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Oral Health–Related Quality of Life of Refugees in Settlements in Greece

Khaleda Zaheer*, David M. Williams, Kristina Wanyonyi

Bart's and The London, School of Medicine and Dentistry, Queen Mary, University of London, London, UK

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ABSTRACT

Introduction: The objective of this cross-sectional study was to investigate the oral health–related quality of life (OHQoL) amongst refugees at emergency dental clinics in settlements in Northern Greece.

Methods: A self-reported survey was undertaken in 7 settlements. The American Dental Association questionnaire on oral health (OH) was adapted and distributed to adults attending a mobile dental clinic between July and August 2017. Data were collected on socio-demographics, length of stay in settlement, utilisation of dental service, and OHQoL. Statistical analysis included descriptive analysis and Chi-square tests of associations.

Results: Of 156 participants, the majority were male (73%), were aged 18 to 34 (59%), and had education up to high school (48%). Most of the participants rated OH as fair or poor (76%) and had spent more than 6 months in the settlements (45%). A majority of the participants (85%) had no access to dental care without the mobile clinic.

Negative impact on OHQoL was significantly ($P < .05$) related to settlement location and time spent, smoking status, frequency of cleaning teeth and use of fluoridated toothpaste, perceived OH, and time since last dental visit. Those who spent less than 1 month in the settlement reported a higher negative OHQoL impact related to chewing, anxiety, smiling, daily activity, and sleeping (range, 48%–73%) compared to those who had spent more than 6 months (range, 17%–41%) ($P < .05$).

Conclusions: To the best of our knowledge, this is the first cross-sectional study assessing the OHQoL of refugees seeking emergency dental care in settlements in Greece. There is evidence that the refugees who were new arrivals to the settlements when provided with access to dental care reported a negative impact on their OHQoL. There is an urgent need for further research to understand the OH needs of refugees in Europe in order to design and deliver targeted and effective interventions.

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Introduction

Every 2 seconds, somewhere in the world a person is forced to leave their home. There are 26 million refugees globally who have been forcibly displaced because of persecution, violence, and human rights violations. Eighty-five percent are hosted in developing countries.¹

A refugee is defined in the 1951 Refugee Convention as “someone who is unable or unwilling to return to their country of origin owing to a well-founded fear of being persecuted

for reasons of race, religion, nationality, membership of a particular social group, or political opinion.”² The UN Refugee Agency (UNHCR) report that refugees arriving in Europe require adequate reception and assistance.³ Refugees are particularly vulnerable to noncommunicable disease (NCD) due to a disrupted health care system in their country of origin and limited access to health care during migration. Other factors that increase their vulnerability include variations in oral health (OH) behaviours and perceptions stemming from differences in socioeconomic and cultural background.⁴ The World Health Assembly and the United Nation’s International Covenant on Economic Social and Cultural Rights have called on member states to deliver the highest standard of essential health care for migrants.⁵ The 2030 Agenda for Sustainable Development emphasises that no one is left behind in

* Corresponding author. Bart's and The London School of Medicine and Dentistry, Queen Mary, University of London, Turner Street, London E1 2AD, UK.

E-mail address: khaledazaheer@hotmail.com (K. Zaheer).

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achieving the Sustainable Development Goals.⁶ However, at present the international community does not have a comprehensive plan for long-term solutions for this new wave of global migration.³

Health care providers across Europe face different challenges in providing care for refugees and migrants at each stage of the migration trajectory. These challenges have an impact on access to health care for unauthorised asylum seekers, and there is a danger that refugee OH may be overlooked in the plans that are drawn up.^{5,7,8}

OH is an essential component of overall health, and poor OH can have a negative impact on quality of life (QoL).⁹ Poor OH results in pain that can limit masticatory function, resulting in reduced food intake and consequent poor nutrition.¹⁰ The limited evidence on refugees and asylum seekers suggests that they tend to have higher levels of oral disease compared to the least privileged in their host countries,¹¹ and their problems are compounded by having limited access to oral health care. Taking this into consideration, the situation of the refugees and factors mentioned above make this population considerably vulnerable and at increased risk of deteriorating OH with limited access to oral health care facilities in their migration route.

In 2015, the number of refugees arriving in the Mediterranean peaked at over 1 million, which drew global attention to the crisis.¹² In the Mediterranean region (Spain, Italy, Greece, Malta, and Cyprus), a total of 123,700 arrivals of refugees and migrants were recorded in 2019.¹² Asylum seekers crossing the Mediterranean Sea and arriving on the Aegean islands are transferred to Greek mainland once authorised. In Northern Greece, the charity Health-Point Foundation operated a mobile dental service providing emergency treatment to refugees.

The objective of this study was to report on the oral health-related quality of life (OHQoL) of refugees attending an emergency dental clinic in settlements in Northern Greece. This is the first study exploring the OHQoL of refugees seeking emergency dental care in settlements in Greece. The findings from this study will contribute to a better understanding of the dental problems faced by refugees, how they perceive their OH, and its impact on OHQoL. This in turn would inform the international community on the needs of refugees that should be considered when designing policies regarding health care access.

