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IZVORNI ZNANSTVENI RAD

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Early Childhood Oral Health Impact Scale: Psychometric Evaluation in Portuguese Preschoolers

Ljestvica utjecaja oralnog zdravlja u ranom djetinjstvu: psihometrijska procjena portugalskih predškolaca

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Abstract
Objective: to contribute to the validation of the *Early Childhood Oral Impact Scale* (ECOHIS) by studying its psychometric properties when applied to a Portuguese preschool population. Methods: Cross-sectional study conducted with children aged between three and five-years-old. The non-probabilistic sample included two preschools in the municipality of Lisbon. Children who agreed to participate and whose guardians signed the informed consent were included. Data collection included a questionnaire, administered to the parents, and an intraoral examination of the children. The questionnaire included the Portuguese version of ECOHIS. The intraoral examination included the caries diagnosis according to the World Health Organization criteria. Discriminant validity compared the ECOHIS score between children with and without caries experience (Mann-Whitney U-test). Cohen's d was calculated to estimate the magnitude of the difference. Reliability analysis included Cronbach's α and test-retest. Construct validity was analyzed by the correlation between the ECOHIS score and dmft (Spearman's correlation). A significance level of 5% was used. Results: The sample included 104 children (mean age 4.1 years). ECOHIS values were significantly different between children with and without caries (p=0.004). The Cohen's d was 0.84. The Cronbach's was 0.78, with no significant increase in value when eliminating any of the items. The test-retest showed significant correlation (r=0.76; p=0.01). There was a significant correlation between the ECOHIS score and caries experience (r=0.28; p=0.004). Conclusion: The Portuguese version of the ECOHIS showed good psychometric properties, indicating that it is a reliable and valid tool to measure the impact of oral health in preschool children.

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Introduction

Children's oral health is a relevant factor for their healthy development (1). The World Health Organization (WHO) defines oral health as "The state of the mouth, teeth and orofacial structures that enable individuals to perform essential functions such as eating, breathing, and speaking, and encompasses psychosocial dimensions such as self-confidence, well-being, and the ability to socialize and work without pain, discomfort, and embarrassment" (2). This definition incorporates the fact that oral health is an integral part of general health and well-being, and it

Uvod

Oralno zdravlje djece važan je čimbenik za njihov zdrav razvoj (1). Svjetska zdravstvena organizacija (SZO) definira ga kao „stanje usta, zuba i orofacijalnih struktura koje pojedincima omogućuju obavljanje bitnih funkcija kao što su jedenje, disanje i govor, a obuhvaća psihosocijalne dimenzije kao što su samopouzdanje, dobrobit te sposobnost druženja i rada bez boli, nelagode i srama" (2). Ta definicija uključuje činjenicu da je oralno zdravlje dio općega zdravlja i dobrobiti te da nije definirano samo nepostojanjem karijesa ili parodontne bolesti (3).

is not only defined by the absence of caries or periodontal disease (3).

Dental caries continues to be considered a public health problem, especially during childhood, due to its high prevalence and severity. According to the World Health Organization (WHO) the prevalence of Early Childhood Caries is increasing in countries with low and middle income (4). In the most recent national survey in Portugal, it was found that 53% of 6-year-old children had dental caries (5). Some Portuguese studies in preschoolers (6,7) found similar results indicating a high prevalence of caries in primary dentition, and unfortunately the World Health Organization's target of achieving 80% of children being caries-free by 2020 was not achieved. The presence of the disease is linked to social factors (6, 7) and behavioural factors (7), underscoring the importance of early and targeted interventions. Various strategies can be used to prevent and control dental caries in children, such as supervised brushing in kindergartens, oral health education and promotion for children and their caregivers, application of fluorides or sealants (1) or the use of an oral health passport (8). Also, besides fluorides some new agents are being tested with promising results in caries prevention (9, 10).

The study of Oral Health-Related Quality of Life (OHRQoL) is a highly relevant indicator since oral disorders can impair daily activities. It is defined as the impact of oral conditions on an individual's physical functioning as well as psychological and social well-being (11). The association between clinical oral health indicators and OHRQoL measurement provides a broad assessment of the patient's oral health, thus allowing this assessment to be improved globally by considering the individual's perception (11).

The impact of oral health conditions is not restricted to children, but it can also affect their families. The absence of proper oral hygiene practices in children can result in dental problems, generating feelings of guilt and anguish in their parents. In addition, the need to take children to the dentist and take time off work for dental treatment can have a financial impact on the family (12).

The quality of life of children and their families can be affected by oral pathologies, and since dental caries is the most prevalent disease, it is one of the diseases with the greatest impact (4).

OHRQoL is linked to social, psychological, and behavioral variables that affect children's oral health in addition to clinically recognized oral health issues (13), Kumar (14) has shown that certain family characteristics such as the parent's level of education, living in a non-traditional family, the crowdedness of the house, and the presence of siblings, are associated with poorer OHRQoL in children.

Locker *et al.* (15) highlighted the importance of including a family impact scale as an essential component for measuring OHRQoL in children since guardians play a vital role in children's health and long-term illness can also affect them. In childhood, it is therefore important to assess the impact of oral health on both the child and the family.

Several instruments have been developed and validated to study OHRQoL in children. Zaror *et al.* (16) identified five

Zubni karijes i dalje se smatra javnozdravstvenim problemom, osobito u djetinjstvu, zbog visoke prevalencije i ozbiljnosti, a prema Svjetskoj zdravstvenoj organizaciji prevalencija ranoga dječjeg karijesa raste u zemljama s niskim i srednjim prihodima (4). U najnovijem nacionalnom istraživanju u Portugalu utvrđeno je da 53 % šestogodišnje djece ima zubni karijes (5). Autori nekih portugalskih istraživanja djece u predškolskoj dobi (6, 7) dobili su slične rezultate koji upozoravaju na visoku prevalenciju karijesa u mliječnoj denticiji i nažalost nije ispunjen cilj Svjetske zdravstvene organizacije da do 2020. godine 80 % djece bude bez karijesa. Ta je bolest povezana sa socijalnim čimbenicima (6, 7) i čimbenicima ponašanja (7), što ističe važnost ranih i ciljanih intervencija. Različite strategije mogu se primijeniti za prevenciju i kontrolu zubnog karijesa kod djece, kao što je nadzirano pranje zuba u dječjim vrtićima, obrazovanje i promicanje oralnoga zdravlja kad je riječ o djeci i njihovim skrbnicima, primjena fluorida ili sredstava za pečaćenje (1) ili korištenje oralne zdravstvene putovnice (8). Također se, uz fluorid, testiraju i neki novi agensi s obećavajućim rezultatima u prevenciji karijesa (9, 10).

Istraživanje o kvaliteti života povezanoj s oralnim zdravljem (OHRQoL) vrlo je relevantan pokazatelj s obzirom na to da intraoralne bolesti mogu narušiti svakodnevne aktivnosti. Definira se kao utjecaj oralnih stanja na tjelesno funkcioniranje pojedinca te na psihičku i socijalnu dobrobit (11). Povezanost između kliničkih pokazatelja oralnoga zdravlja i mjerenja OHRQoL-a daje široku procjenu oralnoga zdravlja pacijenta i omogućuje globalno poboljšanje te procjene, uzimajući u obzir percepciju pojedinca (11).

Utjecaj stanja oralnoga zdravlja nije ograničen samo na djecu, nego može utjecati i na njihove obitelji. Nedostatak pravilne prakse u oralnoj higijeni, kad je riječ o djeci, može rezultirati problemima sa zubima i stvarati osjećaje krivnje i tjeskobe kod njihovih roditelja. Osim toga, potreba za odvođenjem djece stomatologu i odsutnost s posla radi liječenja zuba može i financijski utjecati na obitelj (12).

