različitim kliničkim granama dentalne medicine. Motoričke (manualne) vještine bitna su komponenta sposobnosti koje se traže od doktora dentalne medicine. Moraju se razvijati proporcionalno odgovarajućem broju slučajeva koji omogućuju njihov razvoj (18).

Rezultati pokazuju značajnu povezanost između sigurnosti studenata u komunikaciji i procjene vještina u svim trima mjerenjima te između sigurnosti studenata u dijagnozi i procjene vještina (tablica 2.) (p < 0,001). Poznato je da dob ispitanika može utjecati na rezultate Dunning-Krugerove analize. Stariji ispitanici oprezniji su u procjeni svojih sposobnosti, što je u skladu s njihovim većim iskustvom (19). Ispitana kohorta nije imala varijabilnost u dobi. Zato se promatranim rezultatima ne može pripisati dob. Predvidljiva tendencija povećanja samopouzdanja studenata tijekom kliničkih vježbi dokazuje važnost ponavljanja kliničkih postupaka kao bitnoga dijela postizanja vještina. Rezultati pretraživanja literature pokazuju da evaluacija na mjestu rada i povratne informacije supervizora u stvarnom vremenu potvrđuju učinkovitost i opravdanost trenutačnoga pristupa nastavi (20).

On comparing the student responses (only with a high degree of reliability) and supervisor evaluation (confidence level 3 only) (Graph 2), student responses did not correlate with supervisor evaluation, particularly during the first analysis in September. The highest correlation was observed during the second analysis in January. In May, the measurement followed a similar compliance trend ($p<0.001$). Students' cognitive bias can explain the research results following the characteristic curve of the Dunning-Kruger test. In our opinion, the previous clinical exposure of students during the 7th and 8th semesters in various specialties of dentistry except paediatric dentistry made students believe that the mode of communication, diagnosis, and clinical skills would be the same while dealing with children and caregivers. This experience influenced their perception of their self-confidence levels.

Understanding the Dunning-Kruger effect is also crucial from the aspect of peer reviewers who must pay special attention to the introductory classes of clinical training. Students overestimating their abilities can sometimes affect the outcome of clinical treatment. Students who show a lower level of performance during clinical assignments are also less likely to accept objective feedback from supervisors. The same behavioral tendency is present in young physicians and dentists who have completed an undergraduate program and tend to overestimate their knowledge and capabilities (21).

Constantly providing constructive feedback to students with clear instructions from the supervisor in a clinical setup must be a mandatory part of the training. In this way, students can develop critical thinking and provoke self-doubts that would aid students in improving their knowledge and skills during clinical training (22). It is understood that inflated self-assessments stem from difficulty recognizing one's own incompetence (1). Hodges, Regeher, and Martin suggested several modalities to overcome the DK effect such as teaching/testing self-assessment ability during medical school and residency, selection tests of self-assessment capability prior to medical training; and the development of self-assessment skills and self-directed learning during undergraduate and postgraduate education (23). One of the key strategies to overcome the Dunning-Kruger effect is to professionally mentor underperforming students and create a sense of self-doubt which is a critical step toward improved performance (24). Mentoring is the cornerstone for developing knowledge and clinical competencies (25) Regular academic advising, including constructive feedback, would help over-confident students realize the boundaries of their actual competence. In our opinion, awareness sessions on the existence of the Dunning-Kruger effect and its implications on the professional development of students should be conducted in the initial years of the dental curriculum.

Nonetheless, the study had a few limitations such as a limited sample size and was conducted in only one academic institute in the UAE. Additionally, the research relied on results interpreted from the assessment of clinical skills in only one dental specialty. Furthermore, the limited exposure of students to clinical training on pediatric patients could have had an indirect impact on their cognitive bias.

Uspoređujući odgovore studenata (samo s visokim stupnjem sigurnosti) i evaluaciju mentora (samo razina sigurnosti 3) (grafikon 2.), odgovori studenata nisu korelirali s evaluacijom mentora, osobito tijekom prve analize u rujnu. Najveća korelacija zabilježena je tijekom druge analize u siječnju. U svibnju je mjerenje pratio sličan trend usklađenosti ($p < 0{,}001$). Kognitivna pristranost može objasniti rezultate istraživanja prema karakterističnoj krivulji Dunning-Krugerova testa. Prema našem mišljenju, prethodna klinička izloženost studenata tijekom 7. i 8. semestra u različitim specijalnostima dentalne medicine, osim dječje stomatologije, navela ih je da vjeruju kako će način komunikacije, dijagnoza i kliničke vještine biti jednake u ophođenju s djecom i njegovateljima. To iskustvo utjecalo je na njihovu percepciju razine samopouzdanja.

Razumijevanje Dunning-Krugerova efekta ključno je i s aspekta supervizora koji posebnu pozornost moraju posvetiti uvodnim satima kliničkih vježbi. Studenti koji precjenjuju svoje sposobnosti katkad mogu utjecati na ishod kliničkoga liječenja. Za studente koji pokažu nižu razinu uspješnosti tijekom kliničkih zadataka također je manje vjerojatno da će prihvatiti objektivne povratne informacije od supervizora. Ista tendencija ponašanja uočena je i kod mladih liječnika i stomatologa koji su završili dodiplomski studij i skloni su precjenjivati svoja znanja i sposobnosti (21).