Methods

Design, setting, and participants

The study, which had been approved by the Research Ethics Committee of Queen Mary, University of London (Reference Number: QMERC2017/45), was undertaken in Northern Greece with Health-Point Foundation, a registered charity in the UK and nonprofit organisation in the US. The charity operated a mobile dental clinic for refugees staying in settlements in Northern Greece. Dentists volunteered their time to provide emergency treatment that included restorations, extractions, pulp extirpations, and prescription of antibiotics where indicated. The dental teams visited settlements regularly based

on the population size and influx of new arrivals. Adults attending the dental clinic were recruited into the study with their informed consent.

The refugee settlements visited for data collection were Kilkis, Derveni (Alexil), Alexandria, Loutra Volvis, Nea Kavala, Softex, and Sinatex. The refugee settlement at Loutra Volvis had Iraqi-Kurdish refugees only. Omnes, a Greek non-governmental organisation, housed vulnerable refugees in UNHCR-funded accommodation in Kilkis. Derveni (Alexil) and Sinatex were abandoned buildings where refugees stayed in tents and small wooden houses, respectively. Softex was an abandoned factory in which refugees were housed in containers. Nea Kavala and Alexandria settlements were managed by the Greek military with housing for refugees in suitably adapted shipping containers.^{13,14}

Data collection

The self-reported OH of refugees was assessed using the Oral Health and Well-Being questionnaire from the American Dental Association (ADA) Health Policy Institute. The ADA questionnaire was based on established surveys including the 2008 National Health Interview Survey, the 2007-2008 National Health and Nutrition Examination Survey, and the 2013 World Health Organisation Oral Health Survey, which drew on the ADA Oral Impact on Daily Performance Index.¹⁵

The questionnaire was adapted to the refugee population (Figure 1). The following data were collected: predisposing factors and health behaviours (settlement location, age, sex, education, occupation, time spent in settlement, smoking status, frequency of cleaning teeth, toothpaste used and whether it contains fluoride, perceived OH, and problems with their mouth); utilisation of dental services (time and location of last dental visit); and OH impact questions, which were on a 5-point Likert scale of “very often,” “occasionally,” “rarely,” “never,” or “I don’t know.” OHQoL questions related to the following domains: difficulty chewing, difficulty with speech, dry mouth, felt anxious, felt embarrassment, avoided smiling, difficulty doing daily activity, difficulty sleeping, and pain.

The questionnaire was available in English and translated into Arabic and Farsi, the commonly spoken languages in the settlements. Adults attending the dental clinic were presented with an information sheet so that they could give their informed consent. Interpreters were available to help participants complete the questionnaire. Inclusion criteria were that participants were adults aged 18 years or older; were refugees attending the dental clinic; were able to read and understand English, Arabic, or Farsi; and could give informed consent, and there was no minimum period to how long they lived in the settlement. Data collection took place over a period of 8 days between July and August 2017.

Statistical analysis

Data analysis was performed using statistical package SPSS version 26. Missing data were excluded from the analysis. The data were first analysed using descriptive analysis to report the characteristics of the sample using frequencies and percentages. Frequency of cleaning teeth was recoded

Title of Project: Impact of oral health on the quality of life of Refugees in Thessaloniki, Greece			
Date			
Name of researcher:			
Participant number:			
Country of origin:			
<hr/>			
1. Age			
18-34	35-49	50-64	64+
2. Sex			
Male	Female		
3. What is your highest education level?			
No schooling, Less than high school	Completed high school		
Completed some college	Completed college	Completed some university	
Completed university	Masters	Doctorate	
4. How would you describe the work you do?			
Professional	Managerial	Skilled work	
Unskilled work	Stay-at-home spouse	Never worked	
5. When did you arrive to Thessaloniki?			
Less than one month, 1-6 months, More than 6 months			
6. Where was your last dental appointment?			
In the camp My country Somewhere else (please specify)			
7. How long since you last had a dental visit?			
Less than 12 months 1-2 years 3-5 years More than 5 years Never			
8. Are you experiencing problems with your mouth and teeth?			
Yes No I don't know			
a) When did this start?			
Before your arrival After your arrival			
9. Do you currently smoke?			
Yes No			
a) If yes, how many cigarettes a day?			
1-10 11-20 21-30 31 or more			
b) How many years have you been smoking for?			
Less than 1 year 1-3 years 3-10 years More than 10 years			
10. Do you use smokeless tobacco products or products that contain tobacco?			
Yes No			
a) If yes, how many times a day?			
Once or twice 3-5 times 10 times More than 10 times			
b) What type/form?			
Paan Zarda Naswar Shisha/Hookah Other			
11. How often do you clean your teeth?			
Never, Once or twice a day, 2-6 times a week, Once a week, Once a month			
12. Do you use the following to clean your teeth?			
Toothbrush Toothpick Floss Miswak Other			
13. Do you use toothpaste to clean your teeth?			
Yes No Sometimes			
14. Does it contain fluoride?			
Yes No I don't know			
15. How would you describe the condition of your mouth?			
Poor Fair Good Very Good I don't know			
16. What is the main problem with your mouth or teeth?			
Pain	Sensitivity	Bleeding gums	Appearance
of teeth	Missing teeth	Cavity	
No problem Other (please specify)			
17. How often since your arrival at the camps have you felt that life is less satisfying because of problems with your mouth and teeth?			
Very Often Occasionally Rarely Never I don't know			
18. Have you felt that your general health has worsened because of problems with your mouth?			
Yes No I don't know			
19. How often have you experienced the following problems since your arrival at the camp due to the condition of your mouth and teeth?			
Very Often Occasionally Rarely Never I don't know			
a) Difficulty when chewing food			
b) Difficulty with speech or trouble pronouncing words			
c) Dry mouth			
d) Felt anxious			
e) Felt embarrassment			
f) Avoided smiling			
g) Difficulty doing daily activity			
h) Difficulty sleeping			
i) Experienced pain			
20. Do you have access to a medical doctor or hospital?			
Yes No I don't know			
21. Do you have a place where you would go if you needed to get dental care?			
Yes No I don't know			
22. If this clinic did not operate do you have elsewhere to go for dental care?			
Yes No I don't know			