Na kvalitetu života djece i njihovih obitelji mogu utjecati oralna patološka stanja, a s obzirom na to da je karijes najzastupljenija bolest, jedna je od bolesti s najvećim utjecajem (4).

OHRQoL je povezan sa socijalnim, psihološkim i bihevioralnim varijablama koje utječu na oralno zdravlje djece, uz klinički prepoznate probleme s oralnim zdravljem (13). Kumar (14) je pokazao da su određene obiteljske karakteristike, kao što su stupanj obrazovanja roditelja, život u netradicionalnoj obitelji, prenapučenost kuće i prisutnost braće i sestara, povezane s lošijim OHRQoL-om kod djece.

Locker i suradnici (15) istaknuli su važnost uključivanja ljestvice utjecaja na obitelj kao ključne komponente za mjerenje OHRQoL-a kod djece, s obzirom na to da su skrbnici vitalno važni u zdravlju djece, a dugotrajna bolest također može utjecati na njih. U djetinjstvu je zato bitno procijeniti utjecaj oralnoga zdravlja na dijete i obitelj.

Razvijeno je i potvrđeno nekoliko instrumenata za proučavanje OHRQoL-a kod djece. Zaror i suradnici (16) identificirali su pet dostupnih instrumenata za mjerenje OHRQoL-a kod djece predškolske dobi: upitnik dentalne

instruments available to measure OHRQoL in pre-school children: the Dental Discomfort Questionnaire (DDQ), the Early Childhood Oral Health Impact Scale (ECOHIS), the Michigan Oral Health-Related Quality of Life scale (MichiganOHRQoL), the Oral Health-related Early Childhood Quality of Life tool (OH-ECQOL) and the Scale of Oral Health Outcomes (SOHO-5). In the specific case of pre-school children, because they have lower levels of autonomy and understanding related to oral diseases and their health, the parents/guardians, as children's caretakers, answered to the questionnaire to measure OHRQoL (17).

The ECOHIS was developed by Pahel *et al.* (18) for children between the ages of 3 and 5 years old. This scale was constructed from 45 items of the Child Oral Health Quality of Life Instrument (COHQoL) questionnaire. From these 45 items, the scale was reduced to 13 items: 9 aimed at the impact of oral problems on the child (symptoms, function, psychology, and the child's self-image/social interaction), and 4 aimed at the impact on the family (suffering and family function).

The ECOHIS has already been validated in several countries (19-41), showing, generally, good levels of reliability and acceptable construct validity. In Portugal, this scale was translated and validated by Costa in 2013 (Pt-ECOHIS), in a study carried out on a population of adolescents (42). However, no publications were found evaluating the psychometric properties of the Portuguese version in pre-school children, the age group for which the scale was originally developed. Therefore, this study aimed to contribute to the Portuguese validation of the Pt-ECOHIS by analyzing its psychometric properties when applied to a Portuguese pre-school population.

Materials and methods

This cross-sectional study included a non-probabilistic sample, that consisted of two kindergartens in Lisbon, one public and the other private with public support, that were selected for convenience, because of their proximity to the dental school. The population of the two kindergartens was 157 children, with ages between 3 and 5 years. old. There were included the children who agreed to participate and whose guardians signed the informed consent.

Data were collected between May 2022 and March 2023. They included a questionnaire administered to parents/guardians and an intraoral observation of the children.

The questionnaire collected information on sociodemographic characterization (age and gender of the child and mother's educational level) and on OHRQoL, using the Pt-ECOHIS (42). The questionnaire was distributed to parents with the help of kindergarten teachers. A concise description of the study, outlining its goals and methods, was included with each questionnaire, as well as the informed consent. The documents were placed in an envelope, hence they could be returned confidentially. A retest of the Pt-ECOHIS was made on 10% of the participants to analyze the reliability of the instrument.

The intra-oral observations used the WHO dental caries criteria to collect information on decayed, missing, and filled teeth in the deciduous dentition (dmft) (43). The study was

nelagode (DDQ), ljestvicu utjecaja oralnoga zdravlja u ranom djetinjstvu (ECOHIS), michigansku ljestvicu kvalitete života povezanu s oralnim zdravljem (Michigan OHRQoL), alat za kvalitetu života u ranom djetinjstvu povezanu s oralnim zdravljem (OH-ECQOL) i ljestvicu ishoda oralnoga zdravlja (SOHO-5). U konkretnom slučaju djece predškolske dobi, s obzirom na to da imaju nižu razinu autonomije i razumijevanja u odnosu prema oralnim bolestima i svojem zdravlju, roditelji/staratelji, kao skrbnici djeteta, odgovaraju na upitnik za mjerenje OHRQoL-a (17).

ECOHIS su razvili Pahel i suradnici (18) za djecu od 3 do 5 godina. Ta je ljestvica sastavljena od 45 stavki upitnika instrumenta kvalitete života povezane s oralnim zdravljem djeteta (COHQoL). S tih 45 čestica ljestvica je smanjena na njih 13: 9 usmjerenih na utjecaj oralnih problema na dijete (simptomi, funkcija, psihologija i djetetova slika o sebi / socijalna interakcija) i 4 na utjecaj na obitelj (patnja i obiteljska funkcija).

ECOHIS je već validiran u nekoliko zemalja (19 – 41) te pokazuje općenito dobru razinu pouzdanosti i prihvatljivu konstrukcijsku valjanost. U Portugalu je tu ljestvicu 2013. godine preveo i potvrdio Costa (Pt-ECOHIS) u istraživanju provedenom na populaciji adolescenata (42). Međutim, nisu pronađeni časopisi u kojima bi bila procijenjena psihometrijska svojstva portugalske verzije za djecu predškolske dobi, dobnu skupinu za koju je ljestvica izvorno i nastala. Zato je cilj ovog istraživanja pridonijeti portugalskoj validaciji Pt-ECOHIS-a analizom njegovih psihometrijskih svojstava kada se primijeni na portugalsku predškolsku populaciju.

Materijali i metode

Ovo presječno istraživanje uključivalo je neprobabilistički uzorak od dvaju dječjih vrtića u Lisabonu – jednoga javnog i drugoga privatnog uz javnu potporu koji su odabrani zbog praktičnosti jer su bili u blizini Stomatološkog fakulteta. Populaciju je činilo 157 djece u dobi od 3 do 5 godina koja su pristala sudjelovati i čiji su skrbnici potpisali informirani pristanak.

Podatci su prikupljeni između svibnja 2022. i ožujka 2023., a uključivali su upitnik namijenjen roditeljima/starateljima i intraoralni pregled djece.

Upitnikom su prikupljeni podatci o sociodemografskim obilježjima (dob i spol djeteta i stupanj obrazovanja majke) te o OHRQoL-u s pomoću Pt-ECOHIS-a (42). Upitnik je podijeljen roditeljima uz pomoć odgojitelja iz vrtića. Uz svaki upitnik bio je priložen i sažeti opis istraživanja, s popisom ciljeva i metoda te informirani pristanak. Dokumenti su stavljeni u omotnicu kako bi se mogli povjerljivo vratiti. Ponovno testiranje Pt-ECOHIS-a obavljeno je za 10 % sudionika radi analize pouzdanosti instrumenta.

Intraoralni pregled proveden je prema kriterijima WHO-a za zubni karijes kako bi se prikupili podatci o zubima s karijesom, izvađenim zubima i zubima s ispunima u mliječnoj denticiji (dmft) (43), a to je učinio jedan ispitivač u prostorijama škola koje su sudjelovale koristeći se intraoralnim zrcalom i CPI sondom u prostoriji s prirodnim svjetlom. Proma-

carried out by a single examiner on the premises of the participating schools, using an intraoral mirror and a CPI probe, in a room with natural light. The observer also used a frontal LED light. All measures to prevent cross-infection were used.

