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POLNE RAZLIKE U KVALITETU ŽIVOTA I MOTIVACIJI ZA TRENINGOM KOD ADOLESCENATA PROSEČNE I SUVIŠNE TELESNE MASE[1]

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Apstrakt: Osnovni cilj u ovoj transverzalnoj studiji je ispitivanje razlike u konstruktima kvaliteta života i motivacije za treningom kod adolescenata i adolescentkinja prosečne i suvišne telesne mase. Uzorak je obuhvatio učenike valjevskih srednjih škola (N = 337). Prosečna starost ispitanika iznosila je M = 16.53 godine (SD = .38). Primenjena su dva merna instrumenta: upitnik motivacije za trening (EMI-2) i upitnik kvaliteta života za decu i adolescente (TKQ). Nalazi Kronbahovog α koeficijenta sugerisali su da primenjeni upitnici imaju zadovoljavajuće pouzdanosti tipa interne konzistencije, te da se validno mogu koristiti za procenu adolescentske populacije i u Republici Srbiji.
Rezultati su pokazali da motivaciju za trening adolescenata čine unutrašnji i spoljašnji motivi, pri čemu mladići u odnosu na devojke povoljnije percipiraju kvalitet života. Utvrđene statistički značajne polne razlike, tj. viši stepen evaluacije konstrukta TKQ kod adolescenata, u poređenju sa adolescentkinjama su posledica znatnijeg doživljavanja fizičkog blagostanja, prijatnih osećanja i raspoloženja, dobre porodične i socijalne sredine, kao i izvodljivosti programiranja i njihovog sprovođenja slobodnog vremena. Istovremeno ispitanicima sa prosečnom telesnom masom više prija percepcija sopstvene fizičke aktivnosti i zdravlja nego njihovim vršnjacima sa suvišnom TM. Fizičko vežbanje ispitanika s obzirom na pol više podstiču varijable uživanje, izazov, takmičenje, snaga i izdržljivost, te socijalni faktori (pripadnost grupi, pritisak i priznanje), u odnosu na ispitanice, koje su spremnije da treniraju radi kontrole telesne mase. Rezultati Man-Vitnijevog U neparametrijskog testa ukazali su na relevantne polne razlike: adolescenti sa prosečnom telesnom masom u većem stepenu nego vršnjaci sa suvišnom telesnom masom na trening podstiče varijabla uživanje u aktivnosti, dok sa druge strane adolescente sa prekomernom telesnom masom značajnije stimuliše verovatnoća njene regulacije ($p \leq .01$).
U radu se raspravlja o praktičnim implikacijama ovih rezultata na stvaranju motivacije za vežbanjem i kvalitetom života kod mladih oba pola, sa normalnom i prekomernom TM u doba adolescencije.

Ključne reči: *motivi, adolescencija, indeks telesne mase, fizičko vežbanje, raspoloženje i emocije*

UVOD

Polne razlike u kvalitetu života i motivaciji za treningom adolescentima prosečne i suvišne telesne mase predmet su istraživanja velikog broja autora (Bull et al., 2020; Cilar Budler et al., 2022; Guthold et al., 2020). Kvalitet života podrazumeva kompleksnu pojavu koja sadrži razne vidove života i postupke pojedinaca, konstatuju Li i sar. (Lee et al., 2018). Taj fenomen ni do danas nije identično definisan. U svojoj studiji Pulen i sar. (Poulain et al.,

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2019) određuju kvalitet života kao sveukupnu sreću, koja pretpostavlja realne faktore, lično valorizovanje fizičkih, materijalnih, društvenih i afektivnih mogućnosti, pri čemu dominira individualni razvoj i celovito ponašanje radi ličnog sistema vrednosti. Prema istraživanju Ima (Ihm, 2018) utvrđivanje kvaliteta života uslovljavaju razni činioci, počev od zadovoljenja bioloških potreba, do karakterističnih društvenih, duhovnih, kulturnih i istorijskih situacija. Istraživači Grant i sar. (Grant et al., 2018) navode da kod ovog termina dominira lična percepcija zadovoljstva životom, koji je definisan poklapanjem stvarnog sa očekivanim načinom života. U studiji pomenutih autora utvrđuje se kvalitet života kao povezanost adolescenata i njihovih kompetencija odgovarajućeg programiranja kod ostvarivanja pojedinih ciljeva, a Tveng i sar. (Twenge et al., 2018) izoluju slobodno vreme kao značajnu determinantu u prepoznavanju ličnog životnog stila. U radu Fišera-Grota i sar. (Fischer-Grote et al., 2019) porodični život i relacije sa vršnjacima se ističu kao bitni prediktori kvaliteta života, koji reprezentuje višedimenzionalnu pojavu koja uzrokuje realnu stvarnos i individualne vrednosti pojedinaca.

U traganju za uzrocima visokog nivoa lične sreće osoba, istraživači su ispitivali razne latentne dimenzije, kao što je i nivo uhranjenosti i stepen fizičke aktivnosti u adolescenciji. Fizička aktivnost podrazumeva svako pokretanje tela ostvareno angažovanjem poprečno-prugastih mišića uz potrošnju energije, zaključuju Van Sluijs i sar. (Van Sluijs et al., 2020). Ona je neophodan elemenat realizacije najpovoljnijeg funkcionisanja tela, a naročito za pravilan telesni rast i razvoj i unapređenje psihofizičkog zdravlja čoveka, ustanovili su istraživači Louri i sar. (Lowry et al., 2021). Fizičko vežbanje predstavlja značajan vid treninga s ciljem održavanja i poboljšanja lepo oblikovanog tela, naglašavaju Marota i sar. (Marotta et al., 2022). Pomenuti autori veruju da svakodnevno umereno fizičko vežbanje pozitivno utiče na telesno, mentalno i društveno blagostanje pojedinca. Generalno, ako je stručno organizovano, ono motiviše adolescente na usvajanje i formiranje zdravih navika (Palenzuela-Luis et al., 2022). Aruda i sar. (Arruda et al., 2022) smatraju da je redovno treniranje u doba adolescencije u korelaciji sa smanjenjem opasnosti od negativnih zdravstvenih stanja i bolesti, odnosno minimiziranja negativnih promena u koštanom sistemu, npr. osteoporoze u kasnijem životnom priodu. Takođe, fizičko vežbanje je u relevantnoj interakciji sa smanjenjem suvišne telesne mase, smanjenja rizika od koronarne bolesti, kao i sa unapređenjem duhovnog zdravlja, te porastom konstrukta samopoštovanja i samopouzdanja (Huffman et al., 2018). U studiji koju su sproveli istraživači Asam i sar. (Asam et al., 2019) navodi se da FV predstavlja uspešnu strategiju suočavanja sa stresom, posebno suprostavljanju depresiji i anksioznosti. Isti istraživači tvrde da se efekti fizičkog vežbanja manifestuju boljom socijalnom komunikacijom i usvajanjem ličnih umešnosti. Nalazi u empirijskim studijama kod ovih fenomena nisu usaglašeni, pri čemu istraživači ističu da ih treba analizirati integrišući sve faktore socijalizacijskog procesa (Khamidovna & Khudayberganov, 2022). S aspekta pomenutih autora, sportisti u komparaciji s neaktivnom mladom populacijom, manifestuju razvijeniju komunikacionu umešnost, društvenu sposobnost i tendenciju ka timskom angažovanju, tako što se i na njihovu konstituciju i očekivanu poziciju u vršnjačkom okruženju može uticati fizičkim vežbanjenjem. Međutim, u savremeno doba fenomen hipokinezije je sve dominantniji generator zdravstvenih opasnosti, smatraju Romanova i sar. (Romanova et al., 2022). Rezultati ovih autora pokazuju da je nedostak fizičkog vežbanja povezan sa porastom opasnosti od suvišnog indeksa telesne mase (ITM) i vršnjačkog nasilja, što se naročito negativno odražava na psihosocijalne poteškoće adolescenta. Međutim, bez obzira na naučno poznate efekte treninga na psihofizičko i socijalno zdravlje, činjenica je da se u savremenoj civilizaciji vidno smanjio intenzitet fizičkog vežbanja, posebno kod adolescentkinja, što se reflektuje povećanjem telesne mase iznad optimalnog nivoa (Ivanović i Ivanović, 2012; Ivanović & Ivanović, 2018; Ivanović i Ivanović, 2021; Pope & Harvey, 2015).

Motivacija predstavlja psihički proces koji podstiče osobu na FA, odnosno orijentaciju i usklađivanje jačine i trajanja te aktivnosti, tvrde Tomas i Azmitija (Thomas & Azmitia, 2019). Pomenuti autori smatraju da ukoliko nameravamo motivisati pojedince za trening bitno je identifikovati sklop psiholoških i fizioloških faktora koji ih podstiču na aktivnost. S obzirom na to da aktuelna prevaga suvišnog indeksa telesne mase (ITM) pojačano raste iz godine u godinu, gojaznost postaje uočljiv javno zdravstveni problem, koji je posebno važan u senzibilnom i formativnom periodu adolescencije, gde neaktivnost i prekomeran ITM predstavljaju izrazitu zdravstvenu opasnost, te istraživanje ove tematike postaje neophodnost koja se logično nameće (Ivanović i sar., 2014; Ivanović & Ivanović, 2016). Pored toga, nedostatak fizičkog vežbanja i suvišne TM snižavaju kvalitet života, pa mogu dovesti i do i prerane smrti, pa je zato bitno razvijati efikasne preventivne programe i preduzimati radnje koje direktno menjaju zatečeno stanje. Identifikovanje motivacionog sklopa i motiva za trening pojedinaca određenog uzrasta i karakteristika može uticati na njihovo efikasnije planiranje. U cilju potpunijeg shvatanja potrebe i postupaka adolescenata i upućenosti u njihovo doživljavanje životne sreće, neophodno je identifikovati faktore koji je definišu ili utiču na nju.

Osnovni motiv da se naša teorijsko-istraživačka pažnja usmeri na ovaj kompleksni problem je činjenica da se dizajn dosadašnjih studija nije u dovoljnoj meri sprovodio i na srpskoj adolescentskoj populaciji. Cilj ovog istraživanja

bio je ispitivanje kvaliteta života i motivacionog sklopa za vežbanje, kao i razlika u proceni navedenih konstrukata kod adolescenata u odnosu na pol i ITM. Izuzetno je značajno da se ovaj fenomen istraži, što može imati važne metodološke i teorijske implikacije na dalja istraživanja, ali i za praksu. U skladu s rezultatima ranijih empirijskih studija, teorijskih predikcija i ciljem ovog istraživanja, uz primenu adekvatnih statističkih alata, sa određenom verovatnoćom, formulisane su sledeće hipoteze: H_1 – Očekuje se da mladići kvalitet svog života, tj. varijable fizičko blagostanje, zdravlje, raspoloženje i osećanja evaluiraju višom ocenom u odnosu na devojke; H_2 – Pretpostavlja se da varijable fizičko blagostanje i zdravlje imaju statistički značajno niže vrednosti kod muškog pola sa suvišnom telesnom masom u poređenju sa vršnjacima sa prosečnom telesnom masom; H_3 –Adolescenti sa normalnom telesnom masom i oni sa suvišnom telesnom masom uslovno identično evaluiraju kvalitet života. H_4 – Veruje se da ispitanike na trening podstiču unutrašnji motivi (uživanje, izazov, takmičenje, snaga i izdržljivost) i spoljašnji motivi (pripadnici grupe), dok ispitanice na vežbanje dominatnije motiviše varijabla nadzor nad telesnom masom.

METOD ISTRAŽIVANJA

Ispitanici i procedura

Ovo transverzalno ispitivanje je sprovedeno na prigodnom uzorku (N = 337) učenika iz Ekonomske i Tehničke škole u Valjevu i to: 222 adolescenta (51%) i 115 (49% adolescentkinja). Prosečna starost ispitanika iznosila je 16.53 godina (SD = .38).

Ispitanicima su pre popunjavanja upitnika data detaljna uputstva i usmeno objašnjen opšti cilj istraživanja, bez objašnjavanja šta koji instrument meri (da bi se tako sprečilo davanje poželjnih odgovora), a uputstvo za popunjavanje upitnika je odštampano i na testu. Od ispitanika se zahtevalo da ne razmišljaju previše o odgovorima i u slučaju sumnje izaberu odgovor kojem su više skloni, uz mogućnost odustajanja u bilo kojem trenutku bez ikakvih posledica. Ispitivanje u trajanju od 45 minuta sprovodili su autori rada i školski psiholozi. Istraživanje je bilo anonimno i dobrovoljno, a sprovedeno je uz saglasnost direktora ustanova i roditelja učenika.

Primena upitnika i uzimanje antropometrijskih mera (telesne mase i visine tela) organizovano je u grupama tokom nastave fizičkog vaspitanja. U prvoj tački merenja izvršena su antropometrijska merenja u trajanju od oko 30 minuta. U drugoj tački merenja primenjeni su upitnici: a) motivacije za trening i b) upitnik kvaliteta života za decu i adolescente. Ispunjavanje upitnika trajalo je oko 30 minuta. Empirijsko istraživanje je sprovedeno u oktobru 2022 godine.