Fig. 1 – Questionnaire used in Northern Greece, adapted from the American Dental Association Health Policy Institute questionnaire.

into a binary variable to brushing “once or twice a day” and “irregular brushing” if respondents selected “never,” “2 to 6 times/week,” “once a week,” and “once a month.”

Questions relating to OHQoL domains were recoded into a binary variable to 1 = “negatively impacted” if the participant selected that they were impacted “very often” or “occasionally” vs 0 = “not negatively impacted” if respondents selected “rarely” or “never.” Chi-square test was used to compare the proportion of participants negatively impacted by their OHQoL by predisposing factors and utilisation of dental services. Statistical significance was established using Pearson’s Chi-square test, Fisher’s exact test, and likelihood-ratio test where appropriate depending on the number of variables and sample size. Statistical significance was set at $P < .05$.

Results

A total of 156 participants responded to the survey and were included in the analysis. The majority of these were male (73.0%, $n = 108$), aged 18 to 34 (59.2%, $n = 87$), and skilled workers (35.1%, $n = 53$) with a level of education up to high school

(48.7%, $n = 75$) (Table 1). Nearly half the participants had spent more than 6 months (45.3%, $n = 70$) in the settlements. Smoking was reported by 46.4% ($n = 71$). Most of the participants did not know whether the toothpaste used contained fluoride (76.6%, $n = 111$). The majority reported the condition of their mouth as only fair (41.3%, $n = 62$). Pain was the most commonly reported problem (48.3%, $n = 72$), followed by cavity (31.5%, $n = 47$), and missing teeth (21.5%, $n = 32$). A relatively high proportion had received a dental appointment in the last 12 months (48.0%, $n = 73$), and mainly in the settlement (58.2%, $n = 82$) (Table 1). Most of the participants reported that the mobile dental clinic was their only source of dental care (85%, $n = 100$).

Figure 2 illustrates the proportion of participants impacted by OHQoL. The most prevalent domains negatively impacted were pain (71.5%, $n = 105$), difficulty chewing (54.3%, $n = 80$), and dry mouth (50.7%, $n = 71$).

The variables (predisposing factors and utilisation of dental services) that had negatively impacted OHQoL domains are shown in Table 2. There were no statistically significant differences of participants negatively impacted based on age, sex, education, and occupation. Statistically significant differences were observed in settlement location, time spent at the

Table 1 – Characteristics of the sample (N = 156).

Characteristics	% (n)	Characteristics	% (n)
Presdisposing factors			
Settlement location		Time spent in Northern Greece	
Kilkis	10.3 (16)	<1 month	19.4 (30)
Sinatex	14.1 (22)	1-6 months	35.5 (55)
Loutra Volvis	22.4 (35)	>6 months	45.3 (70)
Derven (Alexil)	10.3 (16)	Smoking	
Softex	11.5 (18)	Smoker	46.4 (71)
Nea Kavala	5.8 (9)	Nonsmoker	53.6 (82)
Alexandreaia	25.6 (40)	Frequency of cleaning teeth	
Age, y		Never	3.4 (5)
18-34	59.2 (87)	Once or twice/day	68.0 (100)
35-49	32.0 (47)	2-6 times/week	21.8 (32)
50-64	7.5 (11)	Once a week	5.4 (8)
64	1.4 (2)	Once a month	1.4 (2)
Sex		Toothpaste use	
Male	73.0 (108)	Yes	93.2 (138)
Female	27.0 (40)	No	2.0 (3)
Education		Sometimes	4.7 (7)
No schooling	21.4 (33)	Does it contain fluoride?	
Up to high school	48.7 (75)	Yes	21.4 (31)
Up to college	21.4 (33)	No	2.1 (3)
University, master's, and doctorate	9.4 (13)	I don't know	76.6 (111)
Occupation		Perceived oral health	
Professional/managerial	8.6 (13)	Poor	34.7 (52)
Skilled	35.1 (53)	Fair	41.3 (62)
Unskilled	8.6 (13)	Good	14.0 (21)
Stay at home	18.5 (28)	Very good	4.0 (6)
Never worked	29.1 (44)	I don't know	6.0 (9)
Problems with mouth			
Pain	48.3 (72)		
Sensitivity	12.8 (19)		
Bleeding gums	17.4 (26)		
Appearance of teeth	18.8 (28)		
Missing teeth	21.5 (32)		
Cavity	31.5 (47)		
No problem	12.8 (19)		
Utilisation of dental services		Location of last dental visit	
Time since last dental visit		Camp	58.2 (82)
<12 months	48.0 (73)	Country of origin	34.0 (48)
1-2 years	23.0 (35)	Somewhere else	7.8 (11)
3 or more years	14.5 (22)		
Never	14.5 (22)		

