

2022

# Impact of socioeconomic barriers on the oral health status of refugee communities

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BOSTON UNIVERSITY  
SCHOOL OF MEDICINE

Thesis

**IMPACT OF SOCIOECONOMIC BARRIERS ON THE  
ORAL HEALTH STATUS OF REFUGEE COMMUNITIES**

by

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B.S., University of California, San Diego, 2020

Submitted in partial fulfillment of the  
requirements for the degree of  
Master of Science

2022



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## DEDICATION

I would like to dedicate this work to my home, City Heights, a community of immigrants and refugees that helped shaped me into the person I am today.

## **ACKNOWLEDGMENTS**

Firstly, I wish to thank my advisor, Dr. Theresa Davies, for my acceptance in the Master of Science in Oral Health Science program at Boston University and your unending support throughout my time as your student. Your guidance allowed me to succeed at times I did not think were possible.

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Lastly, I wish to thank my father, the refugee who inspired this entire work body, and my passion for dentistry. While our time together was rather short, you continue to be the reasoning behind all my most important decisions.

**IMPACT OF SOCIOECONOMIC BARRIERS ON THE  
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**AMI IKEDA**

ABSTRACT

The study's overall objective is to demonstrate the correlation between refugee status and poor oral health outcomes by thoroughly explaining the refugee experience and showing the prevalence of associated oral diseases. All data and information regarding the oral health status of refugees and asylum-seekers are from numerous studies and different institutions.

Refugees often experience traumatizing events such as assault, torture, starvation, and extreme dehydration, resulting in the rapid deterioration of health. However, despite the high prevalence of oral diseases such as caries, gum infections, and, oral health continues to be neglected once they arrive at their new destination. In countries like Germany, refugees from Syria and Iraq have a higher incidence of dental caries(Solyman and Schmidt-Westhausen, 2018). In comparison to their German citizen counterparts, who have shown significantly lower caries rates, a possible result from the advancement of a successful caries prevention program for children and adolescents (Splieth et al., 2019). By comparing the oral health status of refugees versus the native population of the country they have entered, the neglect of refugees' oral health becomes evident.

This study aims to assess the barriers often experienced by refugee and asylum seekers that lead to poor oral health and examine the role of language, refugee perspective and health literacy education in the promoting dental care in this population.

It is clear that a strong association exists between the social and physical barriers refugee experience and oral health. This is especially clear from evaluating the phases of a refugee's migration journey. There is an association between social barriers such as language and health literacy on oral health. It is well documented that when individuals are forced to relocate to new countries where a different language is spoken, healthcare systems can be challenging to navigate. Additionally, language plays a crucial role in shaping refugee perspectives of the oral health community, sometimes negatively; thus, arrival in their new home does not necessarily lead to improved care. Data comparing oral disease in natives versus refugees indicates significantly worse oral health status among recent refugees.



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## LIST OF ABBREVIATIONS

DMFT .....	Decayed, Missing and Filled Teeth
DT .....	Decayed Teeth
FDI .....	Fédération Dentaire Internationale
SES .....	Socioeconomic Status
UNHCR.....	United Nations High Commissioner for Refugees
USGLC.....	U.S. Global Leadership Coalition

## INTRODUCTION

The United Nations High Commissioner for Refugees (UNHCR) defines refugees and asylum seekers as individuals forced to leave their country due to war, extreme violence, or ethnic and religious persecution. Individuals are designated as refugees before legally apply for asylum in a specific foreign country. Internally displaced individuals (IDPs) are different in that they may have been forced to leave their home but have not crossed a border and thus remain in their own country.

In recent years, the number of displaced individuals has dramatically increased, resulting in the worsening of mental and physical health amongst these specific individuals. According to the UNHCR, there are currently more than 82.4 million forcibly displaced people in the world (“Figures at a glance”, n.d.), which includes displaced individuals, migrants and refugees. The migration process often involves dangerous maneuvers and placement in harsh environments, playing a crucial role in deteriorating overall health of the individual. Often after the migration process, individuals are forced to live in overcrowded and unsanitary camps, where adequate hygiene is difficult to maintain. Thus, this has led to a noticeable increase in many oral and systemic health conditions amongst refugee and migrant populations.

While researchers continue the data collection of migrants' and refugee's health status in order to correlate with current living conditions, there has been a recent trend of worsening oral health amongst the population. In some cases, the most common health problems amongst refugees were dental related, specifically refugee children. When comparing various refugee and migrant populations across the world, there is a consensus that there is a lack of prioritization of oral health by the healthcare community despite the need for care. Many of these oral health issues, such as oral infections or severe pain, can then lead to more severe health conditions that can be both physical and psychosocial (Hoyvik et al., 2018).

Several factors have contributed to the increase in poor oral health amongst refugee communities, such as inadequate nutrition, social stigmatization, and inaccessibility to dental care. The most concerning issue is the accessibility of oral health care for refugees. It can be challenging for these individuals to gain access to care as they are not very familiar with the healthcare system in the community where they reside. According to recent research conducted within various refugee communities, there is a high rate of oral disease, mainly dental caries and periodontal disease. Seeking treatment from oral health professionals (dentists and dental hygienists) was scarce or nonexistent (Keboa et al., 2016). Thus, the oral health issues listed previously, and routine care are mainly unmet and tend to progress to more severe conditions. A study conducted by the

University of Oslo demonstrates that most refugees require dental treatment, and researchers have noticed that dental pain has led to anger, frustration, and change in mentality (Hoyvik et al., 2018).

Other existing data and research regarding oral health heavily emphasizes the social barriers often faced by refugees in their new environment. Barriers include lacking knowledge of proper oral hygiene practices due to an absence of proper oral health education, language barriers, or the neglect of health by the receiving governing country.



## **BACKGROUND**

### **Brief History of Refugee Crisis**

The current system implemented for refugees initially stemmed from the collective inaction of the global community to save Jewish refugees during World War II (Jaeger, 2001). During the war, multiple conferences were held to persuade Germany to establish a proper emigration process for Jewish citizens. However, these meetings proved to be ineffective. There were no changes to refugee policy until after millions died in the Holocaust and the war officially ended (Marrus, 2002). In addition to genocide, millions more were forcibly displaced and put into a resettlement program spearheaded by the U.S., Canada, and Australia. In 1950, the UNHCR was created to protect and aid any future refugee crisis (Martin, 2016). This was clear as the UNHCR intervened in the resettlement of refugees during the Hungarian Revolution in 1956 and later in 1970 during the Vietnam War (Martin, 2016).

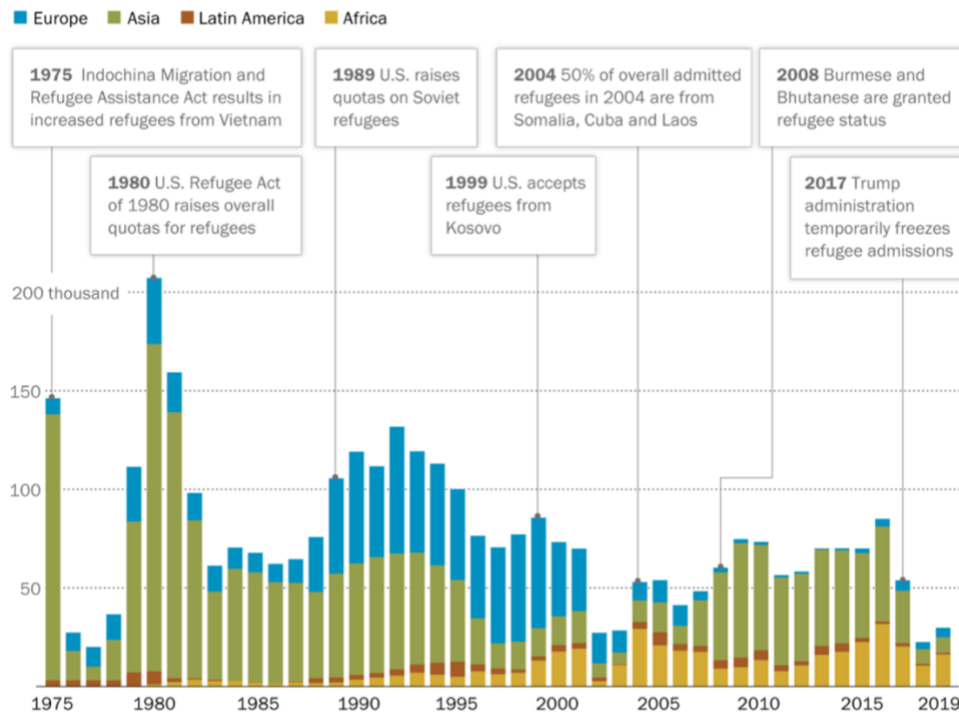
Hungarians escaped to Austria, while another 20,000 relocated to Yugoslavia (Cellini, 2017). As a result of the resettlement of Hungarian refugees, UNHCR and other non-governmental organizations learned how to dispense appropriate help in similar future crises (“History of UNHCR”, n.d.). For example, during the decolonization of Africa in the 1960s, the UNHCR provided helps in various ways such as food distribution (Figure 1), relocation services, and much more (“History of UNHCR”, n.d.). Throughout history, the

UNHCR became the primary source of aid for significant refugee crises such as the displacement of 10 million Bengalis to India and the escape of hundreds of thousands of Vietnamese refugees from the Vietnam War (“History of UNHCR”, n.d.).