Upitnik motivacije za trening – EMI-2

EMI-2 (*The Exercise Motivations Inventory-2*) (Vlašić et al., 2002) obuhvata 54 ajtema oblikovana tako da ispitanici odgovaraju na pitanje zašto pojedinac trenira ili bi trenirao, a podrazumevaju 14 potencijalnih motiva za vežbanje: pripadnost grupi (npr. „Da bih proveo/la vreme sa prijateljima“), fizički izgled (npr. „Da bih imao/la dobru figuru“), izazov (npr. „Da bih mogao/la da razvijem veštine“), takmičenje (npr. „Zato što se volim takmičiti“), uživanje u treningu (npr. „Zato što uživam u naporu“), sprečavanje bolesti (npr. „Da bih izbegao/la bolest“), pokretljivost (npr. „Da bih postao/la pokretljiviji/ja“), zdravlje (npr. „Zato što želim zadržati dobro zdravlje“), osveženje (npr. „Jer smatram vežbanje osvežavajućim“), društveno priznanje (npr. „Kako bi se dokazao/la pred ostalima“), socijalni pritisak (npr. „Zato što me drugi na to nagovaraju“), snaga/izdržljivost (npr. „Da bih povećao/la svoju snagu/izdržljivost“), upravljanje stresom (npr. „Jer mi vežbanje pomaže savladati stres“) i nadzor nad telesnom masom (npr. „Da bih smršavio/la“).

Ukupan rezultat koji upućuje na izraženost pojedinoga motiva za učestvovanje u fizičkoj aktivnosti određen je kao srednja vrednost odgovora na tvrdnje određene supskale. Odgovori na ajteme ubeležavaju se na Likertovoj skali od pet stepeni (od 1 – *„u potpunosti netačno za mene“* do 5 – *„u potpunosti tačno za mene“*). Ispitanici imaju ponuđene odgovore koji pripadaju pojedinim motivima, njihov je zadatak da odgovore koliko je pojedini ajtem tačan za njega.

Pouzdanost (Cronbach's Alpha) dimenzija EMI-2 u ovom istraživanju su sledeće: pripadnost grupi (α = .79); telesni izgled (α = .90); izazov (α = .92); takmičenje (α = .90); uživanje (α = .78); sprečavanje bolesti (α = .79); pokretljivost (α = .86); zdravlje (α = .92), osveženje (α = .80), društveno priznanje (α = .85), socijalni pritisak (α = .91), snaga i izdržljivost (α = .79); upravljanje stresom (α = .94) i kontrola telesne mase (α = .77), što upućuje na zadovoljavajuće metrijske karakteristike upitnika (Tabachnick & Fidell, 2013).

Upitnik kvaliteta života za decu i adolescente – TKQ

TKQ (*The Kidscreen Questionnaire-27*; The Kidscreen Group Europe, 2006) ispituje konstrukt kvaliteta života kroz elemente fizičkog, emocionalnog, socijalnog i bihevioralnog blagostanja. Upitnik sadrži 27 tvrdnji koje mere šest dimenzija kvaliteta života: zabava i odnosi s prijateljima (npr. „Da li si se mogao/la pouzdati u svoje prijatelje?“), škola i učenje (npr. „Da li ti je u školi dobro išlo?“), fizička aktivnost i zdravlje (npr. „Da li si bio/la fizički aktivan/na?“), raspoloženje i emocije (npr. „Da li si li se osećao/la usamljeno?“), porodica i slobodno vreme (npr. „Da li su se roditelji pošteno odnosili prema tebi?“) i novčani resursi (npr. „Da li si li imao/la dovoljno novca za svoje troškove?“). Ispitanici beleže svoj nivo slaganja sa sadržajem pojedinog ajtema na petostepenoj Likertovoj skali (1 bod – *„uopšte ne“* do 5 bodova – *„izrazito jako“*). Negativno izraženi ajtemi ukazuju da veći rezultat na pojedinoj dimenziji objašnjava viši stepen kvaliteta života. Pouzdanost (Cronbach's Alpha) TKQ za pojedine skale na našem uzorku su sledeće: prijatelji (α = .90); škola i učenje (α = .76); fizička aktivnost i zdravlje (α = .82); raspoloženje i emocije (α = 0,80); porodica i slobodno vreme (α = .78) i novčani resursi (α = .78).

Indeks telesne mase – ITM (*Body-mass index*, Lohman et al., 1988)

ITM (Lohman et al., 1988) pokazuje da li je telesna masa u odnosu na visinu tela ispitanika prosečna, više ili manje ispod/iznad proseka. Izračunat je prema međunarodnoj klasifikaciji za decu i adolescente na osnovu izmerenih morfoloških varijabli: telesne mase u kilogramima i visine tela u metrima (Weber et al., 2013). Na taj način brojčana vrednost komparirana je s tabličnim vrednostima na osnovu uzrasta i pola, kako bi se dobila preoblikovana vrednost koja odgovara graničnim veličinama našeg uzorka, te je svaki ispitanik prema uputstvima italijanskih autora (Cacciari et al., 2006) klasifikovan u jednu od četiri kategorije: *neuhranjenost* (≥ 18.5 kg/m²); *normalna telesna masa* (ITM = 18.5–24,99 kg/m²); *suvišna telesna masa* (ITM ≥ 25 kg/m²) i *gojaznost* (ITM ≥ 30 kg/m²). Antropometrijska merenja su obavljena u skladu sa Internacionalnim biološkim programom.

Statistička analiza

Prikupljeni podaci su prvo obrađeni metodom deskriptivne statistike, a zatim su korišćeni neparametrijski Kolmogorov-Smirnov test (K-S) za ispitivanje odstupanja dobijene distribucije podataka od normalne raspodele i Man-Vitnijev (Mann-Whitney) *U* – neparametrijski test za testiranje statistički značajnih razlika između dva skupa podataka. Obrada kvantitativnih podataka sprovedena je programskim paketom IBM SPSS 22.00 (IBM *Corporation*, New York, SAD).

REZULTATI

Statistički parametri procena ispitanika na ispitivnim dimenzijama upitnika kvaliteta života za decu i adolescente predstavljeni su u Tabeli 1.

Tabela 1. *Distribucija rezultata za varijable upitnika TKQ*

Varijable	*M*	*SD*	*C*	*Sk*	*Ku*	*K-S*
Prijatelji	3.95	.82	4.08	5.52 (.18)	2.40 (.28)	1.39*
Škola i učenje	3.47	.80	3.27	4.93(.15)	2.37(.26)	1.58*
Fizička aktivnost i zdravlje	3.66	.69	3.55	.93(.15)	7.33(.31)	2.05**
Porodica i slobodno vreme	3.84	.76	3.78	7.38(.16)	2.94 (.31)	2.59**
Raspoloženje i emocije	3.89	.72	4.48	8.40 (.16)	4.53(.31)	2.44**
Novčani resursi	3.99	.88	4.60	10.30 (.16)	7-86 (.31)	3.29**

Legenda: *M* = Aritmetička sredina; *SD* = Standardna devijacija; *C* = Medijana, mera centralne tendencije; *Sk* = Skjunis-mera asimetričnosti/zakošenosti distribucije ulevo ili udesno sa standardnom greškom za skjunis; *Ku* = Kurtozis-mera izduženosti ili spljoštenosti distribucije sa standardnom greškom; K-S = Kolmogorov-Smirnovljev test. * $p \leq .05$, ** $p \leq .01$.

Uvidom u ćelije matrice uočava se da ispitanici kvalitet života percipiraju uslovno visokim. Maksimalne evaluacije ispitanika usmerene su na varijablu novčani resursi (AS = 3.99, SD = .88) i prijatelji (AS = 3.95, SD = .82),

a minimalne na varijable škola i učenje (AS = 3.47, SD = .80). Vrednosti Kolmogorov-Smirnovljev testa normaliteta distribucije i standardizovanih koeficijenta zakrivljenosti distribucije i mera izduženosti, odnosno spljoštenosti distribucije pokazuju da primenjene varijable nemaju normalnu raspodelu, jer su se njihove veličine kretale izvan intervala –2 i +2 (Gravetter & Wallnau, 2014; Kim, 2013). Stoga je za testiranje razlike između dva nezavisna uzorka korišćena neparametrijska metoda inferencijalne statistike Man-Vitnijev test.

U Tabeli 2 predstavljeni su deskriptivni parametri ispitivanih varijabli upitnika EMI-2 adolescenata.

Tabela 2. *Distribucija rezultata za varijable upitnika EMI-2*

Varijable	*M*	*SD*	*C*	*Sk*	*Ku*	*K-S*
Pripadnost grupi	3.05	1.28	3.00	7.16 (.15)	2.40 (.28)	2.46*
Fizički izgled	3.79	1.17	3.92	5.943(.16)	4.55(.26)	2.58*
Izazov	3.65	1.30	3.82	9.07(.16)	7.33(.31)	2.05**
Takmičenje	2.68	1.62	2.80	7.38(.16)	2.94 (.31)	2.59**
Uživanje u treningu	3.35	1.25	3.18	8.40 (.18)	4.53(.31)	2.44**
Sprečavanje bolesti	2.96	1.37	3.28	10.30 (.16)	7-86 (.31)	3.29**
Pokretljivost	3.63	1.30	3.71	3.35 (.27)	9.85(.31)	2.56**
Zdravlje	3,90	1.19	3.94	2.84 (.15)	3.78(.31)	2.67**
Osveženje	3.59	1.17	3.70	4.81(.16)	6.64(.31)	3.75**
Društveno priznanje	2.28	1.42	2.47	6.78(.15)	5.64(.31)	2.97**
Socijalni pritisak	1.03	1.27	.48	5.53(.16)	3.76(.31)	4.16**
Snaga i izdržljivost	3.93	1.09	4.30	3.68(.15)	8.95(.31)	2.65**
Upravljanje stresom	3.23	1.40	3.30	2.84(.16)	7.68(.31)	2.95**
Nadzor nad telesnom masom	3.42	1.37	3.48	8.56(.16)	5.64(.31)	3.45**

Legenda: *M* = Aritmetička sredina; *SD* – Standardna devijacija; *C* = Medijana, mera centralne tendencije; *Sk* = Skjunis-mera asimetričnosti/zakošenosti distribucije ulevo ili udesno sa standardnom greškom za skjunis; *Ku* = Kurtozis-mera izduženosti ili spljoštenosti distribucije sa standardnom greškom; *K-S* = Kolmogorov-Smirnovljev test. * $p \leq .05$, ** $p \leq .01$.

Osnovni deskriptivni parametri motiva za treningom u većini slučajeva se raspoređuju minimalno iznad srednje vrednosti teorijskog raspona, a to ukazuje na osrednju motivaciju za treningom. Nalazi signaliziraju da su adolescentima najmanje bitni motivi za treningom, socijalni pritisak, potom društveno priznanje i takmičenje. Najznačajnije motive za treningom predstavljaju varijable, zdravlje, snaga i izdržljivost, i telesni izgled. Dobijeni model odgovora ispitanika skreće pažnju na shvatanje ispitanika o značaju fizičkog vežbanja i njegove povezanosti sa poboljšanjem i održavanjem fizičkog blagostanja. Sa druge strane, narušena normalnost odgovora na pojedinim varijablama (vrednosti Kolmogorov-Smirnovljevog testa normaliteta distribucije i standardizovanih skjunisa i kurtozisa), dozvolila je korišćenje neparametrijskih metoda (LaMorte, 2017).

Tabela 3. *Razlike između muških i ženskih ispitanika na dimenzijama upitnika TKQ*

	Adolescenti (N = 222)			Adolescentkinje (N = 115)					
Varijable	*M*	*SD*	*C*	*M*	*SD*	*C*	*U*	*z*	*p*
Prijatelji	4.09	.68	4.23	4.09	.66	4.23	42742.46	-.70	.45
Škola i učenje	3.52	.80	70	3,26	.77	3.50	3962.60	-4.25	.01**
Fizička aktivnost i zdravlje	3.76	.70	3.70	3.62	.65	3.50	4961.30	-5.56	01**
Porodica i slobodno vreme	3,87	.93	3.92	3,59	.91	3.63	5675.00	-4.28	01**
Raspoloženje i emocije	3.99	.59	4,25	3,76	0,74	.66	4.859.30	-8.05	01**
Novčani resursi	4.18	.89	4.56	4.14	.87	4.20	6592.03	2.92	.98

Legenda: *M* = Aritmetička sredina; *SD* = Standardna devijacija; *C* = Medijana; *U* = Mann Whitney test za nezavisne uzorke; *z* = Standardna vrednost U. **p* = Verovatnoća statistički značajne razlike (***p* ≤ .01).