settlement, smoking status, frequency of cleaning teeth, toothpaste use and whether it contains fluoride, perceived OH, and time since last visit. Fewer participants from Kilkis, Nea Kavala, and Loutra Volvis had statistically significantly negative impacts compared to other settlements in relation to difficulty chewing (33.3%, 66.7%, and 31.4%, respectively; $P = .008$), feeling embarrassed (26.7%, 25.0%, and 34.3%, respectively; $P = .029$), avoiding smiling (26.7%, 22.2%, and 31.4%, respectively; $P = .003$), or experiencing pain (40.0%, 62.5%, and 71.4%, respectively; $P = .001$) (Table 2).

A higher proportion of smokers compared to nonsmokers had a statistically significant negative impact on difficulty with speech (30.9% vs 16.7%; $P = .043$), dry mouth (62.9% vs 40.8%; $P = .010$), feeling embarrassment (57.4% vs 40.3%; $P = .040$), and avoiding smiling (58.8% vs 39.0%; $P = .017$). Those who brushed their teeth once or twice a day compared to reporting irregular brushing had a statistically significant negative impact on difficulty chewing (59.5% vs 40.5%; $P = .021$), dry mouth (61.2% vs 38.8%; $P = .039$), and feeling anxious (54.2% vs 45.8%; $P = .018$). However, a higher proportion of those who brushed irregularly compared to brushing once

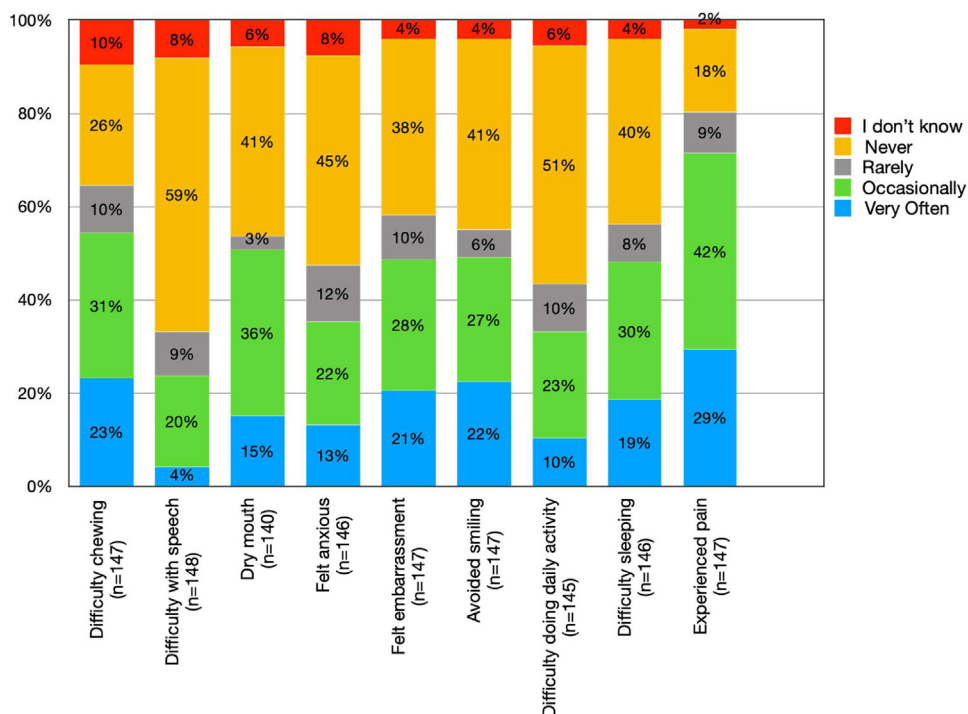


Fig. 2 – Chart illustrating percentage of participants impacted by oral health–related quality of life domains.

or twice a day had a statistically significant negative impact on feeling embarrassment (60.9% vs 41.1%; $P = .027$), avoiding smiling (67.4% vs 38.9%; $P = .002$), and difficulty sleeping (60.0% vs 40.0%; $P = .027$) (Table 2).

In relation to toothpaste use, 19.7% of those who used toothpaste had a statistically significant negative impact on difficulty with speech compared to 66.7% of those who did not ($P = .028$). However, 73.3% who used fluoride toothpaste had a statistically significant negative impact on dry mouth compared to 0% amongst those who did not ($P = .005$). A higher proportion of those who perceived their OH as poor had a statistically significant negative impact on all OHQoL domains. In all, 75.8% of those who had received dental care in the last 1 to 2 years had a statistically significant negative impact on feeling embarrassment compared to 35.0% of those who had never visited a dentist ($P = .004$). Of the problems reported by the refugees with the mouth and teeth, the following had a statistically significant impact on at least one domain of OHQoL: pain, sensitivity, appearance of teeth, cavity, and no problems (Table 2).