Within the past decades, refugee trends have fluctuated in accordance with any political or global event that results in the displacement of large populations. Specifically, for the U.S., there have been an average about 116,000 refugees arriving in the U.S. from 1990 to 1995 (Pew Research Center, 2019). This number significantly decreases during the year of 2002, after the terrorist attacks of September 11, 2001(Pew Research Center, 2019). The number of refugees arriving in the U.S. begins to slowly increase from the year 2008 to 2017, until the Trump presidency, where number faced another steep decline (Pew Research Center, 2019). During recent years, more than half of the total refugee population came from Asia, especially Iraq and Burma (Pew Research Center, 2019).

## The shifting origins of refugees to the U.S. since 1975

Number of refugees admitted to the U.S., by region of origin and fiscal year



Notes: Fiscal years end on Sept. 30 of the years shown. Data do not include special immigrant visas and certain humanitarian parole entrants or refugees admitted under the Private Sector Initiative. Europe includes Russia and former Soviet Union states. Asia includes Middle Eastern and North African countries. Africa includes sub-Saharan Africa, plus Sudan and South Sudan. Latin America includes the Caribbean. Source: U.S. State Department's Refugee Processing Center, accessed Oct. 1, 2019.

PEW RESEARCH CENTER

**Figure 1. Refugee Trends in the U.S. Beginning in 1975.** Graph depicting historical events resulting in trends of refugee migration in the United States from 1975 to 2019 (Pew Research Center, Figure 3, 2019).

According to data collected by Amnesty International, approximately 85% of refugees are currently residing in developing countries such as Pakistan, Sudan, Bangladesh and more (Figure 2).

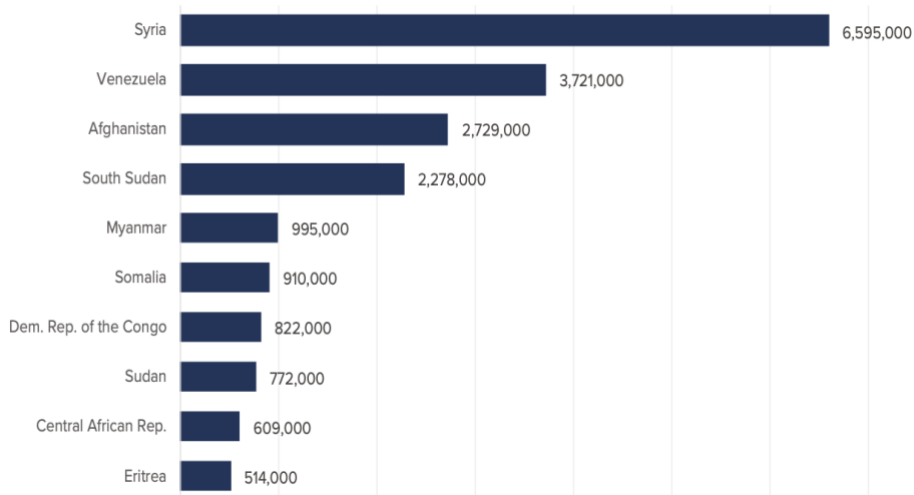


**Figure 2. Current Top 10 Refugee Host Countries.** Map depicting locations with highest numbers of refugees and asylum-seekers. (Amnesty International, Figure 2, 2019).

### Current Refugee Crises

According to the UNHCR mid-2020 report, in modern history, more than half of the total number of refugees worldwide come from the same five countries: Syria, Venezuela, Afghanistan, South Sudan, and Myanmar (Figure 3). Most refugees come from underserved countries where resources are lacking. Over the last few years, refugees have attempted to relocate to Europe; however, many European governments have

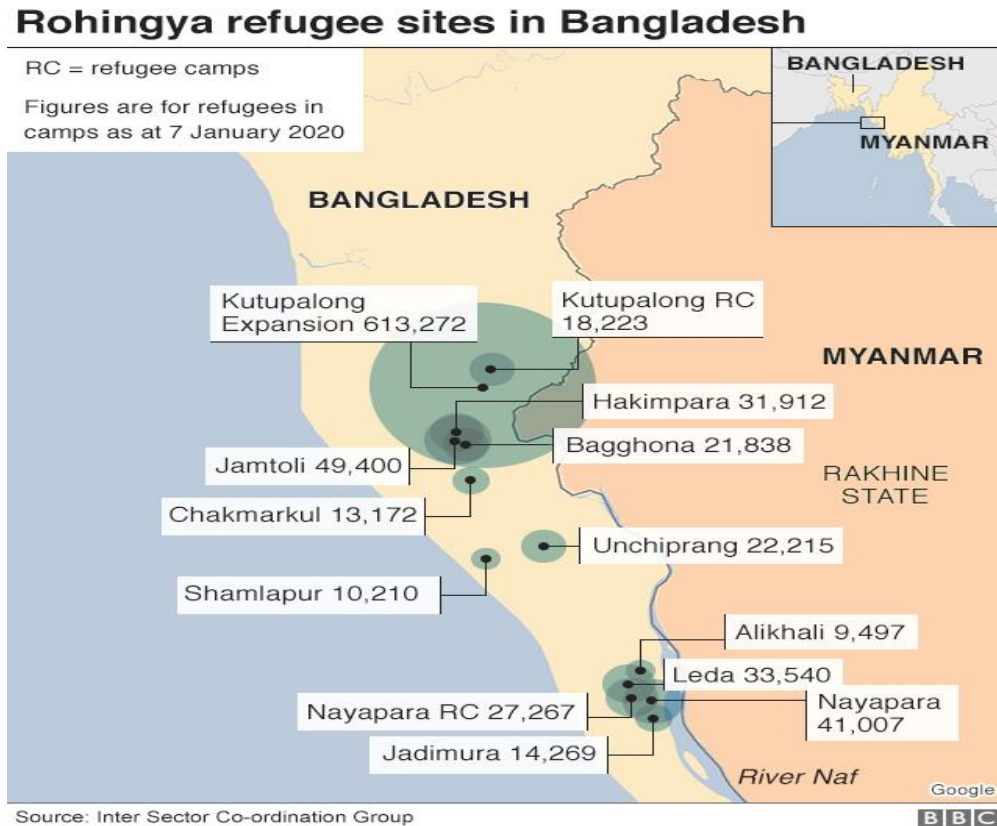
been strongly advocating against allowing the entry of these individuals and have been successful in these attempts to keep out large numbers of people (Stone 2018).



**Figure 3. Bar of Externally Displaced Refugees in Mid-2020.** Each population categorized by the country of origin. As depicted: Syria, Venezuela, Afghanistan, South Sudan and Myanmar comprises the majority of refugees abroad (UNHCR, Figure 2, 2020).

The most current refugee crisis pertains to the persecution and forced displacement of the Rohingya people in Myanmar. The UN Secretary-General Antonio Guterres has previously described this ethnic group as one of the most discriminated populations today (*“Myanmar Rohingya: What you need to know about the crisis”*, 2020) The Rohingya are a Muslim minority group that resided in Myanmar before being forcefully removed from their home in 2017 (*“Myanmar Rohingya: What you need to know about the crisis”*, 2020) genocide ensued during this time, causing over 700,000 individuals to flee to Bangladesh to escape death and extreme violence. Recent statistics reveal that 980,000 refugees and asylum-seekers live in nearby countries, and a large majority

reside in camps in Bangladesh's Cox's Bazar area (**Figure 4**), making it the largest refugee camp in the world (UNHCR, 2021).