Dobijeni nalazi *Man-Vitnijevog U*-testa u Tabeli 3, uz 1% rizika, ukazuju na signifikantne razlike u samoprocenama varijable kvaliteta života s obzirom na pol, pri čemu adolescenti imaju više vrednosti na numeričkim varijablama, na dimenzijama škola i učenje, fizička aktivnost i zdravlje, porodica i slobodno vreme, kao i raspoloženje i emocije u odnosu na adolescentkinje.

Man-Vitnijevim *U*-testom za neparametrijske podatke i *z* – standardnim vrednostima izračunate su statistički značajne razlike u opaženoj varijabli kvaliteta života u odnosu na indeks telesne mase (Tabela 4).

Tabela 4. *Deskriptivni parametri razlike između muških i ženskih ispitanika na varijabli ITM*

	PTM			STM					
Varijable	*M*	*SD*	*C*	*M*	*SD*	*C*	*U*	*z*	*p*
Prijatelji	3.96	.68	4.19	3.95	.90	4.19	5811.00	-.105	.88
Škola i učenje	3.29	0.80	3.35	3.28	.70	3.35	4729.20	-3.352	.67
Fizička aktivnost i zdravlje	3.59	0.67	3.55	3.40	.72	3.47	2591.44	-8.906	01**
Porodica i slobodno vreme	3.80	.77	3.78	3,76	.80	3.78	3670.03	-4.473	.45
Raspoloženje i emocije	3.99	.68	4,00	3.99	.57	3.99	7516.45	-6.128	.34
Novčani resursi	4.20	.80	4.49	4.26	,79	4.49	7282.00	-1.155	.43

Legenda: PTM = Prosečna telesna masa; STM = Suvišna telesna masa; *M* = Aritmetička sredina; *SD* = Standardna devijacija; *C* = Medijana; *U* = Mann Whitney test za nezavisne uzorke; *z* – Standardnna vrednost (mera udaljenosti pojedinog rezultata od aritmetičke sredine izražena u standardnim devijacijama). ** *p* – Verovatnoća statistički značajne razlike ($p \leq .01$).

Uvidom u ćelije matrice uočava se da ispitanici sa suvišnim ITM manifestuju značajno niži stepen zadovoljstva kod varijabli fizička aktivnost i zdravlje u poređenju sa vršnjacima prosečnog ITM.

U cilju upoređivanja rezultata adolescenata i adolescentkinja na varijablama upitnika EMI-2 sproveden je *Man-Vitnijev U* – neparametrijski test (Tabela 5).

Tabela 5. *Deskriptivni parametri razlike između adolescenata i adolescentkinja na supskalama upitnika EMI-2*

	Prosečna telesna masa			Suvišna telesna masa					
Varijable	*M*	*SD*	*C*	*M*	*SD*	*C*	*U*	*z*	*p*
Pripadnost grupi	2.95	1.28	3.18	2.80	1.29	2.95	4874.25	-2.962	.01**
Fizički izgled	3,68	1.27	3.96	4.05	1.07	4.30	5895.03	-1.837	.43
Izazov	3.68	1.30	4.01	3.39	1.18	3.44	7641.05	-2.860	01**
Takmičenje	3.22	1.53	3.48	2.25	1.50	1.96	6085.40	-7.829	01**
Uživanje u treningu	3.38	1.27	3,80	1.33	1.30	3.35	6784.06	-3.014	01**
Sprečavanje bolesti	2.97	1.50	2.96	3.08	1.29	3.28	7942.00	-.655	.72
Pokretljivost	3.49	1.28	3.70	3.59	1.18	3.70	5692.03	-.254	.68
Zdravlje	4.00	1.21	4.28	3.99	1.19	4.30	4824.08	-.742	.57
Osveženje	3.59	1.19	3.70	3.60	1.21	3.68	8027.90	-.436	.46
Društveno priznanje	2.68	1.38	2.70	2.57	1.40	2.69	6078.12	-.560	01**
Društveni pritisak	1.12	1.14	.78	1.05	1.20	.80	7902.94	-.382	01**
Snaga i izdržljivost	4.19	1.10	4.80	4.09	1.08	4.78	6092.44	-.620	01**
Upravljanje stresom	3.19	1.40	3.19	3.15	1.38	3.20	5028.06	-.708	.77
Nadzor nad telesnom masom	2.98	1.38	3.18	3.05	1.42	3.20	4053.24	-.298	01**

Legenda: *M* = Aritmetička sredina; *SD* = Standardna devijacija; *C* = Medijana; *U = Mann Whitney U test* za testiranje razlika rezultata između dva nezavisna skupa podataka; *z* – Standardna vrednost (mera udaljenosti pojedinog rezultata od aritmetičke sredine izražena u standardnim devijacijama). **p* = Verovatnoća statistički značajne razlike (***p* ≤ .01).

Nalazi dobijeni primenom Man-Vitnijevog U neparametrijskog testa i z – standardne vrednosti pokazuju, uz grešku merenja od 1%, statistički značajne razlike u EMI-2 kod ispitanika i ispitanica i to na nivou sledećih varijabli:

pripadnost grupi, izazov, takmičenje, uživanje, društveno priznanje, socijalni pritisak, snaga i izdržljivost i nadzor nad telesnom masom. Varijable pripadnosti grupi, društveno priznanje i socijalni pritisak adolescenata predstavljaju značajnije motive za treningom nego adolescentkinjama. Takođe, ispitanici su u većoj meri usmereni na trening zbog uživanja u njemu nego ispitanice. Pored toga, muški pol znatno više u odnosu na ženski pol podstiču supskale izazov, takmičenja, snaga i izdržljivost pri upražnjavanju fizičkih aktivnosti. Dakle, zapaža se da su svi pomenuti motivi značajniji za trening mladićima nego devojkama, izuzev varijable nadzor nad telesnom masom, koji na trening više podstiče adolescentkinje.

U Tabeli 6 prikazani su rezultati razlika adolescenata oba pola na varijablama Upitnika EMI-2 u odnosu na indeks telesne mase.

Tabela 6. *Deskriptivni parametri razlike između adolescenata na supskalama upitnika EMI-2 u odnosu na ITM*

	Prosečna telesna masa			Suvišna telesna masa					
Varijable	*M*	*SD*	*C*	*M*	*SD*	*C*	*U*	*z*	*p*
Pripadnost grupi	3.10	1.29	3.22	2.79	1.08	4.19	4803.25	-2.958	.45**
Fizički izgled	3.70	1.30	3.98	3.77	1.07	4.30	5903.12	-1.765	.25
Izazov	3.70	1.28	3.99	3.60	1.20	3.48	5691.23	-2.900	.74
Takmičenje	3.23	1.50	3.48	3.18	1.53	2.01	5643. 09	-8.263	.58
Uživanje u treningu	3.40	1.28	3.78	3.36	1.30	3.35	6904.17	-5.836	01**
Sprečavanje bolesti	3.00	1.47	2.98	3.10	1.30	3.30	7075.26	-.698	.65
Pokretljivost	3.56	1.30	3.68	3.60	1.23	3.69	6541.93	-.364	.46
Zdravlje	4.01	1.20	4.28	4.00	1.12	4.29	5162.00	-.560	.34
Osveženje	3.59	1.19	3.70	3.60	1.20	3.98	4732.84	-.452	.56
Društveno priznanje	2.68	1.38	2.80	2.59	1.40	4.00	7096.42	-.290	.86
Socijalni pritisak	1.13	1.14	.79	1.98	1.20	2.00	3641.08	-.905	.70
Snaga i izdržljivost	4.19	1.99	4.80	3.95	2.03	1.98	6852.06	-.628	.29
Upravljanje stresom	3.19	1.40	3.19	3.15	1.38	3.20	5294.05	-.785	.65
Nadzor nad telesnom masom	2.98	1.39	3.18	3.10	1.42	3.20	5093.76	-.543	01**

Legenda: *M* = Aritmetička sredina; *SD* = Standardna devijacija; *C* = Medijana; *U = Mann Whitney U test* za testiranje razlika rezultata između dva nezavisna skupa podataka; *z* – Standardna vrednost (mera udaljenosti pojedinog rezultata od aritmetičke sredine izražena u standardnim devijacijama). **p* – Verovatnoća statistički značajne razlike (***p* ≤ .01).

Dobijeni nalazi upućuju na i statistički značajne razlike u EMI-2 u odnosu na ITM, kod varijabli motiva uživanje i nadzor nad telesnom masom. Vrednosti deskriptivnih parametara skreću pažnju na to da ispitanike sa prosečnom telesnom masom znatnije nego one sa suviśinom telesnom masom za trening podstiče unutrašnji motiv uživanje, dok su ispitanici sa suvišnom telesnom masom u većem stepenu nego vršnjaci sa prosečnom telesnom masom podstaknuti verovatnoćom spoljašnjeg motiva nadzora nad telesnom masom.

DISKUSIJA

Budući da su dosadašnja istraživanja većinom sprovedena u zapadnim kulturama pokazala nekonzistentne rezultate, cilj ove empirijske studije preseka bio je da se ispita kvalitet života i motivacioni sklop za treningom, kao i razlike u proceni navedenih varijabli kod adolescenata i adolescentkinja u odnosu na indeks telesne mase. Dobijeni rezultati na ispitivanom uzorku ukazuju na statistički značajne razlike u samoprocenama fenomena kvaliteta života u odnosu na pol, tako što su ispitanici pokazali više vrednosti na varijablama škola i učenje, fizička aktivnost i zdravlje, porodica i slobodno vreme, kao i raspoloženje i osećanja u odnosu na ispitanice, što se podudara sa nalazima u empirijskim studijama (Nilles et al., 2022; Villafaina et al., 2021). Takođe, u empirijskom istraživanju (Bucur, 2017; Gomez-Baya et al., 2019) konstatovano je da su ispitanici u adolescenciji zadovoljniji životom nego ispitanice. U studijama nekih autora (Årdal et al., 2018; Villafaina et al., 2021) utvrđeno je da su u mladalačko doba razlike u percepciji kvaliteta života između muškog i ženskog pola sve upadljivije, gde učenice

sve negativnije procenjuju svoj kvalitet života. Ovakve težnje se tumače radikalnim fizičkim transformacijama kod devojaka u odnosu na mladiće. Samim tim, u ovom uzrastu adolescentkinje su češće izložene, međusobno protivrečnim društvenim željama, a polna ujednačenost je dalje pojačano prisutna u socijalnim grupama. Nalazi u našem istraživanju su pokazali da adolescenti sa prekomernom telesnom masom manifestuju značajno niži stepen zadovoljstva kod varijabli fizička aktivnost i zdravlje u poređenju sa vršnjacima normalnog ITM. Ako se pođe od hipoteze da se ispitanici sa prosečnim ITM više bave fizičkim aktivnostima nego njihovi vršnjaci koji imaju suvišnu telesnu masu, ovaj rezultat je podudaran s očekivanjima i nalazima prethodnih empirijskih studija (Cole & Lobstein, 2012; Boiché et al., 2014; Jalali-Farahani et al., 2014; Lizandra & Gregori-Font, 2021; Magiera et al., 2017; Weber et al., 2013). Pomenuti autori su ustanovili da sportisti adolescenti u komparaciji sa svojim vršnjakinjama nesportiskinjama signifikantno pozitivnije opažaju sopstveno fizičko blagostanje. Osim toga, rezultati istraživanja (Lizandra & Gregori-Font, 2021) pokazuju da veći nivo fizičke aktivnosti povoljno doprinosi unapređenju zdravlja i uvećavanju zdravstvene koristi. Rezultati dobijeni primenom neparametrijskog *U* testa pokazuju relevantne razlike u motivaciji za treningom kod ispitanika oba pola nivou varijabli: pripadnost grupi, izazov, takmičenje, uživanje, društveno priznanje, socijalni pritisak, snaga i izdržljivost i nadzor nad telesnom masom. Istovremeno tri varijable: pripadnosti grupi, društveno priznanje i socijalni pritisak kod ispitanika predstavljaju signifikantnije motive za vežbanjem nego kod ispitanica. Nađeni nalazi u skladu su sa rezultatima studija (Ivanović & Ivanović, 2018; Galan-Lopez & Ries, 2019; Sicilia et al., 2014), koje ukazuju da se polne razlike u sklopu motiva za treningom pouzdano razlikuju već od uzrasnog perioda adolescencije. Takođe, isti autori su u odnosu na pol ustanovili najvažnije motive: ispitanici su više podstaknuti unutrašnjim podsticajima snage, takmičenja i izazova, a ispitanice motivima nadzora nad telesnom masom i fizičkim izgledom. Na našem uzorku dobijen je identičan motivacioni sklop, koji karakteriše ispoljavanje i unutrašnjih i spoljašnjih motiva. Komparacijom nalaza ispitanika na varijablama upitnika EMI-2 u odnosu na pol, rodna diferencijacija u motivacionom sklopu može se dovesti u uzajamni odnos i sa razlikama u njihovim realnim postupcima. To potvrđuju rezultati empirijskih studija istraživača (Dominguez-Alonso et al., 2018; Guddal et al., 2019; Kueh et al., 2017; Ivanović & Ivanović, 2018; Roychowdhury, 2018; Sicilia et al., 2014) gde je utvrđeno da usled posledica navedenih motivacionih mehanizama adolescentkinje manje upražnjavaju fizičke aktivnosti nego adolescenti. To je potrebno imati u vidu kod programiranja preventivnih postupaka i posredovanja radi poboljšanja blagostanja adolescenata tokom izlaganja opasnosti.