A higher proportion of participants who had spent less than 1 month in the settlement reported a statistically significant negative impact on OHQoL in relation to difficulty chewing ($P = .009$), feeling anxious ($P = .009$), avoiding smiling ($P = .007$), difficulty doing daily activities ($P = .001$), and sleeping ($P = .003$) when compared to those who spent more than 6 months (Figure 3).

Discussion

To the best of our knowledge, this is the first study assessing the OHQoL of refugees in settlements in Northern Greece. A

systematic review of dental services for refugees in Europe by Bhusari et al¹⁶ reported that there were more data on the general health of refugees than OH data.

Refugees are a vulnerable population who arrive in host countries having experienced physical and psychological trauma, and the need to address their health has been recognised by the member states in the WHO European Region. The primary reason for using the ADA questionnaire was to adequately capture the contribution of OH to the overall physical, emotional, and social well-being from the perspective of the participant.¹⁵ The purpose of the study was to focus on purely subjective, self-reported measures of mouth pain and discomfort, function (eg, chewing and speaking), and appearance (eg, smiling).

Refugees arriving on the islands are transferred to mainland Greece, where they are housed in a range of different accommodations for longer periods. The participants surveyed in this study comprised different subpopulations based on the country of origin and level of vulnerability. The effects of the migration process, exposure to varying social determinants of health, and a range of other biological and social factors created different health outcomes for refugees. Consequently, the results from this study cannot be generalised to the wider refugee population.¹⁷ Nevertheless, it is evident that refugees experience a significant burden of oral disease, and a systematic assessment of the OH of refugees is warranted.

Most of the participants in this study were young male adults, which is consistent with the results from a study of the OH of refugees in Germany.¹⁸ UNHCR statistics show that more refugees are men than women.³ This may explain why men are more likely to access oral health care services, but this warrants further investigation. Refugees are at risk for

Table 2 – Percentage (n) of participants negatively impacted by oral health–related quality of life domains according to variables.