The field team included two investigators: the examiner, who made the intraoral observation, and another examiner who recorded the observation on the respective sheet. The examiner was trained by a researcher who had experience in using the WHO criteria. During the study, double observations were carried out on around 10% of the children, to calculate the intraobserver reproducibility of applying the criteria throughout the study (43). Calculations were made using Cohen's kappa, and perfect agreement was obtained (44).

The Pt-ECOHIS had 13 items and all the items have a response scale with 5 categories: 0 = never; 1 = almost never; 2 = occasionally; 3 = frequently; 4 = very frequently; 5 = I don't know. Three ECOHIS scores were calculated: the *ECOHIS total* score included the sum of the response values of all 13 response items on the scale, and could vary between 0 and 52; the *ECOHIS child* score refers to the sum of the 9 items on the child impact subscale and could vary between 0 and 36; and lastly, the *ECOHIS family* score refers to the sum of the values of the 4 items on the family impact subscale, with values between 0 and 16. The higher the score, the greater the impact. Therefore, it results in a worse OHRQoL. If the answer was "I don't know" the value was recoded, and the value "5" was replaced by the mean value of the other items in the subscale. Individuals with more than two "I don't knows" answers in the child subscale and one in the family section were eliminated from the study as described in the original study scale (18).

Descriptive statistical analysis included the calculi of absolute and relative frequencies of all the variables. The mean and standard deviation were also calculated for numerical variables. Inferential analysis used a statistical significance level of 5%. The *Kolmogorov-Smirnov* tested the normal distribution. The $\chi 2$ test was used to compare children with and without caries experience. The study of psychometric properties included the item frequency analysis, total inter-item correlation, internal consistency analysis, and test-retest. The internal consistency analysis (*Cronbach's* α) and the test-retest (*Spearman's* correlation) study the reliability of the scale. To assess discriminant validity, the differences in ECOHIS total between children with and without caries experience were compared using the *Mann-Whitney U-test*. To estimate the magnitude of the difference between the two ECOHIS means, *Cohen's d* was calculated, which in the case of ECOHIS is calculated by dividing the mean scores by the standard deviation (SD). A value of 0.2 indicates a small magnitude of difference; a value of 0.5 indicates a moderate difference; and the value greater than 0.8 indicates a large difference (45). Construct validity was studied with the correlation between the ECOHIS Total score and the dmft score, using *Spearman's* correlation. The *Kappa* statistics was used to verify the application of the caries diagnostic criteria throughout the study, demonstrating a perfect level of agreement (44).

This study was approved by the Health Ethics Committee of the Faculdade de Medicina Dentária da Universidade de Lisboa (registration number 202107).

trač se također koristio prednjim LED svjetlom. Korištene su sve mjere za sprječavanje križne infekcije.

Terenski tim uključivao je dva istraživača: prvoga koji je obavljao intraoralne preglede i drugoga koji je bilježio rezultate (na odgovarajući formular). Ispitivača je u korištenju kriterija WHO-a poučavao istraživač s iskustvom. Tijekom istraživanja provedeni su dvostruki pregledi oko 10 % djece da bi se izračunala ponovljivost primjene kriterija tijekom cijelog istraživanja unutar promatrača (43). Izračunata je s pomoću Cohenove kappe i postignuto je savršeno slaganje (44).

Pt-ECOHIS sadržavao je 13 čestica i sve su imale ljestvicu odgovora s 5 kategorija: 0 = nikad; 1 = gotovo nikad; 2 = povremeno; 3 = često; 4 = vrlo često; 5 = ne znam. Izračunate su tri ECOHIS vrijednosti: ukupni rezultat ECOHIS-a uključivao je zbroj vrijednosti odgovora svih 13 odgovora na ljestvici i mogao je varirati između 0 i 52; dječji rezultat ECOHIS-a odnosi se na zbroj 9 stavki na subljestvici utjecaja na dijete i može varirati između 0 i 36; i na kraju, obiteljski rezultat ECOHIS-a odnosi se na zbroj vrijednosti 4 čestice na subljestvici utjecaja na obitelj, s vrijednostima između 0 i 16. Što je viši rezultat, to je veći utjecaj i zato je lošiji OHRQoL. Ako je odgovor bio „ne znam", vrijednost je ponovno kodirana, a vrijednost „5" zamijenjena je srednjom vrijednošću ostalih stavki na subljestvici. Pojedinci s više od dvaju odgovora „ne znam" u dječjoj podljestvici i jednim u odjeljku obitelji isključeni su iz istraživanja, kako je opisano u izvornoj ljestvici (18).

Deskriptivna statistička analiza uključivala je izračune apsolutnih i relativnih frekvencija svih varijabli. Srednja vrijednost i standardna devijacija također su izračunate za numeričke varijable. Za inferencijalnu analizu korištena je razina statističke značajnosti od 5 %. Kolmogorov-Smirnovljevim testom ispitana je normalna distribucija. $\chi 2$ test korišten je za usporedbu djece s karijesom i bez karijesa. Proučavanje psihometrijskih svojstava obuhvaćalo je analizu učestalosti čestica, ukupnu korelaciju među česticama, analizu interne konzistentnosti i test-retest. Analiza interne konzistencije (Cronbachova alfa) i test-retest (Spearmanova korelacija) proučavaju pouzdanost ljestvice. Kako bi se procijenila diskriminirajuća valjanost, razlike u ukupnom ECOHIS-u između djece s iskustvom i bez iskustva s karijesom uspoređene su s pomoću Mann-Whitneyjeva U-testa. Kako bi se procijenila veličina razlike između dviju srednjih vrijednosti ECOHIS-a, izračunat je Cohenov **d** koji se u slučaju ECOHIS-a izračunava dijeljenjem srednjih rezultata sa standardnom devijacijom (SD). Vrijednost od 0,2 označava malu razliku, vrijednost 0,5 označava umjerenu razliku, a veća od 0,8 označava veliku razliku (45). Valjanost konstrukta proučavana je korelacijom između ukupnog rezultata ECOHIS-a i dmft rezultata, koristeći se Spearmanovom korelacijom. Kappa statistika korištena je za provjeru primjene dijagnostičkih kriterija za karijes tijekom istraživanja i pokazala je savršenu razinu slaganja (44).

Ovo istraživanje odobrio je Odbor za zdravstvenu etiku Fakulteta dentalne medicine Sveučilišta u Lisabonu (Faculdade de Medicina Dentária da Universidade de Lisboa) – procesni broj 202107.

Results

The sample included 104 children with a mean age of 4.1 (SD = 0.8). No significant differences were found in caries experience related to the child's sex or the mother's educational level (p>0.05). Caries experience was found to be higher in older children (p=0.014), with a difference quite evident between the 4- and 5-years-old children (Table 1).

Rezultati

Uzorak je obuhvatio 104 djeteta prosječne dobi od 4,1 godinu (SD = 0,8). Nisu pronađene statistički značajne razlike u učestalosti karijesa prema spolu djeteta ili stupnju obrazovanja majke (p > 0,05). Utvrđeno je da je incidencija karijesa bila veća kod starije djece (p = 0,014), s dosta velikom razlikom između četverogodišnjaka i petogodišnjaka (tablica 1.).