Izračunate vrednosti deskriptivnih parametara na našem uzorku signaliziraju na signifikantne razlike u motivaciji za vežbanjem s obzirom ITM. Vrednosti mera centralne tendencije skreću pažnju na to da adolescente prosečne telesne mase u većoj meri nego one sa suvišnom telesnom masom na trening podstiče intrinzični motiv uživanje, dok su adolescenti sa suvišnom telesnom masom u većem stepenu nego njihovi vršnjaci sa prosečnom telesnom masom podstaknuti verovatnoćom ekstrinzičnog motiva kontrole nad telesnom masom. Zaključno, ovi rezultati su značajni, jer prema istraživanju (Ahmed & Shekahawat, 2021; Fives et al., 2022), spoljašnji motivi prognoziraju kratkoročno upražnjavanje fizičkog vežbanja.

Dobijeni rezultati u ovom istraživanju u potpunosti su potvrdiili četiri polazne hipoteze: prvu hipotezu o pretpostavci da ispitanici u poređenju sa ispitanicama konstrukt kvalitet svog života percipiraju višim, na osnovu evaluacija varijabli fizičkog blagostanja, zdravlja, kao i psihološke sreće, raspoloženja i osećanja (H_1); drugu hipotezu o očekivanju da evaluacije fizičkog blagostanja i zdravlja bude statistički značajno niže kod mladih sa suvišnom telesnom masom u poređenju sa onim koji imaju prosečnu telesnu masu (H_2); treća hipoteza o verovanju da adolescenti normalne telesne mase i oni sa suvišnom telesnom masom uslovno identično evaluiraju kvalitet života (H_3); četvrta hipoteza o naslućivanju da ispitanike na trening podstiču unutrašnji/intrinzični motivi (uživanje, izazov, takmičenje, snaga i izdržljivost) i spoljašnji motivi (pripadnici grupe), dok ispitanice na vežbanje dominatnije motiviše spoljašnji/ekstrinzični motiv varijabla nadzor telesne mase (H_4).

Sprovedeno empirijsko istraživanje ima određena metodološka ograničenja i nedostatke koje treba razmotriti pri interpretaciji dobijenih rezultata, što potencijalno limitira generalizaciju rezultatata na celokupnu adolescentsku populaciju. To su: a) prigodan uzorak koji je nedovoljno reprezentativan s obzirom na geografsko područje; b) metod samoiskaza zbog čega se ne može isključiti davanje neiskrenih ili socijalno poželjnih odgovora, kao i prisutnost metodološke varijanse i c) transverzalni nacrt rada koji testira ispitanike u datom vremenskom roku, u jednoj vremenskoj tački, što sprečava identifikovanje uzročno-posledičnih povezanosti između ispitivanih varijabli.

Ipak, i pored navedenih limita doprinos ovog istraživanja manifestuje se u utvrđivanju motiva i shvatanju motivacionog sklopa adolescenata, tj. dobijanju osnovnih znanja za podsticanje i zadržavanje učenika u mladalačkom dobu u svakodnevnoj fizičkoj aktivnosti radi poboljšanja kvaliteta njihovog života. Nalazi signaliziraju da su adolescentima potrebni diferencirani i adekvatni programi koji će ih motivisati na prihvatanje i održavanje

aktivnog životnog stila. U tom smislu, prepoznati motivacioni sklop kod mladih prosečne telesne mase može biti model za proizvođenje preventivnih programa sa glavnim ciljem prisustva i angažovanja adolescenata u salama fizičkog vaspitanja i na sportskim terenima. U budućim istraživanjima treba ispitati relacije ispitivanih varijabli sa objektivnim bavljenjem adolescenata fizičkim vežbanjem, što bi upotpunilo upućenost u istraživane fenomene kod srednjoškolske populacije.

Testirane upitnike u ovoj studiji preseka preporučujemo kao pouzdanan psihološki alat za merenje motivacije za treningom i kvalitetom života i na srpskom govornom području kod muških i ženskih ispitanika u adolescenciji. Bez obzira na metodološke limite, teorijski i empirijski rezultati u ovoj studiji mogu da budu osnova za naredna istraživanja, ali i validan indikator predikcije adolescenata za njihovom intenzivnijom motivacijom za vežbanjem i kvalitetom života. Shodno tome, zaključuje se da su neophodna dalja epirijska istraživanja u različitim kulturnim i geografskim oblastima koja uključuju (a) različite konceptualizacije i operacionalizacije konstrukta EMI-2 I TKQ u adolescenciji i (b) studije različitog dizajna, tj. longitudinalne studije.

ZAKLJUČAK

Rezultati ove studije preseka upućuju na značaj daljeg istraživanja percepcije razlika u kvalitetu života i motivacionog sklopa treninga u adolescenciji. Vrednosti Cronbach α koeficijenta ukazuju na zadovoljavajuću pouzdanost tipa interne konzistencije kod testiranih upitnika EMI-2 i TKQ, koji se mogu smatrati validnim instrumentima za ispitivanje adolescentske populacije u Srbiji. Nalazi signaliziraju na viši nivo kvaliteta života adolescenata nego adolescentkinja, što se manifestuje signifikantnim razlikama na većini varijabli ispitivanog konstrukta. Uz to, rezultati skreću pažnju na to da adolescenti sa normalnom telesnom masom i oni sa prekomernom telesnom masom donekle identično percipiraju kvalitet života. I pored toga, mladi sa prosečnom telesnom masom izrazitije ispoljavaju fizičko blagostanje nego vršnjaci sa suvišnom telesnom masom. Sumirajući dobijene rezultate ovog empirijskog istraživanja zaključuje se da se motivacija za treningom kod srednjoškolaca statistički značajno razlikuje od strukture srednjoškolki. Pri tome, značajno je veći broj unutrašnjih i spoljašnjih motiva za trening kod muškog pola, dok ženski pol na trening znatnije podstiče eventualnost nadzora telesne mase.

Zaključno, dobijeni nalazi u ovom transverzalnom istraživanju mogu biti podsticaj budućim istraživanjima (sa longitudinalnim nacrtom) za potpunije razumevanje polnih razlika u motivaciji za vežbanjem i kvalitetom života kod adolescenata oba pola, sa normalnom i prekomernom telesnom masom. Takođe, rezultati u ovom istraživanju mogu da inspirišu srednjoškolsku populaciju na veću motivaciju za fizičkim vežbanjem i kvalitetom njihovog života.

LITERATURA

1. Ahmed, M., & Shekahawat, S. S. (2021). Study on mental health improvements. *International Journal of Economic Perspectives, 15*(1), 482–487.
2. Årdal, E., Holsen, I., Diseth, Å., & Larsen, T. (2018). The five cs of positive youth development in a school context; gender and mediator effects. *School Psychology International, 39*, 3–21. https://doi.org/10.1177/0143034317734416
3. Arruda, G. A., Cantieri, F. P., Coledam, D. H. C., Christofaro, D. G. D., Barros, M. V. G., & de Mota, J. (2022). Tracking of physical activity and sedentary behavior of adolescents in different domains. *Acta Scientiarum. Health Sciences, 44*(1), 2–10.
4. Asam, A., Samara, M., & Terry, P. (2019). Problematic internet use and mental health among British children and adolescents. *Addictive Behaviors, 90*, 428–436.
5. Boiché, J., Plaza, M., Chalabaev, A., Guillet, E., & Sarrazin, P. (2014). Social antecedents and consequences of sport gender stereotypes during adolescence. *Psychology of Women Quarterly, 38*(2), 259–274.
6. Bucur, B. (2017). How can we apply the models of the quality of life and the quality of life management in an economy based on knowledge? *Economic Research, 30*, 629–646. https://doi.org/10.1080/1331677
7. Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., … & Carty, C. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *Journal of Sports Medicine, 54*, 1451–1462.

8. Cacciari, E., Milani, S., Balsamo, A., Spada, E., Bona, G., Cavallo, L., ... & Cicognani, A. (2006). Italian cross-sectional growth charts for height, weight and BMI (2 to 20 yr). *Journal of Endocrinological Investigation, 29*(7), 581–93.
9. Cilar Budler, L., Pajnkihar, M., Ravens-Sieberer, U., Barr, O., & Stiglic, G. (2022). The KIDSCREEN-27 scale: translation and validation study of the Slovenian version. *Health and Quality of Life Outcomes, 20*(67), 1–10.
10. Cole, T. J., & Lobstein, T. (2012). Extended international (IOTF) body mass index cut-offs for thinness, overweight and obesity. *Pediatric Obesity, 7*(4), 284–294.
11. Dominguez-Alonso, J., Castedo, A. L., & Pino, I. P. (2018). Validation of the self-report of reasons for practicing physical exercise with adolescents (AMPEF): differences by gender, age and school cycle. *Retos*, (33), 273–278.
12. Fischer-Grote, L., Kothgassner, O. D., & Felnhofer, A. (2019). Risk factors for problematic smartphone use in children and adolescents: a review of existing literature. *Neuropsychiatrie. 33*, 179–90. https://doi.org/10.1007/s40211-019-00319-8
13. Fives, C., Lone, M., & Nolan, Y. M. (2022). Motivation and learning methods of anatomy:Associations with mental well-being. *Clinical Anatomy, 35*(1), 26–39. https://doi.org/10.1002/ca.23781
14. Galan-Lopez, P., & Ries, F. (2019). Motives for Exercising and Associations with Body Composition in Icelandic Adolescents. *Sports, 7*(6), 149–160. https://doi:10.3390/sports7060149
15. Gomez-Baya D., Reis M., & Matos M. G. (2019). Positive youth development, thriving and social engagement: an analysis of gender differences in Spanish youth. *Scandinavian Journal of Psychology, 60*, 559–568 https://doi.org/10.1111/sjop.12577
16. Grant, J. E., Lust, K., & Chamberlain, S. R. (2018). Problematic smartphone use associated with greater alcohol consumption, mental health issues, poorer academic performance, and impulsivity. *Journal of Behavioral Addictions, 8*, 335–42. https://doi.org/10.1556/2006.8.2019.32
17. Gravetter, F., & Wallnau, L. (2014). *Essentials of Statistics for the Behavioral Sciences* (8th Edition). Belmont, CA: Wadsworth.
18. Guddal, M., Stensland, S., Småstuen, M., Johnsen, M., Zwart, J., & Storheim, K. (2019). Physical activity and sport participation. n among adolescents: Associations with mental health in different age groups. Results from the Young-HUNT study: A cross-sectional survey. *BMJ Open, 9*(9), 1–10.
19. Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C., (2020). Global trends in insufficient physical activity among adolescents: A pooled analysis of 298 population-based surveys with 1.6 million participants. *Lancet Child Adolesc. Health, 4*, 23–35.
20. Huffman, L. E., Wilson, D. K., Van Horn, M. L., & Pate, R. R. (2018). Associations between parenting factors, motivation, and physical activity in overweight African American adolescents. *Annals of Behavioral Medicine, 52*(2), 93–105. https://doi.org/10.1007/s12160-017-9919-8
21. Ihm, J. (2018). Social implications of children's smartphone addiction: the role of support networks and social engagement. *Journal of Behavioral Addictions, 7*, 473–81.
22. Ivanović. M., i Ivanović, U. (2021). Anksioznost i depresivnost determinante zadovoljstva telesnim izgledom kod fudbalera pionira i kadeta. U S. Nešković (Ur.), *Međunarodna konferencija „Država i globalni izazovi bezbednosti"* (str. 87–97). Beograd: Centar za strateška istraživanja nacionalne bezbednosti – CESNA.
23. Ivanović, M., i Ivanović, U. (2012). Aspekti self-koncepta predadolescenata kao determinante njihovog bavljenja sportom. *Sport - nauka i praksa, 2*(5), 5–21.
24. Ivanović, M., & Ivanović, U. (2016). Biological, psychological and social variables as determinants of dieting with adolescents. *Sport Science, 9*(2), 15–22.
25. Ivanović, M., & Ivanović, U. (2018). Gender differences during adolescence in the motives for physical exercise, depression, anxiety and stress. *Exercise and Quality of Life (EQOL), 10*(1), 17–22. https://doi.org/10.31382/eqol.180602
26. Ivanović, M., Mačvanin, Đ., i Ivanović, U. (2014). Relacije dimenzija ličnosti sa slikom tela i sklonost ka prejedanju kod rukometaša kadeta. U D. Životić (Ur.), *Međunarodna naučna konferencija „Izazovi savremenog menadžmenta u sportu"* (str. 157–167). Beograd: Alfa Univerzitet, Fakultet za menadžment u sportu.
27. Jalali-Farahani, S., Chin, Y. S., Amiri, P., & Mohd Taib, M. N. (2014). Body mass index (BMI)-for-age and health-related quality of life (HRQOL) among high school students in Teheran. *Child: Care, Health and Development, 5*, 731–739. https://doi.org/10.1111/cch.12103
28. Khamidovna, M. I., & Khudayberganov, O. (2022). The psychology of adolescent conflicts in society. *Yosh Tadqiqotchi Jurnali, 1*(1), 29–33.