Variable	Difficulty chewing	Difficulty with speech	Dry mouth	Felt anxious	Felt embarrassment	Avoided smiling	Difficulty doing daily activity	Difficulty sleeping	Experienced pain
Predisposing factors									
Settlement location									
Kilkis	33.3 (5)**	20.0 (3)	14.3 (2)	20.0 (3)	26.7 (4)**	26.7 (4)**	33.3 (5)	26.7 (4)	40.0 (6)**
Nea Kavala	66.7 (6)**	22.2 (2)	42.9 (3)	37.5 (3)	25.0 (26)**	22.2 (2)**	12.5 (1)	33.3 (3)	62.5 (5)**
Loutra Volvis	31.4 (11)**	14.3 (5)	48.6 (17)	43.4 (12)	34.3 (12)**	31.4 (11)**	17.1 (6)	37.1 (13)	71.4 (25)**
Sinatex	61.1 (11)**	17.6 (3)	68.8 (11)	29.4 (5)	50.0 (9)**	47.1 (8)**	29.4 (5)	47.1 (8)	64.7 (11)**
Softex	76.5 (13)**	33.3 (6)	52.9 (9)	38.9 (7)	50.0 (9)**	55.6 (10)**	38.9 (7)	72.2 (13)	83.3 (15)**
Derveni (Alexil)	73.3 (11)**	46.7 (7)	66.7 (10)	35.7 (5)	64.3 (9)**	71.4 (10)**	46.2 (6)	42.9 (6)	46.7 (7)**
Alexandreia	60.5 (23)**	23.1 (9)	52.8 (19)	41.0 (16)	66.7 (26)**	69.2 (27)**	46.2 (18)	60.5 (23)	92.3 (36)**
Age, y									
18-34	53.5 (46)	22.4 (19)	50 (41)	34.9 (29)	50.6 (43)	58.3 (49)	36.1 (30)	55.4 (46)	73.8 (62)
35-49	53.5 (23)	22.2 (10)	50 (21)	33.3 (15)	42.2 (19)	35.6 (16)	24.4 (11)	35.6 (16)	68.2 (30)
50-64	60.0 (6)	30 (3)	55.6 (5)	40.0 (4)	60.0 (6)	50.0 (5)	30.0 (3)	40.0 (4)	81.8 (9)
Sex									
Male	56.9 (58)	25.7 (26)	51.0 (49)	35.4 (35)	46.5 (47)	51.0 (51)	29.3 (29)	46.5 (46)	71.3 (72)
Female	48.6 (18)	15.4 (6)	51.4 (19)	30.8 (12)	46.2 (18)	38.5 (15)	35.9 (14)	46.2 (18)	71.1 (27)
Education									
No schooling	33.3 (11)	15.2 (5)	51.6 (16)	36.4 (12)	39.4 (13)	54.5 (18)	27.3 (9)	40.6 (13)	72.7 (24)
Up to high school	61.4 (43)	25.7 (18)	50.0 (33)	36.8 (25)	52.9 (36)	42.0 (29)	36.8 (25)	50.7 (35)	71.8 (51)
Up to college	60.0 (18)	25.0 (3)	48.3 (14)	25.8 (8)	40.5 (13)	51.6 (16)	23.3 (7)	48.4 (15)	65.5 (19)
University, master's, and doctorate	58.3 (7)	23.3 (34)	58.3 (7)	41.7 (5)	75.0 (9)	75.0 (9)	50.0 (6)	50.0 (6)	83.3 (10)
Occupation									
Professional	50.0 (2)	25.0 (1)	75.0 (3)	25.0 (1)	75.0 (3)	100.0 (4)	50.0 (2)	66.7 (2)	80.0 (4)
Managerial	57.1 (4)	28.6 (2)	57.1 (4)	0	57.1 (4)	57.1 (4)	28.6 (2)	42.9 (3)	42.9 (3)
Skilled	55.8 (29)	23.5 (12)	48.9 (23)	41.2 (21)	56.0 (28)	56.9 (29)	36.0 (18)	49.0 (25)	73.1 (38)
Unskilled	69.2 (9)	38.5 (5)	46.2 (6)	45.5 (5)	50.0 (6)	58.3 (7)	33.3 (4)	58.3 (7)	66.7 (8)
Stay at home	46.2 (12)	14.8 (4)	46.2 (12)	37.0 (10)	55.6 (15)	44.4 (12)	40.7 (11)	48.1 (13)	77.8 (21)
Never worked	50.0 (20)	22.0 (9)	53.8 (21)	29.3 (12)	33.3 (14)	36.6 (15)	22.5 (9)	43.9 (18)	69.2 (27)
Time spent in Northern Greece									
<1 month	73.1 (19)*	28.0 (7)	66.7 (16)	52.0 (13)*	57.7 (15)	72.0 (18)*	48.0 (12)*	68.0 (17)*	76.0 (19)
1-6 months	61.5 (32)*	26.4 (14)	54.0 (27)	42.3 (22)*	56.6 (30)	54.7 (29)*	45.3 (24)*	56.6 (30)*	77.4 (41)
>6 months	41.2 (28)*	18.8 (13)	41.5 (27)	22.1 (15)*	38.8 (26)	36.8 (25)*	16.7 (11)*	32.8 (22)*	64.7 (44)
Smoking									
Smoker	61.2 (41)	30.9 (21)*	62.9 (39)*	41.2 (28)	57.4 (39)*	58.8 (40)*	38.2 (26)	53.7 (36)	74.6 (50)
Nonsmoker	48.7 (38)	16.7 (13)*	40.8 (31)*	28.9 (22)	40.3 (31)*	39.0 (30)*	26.7 (20)	42.9 (33)	68.8 (53)
Frequency of cleaning teeth									
Once or twice/day	59.5 (44)*	54.5 (18)	61.2 (41)*	54.2 (26)*	41.1 (39)*	38.9 (68)*	58.1 (25)	40.0 (38)*	70.2 (66)
Irregular brushing	40.5 (30)*	45.5 (15)	38.8 (26)*	45.8 (22)*	60.9 (28)*	67.4 (31)*	41.9 (18)	60.0 (27)*	71.7 (33)
Toothpaste use									
Yes	51.1 (67)	19.7 (26)**	48.4 (61)	31.8 (42)	47.0 (62)	47.0 (62)	30.0 (39)	44.3 (58)	70.5 (93)
No	100.0 (3)	66.7 (2)**	66.7 (2)	66.7 (2)	100.0 (3)	100.0 (3)	33.3 (1)	66.7 (2)	66.7 (2)
Sometimes	57.1 (4)	57.1 (4)**	60.0 (3)	66.7 (4)	42.9 (30)	57.1 (4)	42.9 (3)	71.4 (5)	71.4 (5)

(continued on next page)

Table 2 (Continued)