**Figure 4. Map of Rohingya Refugee Camps in Bangladesh.** Bangladesh is currently the place of refuge for approximately 890,000 Rohingya people, approximately 91% of the total number of Rohingya refugees (*"Myanmar Rohingya: What you need to know about the crisis"*, 2020)

### Refugee Living Conditions

In some situations of which refugees are unable to migrate to new countries, they are forced to temporarily reside in large make-shift refugee camps. In most cases, refugee

camps consist of poor living conditions where there is a lack of necessities such as food, water, and medical supplies (“Shelter”,n.d.) A study was conducted in Calais, Europe's largest informal refugee camp, before its demolition in 2016 in order to grasp the severity of the public health crisis within refugee camps. This specific camp allowed for the first comprehensive environmental health survey, providing a more in-depth look at the living conditions of refugees placed in similar environments (Dhesi et al., 2017).

Through detailed observations and survey collections, the study came across various factors that have negatively impacted the health of refugees residing at Calais. For example, there was no proper food storage, hot water, or disinfection station. As a result, several incidents of residents having gastrointestinal issues (Dhesi et al., 2017). Clean water was also inaccessible to residents, and available water could only be stored in previously used chemical containers (Dhesi et al., 2017). In terms of actual shelter, all living quarters comprise plastic coverings and weak foundations (Figure 5). These makeshift tents could not protect residents from weather conditions like heaving rain and frigid weather. The study also mentions that the plastic material used to cover tents was made with highly flammable material, causing several fires. The proximity of these tents also allowed for fires to spread rapidly and destroy homes (Dhesi et al., 2017).



**Figure 5. Unofficial Refugee Camp in Calais.** Depiction of shelters built by refugees in Calais, Europe's largest informal refugee camp, prior to destruction in 2016 (Dhesi et al, Figure 3, 2017).

### **Refugee's Health**

Currently, there are more than 60 million displaced individuals all over the world. Many refugees currently located in Europe are fleeing the Syrian War, while refugees fleeing poverty and violence from Central America seek asylum in North America. Most refugees are children under the age of 21 (Siberholz et al., 2017). Studies have shown that refugees, especially children, often face numerous health crises, such as contracting infectious diseases like helicobacter pylori and hepatitis B (Table 1).



**Table 1. Infectious Diseases Prevalent Among Refugee and Immigrant Children.** Table provides description of infectious diseases common in refugee and immigrant children and also provides information on possible treatment (Kroening and Dawson-Hahn, Table 4, 2019).

<i>Helicobacter pylori</i>	<ul style="list-style-type: none"> <li>• More than half of the world's population is infected. Prevalence estimates are highest in Central and Western Africa, Central Asia, and South America [103].</li> <li>• Multigenerational colonization is common [104].</li> <li>• Presenting symptoms in children may include nausea, regurgitation, vomiting, abdominal pain.</li> <li>• Consider in children with poor appetite or poor growth.</li> </ul>	Optional ( <i>H pylori</i> stool antigen)
Tuberculosis	<ul style="list-style-type: none"> <li>• Children are more likely to convert latent tuberculosis infection to active disease, particularly in the first year of life [105].</li> <li>• Children experience higher rates of extrapulmonary disease than adults [106].</li> </ul>	Routine (QuantIFERON (if >2 y old) or tuberculin skin test)
HIV	<ul style="list-style-type: none"> <li>• Not universally screened for during pregnancy globally</li> <li>• Children whose mothers have immigrated may be at higher risk [107].</li> </ul>	Routine (HIV ELISA [HIV-1 and HIV-2]); if child <18 mo, order HIV polymerase chain reaction)
Syphilis	<ul style="list-style-type: none"> <li>• Commonly asymptomatic latent infection [108]</li> </ul>	Routine if child >13 y old (syphilis enzyme immunoassay)
Hepatitis B	<ul style="list-style-type: none"> <li>• Chronic disease is asymptomatic.</li> <li>• Testing is recommended even if vaccinated before immigration [109].</li> </ul>	Routine (hepatitis B surface antigen)
Hepatitis C	<ul style="list-style-type: none"> <li>• Screen individuals with concern for high risk: blood transfusion, surgery prior to immigration, tattoo, intravenous drug use, maternal history.</li> <li>• Treatable condition</li> </ul>	Optional (hepatitis C antibody)

A recent study conducted by Brown reveals there are approximately 3.5 million refugees globally have chronic hepatitis B infection, contributing to more than 700,000 deaths related to liver failure (Brown et al. 2020). Brown's research also shows nutritional deficiencies as a common health issue amongst adolescent refugee populations, specifically in critical dietary sources such as iron, thiamine, and vitamin D (Table 2).

As previously mentioned, the Rohingya people are currently experiencing extreme persecution and fleeing genocide since October of 2016. Recent findings have shown severe malnutrition amongst Rohingya children; in 60% of Rohingya children, these have resulted in growth delays (Wali et al., 2018). In one of two official camps for the Rohingya, the infant mortality rate is alarming at almost 60% (Wali et al., 2018). Other health conditions often experienced are mental health illnesses, such as anxiety, depression, and post-traumatic disorder (PTSD). A study conducted within Rohingya refugee camps showed that approximately 36% of participants displayed symptoms of PTSD, while 89% of the same participants displayed signs of depression (Wali et al., 2018).

**Table 2. Nutritional Deficiencies of Refugee Children.** Recorded medical history and examination of refugee children that exhibited various illness symptoms due to different types of nutritional deficiencies. Difference in diet and nutrition amongst refugee communities can often lead to health disparity and higher prevalence of preventable diseases such as rickets and goiters (Brown et al., Table 2, 2020).

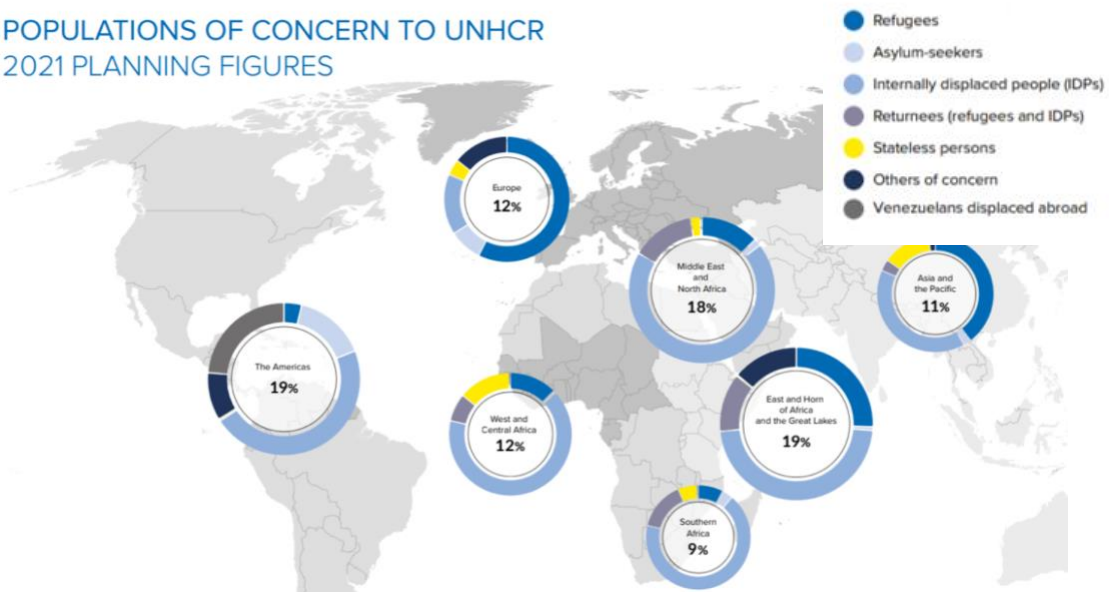
<b>History and physical examination findings in children and adolescents and associated nutritional deficiencies</b>		
<b>Nutrient Deficiency</b>	<b>Pertinent History</b>	<b>Signs and Symptoms</b>
Severe undernutrition	Low food availability, change in behavior, chronic diarrhea	Emaciated appearance, marasmus (characterized by low body muscle mass, low body fat, thin hair), kwashiorkor (characterized by pitting peripheral edema)
Iron deficiency	Consumption of teas and phytates, low iron consumption	Low-grade cardiac flow murmur, pallor
Thiamine	Diet high in white rice, history of recurrent diarrhea	signs/symptoms of heart failure (S3 or S4, cardiomegaly, dyspnea, cough, edema)
Vitamin D (if severe can result in rickets)	Dark skin pigmentation, use of veil	Bone pain/tenderness, history of fractures or skeletal deformities, retarded growth, muscle weakness, craniotabes (thinning/softening of the skull in infants and children), costochondral swelling, dental problems
Zinc, niacin	Diet low in meat, fish, and nuts; high in corn	Dermatitis, diarrhea, stomatitis
Vitamin A	Vision change complaints, lack of vitamin A supplementation in refugee facility	Xerosis, Bitot spots (superficial buildup of keratin in the conjunctiva), poor night vision
Thiamine, niacin/tryptophan, B12	Bhutanese descent (B12 deficiency), limited access to fortified foods, limited intake of animal products, history of <i>Helicobacter pylori</i> infection	Neurologic issues: loss of proprioception, loss of deep tendon reflexes, ataxia, peripheral neuropathy
Iodine	Developing country without iodized salt	Palpable goiter