Table 1 Sociodemographic characterization of the sample and comparison of children with and without caries experience.
Tablica 1. Sociodemografska karakterizacija uzorka te usporedba djece s iskustvom s karijesom i bez toga iskustva

	Total sample • Ukupni uzorak	Caries Experience • Iskustvo s karijesom	No Caries Experience • Bez iskustva s karijesom	*p* value* • *p* vrijednost*
	% (n)	% (n)	% (n)	
Age • Dob				
3 years • 3 godine	27.89 (29)	17.24 (5)	82.76 (24)	**0.014**
4 years • 4 godine	32.69 (34)	14.71 (5)	85.29 (29)	
5 years • 5 godine	39.42 (41)	41.46 (17)	58.54 (24)	
Sex • Spol				
Male • Muški	45.19 (47)	29.79 (14)	70.21 (33)	0.4
Female • Ženski	54.81 (57)	22.81 (13)	77.19 (44)	
Mother´s education level • Stupanj edukacije majke				
Less than 9 years • Manje od 9 godina	5.10 (5)	60.00 (3)	40.00 (2)	0.4
9 years completed • 9 godina završeno	18.37 (18)	22.22 (4)	77.78 (14)	
12 years completed • 12 godina završeno	24.49 (24)	29.17 (7)	70.83 (17)	
High education completed • Visoko obrazovanje završeno	52.04 (51)	25.49 (13)	74.51 (38)	

* χ^2 independence test • χ^2 test za nezavisne uzorke
Values in bold show statistically significant differences (p<0.05) • Podebljane vrijednosti pokazuju statistički značajne razlike (p < 0,05)

Table 2 Distribution of ECOHIS scale items and scores.
Tablica 2. Distribucija stavki i rezultata ECOHIS ljestvice

Items • Stavka	Never • Nikad	Hardly ever • Rijetko kad	Occasionally • Povremeno	Often • Često	Very often • Vrlo često	Mean • Srednja vrijednost (SD)
	% (n)	% (n)	% (n)	% (n)	% (n)	
Child subscale • Djetetova podljestvica						
Pain in the teeth, mouth or jaws • Bol u zubima, ustima ili čeljusti	78.85 (82)	9.61 (10)	7.69 (8)	3.85 (4)	0 (0)	0.37 (0.79)
Difficulty drinking hot or cold beverages • Poteškoće s ispijanjem toplih ili hladnih napitaka	89.22 (91)	8.82 (9)	1.96 (2)	0 (0)	0 (0)	0.13 (0.39)
Difficulty eating some foods • Poteškoće s konzumiranjem neke hrane	89.42 (93)	4.81 (5)	4.81 (5)	0.96 (1)	0 (0)	0.17 (0.55)
Difficulty pronouncing words • Poteškoće u izgovaranju riječi	92.00 (92)	1.00 (1)	4.00 (4)	2.00 (2)	0 (0)	0.16 (0.57)
Missed preschool, daycare, or school • Izostanak iz vrtića ili škole	93.28 (97)	2.88 (3)	2.88 (3)	0.96 (1)	0 (0)	0.11 (0.47)
Trouble sleeping • Problemi sa spavanjem	90.38 (94)	4.81 (5)	4.81 (5)	0 (0)	0 (0)	0.14 (0.47)
Irritable or frustrated • Razdražljivo ili frustrirano	92.30 (96)	3.85 (4)	3.85 (4)	0 (0)	0 (0)	0.11 (0.42)
Avoided smiling or laughing • Izbjegava osmijeh ili smijeh	97.12 (101)	0.96 (1)	0.96 (1)	0.96 (1)	0 (0)	0.06 (0.36)
Avoided talking • Izbjegava razgovor	99.03 (102)	0 (0)	0.97 (1)	0 (0)	0 (0)	0.04 (0.27)
Family subscale • Obiteljska podljestvica						
Been upset • Bio sam uzrujan	81.73 (85)	11.54 (12)	4.81 (5)	0.96 (1)	0.96 (1)	0.28 (0.69)
Felt guilty • Osjećao se krivim	84.62 (88)	7.69 (8)	4.81 (5)	2.88 (3)	0 (0)	0.26 (0.68)
Taken time off from work • Odsutnost s posla	93.27 (97)	3.85 (4)	2.88 (3)	0 (0)	0 (0)	0.10 (0.38)
Financial Impact • Financijski učinak	85.44 (88)	6.80 (7)	4.85 (5)	0.97 (1)	1.94 (2)	0.27 (0.76)

SD: standard deviation • standardna devijacija

Table 3 Mean, median, maximum and minimum values of ECOHIS scores.
Tablica 3. Srednje, maksimalne i minimalne vrijednosti rezultata ECOHIS-a

ECOHIS sum • Zbroj ECOHIS-a	Minimum	Maximum	Mean • Srednja vrijednost (SD)	Median • Medijan
Child subscale • Djetetova podljestvica	0	16.9	1.3 (2.7)	0
Family subscale • Obiteljska podljestvica	0	9.0	0.9 (1.8)	0
Total score • Ukupna vrijednost	0	25.9	2.2 (4.1)	0

SD: standard deviation • standardna devijacija

All the items on the ECOHIS had a higher percentage of "never" responses. In the ECOHIS child subscale, the item with the greatest impact on OHRQoL was "tooth/mouth pain", where 21.15% of parents/guardians reported that their child had tooth or mouth pain, and 11.54% reported that their child had tooth or mouth pain occasionally or frequently. The items "difficulty drinking" (10.78%), "difficulty eating" (10.58%), and "problems falling asleep" (9.62%) also had some impact. Regarding the ECOHIS family subscale, it was found that 18.27% of parents had been upset or annoyed because of their child's dental problems, which was the item that revealed the greatest impact (Table 2).

The mean ECOHIS total score was 2.2 (SD=4.1), with a minimum of 0 and a maximum of 25.9 (Table 3).

Reliability Analysis and Inter-Item Correlation

The internal consistency of the ECOHIS scores revealed *Cronbach's* α values of 0.78 for the child subscale, 0.66 for the family subscale, and 0.83 for the total value (Table 4).

The correlation between the test and retest showed a significant and strong correlation for the child subscale (r=0.85; p=0.002) and for the total scale (r=0.76; p=0.011). However, in the family subscale, the correlation was lower, and it was not significant (r=0.26; p=0.47) (Table 4).

The item-total correlation analysis verified the non-redundancy of the items, with all the items being moderately correlated with each other. The item with the lowest value was the item 4, which corresponds to difficulty pronouncing words. No item led to a significant increase in *Cronbach's* α when eliminated (Table 5).

Discriminant validity: ECOHIS in children with and without caries experience

When the ECOHIS scores of children with and without caries experience were compared, there were significant differences in the ECOHIS Child (p=0.004), ECOHIS Family (p=0.04), and ECOHIS Total (p=0.004). The mean values

Za sve stavke ECOHIS-a dobiven je veći postotak odgovora „nikad". U dječjoj podljestvici ECOHIS, stavka s najvećim utjecajem na OHRQoL bila je „bol zuba / u ustima", u kojoj je 21,15 % roditelja/skrbnika izjavilo da se njihovo dijete katkad požalilo na bolove u zubima ili u ustima, a 11,54 % to je prijavilo kao povremeno ili često. Stavke „poteškoće s pićem" (10,78 %), „poteškoće s jelom" (10,58 %) i „problemi s uspavljivanjem" (9,62 %) također su imale određeni utjecaj. Kad je riječ o obiteljskoj podljestvici ECOHIS-a, ustanovljeno je da je 18,27 % roditelja bilo uzrujano zbog problema sa zubima njihova djeteta, što je stavka koja je pokazala najveći utjecaj (tablica 2.).

Prosječna ukupna ocjena ECOHIS-a bila je 2,2 (SD = 4,1), s najmanjom vrijednosti 0 i najvećom vrijednosti 25,9 (tablica 3.).

Analiza pouzdanosti i korelacija između stavki

Interna konzistentnost vrijednosti ECOHIS-a otkrila je vrijednosti Cronbachove alfe od 0,78 za djetetovu podljestvicu, 0,66 za obiteljsku podljestvicu i 0,83 za ukupnu vrijednost (tablica 4.).

Korelacija između testa i retesta pokazala je značajnu i jaku korelaciju za djetetovu podljestvicu (r = 0,85; p = 0,002) i za ukupnu ljestvicu (r = 0,76; p = 0,011). Međutim, na obiteljskoj podljestvici korelacija je bila slabija i neznačajna (r = 0,26; p = 0,47) (tablica 4.).