Variable	Difficulty chewing	Difficulty with speech	Dry mouth	Felt anxious	Felt embarrassment	Avoided smiling	Difficulty doing daily activity	Difficulty sleeping	Experienced pain
Contains fluoride									
Yes	58.6 (17)	23.3 (7)	73.3 (22)**	17.2 (5)	43.3 (13)	34.5 (10)	34.5 (10)	39.3 (11)	70.4 (19)
No	50.0 (1)	0	0**	50.0 (1)	0	50.0 (1)	0	100.0 (2)	100.0 (3)
I don't know	50.9 (55)	22.2 (24)	45.0 (45)**	37.4 (40)	48.6 (52)	51.9 (56)	29.9 (32)	46.3 (50)	69.7 (76)
Perceived oral health									
Poor	74.0 (37)**	43.1 (22)**	74.5 (35)**	62.7 (32)**	60.8 (31)**	66.7 (34)**	51.0 (26)**	76.5 (39)**	88.2 (45)**
Fair	48.3 (28)**	10.2 (6)**	37.9 (22)**	22.0 (13)**	51.7 (31)**	47.5 (28)**	20.7 (12)**	33.9 (20)**	72.4 (42)**
Good	15.0 (3)**	5.3 (1)**	27.8 (5)**	5.6 (1)**	15.8 (3)**	21.1 (4)**	15.8 (3)**	5.6 (1)**	38.1 (8)**
Very good	50.0 (3)**	16.7 (1)**	40.0 (2)**	0**	0**	0**	25.0 (1)**	20.0 (1)**	25.0 (1)**
I don't know	55.6 (5)**	33.3 (3)**	50.0 (4)**	33.3 (3)**	44.4 (4)**	44.4 (4)**	22.2 (2)**	55.6 (5)**	55.6 (5)**
Problems with mouth									
Pain	65.7 (44)*	30.4 (21)*	64.6 (42)*	44.1 (30)*	55.1 (38)	57.4 (39)	37.3 (25)	67.6 (46)*	
Sensitivity	63.2 (12)	15.8 (3)	58.8 (10)	26.3 (5)	73.7 (14)*	63.2 (12)	26.3 (5)	47.4 (9)	88.9 (16)
Bleeding gums	46.2 (12)	26.9 (7)	58.3 (14)	30.8 (8)	61.5 (16)	53.8 (14)	26.9 (7)	46.2 (12)	65.4 (17)
Appearance of teeth	70.4 (19)*	33.3 (9)	75.0 (18)*	55.6 (15)*	70.4 (19)*	70.4 (19)*	33.3 (9)	59.3 (16)	73.1 (19)
Missing teeth	67.7 (21)	32.3 (10)	53.3 (16)	41.9 (13)	58.1 (18)	61.3 (19)	41.9 (13)	51.6 (16)	80.6 (25)
Cavity	70.5 (31)*	29.5 (13)	55.0 (22)	40.9 (18)	57.8 (26)	61.4 (27)	38.6 (17)	60.5 (26)*	80.4 (37)
No problem	10.5 (2)*	5.3 (1)	5.6 (1)*	22.2 (4)	16.7 (3)*	26.3 (5)*	27.8 (5)	15.8 (3)*	26.3 (5)*
Utilisation of dental services									
Time since last dental visit									
Less than 12 months	55.1 (38)	20.0 (14)	53.0 (35)	37.7 (26)	40.0 (28)*	42.0 (29)	29.4 (20)	50.7 (35)	73.5 (5)
1-2 years	56.3 (18)	27.3 (9)	38.7 (12)	39.4 (13)	75.8 (25)*	60.5 (20)	45.5 (15)	48.5 (16)	75.8 (25)
3 or more years	57.1 (12)	33.3 (7)	50.0 (10)	23.8 (5)	47.6 (10)*	52.4 (11)	33.3 (7)	42.9 (9)	76.2 (16)
Never	45.5 (10)	19.0 (4)	60.0 (12)	30.0 (6)	35.0 (7)*	47.6 (10)	30.0 (6)	40.0 (8)	52.4 (11)

P < .05.

* Pearson chi-square test

** Fisher's exact test***Likelihood-ratio test

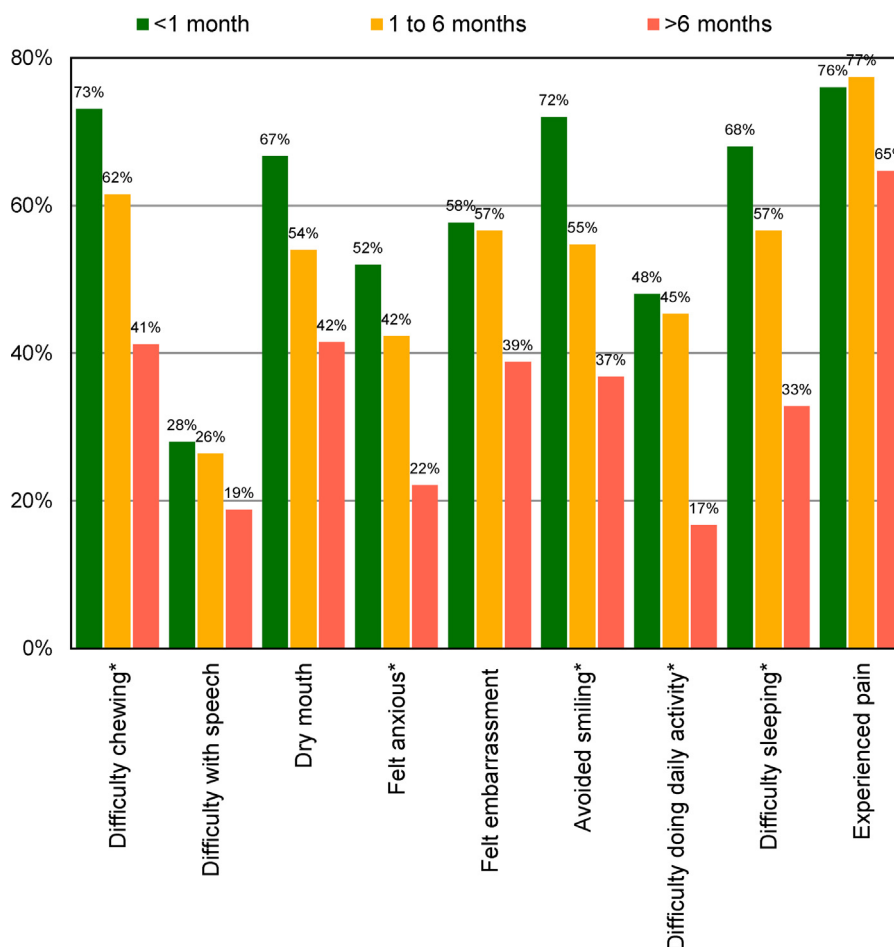


Fig. 3 – Chart illustrating percentage of participants negatively impacted by oral health–related quality of life domains, based on time (months) spent in the camp.