## **Health in Times of COVID-19**

Due to the current global crisis of COVID-19, it is essential to discuss the health status and living conditions of refugees within the past two years. Refugees are unable to practice proper social distancing because of overcrowding at refugee camps. By being unable to follow appropriate safety precautions, this population is highly vulnerable to contracting the virus. Additionally, there would be little to no accessible health care (UNHCR 2020). Since November of 2020, an estimated 34,000 refugees have contracted the virus, and it is most likely that the rise in COVID cases amongst refugee communities will continue. Through the analysis of ongoing trends, the UNHCR details seven regions of concern for COVID-19 (Figure 6).

The U.S. Global Leadership Coalition (USGLC) reports despite contrary belief that the rise in cases of COVID-19 would decrease the likeliness of political violence in developing countries, the opposite result has occurred. In 2020, violence against civilians in countries such as Brazil, Nigeria, Iraq, and many more have increased significantly. Consequently, many health workers were killed or fled to neighboring countries, resulting in the nonexistence of treatment for refugees with COVID-19 (USGLC, 2021).

## POPULATIONS OF CONCERN TO UNHCR 2021 PLANNING FIGURES



**Figure 6. COVID-19 Vulnerable Refugee Populations.** Map displaying various refugee populations most at risk for contracting COVID-19 (Figure amended from UNHCR, 2021).

### **Factors Contributing to Oral Health Disparity Amongst Refugee Communities**

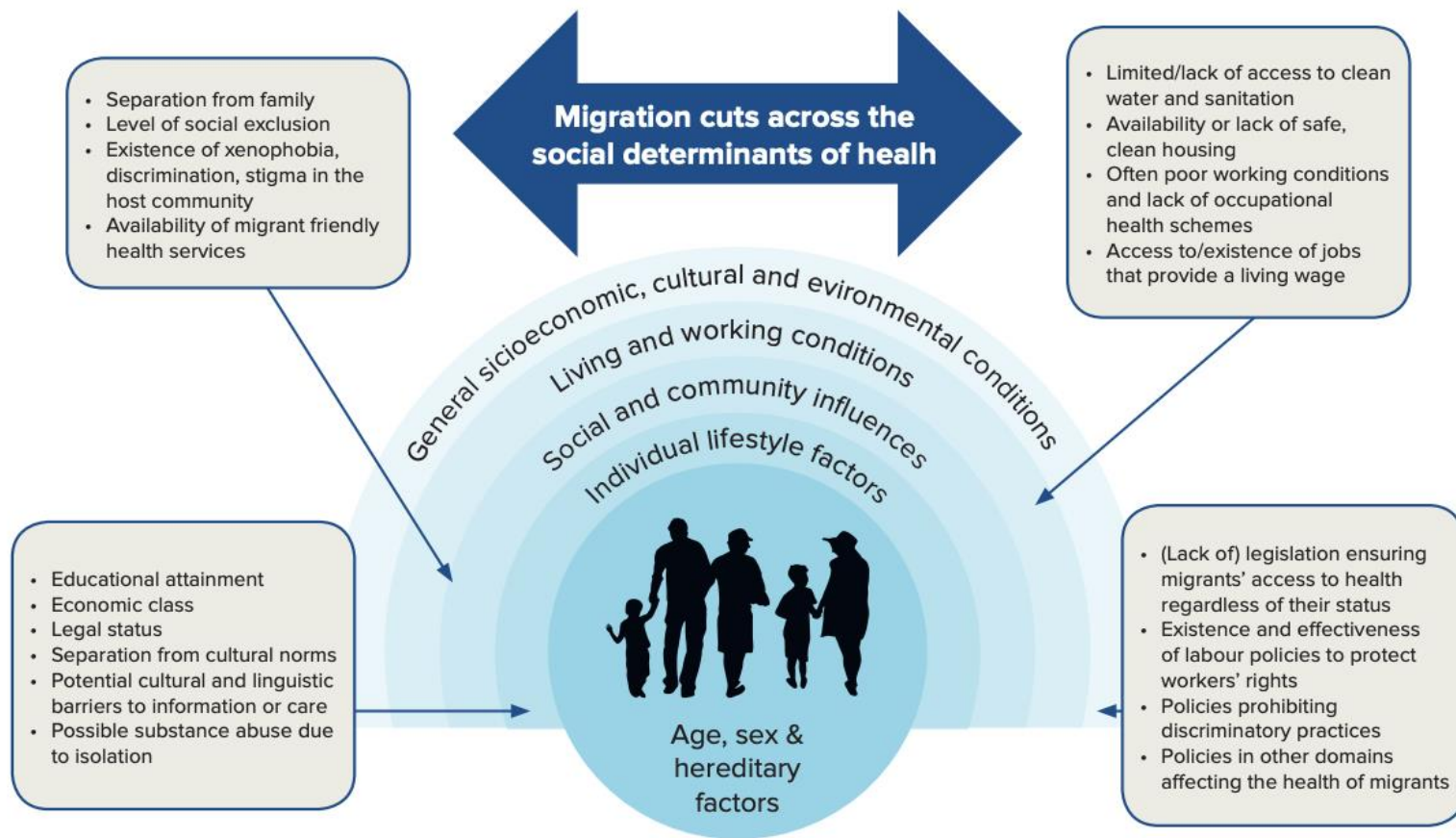
While refugees face many issues, oral health is one of the most prevalent and neglected issues. There are currently a limited number of resources to understand prevalent oral diseases within the community; however, because of the severity of the problem, it is essential to investigate and understand the linkage between refugee status and oral health.

There are multiple factors to consider that could impact oral health. For instance, the health care system that refugees and migrants originate from are often relatively poor and inadequate. General healthcare, dentists and/or dental care is often inaccessible, and so oral health maintenance and prevention is challenging (Zinah and Al-Ibrahim 2021). Additionally, refugees experience an abnormally high level of violence in their home countries. In a 2018 survey involving Syrian refugees, most of the participants in the study had experienced at least one violent event. In one hotspot, 77.5% of the population in Samos reported having had at least one violent encounter (Farhat et al., 2018). Thus, with the presence of stressors in their lives, issues such as oral health become neglected leading to the prevalence of oral diseases (Vasiliou, 2016).

Another critical factor regarding oral health disparity amongst refugees and asylum seekers is their socio-economic status once arriving in a new country. Socioeconomic status or SES is explained as an individual's financial assets that can affect their overall health, including oral health (Assari and Hani, 2018). Socioeconomic status can sometimes provide insight to oral health status and knowledge of oral hygiene. Children in low-income families are more likely to have untreated caries when compared to children from high-income families. Lack of resources often prevents families from seeking immediate help for their oral health needs, and preventative care is also decreased. Lack of resources such as dental insurance and appropriate funds to visit a

dental provider often discourage individuals from routine cleanings. These individuals often only seek out dentists for dental emergencies (Assari, 2018).