Stalno davanje konstruktivnih povratnih informacija studentima, uz jasne upute supervizora, u kliničkom okruženju mora biti obvezni dio izobrazbe. Na taj način studenti mogu razviti kritičko mišljenje i potaknuti sumnju u sebe što bi im pomoglo u poboljšanju znanja i vještina tijekom kliničkoga rada (22). Razumije se da prenapuhane samoprocjene nastaju zbog poteškoća u prepoznavanju vlastite nesposobnosti (1). Hodges, Regeher i Martin predložili su nekoliko načina za prevladavanje DK-efekta kao što su poučavanje/testiranje sposobnosti samoprocjene tijekom studija medicine i specijalizacije, izborni testovi sposobnosti samoprocjene prije medicinske izobrazbe te razvoj vještina samoprocjene i samousmjerenoga učenja tijekom dodiplomskoga i poslijediplomskoga obrazovanja (23). Jedna od ključnih strategija za prevladavanje Dunning-Krugerova efekta jest profesionalno mentoriranje učenika s lošijim uspjehom i stvaranje osjećaja sumnje u sebe, što je kritičan korak prema poboljšanju uspjeha (24). Mentorstvo je temelj za razvoj znanja i kliničkih kompetencija (25). Redovito akademsko savjetovanje, uključujući konstruktivne povratne informacije, pomoglo bi pretjerano samopouzdanim studentima da shvate granice svoje stvarne kompetencije. Prema našem mišljenju, sesije podizanja svijesti o postojanju Dunning-Krugerova efekta i njegovim implikacijama na profesionalni razvoj studenata trebale bi se provoditi u početnim godinama kurikula dentalne medicine.

Unatoč tomu, istraživanje je imalo nekoliko ograničenja kao što je veličina uzorka i provedba u samo jednome akademskom institutu u UAE-u. Uz to, istraživanje se oslanjalo na rezultate interpretirane na temelju procjene kliničkih vještina samo jedne stomatološke specijalnosti. Nadalje, ograničena izloženost studenata kliničkim vježbama s pedodontskim pacijentima mogla je neizravno utjecati na njihovu kognitivnu pristranost.

Conclusion

The research results concluded that the Dunning-Kruger effect, which is the cognitive bias of the perception pattern, is present in the examined group of dental students.

Students who exhibit this effect may present with attitudes and approaches, resulting in poor communication in the student-child-parents triangle, misdiagnosis, and poor performance in the clinical procedures.

Although fostering students' exposure to clinical cases is the primary goal in dental education, this can be synergistically augmented with academic advising, mentoring, and real-time constructive feedback and awareness sessions

Zaključak

Rezultati istraživanja pokazali su da je Dunning-Krugerov efekt, odnosno kognitivna pristranost percepcijskoga obrasca, prisutna u ispitivanoj skupini studenata dentalne medicine.

Studenti koji su skloni tome fenomenu mogu imati stajališta i pristupe koji rezultiraju lošom komunikacijom u trokutu student – dijete – roditelji, pogrešnom dijagnozom i lošim rezultatima u kliničkim postupcima.

Iako je poticanje sudjelovanja studenata u kliničkim slučajevima primarni cilj u stomatološkom obrazovanju, to se može sinergijski unaprijediti akademskim savjetovanjem, mentorstvom i konstruktivnim povratnim informacijama i sesijama za podizanje svijesti u stvarnom vremenu.

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Conflict of interest

The authors declare that they have no conflict of interest.

Sukob interesa

Autori nisu bili u sukobu interesa.

Author contributions:

D.S - contributed to conception and design, acquisition of data, analysis and interpretation drafting of the work, revising the work, and final approval; **P.A** - contributed to the design, analysis, and interpretation, drafting the work, revising the work, and final approval; **S.F** - contributed to analysis and interpretation, drafting the work, revising the work, final approval; **H.A** - contributed to design, analysis, and interpretation, revising the work, and final approval; **J.D** - contributed to analysis and interpretation, drafting the work, and revising the work.

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D. S. – koncepcija i dizajn, prikupljanje podataka, analiza i interpretacija, izrada nacrta rada, revidiranje rada i konačno odobrenje; **P. A.** – doprinos koncepciji i dizajnu, prikupljanju podataka, analizi i interpretaciji, izradi nacrta rada, revidiranju rada i konačnom odobrenju; **S. F.** – doprinos analizi i interpretaciji, izradi nacrta rada, revidiranju rada, konačnom odobrenju; **H. A.** – doprinos dizajnu, analizi i tumačenju, revidiranju rada i konačnom odobrenju; **J. D.** – doprinos analizi i interpretaciji, izradi nacrta djela i revidiranju teksta

Sažetak

Dunning-Krugerov efekt (kognitivna pristranost) psihološki je fenomen koji pokazuje da pojedinci s nedostatkom znanja i vještina imaju nerealno optimističnu sliku o svojim sposobnostima u usporedbi s drugima. **Svrha rada:** Cilj ovog istraživanja bio je ispitati prisutnost Dunning-Krugerova efekta kod studenata pete (završne) godine dodiplomskoga studija dentalne medicine u kliničkim područjima povezanima s pedodoncijom na Medicinskom sveučilištu Gulf u UAE-u. **Metode:** Na Stomatološkom fakultetu Medicinskoga sveučilišta Gulf provedeno je longitudinalno kohortno istraživanje da bi se procijenila kognitivna pristranost među studentima 5. godine dentalne medicine u područjima kompetencija komunikacije, dijagnoze i kliničkih vještina u dječjoj stomatologiji. **Zaključak:** Uočeni su karakteristični obrasci fluktuacije samopouzdanja studenata tijekom kliničke izloženosti. Rezultati istraživanja dokazuju da je Dunning-Krugerov efekt, kognitivna pristranost percepcijskoga obrasca, prisutan u ispitivanoj skupini studenata dentalne medicine.

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