29. Kim, H. Y. (2013). Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restorative Dentistry & Endodontics, 38*(1), 52–54.
30. Kueh, Y. C., Kuan, G., & Morris, T. (2017). The Physical Activity and Leisure Motivation Scale: A confirmatory study of the Malay language versión. *International Journal of Sport and Exercise Psychology, 17*, 250–265.
31. LaMorte, W. W. (2017). *Nonparametric Tests*. Boston: Boston University of Public Health.
32. Lee, J., Sung, M. J., Song, S. H., Lee, Y. M., Lee, J. J., & Cho, S. M. (2018). Psychological factors associated With smartphone addiction in South Korean adolescents. *Journal of Early Adolescence, 38*, 288–302. https://doi.org/10.1177/0272431616670751
33. Lizandra, J., & Gregori-Font, M. (2021). Study of eating habits, physical activity, socioeconomic status and sedentary lifestyle in adolescents in the city of Valencia. *Revista Española de Nutrición Humana y Dietética, 25*, 199–211.
34. Lohman, T. G., Roche, A. F., & Martorell, R. (1988). *Antropometric standartization reference manual*. Chicago: Human Kinetics.
35. Lowry, R., Haarbauer-Krupa, J., Breiding, M. J., & Simon, T. R. (2021). Sports-and physical activity–related concussion and risk for youth violence. *American Journal of Preventive Medicine, 60*(3), 352–359. https://doi.org/10.1016/j.amepre.2020.10.018
36. Magiera, A., Sowa, A., Jacek, R., & Pac, A. (2017). The quality of life among middle-school adolescents in Krakow. *Developmental period medicine, 21*, 124–130.
37. Marotta, L., Scheltinga, B. L., van Middelaar, R., Bramer, W. M., van Beijnum, B. J. F., Reenalda, … & J. Burke, J. H. (2022). Accelerometer-Based Identification of Fatigue in the Lower Limbs during Cyclical Physical Exercise: A Systematic Review. *Sensors, 22*(8), 3008-3012. https://doi.org//10.3390/s22083008
38. Nilles, H., Kerkhoff, D., Demir, Z., Braig, J., Schmees, P., Rueth, J.-E., . . . & Lohaus, A. (2022). Coping of young refugees in Germany: Relations to gender, age, and gender role attitudes. *European Journal of Health Psychology, 29*(1), 15–25. https://doi.org/10.1027/2512-8442/a000094
39. Palenzuela-Luis, N., Duarte-Clíments, G., Gómez-Salgado, J., Rodríguez-Gómez, J. Á., & Sánchez-Gómez, M. B. (2022). Questionnaires Assessing Adolescents' Self-Concept, Self-Perception, Physical Activity and Lifestyle: A Systematic Review. *Children, 9*(1), 91–112. https://doi.org/10.3390/children9010091
40. Pope, L., & Harvey, J. (2015). The impact incentives on intrinsic and extrinsic motives for fitness-center attendance in college first-year students. *American Journal of Health Promotion, 29*(3), 192–199. 10.4278/ajhp.140408-QUAN-135
41. Poulain, T., Vogel, M., Ludwig, J., Grafe, N., Körner, A., & Kiess, W. (2019). Reciprocal longitudinal associations between adolescents' media consumption and psychological health. *Acad Pediatr, 19*, 109–17. https://doi.org/10.1016/j.acap.2018.08.009
42. Romanova, E., Kolokoltsev, M., Vorozheikin, A., Limarenko, O., Bolotin, A., Solomon, A. N., ... & Balashkevich, N. (2022). Physical activity and metabolism of girls with different somatotypes. *Journal of Physical Education and Sport (JPES), 22*(4), 900–906. https://doi.org/10.7752/jpes.2022.04114
43. Roychowdhury, D. (2018). A comprehensive measure of participation motivation: Examining and validating the Physical Activity and Leisure Motivation Scale (PALMS). J*ournal of Human Sport and Exercise, 13*, 231–247.
44. Sicilia, A., Sáenz-Alvarez, P., González-Cutre, D., & Ferriz, R. (2014). Exercise motivation and social physique anxiety in adolescents. *Psychologica Belgica, 54*(1), 111–129. https://doi.org/10.5334/pb.ai
45. Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics* (6th ed.). Boston, MA: Pearson.
46. The KIDSCREEN Group Europe (2006). *The KIDSCREEN Questionnaires – Quality of life questionnaires for children and adolescents*. Handbook. Lengerich: Pabst Science Publishers.
47. Thomas, V., & Azmitia, M. (2019). Motivation matters: Development and validation of the motivation for solitude scale - Short Form (MSS-SF). *Journal of Adolescence, 70*, 33–42. https://doi.org/:10.1016/j.adolescence
48. Twenge, J. M., Martin, G. N., & Campbell, W. K. (2018). Decreases in psychological well-being among American adolescents after 2012 and links to screen time during the rise of smartphone technology. *Emotion, 18*, 765–80. https://doi.org/10.1037/emo0000403
49. Van Sluijs, E. M. F., Ekelund, U., & Crochemore-Silva, I. (2020). Physical activity behaviours in adolescence: Current evidence and opportunities for intervention. *The Lancet, 398*, 429–442. doi: 10.1016/S0140-6736(21)01259-9
50. Villafaina, S., Miguel, Á., Tapia-Serrano, M. A., Vaquero-Solís, M., León-Llamas, L. J., & Sánchez-Miguel., P. A. (2021). The Role of Physical Activity in the Relationship between Satisfaction with Life and Health-Related

Quality of Life in School-Age Adolescents. *Behavioral Sciences, 11*(9), 121–130. https://doi.org/10.3390/bs11090121

51. Vlašić, J., Barić, R., Oreb, G., & Kasović, M. (2002). Exercise motives in middle aged and eldery female population. In Milanović, D., Prot, F. (Eds.) *Proceedings of the 3rd international scientific conference Kinesiology-new perspectives* (pp. 462-766), Zagreb: Faculty of Kinesiology, University of Zagreb.
52. Weber, D. R., Moore, R. H., Leonard, M. B. & Zemel, B. S. (2013). Fat and lean BMI reference curves in children and adolescents and their utility in identifying excess adiposity compared with BMI and percentage body fat. *American Journal of Clinical Nutrition, 98*(1), 49–56. https://doi.org/10.3945/ajcn.112.053611

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Original scientific paper

GENDER DIFFERENCES IN QUALITY OF LIFE AND EXERCISE MOTIVATION OF ADOLESCENTS OF AVERAGE AND INCREASED BODY MASS[1]

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Abstract: The main aim of this transversal study was to examine the relevant differences between the constructs of quality of life and exercise motivation among male and female adolescents of average and increased body mass. The sample included high school students from Valjevo (N = 337). The average age of the participants was M = 16.53 years (SD = .38). Two measuring instruments were used: The Exercise Motivations Inventory-2 (EMI-2) and The Kidscreen Questionnaire -27 (TKQ). The results of the Cronbach's alpha suggested that the questionnaires used in the research have satisfactory level of reliability and internal consistency, and are valid for assessing adolescent population in Serbia.

The research has shown that there are internal and external motives for adolescents' exercise motivation, and that the male adolescents more favourably perceive the quality of life. Statistically significant gender differences were found, there was higher level of the evaluation of the TKQ construct among male adolescents than female adolescents which is the consequence of a more substantial view of physical well-being, pleasant feelings and moods, good family and social environment, as well as the ability to organize and arrange free time. It was also found that participants with average body mass prefer the perception of own physical activity and health more than their peers with increased body mass. Male adolescents do physical exercise for enjoyment, challenge, competition, strength and endurance, as well as for social reasons (factors such as belonging to a group, pressure, and acceptance), whereas female participants are more willing to exercise in order to control their body mass. The results of the Mann–Whitney U test revealed relevant gender differences: adolescents with average body mass are more likely to exercise because they enjoy the activity, while adolescents with increased body mass are more stimulated by the possibility of body mass regulation ($p \leq .01$).

This research discussed practical implications of the results on creating the motivation for exercise and quality of life among adolescents of both sexes with normal and increased body mass (BM).

Keywords: *motives, adolescence, body mass index, physical exercise, mood and emotions*

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INTRODUCTION

Gender differences in the quality of life and exercise motivation among adolescents of average and increased body mass have been the research subject of many authors (Bull et al., 2020; Cilar Budler et al., 2022; Guthold et al., 2020). Some of the authors (Lee et al., 2018) have noted that the quality of life is complex and includes various lifestyles and individual actions. In their study Poulain et al. (2019) view the quality of life as overall happiness which involves real factors, personal valorisation of physical, material, social and affective possibilities, where individual development and overall behaviour are dominant in one's personal system of values. According to a research conducted by Ihm (2018), determining the quality of life is influenced by various factors, starting from satisfying biological needs, to characteristic social, spiritual, cultural, and historical situations. Certain authors (Grant et al., 2018) claim that personal perception of satisfaction with life dominates this term, which is defined as the overlap between real life and what one expects. This research also identifies the quality of life as a link between adolescents and their competence to plan to achieve certain goals, while other authors (Twenge et al., 2018) isolate free time as a significant determinant in recognizing personal lifestyle. In the study of Fischer-Grote et al. (2019) family life and peer relationship are regarded as significant predictors of the quality of life, which is presented as a multidimensional experience caused by reality and a person's values.

Searching for the causes of the high level of personal happiness, authors examined various latent dimensions such as the level of nutritional status and physical activity in adolescence. The authors of another study (Van Sluijs et al., 2020) noted that physical activity involves any body movement that includes activating skeletal muscles and spending energy. Lowry et al. (2021) claim that physical activity is a necessary element for realizing the most advantageous functioning of the body, especially proper body growth and development, and improvement of psychophysical health. Physical exercise is a significant way of training aimed at preserving and improving body shape, as noted in another study (Marotta et al., 2022). The aforementioned authors believe that moderate daily exercise has positive influence on physical, mental and social well-being of an individual. Generally speaking, if professionally organized, physical exercise can motivate adolescents to create and adopt healthy habits (Palenzuela-Luis et al., 2022). According to another study (Arruda et al., 2022), regular training during adolescence correlates to the decrease of negative health conditions and illnesses, meaning that it minimizes the danger of negative changes in the skeletal system such as osteoporosis later in life. In addition, physical exercise is in relevant interaction with the decrease of body mass and risk of coronary disease, and the improvement of spiritual health, and consequently the increase of self-respect and self-confidence (Huffman et al., 2018). In their study, Asam et al. (2019) note that physical exercise represents a successful strategy for dealing with stress, especially depression and anxiety. The same authors claim that the effects of physical exercise lead to better social communication and acceptance of personal skills. The findings of other empirical studies that deal with these phenomena are not consistent, and the authors point out that they should be analysed by integrating all the factors of the process of socialization (Khamidovna & Khudayberganov, 2022). These authors also found that when compared to the physically non-active young population, athletes manifest more developed communication skills, social skills, and a tendency to be team players because physical exercise can affect their physical constitution and social position among peers. However, Romanova et al. (2022) claim that the contemporary phenomenon of hypokinesis is more and more dominant as a generator of health problems. These results indicate that the lack of physical exercise is linked to the growing dangers of increased body mass index (BMI) and peer violence, which has a particularly negative influence on psychosocial difficulties among adolescents. However, despite the well-known scientific effects that exercising has on psychophysical and social health, the fact remains that the intensity of exercise is visibly low in modern society, especially among female adolescents which is reflected in increased body mass (Ivanović & Ivanović, 2012; Ivanović & Ivanović, 2018; Ivanović, & Ivanović, 2021; Pope & Harvey, 2015).

Motivation is a mental process which encourages a person to engage in physical activity (PA), to determine the orientation and coordinate the intensity and length of the activity (Thomas & Azmitia, 2019). The aforementioned authors believe that if we are to motivate people to exercise, it would be important to identify the mental and physiological factors which encourage them to be physically active. Seeing how the increased body mass (BMI) is a growing occurrence, obesity has become a serious health condition which is particularly significant during the sensitive and formative period of adolescence where lack of physical activity and increased BMI are dangerous, and

therefore researching this subject matter has become a necessity (Ivanović et al., 2014; Ivanović & Ivanović, 2016). In addition, the lack of physical exercise and the increase in body mass lower the quality of life and can lead to premature death, so it is important to develop effective prevention programs and actions that can directly change the existing condition. Identifying the motivation and motives for exercising of an individual of a certain age, as well as their characteristics can influence more efficient planning. In order to understand better the needs and actions of adolescents and gain better insight into the way they experience happiness, it is necessary to identify the factors which define or influence it.