A strong component of SES is educational background; there is a strong correlation between higher education and oral health status. Data reports that adults in the age range between 35-44 years with less than a high school education are three times more likely to have untreated tooth decay in comparison to those who received a college education. Additionally, these individuals are much more likely to have severe periodontal disease in the future (Assari 2018).



**Figure 7. Social Determinants of Health.** Figure depicting the various levels of social determinants of health experienced by the refugee community. Kateeb, 2021.



A study conducted in 2017 by Makerere University in Uganda collected surveys and interviewed 348 individuals from different households to measure the socioeconomic status of Kyangwali refugees (Ayine et al., 2017). Researchers assessed the weekly usage of Uganda shillings in each family to determine each family's economic standing. Families that used less than 33,000 Ugandan shillings (approximately 9.35 USD) per week are in the "surviving" category (Table 2) (Ayine et al., 2017). As seen in Table 3., families that spend more than 66,1000 shillings (18.74 USD) are placed in the thriving category and only constitute 4.3% of the sample population. In contrast, those between the two category are managing and comprise 19% of the sample (Ayine et al., 2017). Due to the lack of finances for necessities such as food and water, the majority of refugees would be unable to pay for dental procedures, further widening the gap of oral health disparity.

**Table 3. Categorization of the Socio-Economic Status of Kyangwali Refugee Families.**

Three hundred seventy-eight families answered the questionnaire regarding the weekly usage of Ugandan shillings. They were separated into three separate categories revealing the current financial status of refugees residing in Uganda (Ayine et al., Table 3, 2017).

Expenditure/week	Freq	%	Categorization
500 – 33,000	267	76.7	Surviving
33,100 – 66,000	66	19.0	Managing
66,100 – 99,000	15	4.3	Thriving
Total	348	100	

## OBJECTIVES

As the refugee population grows throughout the world, more issues continue to arise within this group. While many problems need to be addressed, one of the most neglected topics not discussed is the lack of care towards oral health (despite being one of the most prevalent diseases within these populations). Current research has shown that refugees or asylum seekers often experience multiple social and physical barriers (weather, difficult paths, violence, etc.). Due to these complications, refugees and asylum seekers find it difficult to seek help from oral health professionals and maintain good oral hygiene. Thus, it is essential to analyze the barriers often faced by refugees and recognize its correlation with deteriorating oral health status.

This literature review aims to:

1. Review the different barriers during each phase of migration journey and how they impact oral health
2. Examine the role of language and health literacy education in the promoting adequate dental care
3. Describe oral health among refugee populations
4. Examine current oral health practices and perspectives amongst refugee community

This review highlights current gaps in research and data specifically pertaining to the declining oral health of refugees and promote future studies aimed at finding solutions to the ongoing problem.

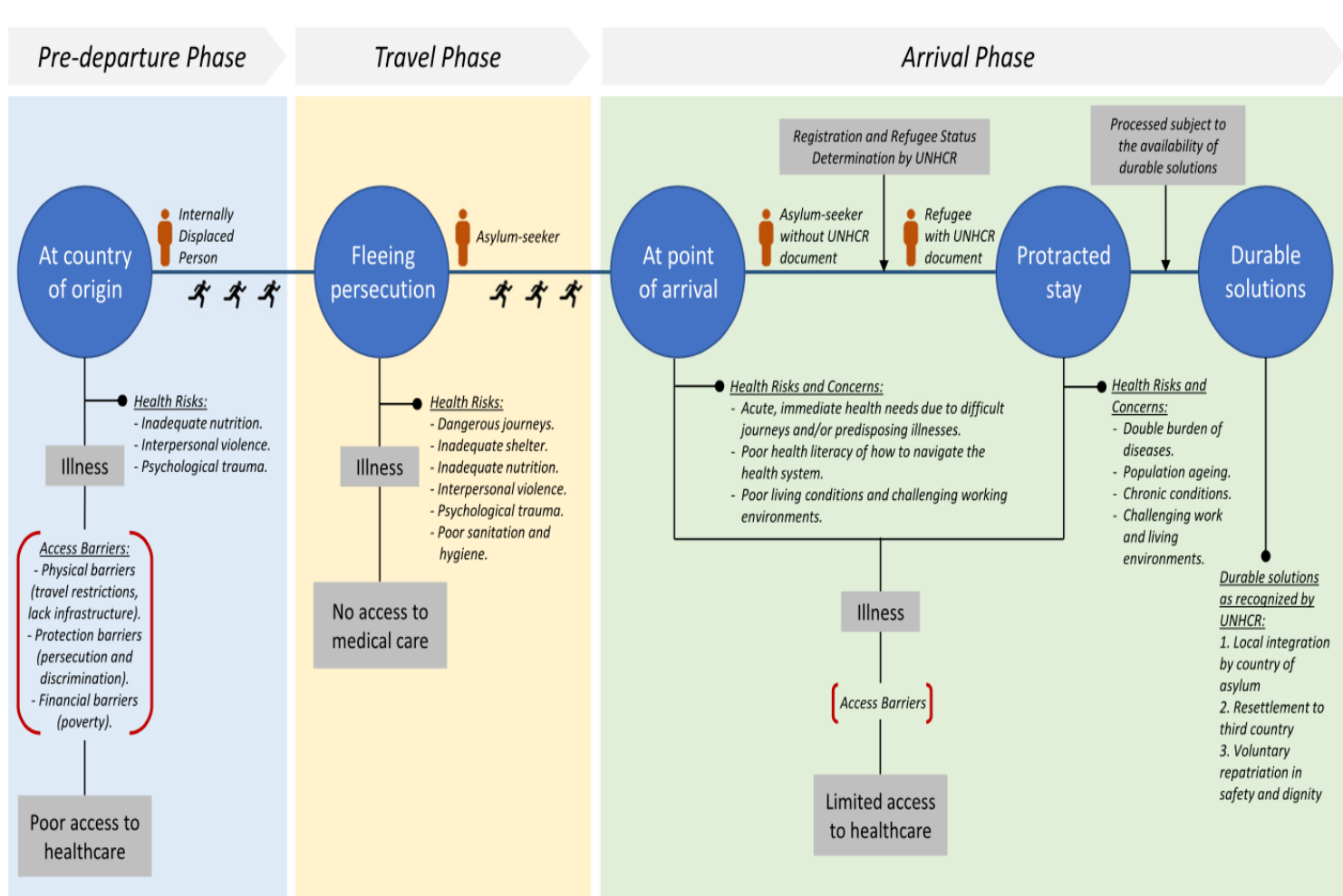
## **PUBLISHED STUDIES**

### **Barriers to Oral Health During the Migration Journey**

A recent study conducted by the National University of Singapore focusing on the health needs and accessibility to healthcare reveals multiple barriers that refugees and asylum seekers from Malaysia often experience (Chuah et al., 2018). Researchers separate the migration into three separate phases: pre-departure, travel phase, and the arrival phase (Figure 7).

During the pre-departure phase, general and oral health is impacted by issues such as violence, lack of nutrition, psychological trauma, and lack of access to healthcare. Healthcare can be inaccessible for reasons such as ethnic or religious persecution, war, and collapse of political infrastructure (Chuah et al., 2018). While during the migration or travel phase, refugees experience food and water shortages, improper sanitation, and violence. One of the interviewees in the study describes their experience during the migration and explains how maintaining general hygiene was impossible since most of the time, people were trapped together in small spaces (Chuah et al. 2018). The lack of water, sanitary living conditions, and oral hygiene supplies during migration can contribute to poor oral health.

The arrival phase of the migration journey encompasses an overwhelming number of barriers for refugees and asylum seekers. As mentioned previously, most refugees are unaware of available healthcare resources and their rights to access these services. It is especially difficult to seek help when one does not comprehend the language. Since most public healthcare services usually focus on the local community, there tends to be a lack of adequate translations (Chuah et al., 2018). Since resources are not in their native languages, refugees currently residing in a foreign country can be discouraged from visiting dental clinics and address their concerns. A participant of the study describes their frustration with not being able to elaborate on their past medical history and the pain that they are experiencing (Chuah et al., 2018).



**Figure 8. Barriers During Each Phase of Migration.** Infographic demonstrating the different health concerns refugees and asylum seekers experience during different phases of migration (Chuah et al., Figure 1, 2018).