exposure to infectious diseases due lack of access to health care in transit and poor living conditions¹⁷ and are particularly vulnerable to NCD, but limited access to health care means that a substantial fraction of this disease burden is either undiagnosed or poorly controlled.⁴ Oral diseases share common risk factors with other NCDs, such as tobacco use, poor diet, and poor hygiene practices.⁴ It was noted that 46% of participants reported smoking, which had a statistically significant negative impact on several OHQoL domains. Tobacco interventions should be considered in OH packages for refugees, and oral cancer screening should be included in clinical examinations when assessing severity of caries and periodontal disease.

There were statistically significant differences in the proportions of participants who were negatively impacted depending on which settlement they were in. It is unclear why this was the case, but it may be related to the conditions of the camp. This impression is supported by the observation that participants from the Kilkis settlement had relatively fewer negative OHQoL impacts than those from other sites. At this settlement, UNHCR provides rented housing to vulnerable refugees (serious medical condition, single parent, or child at risk),¹³ and hence living conditions might be better than in the other settlements.

It was also apparent that refugees who had spent longer periods in the settlement had greater access to the mobile dental services provided by Health-Point Foundation compared to new arrivals, who were unlikely to have received dental treatment on the islands. The observation that a lower proportion of those who had been in the settlement for longer than 6 months were negatively impacted by their OH compared to new arrivals (Figure 3) may reflect an improvement in their OH due to a greater opportunity to access the dental service provided by the organisation. Høyvik et al¹⁹ reported similar outcomes by reporting that OH had a significant impact on social, physical, and psychological well-being. Abu-Awwad et al²⁰ also reported that Syrian refugees in Jordan who attended dental services had more positive OHQoL scores. Despite the challenges faced by organisations working in this field, it appears that even the limited care that was possible had a beneficial impact on the perceived OHQoL of refugees.

The World Health Organisation Basic Package of Oral Care is designed to create maximum effect with minimum resources.²¹ The mobile service provided restorations and extractions; however, there was less focus on providing fluoride toothpaste and this is reflected by the observation that most of the participants did not know whether their toothpaste

contained fluoride. Consideration should be given to establishing partnerships with private-sector companies to make fluoride toothpaste available to this population.

Strengths

Refugees are a diverse population due to socioeconomic and cultural differences and complex migration trajectories. This is the first study that explores the topic of OHQoL in refugees who live in settlements in Europe. Although the study involved a convenience sample, the information was collected from 7 individual settlements in Northern Greece, providing a substantial amount of information about the OH of refugees. Extensive data have been collected on a wide range of variables including demographic, socioeconomic, health behaviours, and utilisation of dental services. The refugees in this study had access to oral health care; however, there is still a significant burden of self-reported oral disease. As the global migrant crisis worsens, it is pivotal to understand the needs of this population and inform policymakers to enable delivery of appropriately designed interventions.

Limitations

An important limitation of this study is that the Oral Health and Well-Being questionnaire adapted from the ADA was not validated. In addition to this, a convenience sample was taken of refugees who attended the dental clinic in the settlements. There are several challenges in recruiting participants from this population; therefore, researchers working in this field sometimes opt for a convenience sample.¹¹ Considering this, the findings are of a subgroup of refugees who had access to dental care, thereby reducing the external validity. A further limitation is that no adjustment for covariates was included in the statistical analysis. Not all participants answered every question, and this could be due to low education level and unfamiliarity with surveys; therefore, a structured interview style may be more appropriate in future studies.

Recommendations

There is evidence that the subgroup of refugees in settlements in Greece with access to dental care reported a negative impact of OHQoL. Consideration should be given to addressing the OH needs of this population. This will call for further research and providing a basic package of oral care, including access to fluoride toothpaste and dental services appropriate to the setting and population.

Conclusions

To the best of our knowledge, this is the first cross-sectional study assessing the OHQoL of refugees who had access to dental care in settlements in Greece. There is evidence of a significant need for oral health care for newly arriving refugees into Europe. The refugees who were new arrivals with access to dental care reported a negative impact on their QoL. There is an urgent need for further research to establish

the immediate OH needs of refugees in Europe, and consideration needs to be given to provide a basic package of oral care services.

Author contributions

Khaleda Zaheer: Conception and design of the study, acquisition of data, analysis and interpretation of data, drafting the article, and final approval of the version to be submitted. David M. Williams: Conception and design of the study, interpretation of data, drafting the article, and final approval of the version to be submitted. Kristina Wanyonyi: Analysis and interpretation of data, drafting the article, and final approval of the version to be submitted.

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Conflict of interest

None disclosed.

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Supplementary materials

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