Analiza ukupne korelacije stavki potvrdila je neredundanciju čestica, pri čemu su sve čestice uzajamno umjereno korelirale. Čestica s najnižom vrijednošću bila je čestica 4 koja odgovara poteškoćama u izgovoru riječi. Nijedna stavka nije značajnije povećala Cronbachovu alfu kada je eliminirana (tablica 5.).

Diskriminirajuća valjanost: ECOHIS kod djece s iskustvom i bez iskustva s karijesom

Kada su uspoređeni rezultati ECOHIS-a za djecu s karijesom i bez karijesa, bilo je značajnih razlika u djetetovoj podljestvici ECOHIS-a (p = 0,004), obiteljskoj podsljestvici ECOHIS-a (p = 0,04) i u ukupnoj vrijednosti (p = 0,004).

Table 4 Reliability analysis – Internal consistency and test-retest reliability.
Tablica 4. Analiza pouzdanosti – interna dosljednost i pouzdanost testiranja i ponovnog testiranja

ECOHIS (number of items) • ECOHIS (broj stavki)	Internal consistency reliability (Cronbach´s Alpha) • Pouzdanost unutarnje konzistentnosti (Cronbachova alfa)	Test-retest reliability Spearman´s rank correlation • Pouzdanost test-retesta Spearmanova korelacija ranga
Child subscale (9) • Djetetova podljestvica (9)	0.78	r= 0.85; p=0.002
Family subscale (4) • Obiteljska podljestvica (4)	0.66	r= 0.26; p=0.47
Total score (13) • Ukupna vrijednost (13)	0.83	r= 0.76; p=0.011

Table 5 Item-total correlation and Cronbach's α without item.
Tablica 5. Stavka – ukupna korelacija i Cronbachova alfa bez stavke

ECOHIS Items • Stavke ECOHIS-a	r item-total • r stavka-ukupno	Cronbach´s alpha Without item • Cronbachova alfa bez stavke
1. Pain in the teeth, mouth or jaws • Bolovi u zubima, ustima ili čeljusti	0.58	0.81
2. Difficulty drinking hot or cold beverages • Poteškoće s ispijanjem toplih ili hladnih napitaka	0.62	0.81
3. Difficulty eating some foods • Poteškoće s konzumiranjem neke hrane	0.38	0.83
4. Difficulty pronouncing words • Poteškoće u izgovaranju riječi	0.12	0.85
5. Missed preschool, daycare or school • Izostajanje iz vrtića, predškolskog vrtića ili škole	0.65	0.81
6. Trouble sleeping • Problemi sa spavanjem	0.54	0.82
7. Irritable or frustrated • Razdražljivo ili frustrirano	0.67	0.81
8. Avoided smiling or laughing • Izbjegava osmijeh ili smijeh	0.5	0.82
9. Avoided talking • Izbjegava razgovor	0.52	0.82
10. Been upset • Bio sam uzrujan	0.40	0.83
11. Felt guilty • Osjećao se krivim	0.60	0.81
12. Taken time off from work • Odsutnost s posla	0.55	0.82
13. Financial Impact • Financijski učinak	0.49	0.82

Table 6 Comparison of mean ECOHIS scores between the groups of children with and without caries experience.
Tablica 6. Usporedba srednjih rezultata ECOHIS-a između skupina djece s iskustvom s karijesom i bez toga iskustva

ECOHIS	With caries experience • S iskustvom s karijesom Mean • Srednja vrijednost (SD)	Without caries experience • Bez iskustva s karijesom Mean • Srednja vrijednost (SD)	p-value* • p-vrijednost*	Cohen´s d • Cohenov d
Child subscale • Djetetova podljestvica	2.9 (4.3)	0.7 (1.5)	0.004	0.68
Family subscale • Obiteljska podljestvica	1.6 (2.7)	0.7 (1.4)	0.04	0.42
Total score • Ukupna vrijednost	5.5 (6.4)	1.4 (2.5)	0.004	0.84

* U-Mann-Whitney Test • Mann-Whitneyjev U-test

were higher in the group of children with caries experience, thus demonstrating a significant impact of this disease on OHRQoL (Table 6).

Construct validity: correlation between ECOHIS and dmft scores

There was a positive and direct correlation between the scores of the ECOHIS and the dmft in the deciduous dentition. These results show that caries has an important impact on daily lives of children and their families. *Spearman's* correlation revealed a weak but highly significant correlation between the scores of the ECOHIS Child (r=0.28; p=0.004), the ECOHIS Family (r=0.20; p=0.04) and the ECOHIS Total (r=0.28; p=0.004) and the caries severity (dmft) in the deciduous dentition.

Discussion

The cross-cultural adaptation of an instrument requires some important steps such as translation and analysis of psychometric properties. The availability of culturally valid versions of instruments in different languages is important to obtain reliable and comparable data, considering social, cultural, and economic differences. The Pt-ECOHIS had already been developed by Costa in 2013 (42), but the author validated the scale in a population of adolescents encompassing the age of 12 years. Therefore, this study aimed to contribute to the validation of this instrument by studying the

Srednje vrijednosti bile su veće u skupini djece s iskustvom karijesa, što upozorava na značajan utjecaj te bolesti na OHRQoL (tablica 6.).

Konstruktna valjanost: korelacija između ECOHIS-a i dmft rezultata

Postojala je pozitivna i izravna korelacija između rezultata ECOHIS-a i dmft-a u mliječnoj denticiji. Ti rezultati pokazuju da karijes itekako utječe na svakodnevni život djece i njihovih obitelji. Spearmanova korelacija otkrila je slabu, ali vrlo značajnu korelaciju između djetetovih vrijednosti ECOHIS-a (r = 0,28; p = 0,004), obiteljskoga ECOHIS-a (r = 0,20; p = 0,04) i ukupnog ECOHIS-a (r = 0,28; p = 0,004)) te težinu karijesa (dmft) u mliječnoj denticiji.

Rasprava

Međukulturalna prilagodba instrumenta zahtijeva neke važne korake, kao što su prijevod i analiza psihometrijskih svojstava. Uzimajući u obzir društvene, kulturne i ekonomske razlike, dostupnost kulturološki valjanih verzija instrumenata na različitim jezicima važna je za dobivanje pouzdanih i usporedivih podataka. Pt-ECOHIS već je 2013. godine razvio Costa (42), ali autor je potvrdio ljestvicu u populaciji adolescenata od 12 godina. Zato je cilj ovog istraživanja bio pridonijeti validaciji toga instrumenta proučavanjem psihometrijskih svojstava Pt-ECOHIS-a, ali kada se primjenjuje

psychometric properties of the Pt-ECOHIS. However, it was applied to a pre-school population since that was the age group for which the scale was originally developed.

The questionnaire was self-administered to the child's legal guardians, as in the case of the original version of the ECOHIS (18). This method has advantages over interviewing, namely lower cost, and a reduction in interviewer bias (45). In addition, studies that have assessed quality of life on other scales, such as Malter (46), Sousa (47) and Puhan (48) found that the method of administration did not influence the results of the instruments.

The sample consisted of a total of 104 children, a size similar to several validation studies of the same scale (20, 24, 28-31, 35). The size of the sample for scale validation studies is a discussed topic, and this study followed the general rule adopted by many researchers, which states that the number of participants should be at least equal to the number of response options for each statement for each of the scale's items (49). With the ECOHIS having 13 items and 5 response hypotheses in all items, the sample should have at least 65 individuals. Furthermore, it is recommended that this minimum should include additional 20% of participants (49), which was also met in the study sample.