The main motive for the focus of our research on this complex problem is the fact that such studies so far have not been conducted on the Serbian adolescent population, so the main aim of this research was to examine the quality of life and exercise motivation, and the difference in assessing the aforementioned constructs among adolescents depending on gender and BMI. It is very significant to explore this phenomenon as it can have significant methodological and theoretical implications for both further research and practice.

In accordance with the results of earlier empirical studies, theoretical predictions and the aim of this research, and with the application of adequate statistical tools, the following hypotheses were formulated: H_1 – male participants are expected to score their quality of life, meaning the variables of physical well-being, mood, and feelings higher than female participants; H_2 – the assumption is that the variables of physical well-being and health have statistically significantly lower values in male participants with increased body mass than in their peers with average body mass; H_3 – adolescents with normal body mass and those with increased body mass generally evaluate the quality of life identically; H_4 – it is believed that internal (enjoyment, challenge, competition, strength, and endurance) and external motives (belonging to a group) stimulate male participant to exercise, while female participants are motivated more by the control of their body mass.

METHOD

Participants and procedure

This transversal research was conducted on a pertinent sample (N = 337) consisting of students from a secondary economy school and a technical vocational school in Valjevo, including: 222 male adolescents (51%) and 115 female adolescents (49%). The average age of the participants was 16.53 (SD = .38).

Before filling in the questionnaires, the students were given detailed instructions, and the aim of the research was explained to them, without explaining the purpose of each measuring instruments (in order to prevent desirable responding). The instructions were printed out on the test as well. The students were asked not to think too much about answers and in case of doubt choose an answer they favour more, and that there would be no consequences for quitting at any time. The research lasted for 45 minutes and was conducted by the authors of this study and the school psychologists. The research was anonymous and voluntary, and was conducted with the permission of school principals and students' parents.

The process of filling in the questionnaires and taking the anthropometric measurements (body mass and height) was organized in groups during the physical exercise classes. The anthropometric measurements were taken and that lasted approximately 30 minutes. Then, the participants were given the questionnaires: a) The Exercise Motivations Inventory-2, and b) The Kidscreen Questionnaire -27. That took approximately 30 minutes. The empirical research was conducted in October 2022.

The Exercise Motivations Inventory – EMI-2 (Vlašić et al., 2002)

The EMI-2 includes 54 items and it is created in a way that participants answer the question why an individual exercises or should exercise, and it includes 14 potential exercise motives: belonging to a group (for example, "To spend time with friends"), physical appearance (for example, "To have good figure"), challenge (for example, "So that I could develop skills"), competition (for example, "Because I like to compete"), enjoyment (for example, "Because I enjoy making effort"), disease prevention (for example, "In order to avoid getting sick"), agility (for example, "In order to get more agile"), health (for example, "Because I want to stay healthy"), refreshment (for example, "I find exercising refreshing"), social acceptance (for example, "In order to prove myself in front of others"), social pressure (for example, "Because others talk me into doing it"), strength/endurance (for example, "To increase

my strength/endurance"), stress management (for example, "Because exercising helps me cope with stress"), and control over body mass (for example, "In order to lose weight").

The total score shows the importance individual motives have in the decision to engage in physical activity and it is determined as a mean value of answers on specific subscales. The answers to the items are marked on a five point Likert-type scale (from 1 – *"very untrue for me"* to 5 – *"very true for me"*). The participants are offered multiple answers that belong to specific motives, and they have to answer how true a certain item is for them.

The reliability of internal consistency (Cronbach's Alpha) of the dimensions of the EMI-2 in this research is: belonging to a group (α = .79), physical appearance (α = .90), challenge (α = .92), competition (α = .90), enjoyment (α = .78), disease prevention (α = .79), agility (α = .86), health (α = .92), refreshment (α = .80), social acceptance (α = .85), social pressure (α = .91), strength and endurance (α = .79), stress management (α = .94), and body mass control (α = .77), which indicates that the metric characteristics of the questionnaire are satisfactory (Tabachnick & Fidell, 2013).

The Kidscreen Questionnaire -27 – TKQ (The Kidscreen Questionnaire -27; The Kidscreen Group Europe, 2006)

The TKQ examines the construct of the quality of life through the elements of physical, emotional, social, and behavioural well-being. The questionnaire contains 27 claims which measure six dimensions of the quality of life: fun and relationship with friends (for example, "Could you rely on your friends?"), school and learning (for example, "Were you doing well in school?"), physical activity and health (for example, "Were you physically active?"), mood and emotions (for example, "Were you feeling lonely?"), family and spare time (for example, "Were your parents fair to you?"), and financial resources (for example, "Did you have enough money for your own expenses?"). The participants needed to determine their level of agreement with a specific item on a five point Likert-type scale (1 – "*not at all*" to 5 – "*strongly agree*"). Negatively expressed items indicate that a higher score on a specific dimension means higher degree of the quality of life. The reliability of the coefficient of the internal consistency of each dimension of the questionnaire is satisfactory, and the value of Cronbach's alpha reliability coefficient for specific scales for our sample is: friends (α = .90), school and learning (α = .76), physical activity and health (α = .82), mood and emotions (α = 0,80), family and spare time (α = .78), and financial resources (α = .78).

Body Mass Index – BMI (Lohman et al., 1988)

The height-weight indicator of nutrition - BMI shows whether the body mass in relation to the body height of the subject is average, more or less below/above the average. It is calculated in accordance with the international classification for children and adolescents based on the measured morphological variables: body weight in kilograms and body height in meters (Weber et al., 2013). In that way the numerical value is compared to the values presented in the table classified by age and gender in order to obtain the converted value which is in accordance with the border values of our sample, so each participant is classified by the guidelines of Italian authors (Cacciari et al., 2006) into one of the four following categories: underweight (BMI ≥ 18.5 kg/m²), normal weight (BMI = 18.5–24,99 kg/m²), overweight (BMI ≥ 25 kg/m²), and obesity (BMI ≥ 30 kg/m²). Anthropometric measurements were conducted in accordance with the International Biological Programme.

Statistical analysis

The obtained data was first processed using the method of descriptive statistics, and then the Kolmogorov–Smirnov test was used for the examination of deviations from the obtained data distribution, and the Mann–Whitney U nonparametric test was used for testing the statistically significant differences between the two groups of data. The IBM SPSS 22.00 software (IBM Corporation, New York, USA) was used for processing the quantitative data.

RESULTS

The statistical parameters of the participants' assessments of the examined dimensions of The Kidscreen Questionnaire are presented in Table 1.

Table 1. *Result distribution for TKQ questionnaire variables*

Variables	*M*	*SD*	*C*	*Sk*	*Ku*	*K-S*
Friends	3.95	.82	4.08	5.52 (.18)	2.40 (.28)	1.39*
School and learning	3.47	.80	3.27	4.93(.15)	2.37(.26)	1.58*
Physical activity and health	3.66	.69	3.55	9.07(.16)	7.33(.31)	2.05**
Family and spare time	3.84	.76	3.78	7.38(.16)	2.94 (.31)	2.59**
Mood and emotions	3.89	.72	4.48	8.40 (.16)	4.53(.31)	2.44**
Financial resources	3.99	.88	4.60	10.30 (.16)	7-86 (.31)	3.29**

Legend. *M* = Arithmetic mean; *SD* = Standard deviation; *C* = median, measure of central tendency; *Sk* = skewness, with standard error for skewness; *Ku* = kurtosis, with standard error for kurtosis; *K-S* = Kolmogorov–Smirnov test; * $p \leq .05$, ** $p \leq .01$ ($N = 337$)

Having an insight into the matrix, one can see that participants perceive the quality of life on a generally high level. Maximum evaluations can be seen on the financial resources ($M = 3.99$, $SD = .88$), and friends ($M = 3.47$, $SD = .80$) variables. The values of the Kolmogorov–Smirnov test of normal distribution and standardized coefficients of skewness and kurtosis show that the applied variables do not have normal distribution, because the values ranged between -2 and +2 (Gravetter & Wallnau, 2014; Kim, 2013). Therefore, the nonparametric method of the inferential statistics of the Mann–Whitney U test was used to test the differences between the two independent samples.

Table 2 shows the descriptive parameters of the examined variables of the EMI-2 questionnaire.

Table 2. *Result distribution for EMI-2 questionnaire variables*

Variables	*M*	*SD*	*C*	*Sk*	*Ku*	*K-S*
Belonging to a group	3.05	1.28	3.00	7.16 (.15)	2.40 (.28)	2.46*
Physical appearance	3.79	1.17	3.92	5.943(.16)	4.55(.26)	2.58*
Challenge	3.65	1.30	3.82	9.07(.16)	7.33(.31)	2.05**
Competition	2.68	1.62	2.80	7.38(.16)	2.94 (.31)	2.59**
Enjoyment while exercising	3.35	1.25	3.18	8.40 (.18)	4.53(.31)	2.44**
Disease prevention	2.96	1.37	3.28	10.30 (.16)	7-86 (.31)	3.29**
Agility	3.63	1.30	3.71	3.35 (.27)	9.85(.31)	2.56**
Health	3,90	1.19	3.94	2.84 (.15)	3.78(.31)	2.67**
Refreshment	3.59	1.17	3.70	4.81(.16)	6.64(.31)	3.75**
Social acceptance	2.28	1.42	2.47	6.78(.15)	5.64(.31)	2.97**
Social pressure	1.03	1.27	.48	5.53(.16)	3.76(.31)	4.16**
Strength and endurance	3.93	1.09	4.30	3.68(.15)	8.95(.31)	2.65**
Stress management	3.23	1.40	3.30	2.84(.16)	7.68(.31)	2.95**
Body mass control	3.42	1.37	3.48	8.56(.16)	5.64(.31)	3.45**

Legend. *M* = Arithmetic mean; *SD* = Standard deviation; *C* = median, measure of central tendency; *Sk* = skewness, with standard error for skewness; *Ku* = kurtosis, with standard error for kurtosis; *K-S* = Kolmogorov–Smirnov test; * $p \leq .05$, ** $p \leq .01$ ($N = 337$)

The main descriptive parameters of the exercise motivation construct are in most cases distributed just above the mean value of the theoretical range, which means that the exercise motivation is average. The findings show that

adolescents consider social pressure, social acceptance, and competition to be the least important motives for exercising. They consider the most important motives to be health, strength and endurance, and physical appearance. The participants' answers reveal much about how they see the connection between physical exercise and improving and preserving their physical well-being. On the other hand, the distortion of the normality of answers on certain variables (the values of the Kolmogorov–Smirnov test of normal distribution and standardized skewness and kurtosis) allowed the use of nonparametric methods (LaMorte, 2017).

The findings obtained from the *Mann–Whitney U test*, with 1% risk, are shown in Table 3 and reveal the significant differences between the self-assessments of the quality of life construct based on gender, where compared to female adolescents, male adolescents have higher values on the numerical variables, the dimensions school and learning, physical activity and health, family and spare time, and mood and emotions.

Table 3. *Differences between male and female participants on TKQ questionnaire dimensions*

	Male adolescents (H = 222)			Female adolescents (N = 115)					
Variables	*M*	*SD*	*C*	*M*	*SD*	*C*	*U*	*Z*	*p*
Friends	4.09	.68	4.23	4.09	.66	4.23	42742.46	-.70	.45
School and learning	3.52	.80	70	3,26	.77	3.50	3962.60	-4.25	.01**
Physical activity and health	3.76	.70	3.70	3.62	.65	3.50	4961.30	-5.56	01**
Family and spare time	3,87	.93	3.92	3,59	.91	3.63	5675.00	-4.28	01**
Mood and emotions	3.99	.59	4,25	3,76	0,74	.66	4.859.30	-8.05	01**
Financial resources	4.18	.89	4.56	4.14	.87	4.20	6592.03	2.92	.98

Legend. *M* = Arithmetic mean; *SD* = Standard deviation; *C* = median; *U* – value of Mann–Whitney U test for independent samples; *z* – Standard value of u; **p* – Probability of statistically significant difference (***p* ≤ .01)

The Mann–Whitney U test for nonparametric data and z – standard values were used to calculate the statistically significant differences in the perceived construct of the quality of life depending on the body mass index (Table 4).