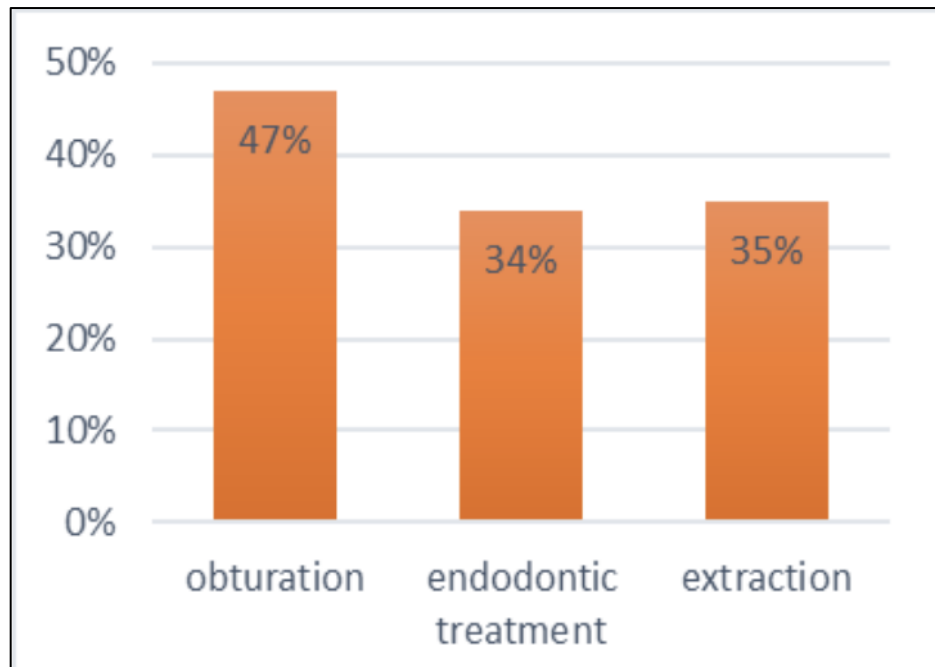
## **Prevalent Oral Health Diseases Amongst Refugee Communities**

As the global refugee crisis worsens, the health of individuals has become more concerning, especially noticeable in the prevalence of oral diseases. Within recent years, studies have reported on the common oral diseases' migrants and refugee communities most often experience.

### *Oral Health Among Adult Refugees*

A study in 2016 conducted a clinical oral assessment amongst 386 refugees from Syria and Iraq currently living in Germany (Solyman and Westhausen, 2018). Each participant was given a clinical examination by a dentist and given an interview in their native language. The study reveals that most participants, almost 80%, had signs of plaque in all four quadrants of their teeth, and 60% had noticeable calculus (Solyman and Westhausen, 2018). Many of the participants required immediate dental treatment, while less than 5% showed signs of dental trauma and required extensive work. An additional study also conducted in Germany comprising of 100 refugees and 150 dental practitioners demonstrates demonstrated the severity of the oral health crisis within this population. Over 80% of examined patients only went to the dentist when there was significant dental pain. Included in the study were 35 patients with severe inflammation in their pulp tissue (Furnadzhieva, 2017). In this study, 47% of the

procedures conducted were restoration of caries, 34% were endodontic treatment, and 35% were extractions (Figure 8).



**Figure 9. Number and Variety of Dental Procedures Conducted within Sample Refugee Population in Germany.** Graph demonstrates the different dental treatments given to 100 refugees currently residing in Germany. It is noted that although there were only 100 patients, many of these patients required more than one procedure, thus the total number of procedures was 116 (Furnadzhieva, Figure 5, 2017).



A cross-sectional study conducted within the close living quarters of a small community of refugees in Schleswig- Holstein, further details the oral health status and current DMFT-index of these individuals (Goetz et al., 2018). The data collected in the study began in August of 2016 and ended in July 2017. Only one dentist carried out the oral health assessment and the DMFT (decayed, missing, filled, teeth), was used to determine current oral health status. The study had 102 participants and most individuals were in their late twenties to thirties (Goetz et al., 2018). The assessment reveals that over 84% of participants did not visit the dentist regularly during childhood and 46% of participants mentions there was a time in which dental hygiene products were not accessible (Table 4). In terms of oral health status, over 50% of participants mentions having current toothaches. Only 13.7 percent of participants were categorized as having healthy teeth, while 25.5% had a high DMFT -index (greater than 9). The World Health Organization defines the DMFT mean as the total number of decayed, missing and permanent teeth divided by the number of individuals in the population.

**Table 4. Oral Health Status and DMFT Scores of Refugees Living in Schleswig-Holstein.** Researchers collected data such as dental experience and DMFT index 106 refugees and compiled data into table (Goetz et al., Table 3, 2018)

**Table 3** Oral health and DMF-T index of refugees

Variable		Number (%)
Year of last dental visit	2017	31(30.4%)
	2016	29 (28.5%)
	2015	4 (3.9%)
	2014	9 (8.8%)
	< 2014	26 (25.5%)
Regular visits to a dentist during childhood	No	86 (84.3%)
	Once per year	11 (10.8%)
	Twice per year	5 (4.9%)
Daily dental hygiene	Once per day	45 (44.1%)
	Twice per day	50 (49.0%)
	More than twice per day	7 (6.9%)
Was there a time without access to dental hygiene products?	No	47 (46.1%)
	Yes	55 (53.9%)
Do you currently have a toothache?	No	52 (51.0%)
	Yes	50 (49.0%)
Toothache on the pain scale <sup>a</sup> , mean (SD); range		4.51 (1.9); 2–10
DMF-T index, mean (SD)		6.89 (5.5)
Categorization of DMF-T Index, n (%)	No index (0.0)	14 (13.7%)
	Very low Index (< 5.0)	38 (37.3%)
	Low Index (5.0–8.9)	24 (23.5%)
	Moderate Index (9.0–13.9)	14 (13.7%)
	High Index (> 13.9)	12 (11.8%)

<sup>a</sup>ranged from 0 (no pain) to 10 (extremely strong pain), SD standard deviation

Due to the large number of refugees in Germany, many oral health surveys were conducted. Researchers at the University of Greifswald found 544 refugees, ages ranging from 3 to 75 years old, to participate in a survey to assess their current oral health status and prevalence of caries within the community (Al- Ani et al., 2019). DMFT (decayed missing and filled teeth) index scores of refugees were obtained. This data was further compared to oral health data collected from German residents (using national surveys) to evaluate differences. According to the study, only 7% of 6- to 7-year-old refugees had healthy teeth, compared to 56% of German children in the same age range (Al-Ani et al., 2019). Additionally, refugees in the age range of 35 to 44 years old had higher incidence of caries defect, with 3.13 decayed teeth compared to an average of less than one decayed tooth for the German population (Al-Ani et al., 2019). These studies indicate that there are significant oral health issues among refugees, additionally, this issue is even further pronounced in children.

#### *Oral Health Crisis Amongst Refugee Children*

Amongst the refugee population, children are the most affected subgroups as shown in data collections within recent years. A study conducted by the Student Dental Clinic for Pediatric Dentistry at Montreal Children's Hospital provided refugee children between the ages of 1 to 14 a complete dental examination. These exams consisted of

radiographs, caries detection, plaque presence, and gingival condition (Moreau et al., 2018). The study compared the difference of oral health status of refugee children to Canadian children. The study results demonstrate that significantly more Canadian children (64%) made yearly visits to the dentist for preventative measures compared to refugee children (27%) (Moreau et al., 2018). Furthermore, the data reports the daily oral hygiene habits of refugee children, with almost 50% of the study population only brushing their teeth once a day or less (Table 5)(Moreau et al., 2018).