No significant differences were found when comparing the caries experience with the sex of the child or mother's education. The same pattern was seen in the validation study performed in China (24), unlike the study performed in Brazil (19), which found statistically significant differences between the mother's level of education and caries experience. This result can be attributed to the differences in sample sizes, which were smaller in this study (n=104) and in the Chinese study (n=111), compared to the Brazilian study (n=247) since larger sample is required to identify differences to similar extent. There may also be differences in the type of population included, and the population of Lisbon, as a capital city, may include a more differentiated population.

On the other hand, statistically significant differences were found between age and caries experience, which is in line with the results obtained in the validation studies carried out on the Chinese (24) and Australian populations (21). Since dental caries is characterized as a progressive and cumulative disease, this would be the expected result.

In all the items, there was a high percentage of answers in the "never" option, demonstrating the presence of a "floor effect". Most parents reported that their child's quality of life was not affected by oral health, which can be partly attributed to the fact that the study sample was community-based and made up of children who did not seek medical treatment. As such, the pattern of responses was lower when compared to other studies that included samples of children who were seeking dental treatment, and could therefore have more oral health problems (22, 24, 28, 30, 32, 38). In studies that included community samples, the distribution of the items was more focused on the answers with the lowest values (18, 19, 23, 26, 34, 39, 40), as seen in the sample studied.

In the child impact subscale, the item with the greatest impact on OHRQoL was "tooth/mouth pain" (21.15%), followed by "difficulty drinking" (10.78%), "difficulty eating"

na populaciju predškolske dobi, s obzirom na to da je to bila dobna skupina za koju je ljestvica izvorno razvijena.

Upitnik je samostalno ispunjavao zakonski skrbnik djeteta, kao i u slučaju izvorne verzije ECOHIS-a (18). Ta metoda ima prednosti u odnosu na intervjuiranje, naime nižu cijenu i smanjenje pristranosti anketara (45). Osim toga, istraživanja koja su procjenjivala kvalitetu života drugim ljestvicama, poput onih Maltera (46), Souse (47) i Puhana (48), otkrila su da način primjene nije utjecao na rezultate instrumenata.

Uzorak se sastojao od ukupno 104 djeteta, a veličina je bila slična nekim validacijskim istraživanjima iste ljestvice (20, 24, 28 – 31, 35). Veličina uzorka za validacijska istraživanja ljestvice tema je o kojoj se raspravlja, a ovo je istraživanje slijedilo opće pravilo koje su prihvatili mnogi istraživači, a kaže da broj sudionika treba biti najmanje jednak broju opcija odgovora za svaku tvrdnju za svaku od stavki ljestvice (49). Budući da ECOHIS ima 13 čestica i 5 hipoteza odgovora u svim česticama, uzorak bi trebao imati najmanje 65 pojedinaca. Dodatno, preporučuje se da se u taj minimum uključi dodatnih 20 % sudionika (49), što je također ispunjeno u uzorku istraživanja.

Nisu pronađene statistički značajne razlike u usporedbi iskustva s karijesom prema spolu djeteta ili obrazovanju majke. Isti je obrazac uočen u validacijskom istraživanju u Kini (24), ali ne i u Brazilu (19) gdje su otkrivene statistički značajne razlike između razine obrazovanja majke i iskustva s karijesom. Taj se rezultat može pripisati razlikama u veličinama uzoraka koje su bile manje u ovom istraživanju (n = 104) i u kineskom istraživanju (n = 111), u usporedbi s brazilskim istraživanjem (n = 247), s obzirom na to da je u većem uzorku potrebno identificirati razlike u sličnoj mjeri. Također mogu postojati razlike u tipu uključene populacije, a stanovništvo Lisabona, kao glavnoga grada, može uključivati diferenciraniju populaciju.

S druge strane, utvrđene su statistički značajne razlike između dobi i iskustva s karijesom, kao u validacijskim istraživanjima provedenima na kineskoj (24) i australskoj populaciji (21). Budući da je karijes okarakteriziran kao progresivna i kumulativna bolest, to je bio i očekivani rezultat.

U svim česticama bio je visok postotak odgovora za opciju „nikad", što upućuje na prisutnost „efekta poda". Većina roditelja izjavila je da oralno zdravlje nije utjecalo na kvalitetu života njihova djeteta, što se djelomično može pripisati činjenici da je uzorak istraživanja bio utemeljen u zajednici i sastavljen od djece koja nisu tražila liječničku pomoć. Kao takav, obrazac odgovora bio je niži u usporedbi s drugim istraživanjima koja su uključivala uzorke djece koja su tražila stomatološko liječenje i stoga su mogla imati više problema s oralnim zdravljem (22, 24, 28, 30, 32, 38). U istraživanjima koja su uključivala uzorke zajednice, distribucija čestica bila je više usmjerena na odgovore s najnižim vrijednostima (18, 19, 23, 26, 34, 39, 40), kao što se vidi u proučavanom uzorku.

Na podljestvici utjecaja na dijete, stavka s najvećim utjecajem na OHRQoL bila je „bol zuba / u ustima" (21,15 %), zatim „poteškoće s pićem" (10,78 %), „poteškoće s jelom" (10,58 %) i „poteškoće s uspavljivanjem" (9,62 %). Ti su rezultati slični u nekoliko istraživanja koja su otkrila da je zu-

(10.58%), and "trouble falling asleep" (9.62%). These results were similar to several studies that revealed that toothache was the item with the greatest impact on OHRQoL (18, 19, 21-24, 29-33). However, the studies carried out in Italy (37), Lithuania (28), and Turkey (35) revealed that the items with the greatest impact were "missing school", "difficulty eating" and "being frustrated", respectively.

In the family impact subscale, the items with the greatest impact were "being upset" (18.27%) and "feeling guilty" (15.38%), which is in agreement with several other studies validating the scale (19, 21-24, 26, 28, 29, 39). However, in the original version of ECOHIS (18), in Nigeria (30) and Taiwan (36), the item with the greatest impact was "missing work".

In this study, the mean ECOHIS Total score was 2.21 (SD=4.09), which can be considered low. Validation studies carried out in Colombia (25) and India (26) showed similar results, which is in line with other studies carried out in Portuguese populations (50,51). Other ECOHIS validation studies showed higher means (22-24, 27, 31, 35), with a wide range of values between 3.7 (22) and 25.7 (27).

The values of *Cronbach's* α revealed good internal consistency in the case of family subscale and very good for the child subscale and the ECOHIS Total (52). The lower value of the ECOHIS family can be explained by its small number of items. There is a wide variation in the internal consistency of the ECOHIS items in various validation studies, with the value for the Total ECOHIS varying between 0.76 (36) and 0.95 (30). The value found in this study was similar to that in some studies (29, 32, 36-40) and lower than others (22, 36). On the other hand, there are also several validation studies with higher values (18, 19, 21, 23-28). One similarity found in most validation studies is that the Family subscale showed lower internal consistency values. However, it is very interesting to see that this subscale improves the internal consistency of the ECOHIS Total, which is why it is important to keep the family subscale in the instrument.

The other parameter that studied the scale's reliability was the test-retest, which was applied to 10 children in the sample. One difficulty encountered in repeating the ECOHIS was the time interval between administering the two questionnaires, which was set to be between two and three weeks, but in some cases it varied up to two months due to the lack of cooperation of some parents in returning the questionnaire. Analysis of the correlation between the test and retest showed a significant and strong correlation (53) in the child subscale (r=0.85; p=0.002) and the total scale (r=0.76; p=0.011). However, in the family subscale, the correlation found was weaker and not significant (r=0.26; p=0.47). This lower value can be attributed to several reasons, namely small sample size, the number of items in the subscale, and the difficulty which was already reported, and related to the time between the test and retest.