Table 4. *Descriptive parameters of difference between male and female participants on BMI variable*

	ABM			EBM					
Variables	*M*	*SD*	*C*	*M*	*SD*	*C*	*U*	*Z*	*p*
Friends	3.96	.68	4.19	3.95	.90	4.19	5811.00	-.105	.88
School and learning	3.29	0.80	3.35	3.28	.70	3.35	4729.20	-3.352	.67
Physical activity and health	3.59	0.67	3.55	3.40	.72	3.47	2591.44	-8.906	01**
Family and spare time	3.80	.77	3.78	3,76	.80	3.78	3670.03	-4.473	.45
Mood and emotions	3.99	.68	4,00	3.99	.57	3.99	7516.45	-6.128	.34
Financial resources	4.20	.80	4.49	4.26	,79	4.49	7282.00	-1.155	.43

Legend. ABM – average body mass; EBM – extra body mass; *M* – Arithmetic mean; *SD* – Standard deviation; *C* – median; *U* – value of Mann–Whitney U test for independent samples; *z* – Standard value (deviation of some results from the arithmetic mean presented as standard deviation); ** *p* – Probability of statistically significant difference (*p* ≤ .01)

Having an insight into the matrix, one can see that when compared to the participants of average BMI, the participants with increased BMI manifest significantly lower level of satisfaction on the variables physical activity and health.

The *Mann–Whitney U* nonparametric test was used to compare the results between male and female adolescents on the EMI-2 questionnaire variables (Table 5).

Table 5. *Descriptive parameters of differences between male and female adolescents on EMI-2 questionnaire subscales*

	Average body mass			Excessive body mass					
Variables	*M*	*SD*	*C*	*M*	*SD*	*C*	*U*	*z*	*p*
Belonging to a group	2.95	1.28	3.18	2.80	1.29	2.95	4874.25	-2.962	.01**
Physical appearance	3,68	1.27	3.96	4.05	1.07	4.30	5895.03	-1.837	.43
Challenge	3.68	1.30	4.01	3.39	1.18	3.44	7641.05	-2.860	01**
Competition	3.22	1.53	3.48	2.25	1.50	1.96	6085.40	-7.829	01**
Enjoyment while exercising	3.38	1.27	3,80	1.33	1.30	3.35	6784.06	-3.014	01**
Disease prevention	2.97	1.50	2.96	3.08	1.29	3.28	7942.00	-.655	.72
Agility	3.49	1.28	3.70	3.59	1.18	3.70	5692.03	-.254	.68
Health	4.00	1.21	4.28	3.99	1.19	4.30	4824.08	-.742	.57
Refreshment	3.59	1.19	3.70	3.60	1.21	3.68	8027.90	-.436	.46
Social acceptance	2.68	1.38	2.70	2.57	1.40	2.69	6078.12	-.560	01**
Social pressure	1.12	1.14	.78	1.05	1.20	.80	7902.94	-.382	01**
Strength and endurance	4.19	1.10	4.80	4.09	1.08	4.78	6092.44	-.620	01**
Stress management	3.19	1.40	3.19	3.15	1.38	3.20	5028.06	-.708	.77
Body mass control	2.98	1.38	3.18	3.05	1.42	3.20	4053.24	-.298	01**

Legend. *M* = Arithmetic mean; *SD* = Standard deviation; *C* = median; *U* – the value of the Mann–Whitney U test for testing the difference in the results of two independent groups of data; *z* – standard value (deviation of some result from the arithmetic mean presented as standard deviation); **p* – Probability of statistically significant difference (***p* ≤ .01)

The findings obtained using the *Mann–Whitney U* nonparametric and z – standard values show, with a 1% error, statistically significant differences on the EMI-2 questionnaire between male and female adolescents, in case of the following variables: belonging to a group, challenge, competition, enjoyment, social acceptance, social pressure, strength and endurance, and control over body mass. The variables belonging to a group, social acceptance, and social pressure are more important exercise motives to male than to female adolescents. In addition, male participants exercise more for the reason of enjoyment than female participants do. Males are also more motivated by the subscales challenge, competition, strength and endurance while engaging in physical activity. So, all the aforementioned motives are more important to male than female adolescents, except the body mass control variable, which is a bigger factor of motivation for female adolescents.

Table 6 shows the EMI-2 questionnaire results of the difference between the adolescents of both sexes depending on the body mass index.

Table 6. *Descriptive parameters of differences between adolescents on EMI-2 questionnaire subscales depending on BMI*

	Average body mass			Excessive body mass					
Variables	*M*	*SD*	*C*	*M*	*SD*	*C*	*U*	*z*	*p*
Belonging to a group	3.10	1.29	3.22	2.79	1.08	4.19	4803.25	-2.958	.45**
Physical appearance	3.70	1.30	3.98	3.77	1.07	4.30	5903.12	-1.765	.25
Challenge	3.70	1.28	3.99	3.60	1.20	3.48	5691.23	-2.900	.74
Competition	3.23	1.50	3.48	3.18	1.53	2.01	5643. 09	-8.263	.58
Enjoyment while exercising	3.40	1.28	3.78	3.36	1.30	3.35	6904.17	-5.836	01**
Disease prevention	3.00	1.47	2.98	3.10	1.30	3.30	7075.26	-.698	.65
Agility	3.56	1.30	3.68	3.60	1.23	3.69	6541.93	-.364	.46

Health	4.01	1.20	4.28	4.00	1.12	4.29	5162.00	-.560	.34
Refreshment	3.59	1.19	3.70	3.60	1.20	3.98	4732.84	-.452	.56
Social acceptance	2.68	1.38	2.80	2.59	1.40	4.00	7096.42	-.290	.86
Social pressure	1.13	1.14	.79	1.98	1.20	2.00	3641.08	-.905	.70
Strength and endurance	4.19	1.99	4.80	3.95	2.03	1.98	6852.06	-.628	.29
Stress management	3.19	1.40	3.19	3.15	1.38	3.20	5294.05	-.785	.65
Body mass control	2.98	1.39	3.18	3.10	1.42	3.20	5093.76	-.543	01**

Legend. *M* = Arithmetic mean; *SD* = Standard deviation; *C* = median; *U* – the value of the Mann–Whitney U test for testing the difference in the results of two independent groups of data; *z* – Standard value (deviation of some results from the arithmetic mean presented as standard deviation); **p* – Probability of statistically significant difference (***p* ≤ .01)

The obtained findings indicate that there are statistically significant differences on the EMI-2 depending on BMI, on the variables enjoyment and body mass control. The values of the descriptive parameters indicate that participants with average body mass are more motivated by the internal motive of enjoyment then the participants with increased body mass, while the participants with increased body mass are more motivated by the external motive of body mass control than the participants with average body mass.

DISCUSSION

Seeing how the research so far conducted on the western cultures gave inconsistent results, the aim of this empirical cross-sectional study was to examine the quality of life and exercise motivation, as well as the differences in the assessment of these constructs among male and female adolescents depending on the body mass index. The obtained results show that there are statistically significant differences between the self-assessment of the quality of life depending on gender, where male participants showed higher scores on the variables school and learning, physical activity and health, family and spare time, and emotions and mood than female participants, which is in accordance with empirical studies (Nilles et al., 2022; Villafaina et al., 2021). In addition, empirical research by various authors (Bucur, 2017; Gomez-Baya et al., 2019) showed that male adolescents are more satisfied with life than female adolescents. The studies (Årdal et al., 2018; Villafaina et al., 2021) determined that during the period of youth the differences in the way male and female persons perceive the quality of life are quite striking, with females having a more negative view on their quality of life. This can be explained by the radical physical transformations girls go through at that period of life. During that period female adolescents are more exposed to contradictory social expectations while gender equality is still present within a social group. The findings of our research have shown that adolescents with increased body mass manifest significantly lower level of satisfaction with the physical activity and health variables than their peers with average BMI. If we take the starting hypothesis that participants with average BMI engage in physical activity more than their peers with increased body mass, then this result is in accordance with the expectations and findings of previous empirical studies (Cole & Lobstein, 2012; Boiché et al., 2014; Jalali-Farahani et al., 2014; Lizandra & Gregori-Font, 2021; Magiera et al., 2017; Weber et al., 2013) which established that male adolescents who are athletes have significantly better perception of their physical well-being than their female peers who do not practice any sport. In addition, other research results (Lizandra & Gregori-Font, 2021) show that a higher level of physical activity is beneficial for emotions and health. The results obtained using the nonparametric U test revealed relevant differences in exercise motivation with participants of both sexes in terms of the following variables: belonging to a group, challenge, competition, enjoyment, social acceptance, social pressure, strength and endurance, and body mass control. At the same time, three variables: belonging to a group, social acceptance, and social pressure are more significant exercise motives for male than for female participants. The findings are in accordance with various studies' results (Ivanović & Ivanović, 2018; Galan-Lopez & Ries, 2019; Sicilia et al., 2014), which show that gender differences regarding exercise motivation start from the early period of adolescence. In addition, the same authors found that the most important motives depend on gender: male participants are more incited by intrinsic motives such as strength, competition and challenge, while female participants are more incited by body mass control and physical appearance. Our sample provided identical results characterized by the expression of intrinsic and extrinsic motives. Comparing the findings on the EMI-2 questionnaire depending

on gender, gender difference in motivation can be linked to the differences in their real actions. That is confirmed by the results of several studies (Dominguez-Alonso et al., 2018; Guddal et al., 2019; Kueh et al., 2017; Ivanović & Ivanović, 2018; Roychowdhury, 2018; Sicilia et al., 2014) which found that due to the consequences of the aforementioned motivational mechanism, female adolescents engage in physical activity less than male adolescents. It is important to keep that in mind while creating preventive procedures and mediations that are aimed at improving well-being of adolescents who expose themselves to danger.

The calculated values of the descriptive parameters on our sample show significant differences in exercise motivation depending on BMI. The values of the measures of central tendency point out that adolescents of average body mass are more motivated to exercise by the intrinsic motive of enjoyment than their peers with increased body mass, while adolescents with increased body mass are more incited to exercise by the body mass control motive than their peers with average body mass. Finally, these results are significant because, according to different studies (Ahmed & Shekahawat, 2021; Fives et al., 2022), external motives lead to short-term physical exercise.

The results obtained in this research completely confirmed all of the four starting hypotheses: the first hypothesis that, based on the assessment of the physical well-being, health, mental happiness, emotions and mood variables, male participants perceive the quality of life on a higher level than female participants (H_1); the second hypothesis where it was expected that physical well-being and health are on a statistically lower level in adolescents with increased body mass than in those with average body mass (H_2); the third hypothesis where it is believed that adolescents with average body mass and those with increased body mass generally identically evaluate the quality of life (H_3); the fourth hypothesis which suggested that male participants are more incited to exercise by intrinsic motives (enjoyment, challenge, competition, strength and endurance) and extrinsic motives (belonging to a group), while female participants are predominantly motivated by an extrinsic motive - body mass control (H_4).

This empirical research has certain methodological limitations that should be taken into account while interpreting the obtained results, which can potentially limit the generalization of the results on the entire adolescent population. The limitations are: a) the pertinent sample is not sufficiently representative due to the geographical area; b) methodological variance and the self-assessment method due to which the possibility of giving dishonest or socially desirable answers cannot be excluded; and c) transversal design of the research which tests the participants within a given timeframe, thus preventing identification of the cause-effect link between the examined variables.

Still, even with the aforementioned limitations, this research contributed in determining the motives and understandings of the motivation of adolescents, and acquiring the basic knowledge for encouraging and preserving daily physical activity of adolescents and thus improving the quality of their lives. The findings indicate that adolescents need adequate programs which can motivate them to accept and keep an active lifestyle. Recognizing the motivational factors among young people with average body mass can be a model for creating preventive programs aimed at engaging adolescents in physical activity in school gyms and sports fields. Future research should examine the relations between the examined variables and adolescents' physical exercise, which would provide a more comprehensive insight into the examined phenomena among high school population.

We recommend the questionnaires tested in this study as reliable psychological tools for measuring exercise motivation and the quality of life among Serbian male and female adolescents. Despite the methodological limitations, the theoretical and empirical results of this study can be used as a basis for future research, but can also serve as a valid indicator for predicting adolescents' increased exercise motivation and the quality of life. With that in mind, we can say that further empirical research is needed, covering various cultures and geographical regions, and that it should include: a) various conceptualizations and operationalization of the EMI-2 and TKQ concepts in adolescence, and b) differently designed studies, meaning longitudinal studies.

CONCLUSIONS

The results of this study point to the importance of further research regarding the perception of the differences of the quality of life and exercise motivation during adolescence. The values of the *Cronbach* α coefficient revealed satisfactory reliability of internal consistency type for the EMI-2 and TKQ questionnaires, which implies that they can be regarded as valid instruments for examining adolescent population in Serbia. The findings revealed higher quality of life among male than female adolescents, which is manifested through the significant differences on most variables of the examined construct. In addition, the results have shown that adolescents with average body mass and those with increased body mass have almost identical perception of the quality of life. Young people with

average body mass also enjoy higher level of physical well-being than their peers with increased body mass. Summing up the obtained results of this empirical research, one can conclude that motivational factors among male high school students are significantly different from the motivational factors among female high school students. There are significantly more intrinsic and extrinsic factors that motivate male students, while female students are motivated to exercise mostly because of body mass control.

To conclude, the obtained findings of this transversal research can be an encouragement for future (longitudinal) research which can lead to a better understanding of gender differences in exercise motivation and the quality of life among male and female adolescents with average and increased body mass. Additionally, these results can inspire exercise motivation and improve of the quality of life among the high school population.