**Table 5. Oral Hygiene Habits of Refugee Children.** Comparison of oral hygiene practice among refugee and Canadian native counterparts. (Moreau et al., Table 1, 2018)

Variables	Refugees (N = 120)	Canadian (N = 117)
Gender		
Male	61 (50.8)	61 (52.1)
Female	59 (49.2)	56 (47.9)
Age	6.49 ± 2.66	5.89 ± 2.23
Time since last dental visit*		
First dental visit	69 (58.5)	24 (20.7)
Within the last year	32 (27.1)	74 (63.8)
More than a year	17 (14.4)	18 (15.5)
Tooth brushing habits		
Twice or more a day	56 (54.4)	67 (66.3)
Once a day or less	47 (45.6)	34 (33.7)

Categorical variables presented as number (N) and percentage (%).  
Continuous variables presented as mean ± standard deviation

\*p < 0.0001 (Pearson Chi square)

Refugee children had higher rates of decayed teeth (Moreau et al., 2018). Additionally, dental professionals noticed that 20% of the sample population had an anterior crossbite (Moreau et al., 2018). In most cases, anterior crossbites can be resolved through extractions if primary teeth are involved or by a simple orthodontic procedure (Moreau et al., 2018). Since refugee children often lack access to these resources, they are more likely to maintain their anterior crossbites.

In Spain, an assessment of the oral health status in Syrian refugees' children reveals the influence of the refugee status, more specifically, ethnicity, affected their oral health (Riatta et al., 2018). Results show a significant difference in mean DMFT scores between children of Arab, Syrian refugees and Caucasian children in Spain (Riatta et al., 2018). In the study, the refugee children population are stated to have a global DMFT score (decayed, missing, and filled permanent teeth) 3.5, while Caucasian children had a DMFT score of 2.7 (Riatta et al., 2018).

### **Correlation of Language Barrier and Oral Health Literacy**

The ability to communicate and comprehend the language of the healthcare providers allow for patients to be more aware of any health issues. This is especially true to refugees as there is not only a language barrier but also a literacy barrier. The CDC defines personal health literacy as an individual's ability to understand and utilize the

information and services available to make an informed decision in regard to their own health (“What is health literacy”, 2021).

Thus, lack of health can hinder these individuals from making visits to a physician or dentist. This can be further compounded by access and of course finances (not discussed here). A cross-sectional study conducted in Sweden sought to measure the level of comprehensive health literacy of 513 refugees al (Wangdahl et al., 2018). The purpose was to determine if a correlation existed between health literacy and willingness to seek healthcare. Results demonstrated that over one third of the population refrained from seeking a healthcare provider despite having obvious health issues. Language was the leading problem (40%) they did not seek care with feeling they couldn't be helped (24%) and questions about access (19%) also being noted as reasons (Wangdahl et al., 2018). The study also indicated that over 40% of the tested population categorized their own health as less than good and one-third had impaired psychological well-being. These results support the fact that limited health literacy and knowledge of the country's healthcare system did hinder a large proportion of these individuals from finding appropriate help (Wangdahl et al., 2018).

The impact of a language barrier and oral health is more clearly demonstrated in a study conducted by the Boston University School of Dental Medicine (Hunter- Adams et al., 2013). The study evaluated the relationship between English language skills and the

utilization of dental services and oral health status in 439 Somali Somalis refugees known to have low English literacy (Hunter- Adams et al., 2013). The study involved asking participants of their level of understanding of English and their acculturation level by asking questions such as their understanding of American music, newspapers, and books (Hunter- Adams et al., 2013). The answers to these questions were then correlated to determine whether there is an association between understanding the English language and the DMFT index (Table 6). Patients who stated to have a better understanding of English were reported to have an average DMFT index that was less than .5, while patients who claim to not understand English had a DMFT index of greater than .5 (Hunter-Adams et al., 2013).

Additionally, the study revealed that subjects who had a reportedly higher level of health literacy were twice as likely to attend a preventative visit to the dentist (Hunter- Adams et al., 2013). More specifically, individuals with a more comprehensive understanding of simple dental terminology were more like to attend their biannual or annual preventative dental cleaning (Hunter-Adams et al., 2013). Thus, correlation between language and oral health literacy is evident in the study, since patients with higher English literacy were able to understand the importance of dental visits.

**Table 6. Association between English Acculturation and DMFT Score index of Somali Refugees in Massachusetts.** Data indicating correlation of English literacy and DMFT index, demonstrating those with those who are stated to have less comprehension to different aspects of American culture due to language barrier have higher DMFT index scores (Hunter-Adams, 2013).

Characteristic	Overall (N=439) (%)	DT/(DT+DFT)			DMFT		
		<0.5 N=293 (%)	>0.5 N=146 (%)	p Value	<10 N=351 (%)	10+ N=88 (%)	p Value
<b>Understanding english</b>							
Yes	274 (62)	212 (72)	62 (43)	<0.001	234 (67)	40 (46)	<0.001
No	165 (38)	81 (28)	84 (58)		117 (33)	48 (55)	
<b>Speaking english</b>							
Yes	274 (62)	212 (72)	62 (43)	<0.001	233 (67)	41 (47)	0.001
No	165 (38)	81 (28)	84 (58)		118 (34)	47 (53)	
<b>Music and radio</b>							
More acc.	105 (24)	84 (29)	21 (14)	0.001	95 (27)	10 (11)	0.002
Less acc.	333 (76)	208 (71)	125 (86)		255 (73)	78 (89)	
<b>Newspapers and books</b>							
More acc.	165 (38)	134 (46)	31 (21)	<0.001	142 (41)	23 (26)	0.014
Less acc.	273 (62)	158 (54)	115 (79)		208 (60)	65 (74)	
<b>Social groups</b>							
More acc.	59 (14)	45 (16)	14 (10)	0.103	52 (15)	7 (8)	0.115
Less acc.	376 (86)	245 (85)	131 (90)		295 (85)	81 (92)	
<b>Religious groups</b>							
More acc.	331 (75)	225 (77)	106 (73)	0.348	267 (76)	64 (73)	0.580
Less acc.	108 (25)	68 (23)	40 (27)		84 (24)	24 (27)	
<b>Self-identification</b>							
More acc.	29 (7)	24 (8)	5 (3)	0.067	22 (6)	7 (8)	0.630
Less acc.	410 (93)	269 (92)	141 (97)		329 (94)	81 (92)	
<b>Preferred language</b>							
More acc.	104 (24)	85 (29)	19 (13)	<0.001	88 (25)	16 (18)	0.207
Less acc.	334 (76)	207 (71)	127 (87)		262 (75)	72 (82)	
<b>Close friends</b>							
More acc.	60 (14)	50 (17)	10 (7)	0.003	53 (1%)	7 (8)	0.116
Less acc.	376 (86)	242 (83)	134 (93)		296 (85)	80 (92)	
<b>Food preference</b>							
More acc.	123 (28)	98 (33)	25 (17)	<0.001	108 (31)	15 (17)	0.011
Less acc.	316 (72)	195 (67)	121 (83)		243 (69)	73 (83)	



### **Refugee's Current Perspective of Oral Health Care System**

The deterioration of oral health within refugee communities continues once these individuals arrive in their new destinations. One possible reason could be previous misconceptions about seeking professional help.

A study conducted by the School of Psychology at the University of Adelaide interviewed 20 Middle Eastern refugees and asylum seekers currently residing in Australia (Due et al., 2020). Researchers were able to identify several central themes throughout the conducted interviews that contributed towards the lack of usage of available dental services by refugee participants. Several interviewees noted the importance of educational status and how it correlates to oral health (Due et al., 2020). One individual from Afghanistan stated how most individuals in their community either come from low or no education background, thus the lack of knowledge in health can lead to neglect of oral health, again indicating the importance of health literacy. In addition, refugees and asylum seekers interviewed mentioned the need for time to adjust to new oral hygiene practices. For instance, a participant stated how back home in Pakistan, tooth brushing is not an everyday occurrence (Due et al, 2020).

Other participants mention their reluctance to visit the dentist in Australia because of financial constraints. One individual disclosed how the cost for extracting multiple teeth in Pakistan is equivalent to extracting one tooth in Australia.

Lastly, the study mentions how in certain cases, interviewees were extremely dissatisfied with their dental treatment. An oral health practitioner involved in the study explains how there are a significant number of dentists who refuse to treat refugees or do very limited procedures for emergency cases only, such as extraction (Due et al, 2020). As a result, refugees become more reluctant to see other dental professionals to avoid repeating similar negative experiences.