The item-total correlation analysis found that the items were not redundant, with all items being moderately correlated with each other. Item 4, which corresponds to difficulty pronouncing words, obtained a value of 0.12, which was the only item below the recommended value of 0.20 (26). In the

bobolja stavka s najvećim utjecajem na OHRQoL (18, 19, 21 – 24, 29 – 33). Međutim, istraživanja provedena u Italiji (37), Litvi (28) i Turskoj (35) otkrila su da su stavke s najvećim utjecajem bile „izostajanje iz škole", „poteškoće s prehranom" i „frustriranost".

Na podljestvici utjecaja na obitelj, stavke s najvećim utjecajem bile su „uzrujanost" (18,27 %) i „osjećaj krivnje" (15,38 %), u skladu s nekoliko drugih istraživanja koja potvrđuju ljestvicu (19, 21 – 24, 26, 28, 29, 39). Međutim, u izvornoj verziji ECOHIS-a (18), u Nigeriji (30) i Tajvanu (36) stavka s najvećim utjecajem bila je „izostajanje s posla".

U ovom istraživanju prosječna ukupna ocjena ECOHIS-a bila je 2,21 (SD = 4,09), što se može smatrati niskom vrijednošću. Validacijska istraživanja provedena u Kolumbiji (25) i Indiji (26) pokazala su slične rezultate, kao i druga istraživanja provedena u portugalskoj populaciji (50, 51). Druga validacijska istraživanja ECOHIS-a pokazala su više srednje vrijednosti (22 – 24, 27, 31, 35), sa širokim rasponom između 3,7 (22) i 25,7 (27).

Vrijednosti Cronbachove alfe pokazale su dobru unutarnju konzistentnost za obiteljsku podljestvicu i vrlo dobru za podljestvicu djeteta i ukupni ECOHIS (52). Niža vrijednost obiteljskog ECOHIS-a može se objasniti malim brojem stavki. Postoji široka varijacija u internoj dosljednosti stavki ECOHIS-a u različitim validacijskim istraživanjima, s vrijednošću ukupnoga ECOHIS-a koja varira između 0,76 (36) i 0,95 (30). Vrijednost dobivena u ovom istraživanju bila je slična nekim istraživanjima (29, 32, 36 – 40), ali i niža od drugih (22, 36). S druge strane, postoji nekoliko validacijskih istraživanja s višim vrijednostima (18, 19, 21, 23 – 28). Jedna sličnost pronađena u većini validacijskih istraživanja jest ta da je obiteljska podljestvica pokazala niže vrijednosti unutarnje konzistentnosti. Međutim, vrlo je zanimljivo vidjeti da ta podljestvica poboljšava internu konzistentnost ukupnoga ECOHIS-a, zbog čega je važno zadržati obiteljsku podljestvicu u instrumentu.

Drugi parametar kojim se proučavala pouzdanost ljestvice bio je test-retest koji je primijenjen na 10 djece u uzorku. Jedna poteškoća na koju smo naišli pri ponavljanju ECOHIS-a bio je vremenski razmak između davanja dvaju upitnika koji je bio postavljen na između dva i tri tjedna, ali je u nekim slučajevima varirao i do dva mjeseca zbog nedostatka suradnje nekih roditelja pri vraćanju upitnika. Analiza korelacije između testa i retesta pokazala je značajnu i jaku korelaciju (53) na djetetovoj podljestvici (r = 0,85; p = 0,002) i ukupnoj ljestvici (r = 0,76; p = 0,011). Međutim, u obiteljskoj podljestvici utvrđena je slabija i neznačajna korelacija (r = 0,26; p = 0,47). Za tu nižu vrijednost može postojati nekoliko razloga: mali uzorak, broj čestica na podljestvici i već prijavljene poteškoće vezane za vrijeme između testa i ponovnog testiranja.

Analiza ukupne korelacije stavki pokazala je da one nisu suvišne, pri čemu su sve uzajamno umjereno korelirale. Zadatak 4, koji odgovara poteškoćama u izgovoru riječi, dobio je vrijednost 0,12, što je jedini zadatak ispod preporučene vrijednosti od 0,20 (26). U validacijskom istraživanju provedenom u Maleziji (29) također su bile dvije stavke ispod preporučene korelacije između stavki i ukupne vrijednosti – stavka

validation study carried out in Malaysia (29), there were also two items below the recommended item-total correlation, the item "missing school" and the item "financial impact," with values of 0.15 and 0.04, respectively. However, most studies (26-28, 36) obtained item-total correlations that were always above 0.20.

When the *Cronbach's* α value was analyzed when each of the items was removed, it was found that excluding the item "difficulty pronouncing words" would slightly increase the internal consistency value, but not considerably (it would increase 0.02). A similar result was also obtained in the validation study carried out in India (26).

The discriminant validity analysis confirmed that the ECOHIS allows us to differentiate between children with and without caries experience. The mean values of the scores were higher in the group of children with caries experience, thus indicating a significant impact of the disease on OHRQoL. This behavior of the ECOHIS has been demonstrated in several validation studies (18, 19, 21, 23, 24, 26, 29, 31, 32, 35-40).

Construct validity further supported the impact of dental caries by demonstrating a substantial correlation between the mean dmft values. Although significant, the correlation values showed a slightly weak correlation (53). The study carried out in Brazil (19) also found a slightly weak but significant correlation ($r=0.40$; $p<0.01$). Validation studies made in China (24), Peru (31), and Turkey (35) found significant medium or strong correlations.

Clinical measures, such as the dmft, focus on objective and observable aspects and do not always fully reflect the psychosocial impact that oral health can have on people's lives. For this reason, other studies use other variables to analyze the construct validity of the ECOHIS, namely measures that allow for the collection of perceptions and experiences reported by caregivers, such as parents' oral health perceptions of their child's. For this reason, numerous studies that validated the ECOHIS used this assessment of the child's oral or general health to analyze the construct validity of the scale (21-23,26,28,30,32,38-40). Barbosa pointed out that valid and reliable information can be obtained from parents and children using appropriate questionnaire techniques (54). Although the parents' reports may be incomplete due to a lack of knowledge about some experiences, the information can still be useful (54). This assessment of the parents' perception and self-reporting of the child's oral health could have been an interesting variable to be included in this study, particularly because there may be situations in which dental caries lesions remain asymptomatic and, for this reason, can have less impact on OHRQoL.

Oral health-related quality of life is a relevant element for assessing the impact that oral health has on an individual's well-being. Considering patient's or parent's self-perceived oral health and needs in terms of social or psychological repercussions, complements conventional diagnostic criteria in clinical practice (55). The earlier the impact of oral disorders is assessed the higher the chance to intervene with educational and preventive strategies. Pre-schoolers benefit much from such interventions because this is the time when chil-

„izostanak iz škole" i stavka „financijski učinak", s vrijednostima od 0,15, odnosno 0,04. Međutim, većina istraživanja (26 – 28, 36) dobila je korelacije ukupnih stavki koje su uvijek bile iznad 0,20.

Kada je vrijednost Cronbachove alfe analizirana nakon što je svaka stavka uklonjena, utvrđeno je da bi isključivanje stavke „poteškoće u izgovoru riječi" malo povećalo vrijednost unutarnje konzistentnosti, ali ne značajno (povećala bi se za 0,02). Sličan rezultat dobiven je i u validacijskom istraživanju provedenom u Indiji (26).

Analiza diskriminacijske valjanosti potvrdila je da ECOHIS omogućuje razlikovanje djece s iskustvom s karijesom i one bez toga iskustva. Srednje vrijednosti bile su veće u skupini djece s karijesom, što upućuje na značajan utjecaj bolesti na OHRQoL. To ponašanje ECOHIS-a dokazano je u nekoliko validacijskih istraživanja (18, 19, 21, 23, 24, 26, 29, 31, 32, 35 – 40).