REFERENCES

1. Ahmed, M., & Shekahawat, S. S. (2021). Study on mental health improvements. *International Journal of Economic Perspectives, 15*(1), 482–487.
2. Årdal, E., Holsen, I., Diseth, Å., & Larsen, T. (2018). The five cs of positive youth development in a school context; gender and mediator effects. *School Psychology International, 39*, 3–21. https://doi.org/10.1177/0143034317734416
3. Arruda, G. A., Cantieri, F. P., Coledam, D. H. C., Christofaro, D. G. D., Barros, M. V. G., & de Mota, J. (2022). Tracking of physical activity and sedentary behavior of adolescents in different domains. *Acta Scientiarum. Health Sciences, 44*(1), 2–10.
4. Asam, A., Samara, M., & Terry, P. (2019). Problematic internet use and mental health among British children and adolescents. *Addictive Behaviors, 90*, 428–436.
5. Boiché, J., Plaza, M., Chalabaev, A., Guillet, E., & Sarrazin, P. (2014). Social antecedents and consequences of sport gender stereotypes during adolescence. *Psychology of Women Quarterly, 38*(2), 259–274.
6. Bucur, B. (2017). How can we apply the models of the quality of life and the quality of life management in an economy based on knowledge? *Economic Research, 30*, 629–646. https://doi.org/10.1080/1331677
7. Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., … & Carty, C. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *Journal of Sports Medicine, 54*, 1451–1462.
8. Cacciari, E., Milani, S., Balsamo, A., Spada, E., Bona, G., Cavallo, L., ... & Cicognani, A. (2006). Italian cross-sectional growth charts for height, weight and BMI (2 to 20 yr). *Journal of Endocrinological Investigation, 29*(7), 581–93.
9. Cilar Budler, L., Pajnkihar, M., Ravens-Sieberer, U., Barr, O., & Stiglic, G. (2022). The KIDSCREEN-27 scale: translation and validation study of the Slovenian version. *Health and Quality of Life Outcomes, 20*(67), 1–10.
10. Cole, T. J., & Lobstein, T. (2012). Extended international (IOTF) body mass index cut-offs for thinness, overweight and obesity. *Pediatric Obesity, 7*(4), 284–294.
11. Dominguez-Alonso, J., Castedo, A. L., & Pino, I. P. (2018). Validation of the self-report of reasons for practicing physical exercise with adolescents (AMPEF): differences by gender, age and school cycle. *Retos*, (33), 273–278.
12. Fischer-Grote, L., Kothgassner, O. D., & Felnhofer, A. (2019). Risk factors for problematic smartphone use in children and adolescents: a review of existing literature. *Neuropsychiatrie. 33*, 179–90. https://doi.org/10.1007/s40211-019-00319-8
13. Fives, C., Lone, M., & Nolan, Y. M. (2022). Motivation and learning methods of anatomy:Associations with mental well-being. *Clinical Anatomy, 35*(1), 26–39. https://doi.org/10.1002/ca.23781
14. Galan-Lopez, P., & Ries, F. (2019). Motives for Exercising and Associations with Body Composition in Icelandic Adolescents. *Sports, 7*(6), 149–160. https://doi:10.3390/sports7060149
15. Gomez-Baya D., Reis M., & Matos M. G. (2019). Positive youth development, thriving and social engagement: an analysis of gender differences in Spanish youth. *Scandinavian Journal of Psychology, 60*, 559–568 https://doi.org/10.1111/sjop.12577
16. Grant, J. E., Lust, K., & Chamberlain, S. R. (2018). Problematic smartphone use associated with greater alcohol consumption, mental health issues, poorer academic performance, and impulsivity. *Journal of Behavioral Addictions, 8*, 335–42. https://doi.org/10.1556/2006.8.2019.32
17. Gravetter, F., & Wallnau, L. (2014). *Essentials of Statistics for the Behavioral Sciences* (8th Edition). Belmont, CA: Wadsworth.

18. Guddal, M., Stensland, S., Småstuen, M., Johnsen, M., Zwart, J., & Storheim, K. (2019). Physical activity and sport participation. n among adolescents: Associations with mental health in different age groups. Results from the Young-HUNT study: A cross-sectional survey. *BMJ Open, 9*(9), 1–10.
19. Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C., (2020). Global trends in insufficient physical activity among adolescents: A pooled analysis of 298 population-based surveys with 1.6 million participants. *Lancet Child Adolesc. Health, 4*, 23–35.
20. Huffman, L. E., Wilson, D. K., Van Horn, M. L., & Pate, R. R. (2018). Associations between parenting factors, motivation, and physical activity in overweight African American adolescents. *Annals of Behavioral Medicine, 52*(2), 93–105. https://doi.org/10.1007/s12160-017-9919-8
21. Ihm, J. (2018). Social implications of children's smartphone addiction: the role of support networks and social engagement. *Journal of Behavioral Addictions, 7*, 473–81.
22. Ivanović. M., & Ivanović, U. (2021). Anksioznost i depresivnost determinante zadovoljstva telesnim izgledom kod fudbalera pionira i kadeta. In S. Nešković (Ed.), *Međunarodna konferencija „Država i globalni izazovi bezbednosti"* (pp. 87–97). Beograd: Centar za strateška istraživanja nacionalne bezbednosti – CESNA.
23. Ivanović, M., & Ivanović, U. (2016). Biological, psychological and social variables as determinants of dieting with adolescents. *Sport Science, 9*(2), 15–22.
24. Ivanović, M., & Ivanović, U. (2018). Gender differences during adolescence in the motives for physical exercise, depression, anxiety and stress. *Exercise and Quality of Life (EQOL), 10*(1), 17–22. https://doi.org/10.31382/eqol.180602
25. Ivanović, M., & Ivanović, U. (2012). Pre-adolescent self-concept aspects as determinants of engagement in sports activities. *Sport – Science & Practice, 2*(5), 5–21.
26. Ivanović, M., Mačvanin, Đ., & Ivanović, U. (2014). Relacije dimenzija ličnosti sa slikom tela i sklonost ka prejedanju kod rukometaša kadeta. In D. Životić (Ed.), *Međunarodna naučna konferencija „Izazovi savremenog menadžmenta u sportu"* (pp. 157–167). Beograd: Alfa Univerzitet, Fakultet za menadžment u sportu.
27. Jalali-Farahani, S., Chin, Y. S., Amiri, P., & Mohd Taib, M. N. (2014). Body mass index (BMI)-for-age and health-related quality of life (HRQOL) among high school students in Teheran. *Child: Care, Health and Development, 5*, 731–739. https://doi.org/10.1111/cch.12103
28. Khamidovna, M. I., & Khudayberganov, O. (2022). The psychology of adolescent conflicts in society. *Yosh Tadqiqotchi Jurnali, 1*(1), 29–33.
29. Kim, H. Y. (2013). Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restorative Dentistry & Endodontics, 38*(1), 52–54.
30. Kueh, Y. C., Kuan, G., & Morris, T. (2017). The Physical Activity and Leisure Motivation Scale: A confirmatory study of the Malay language versión. *International Journal of Sport and Exercise Psychology, 17*, 250–265.
31. LaMorte, W. W. (2017). *Nonparametric Tests*. Boston: Boston University of Public Health.
32. Lee, J., Sung, M. J., Song, S. H., Lee, Y. M., Lee, J. J., & Cho, S. M. (2018). Psychological factors associated With smartphone addiction in South Korean adolescents. *Journal of Early Adolescence, 38*, 288–302. https://doi.org/10.1177/0272431616670751
33. Lizandra, J., & Gregori-Font, M. (2021). Study of eating habits, physical activity, socioeconomic status and sedentary lifestyle in adolescents in the city of Valencia. *Revista Española de Nutrición Humana y Dietética, 25*, 199–211.
34. Lohman, T. G., Roche, A. F., & Martorell, R. (1988). *Antropometric standartization reference manual*. Chicago: Human Kinetics.
35. Lowry, R., Haarbauer-Krupa, J., Breiding, M. J., & Simon, T. R. (2021). Sports-and physical activity–related concussion and risk for youth violence. *American Journal of Preventive Medicine, 60*(3), 352–359. https://doi.org/10.1016/j.amepre.2020.10.018
36. Magiera, A., Sowa, A., Jacek, R., & Pac, A. (2017). The quality of life among middle-school adolescents in Krakow. *Developmental period medicine, 21*, 124–130.
37. Marotta, L., Scheltinga, B. L., van Middelaar, R., Bramer, W. M., van Beijnum, B. J. F., Reenalda, … & J. Burke, J. H. (2022). Accelerometer-Based Identification of Fatigue in the Lower Limbs during Cyclical Physical Exercise: A Systematic Review. *Sensors, 22*(8), 3008-3012. https://doi.org//10.3390/s22083008
38. Nilles, H., Kerkhoff, D., Demir, Z., Braig, J., Schmees, P., Rueth, J.-E., . . . & Lohaus, A. (2022). Coping of young refugees in Germany: Relations to gender, age, and gender role attitudes. *European Journal of Health Psychology, 29*(1), 15–25. https://doi.org/10.1027/2512-8442/a000094

39. Palenzuela-Luis, N., Duarte-Clíments, G., Gómez-Salgado, J., Rodríguez-Gómez, J. Á., & Sánchez-Gómez, M. B. (2022). Questionnaires Assessing Adolescents' Self-Concept, Self-Perception, Physical Activity and Lifestyle: A Systematic Review. *Children, 9*(1), 91–112. https://doi.org/10.3390/children9010091
40. Pope, L., & Harvey, J. (2015). The impact of incentives on intrinsic and extrinsic motives for fitness-center attendance in college first-year students. *American Journal of Health Promotion, 29*(3), 192–199. 10.4278/ajhp.140408-QUAN-135
41. Poulain, T., Vogel, M., Ludwig, J., Grafe, N., Körner, A., & Kiess, W. (2019). Reciprocal longitudinal associations between adolescents' media consumption and psychological health. *Acad Pediatr, 19*, 109–17. https://doi.org/10.1016/j.acap.2018.08.009
42. Romanova, E., Kolokoltsev, M., Vorozheikin, A., Limarenko, O., Bolotin, A., Solomon, A. N., ... & Balashkevich, N. (2022). Physical activity and metabolism of girls with different somatotypes. *Journal of Physical Education and Sport (JPES), 22*(4), 900–906. https://doi.org/10.7752/jpes.2022.04114
43. Roychowdhury, D. (2018). A comprehensive measure of participation motivation: Examining and validating the Physical Activity and Leisure Motivation Scale (PALMS). J*ournal of Human Sport and Exercise, 13*, 231–247.
44. Sicilia, A., Sáenz-Alvarez, P., González-Cutre, D., & Ferriz, R. (2014). Exercise motivation and social physique anxiety in adolescents. *Psychologica Belgica, 54*(1), 111–129. https://doi.org/10.5334/pb.ai
45. Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics* (6th ed.). Boston, MA: Pearson.
46. The KIDSCREEN Group Europe (2006). *The KIDSCREEN Questionnaires – Quality of life questionnaires for children and adolescents*. Handbook. Lengerich: Pabst Science Publishers.
47. Thomas, V., & Azmitia, M. (2019). Motivation matters: Development and validation of the motivation for solitude scale - Short Form (MSS-SF). *Journal of Adolescence, 70*, 33–42. https://doi.org/:10.1016/j.adolescence
48. Twenge, J. M., Martin, G. N., & Campbell, W. K. (2018). Decreases in psychological well-being among American adolescents after 2012 and links to screen time during the rise of smartphone technology. *Emotion, 18*, 765–80. https://doi.org/10.1037/emo0000403
49. Van Sluijs, E. M. F., Ekelund, U., & Crochemore-Silva, I. (2020). Physical activity behaviours in adolescence: Current evidence and opportunities for intervention. *The Lancet, 398*, 429–442. doi: 10.1016/S0140-6736(21)01259-9
50. Villafaina, S., Miguel, Á., Tapia-Serrano, M. A., Vaquero-Solís, M., León-Llamas, L. J., & Sánchez-Miguel., P. A. (2021). The Role of Physical Activity in the Relationship between Satisfaction with Life and Health-Related Quality of Life in School-Age Adolescents. *Behavioral Sciences, 11*(9), 121–130. https://doi.org/10.3390/bs11090121
51. Vlašić, J., Barić, R., Oreb, G., & Kasović, M. (2002). Exercise motives in middle aged and eldery female population. In Milanović, D., Prot, F. (Eds.) *Proceedings of the 3rd international scientific conference Kinesiology-new perspectives* (pp. 462-766), Zagreb: Faculty of Kinesiology, University of Zagreb.
52. Weber, D. R., Moore, R. H., Leonard, M. B. & Zemel, B. S. (2013). Fat and lean BMI reference curves in children and adolescents and their utility in identifying excess adiposity compared with BMI and percentage body fat. *American Journal of Clinical Nutrition, 98*(1), 49–56. https://doi.org/10.3945/ajcn.112.053611