Konstruktna valjanost dodatno je poduprla utjecaj zubnog karijesa pokazujući značajnu korelaciju između srednje vrijednosti dmft-a. Iako značajne, vrijednosti korelacije pokazale su slabu korelaciju (53). Istraživanje provedeno u Brazilu (19) također je pokazalo nešto slabiju, ali značajnu korelaciju ($r = 0,40$; $p < 0,01$). Validacijska istraživanja provedena u Kini (24), Peruu (31) i Turskoj (35) pronašla su značajne srednje ili jake korelacije.

Kliničke mjere, kao što je dmft, usredotočuju se na objektivne i vidljive aspekte i ne odražavaju uvijek u cijelosti psihosocijalni učinak koji oralno zdravlje može imati na živote ljudi. Iz tog razloga, druga istraživanja koriste se drugim varijablama za analizu konstruktivne valjanosti ECOHIS-a, naime mjerama koje omogućuju prikupljanje percepcija i iskustava o kojima izvješćuju skrbnici, kao što je percepcija roditelja o djetetovu oralnom zdravlju. Iz tog razloga, mnoga istraživanja koja su potvrdila ECOHIS koristila su se ovom procjenom djetetova oralnoga ili općega zdravlja za analizu konstruktivne valjanosti ljestvice (21 – 23, 26, 28, 30, 32, 38 – 40). Barbosa je istaknuo da se valjane i pouzdane informacije mogu dobiti od roditelja i djece korištenjem odgovarajućih tehnika upitnika (54). Iako izvješća roditelja mogu biti nepotpuna zbog nepoznavanja nekih iskustava, informacije ipak mogu biti korisne (54). Ta procjena roditeljske percepcije i samoizvješćivanja o djetetovu oralnom zdravlju mogla je biti zanimljiva varijabla za uključivanje u ovo istraživanje, osobito zato što mogu postojati situacije u kojima lezije zubnog karijesa ostaju asimptomatske i, iz tog razloga, mogu manje utjecati na OHRQoL.

Kvaliteta života povezana s oralnim zdravljem relevantna je metrika za procjenu utjecaja oralnoga zdravlja na dobrobit pojedinca. Uzimanje u obzir oralnoga zdravlja pacijenta ili roditelja i njegovih potreba u smislu društvenih ili psiholoških posljedica, nadopunjuje konvencionalne dijagnostičke kriterije u kliničkoj praksi (55). Što se ranije procijeni učinak oralnih smetnji, to je veća mogućnost da se intervenira obrazovnim i preventivnim strategijama. Predškolska djeca imaju mnogo koristi od takvih intervencija jer je to razdoblje kada se razvijaju tjelesno i kognitivno te formiraju nekoliko navika i stajališta, uključujući one koji se odnose na zdravlje i brigu o sebi (56).

dren develop physically and cognitively as well as form several habits and attitudes, including those pertaining to health and self-care (56).

The present study offers information relevant to health professionals by providing a contribution to the validation of the ECOHIS and by exploring the impact of oral problems on preschool children and their families. This information can be used to create public health initiatives targeted at populations at higher risk and the implementation of more adequate approaches to prevent, reduce, and control oral diseases in preschool children (55).

It would be useful to study the scale behavior in larger and probabilistic samples to allow true extrapolation of the results. However, despite the convenience sample, this study is an important contribution to validating the ECOHIS in the Portuguese preschool population.

Conclusion

The Portuguese version of the ECOHIS showed, generally, good psychometric properties when applied to the study population. The scale showed good internal consistency, acceptable test-retest reliability, good discriminant validity, and acceptable construct validity. Considering the behavior of the Portuguese version of the scale in this preschool population, it can be concluded that it is a reliable and valid tool for measuring the impact of oral health on preschool children and their families.

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Ethics: Authors declare data transparency and if necessary, availability of data and material. This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of University of Lisbon, FMDUL. Informed consent was obtained from all individual participants included in the study.

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Ovo istraživanje nudi informacije relevantne za zdravstvene radnike zato što daje doprinos validaciji ECOHIS-a i istražuje utjecaj oralnih problema na djecu predškolske dobi i njihove obitelji. Te informacije mogu se koristiti za kreiranje javnozdravstvenih inicijativa usmjerenih na populacije s visokim rizikom i provedbu primjerenijih pristupa kad je riječ o prevenciji, smanjenju i kontroli oralnih bolesti kod djece predškolske dobi (55).

Bilo bi korisno proučiti rezultate dobivene ljestvicom u većim i probabilističkim uzorcima kako bi se omogućila njihova prava ekstrapolacija. Međutim, unatoč praktičnom uzorku, ovo je istraživanje važan doprinos potvrđivanju ECOHIS-a u portugalskoj predškolskoj populaciji.

Zaključak

Portugalska verzija ECOHIS-a pokazala je općenito dobra psihometrijska svojstva kada se primijenila na ispitivanu populaciju. Ljestvica je pokazala dobru unutarnju konzistentnost, prihvatljivu pouzdanost test-retesta, dobru diskriminantnu valjanost i prihvatljivu konstruktnu valjanost. S obzirom na rezultate dobivene portugalskom verzijom ljestvice u ovoj populaciji predškolske dobi, može se zaključiti da je ona pouzdan i valjan alat za mjerenje utjecaja oralnoga zdravlja na djecu predškolske dobi i njihove obitelji.

Sukob interesa: Autori nisu bili u sukobu interesa.

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Doprinos autora: **C. C.** – priprema materijala i prikupljanje podataka; **C. C., S. M.** – statističke analize; **S. M., S. R.** – nadzor točnosti podataka; **C. C.** – prvi nacrt teksta. Svi su autori pročitali i odobrili konačni tekst. Svi su autori pridonijeli koncepciji i dizajnu istraživanja.

Sažetak

Svrha rada: Željelo se pridonijeti validaciji ljestvice utjecaja na oralno zdravlje u ranom djetinjstvu (*Early Childhood Oral Impact Scale* – ECOHIS) proučavanjem njezinih psihometrijskih svojstava kada se primjenjuje na portugalsku predškolsku populaciju. **Materijali i metode:** Presječno istraživanje provedeno je na djeci u dobi od tri do pet godina. Neprobabilistički uzorak obuhvaćao je dvije predškolske ustanove u općini Lisabon. Uključena su djeca koja su pristala sudjelovati i čiji su roditelji potpisali informirani pristanak. Prikupljanje podataka obuhvaća anketiranje roditelja i intraoralni pregled djece. Upitnik je uključivao portugalsku verziju ECOHIS-a. Intraoralni pregled obuhvaćao je dijagnostiku karijesa prema kriterijima Svjetske zdravstvene organizacije. Diskriminirajuća valjanost uspoređivala je vrijednosti ECOHIS-a između djece s iskustvom s karijesom i bez toga iskustva (Mann-Whitneyjev U-test). Cohenov d izračunat je za procjenu veličine razlike. Analiza pouzdanosti uključivala je Cronbachovu alfu i test-retest. Valjanost konstrukta analizirana je korelacijom između vrijednosti ECOHIS-a i dmft-a (Spearmanova korelacija). Korištena je razina značajnosti od 5 %. **Rezultati:** Uzorak je obuhvaćao 104 djeteta (prosječna dob 4,1 godina). Vrijednosti ECOHIS-a značajno su se razlikovale između djece s karijesom i bez karijesa (p = 0,004). Cohenov **d** bio je 0,84. Cronbachova alfa iznosila je 0,78, bez značajnog povećanja vrijednosti pri eliminaciji bilo koje stavke. Test-retest pokazao je značajnu korelaciju (r = 0,76; p = 0,01). Postojala je značajna korelacija između vrijednosti ECOHIS-a i iskustva s karijesom (r = 0,28; p = 0,004). **Zaključak:** Portugalska verzija ECOHIS-a pokazala je dobra psihometrijska svojstva, što upućuje na to da je pouzdan i valjan alat za mjerenje utjecaja oralnoga zdravlja djece predškolske dobi.

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