### **Oral Health Practices Amongst Refugees**

Oral health knowledge and oral hygiene practice varies amongst different locations throughout the world. Events such as war, violence, and starvation, can often result in the neglect of one's oral health. In a study conducted by the University of Medicine Berlin, participants were given a questionnaire asking refugees their current oral hygiene routine and current knowledge of dental care (Solyman and Schmidt-Westhausen, 2018). Questions were divided into three main categories: the participant's knowledge of tooth brushing and flossing, current practices of oral hygiene, and opinions towards oral health. Additionally, participants were asked whether they had knowledge of whether their current toothpaste contained fluoride, and an overwhelming amount of 95% or 367 individuals did not know the answer. Regarding opinions towards oral health, over half of participants believed one should only visit a dentist only when there are noticeable or debilitating issues. Lastly, approximately 65%

of those surveyed agreed that dental health can affect an individual's general health (Solyman and Schmidt-Westhausen, 2018).

A survey study conducted recently in Norway amongst refugees from Africa and Middle East further demonstrates the current oral health knowledge the refugee community currently possesses. Individuals were asked questions regarding their current oral health status, teeth satisfaction, and their daily activities that have been impacted by their current oral health condition (Hoyvik et al., 2018). An overwhelming majority of participants describes their oral health as inadequate and believe that they currently have untreated dental conditions. Approximately half of patients are unsatisfied with their teeth and have chronic oral or tooth pain. When examining the overall oral health status of participants, 89.4% of participants had at least one cavity, 36.4% had one or more tooth displacements (mobile tooth), approximately 10% showed signs of an oral infection (Hoyvik et al., 2018).

**Table 7. Self-reported Analysis of Current Oral Health Status.** Collected data of refugees and asylum seekers currently residing in Norway regarding oral health status and its impact in daily life. (Hoyvik et al., Table 2, 2018)

	Total n=132	Middle East n=45	Africa n=87	Test value (df)*	p*
“How would you describe the health of your teeth or mouth?” % “Not good”	63.6	71.1	59.8	1.65 (1)	0.199
“Do you think you have any untreated dental conditions?” % “Yes”	76.5	80.0	74.7	0.46 (1)	0.497
“Are you satisfied with your own teeth?” % “No”	50.8	64.4	43.7	5.12 (1)	<b>0.024</b>
“Do you suffer from toothache or other pain in the mouth?” % “Regular oral pain”	37.9	40.0	36.8	0.13 (1)	0.718
% Reporting problems once a week or more often with...due to problems with teeth or dentures (OIDP)					
...eating and enjoying food...	37.9	44.4	34.4	1.25 (1)	0.263
...speaking and pronouncing clearly...	10.6	15.5	8.0	1.76 (1)	0.184
...tooth cleaning...	31.8	35.5	29.9	0.44 (1)	0.507
...sleep and relaxation...	14.4	24.4	9.1	5.60 (1)	<b>0.018</b>
...smiling and showing teeth without being embarrassed...	21.2	28.9	17.2	2.41 (1)	0.121
...being emotionally stable...	12.9	20.0	9.1	3.09 (1)	0.079
...being sociable (enjoying being with other people)...	12.9	22.2	8.0	5.31 (1)	<b>0.021</b>
...performing daily work/daily chores...	11.4	17.7	8.0	2.79 (1)	0.095

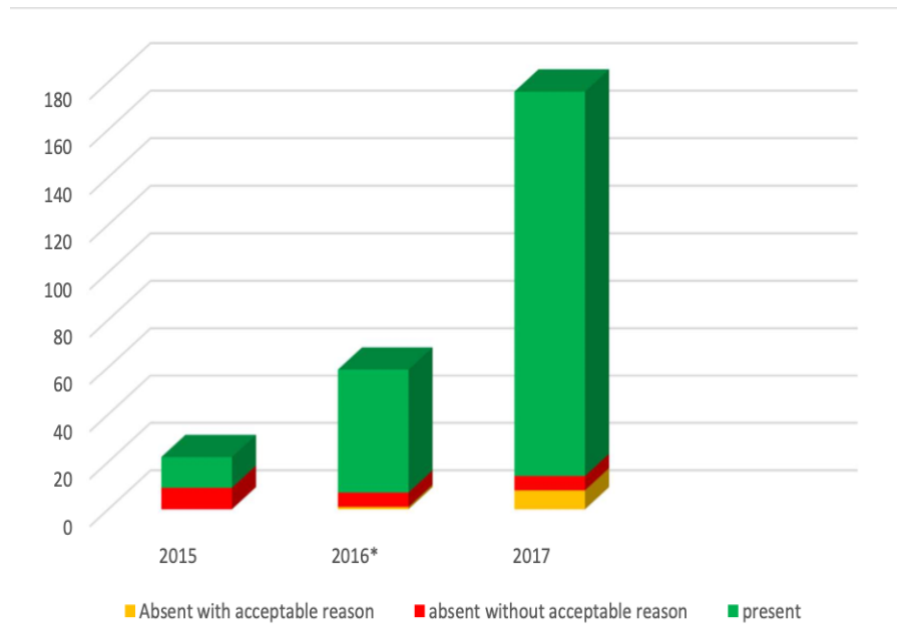
Bold values indicate significance level 0.05

\*Calculated using Pearson’s chi-squared test

Additionally, patients were asked personal questions such as how willing they were to smile and show their teeth without feeling embarrassment (Hoyvik et al., 2018). The collected data from the survey is shown in Table 7.

## **Oral Health Intervention**

By assessing prevalent oral diseases and the barriers preventing refugees from receiving adequate oral health care, we can conclude that early preventative oral health intervention would be an effective solution towards lessening the gap of oral health disparity. Lambert's study involving undocumented immigrants in Belgium exemplifies the positive correlation between community intervention and increased dental visits. Two dentists provided a free bi-weekly oral health exam, and each patient was then assigned to volunteer community oral health workers (Lambert, 2018). The main objective of this intervention was to increase regular dental visits and compliance potentially. During the initial phases of the study, 71.6 % of patients reported having untreated caries and had a very low level of preventative oral care (Lambert, 2018). Patients who reported needing more comprehensive dental procedures such as composite restoration or periodontal treatment (not specified in the study) were referred to another dental office (Lambert, 2018). After implementing the free bi-weekly oral health examination program, there was a significant decrease in missed appointments, and patients became more aware of the importance of oral hygiene (Figure 10).



**Figure 10. Graph Depicting Decrease in Missed Dental Appointments.** Demonstrates an increase in undocumented immigrant patients present for their dental appointments after implementing community oral health intervention (Lambert, Figure 1, 2018).

A study conducted in San Antonio, Texas, tested the effects of oral health education and early oral health intervention amongst 66 refugee participants of various cultural backgrounds (Alrashdi, 2020). The study divided participants into two separate groups: the intervention group and the control group. The intervention group was instructed to attend five oral health education classes and participate in four oral health evaluations. In contrast, the control group only had to take part in two evaluations (Alrashdi, 2020). The oral health education courses involved topics like oral hygiene, accessibility to dental professionals, and the importance of fluoride (Alrashdi, 2020). Additionally, instructors also included visual demonstrations on how to floss and brush their teeth

properly. To effectively teach, each demonstration and instruction was conducted by interpreters from a similar cultural background as the participants (Alrashdi, 2020). The study was unable to successfully demonstrate the efficacy of oral health education due to limitations such as the short time frame of the study.

## DISCUSSION

The refugee experiences multiple barriers along the migration and integration process of seeking asylum. The challenges presented to the refugee community often play a significant role in determining the oral health status of these individuals. Through research presented here and the literature, it is clear that a strong association exists between the social and physical barriers refugee experience and the oral health status of these individuals.

It is clear from evaluating the phases of refugee's migration journey that the oral health status of refugees are negatively impacted. The National University of Singapore study reflects how each step of migration (pre-departure, departure, and arrival) consists of specific traumatic events that can hinder refugees from receiving appropriate help and resources from maintaining adequate oral healthcare (Chuah et al., 2018). In line with the hypothesis, the study effectively demonstrates the correlation between the physical journey of migration and its impact on one's mental and physical health, often increasing oral diseases such as caries or periodontitis (Chuah et al., 2018).

To further demonstrate the association between social barriers and their impact on oral health, the review discusses the relationship between language and oral health literacy. In cases where individuals are forced to relocate to new countries where a different



language is spoken, healthcare systems can be challenging to navigate. As shown in the studies conducted in Sweden (Wangdahl et al., 2018) and Boston (Hunter-Adams et al., 2013), patients were far less likely to utilize and visit healthcare and dental providers when unable to understand and communicate the same language. Additionally, language plays a crucial role in shaping the perspectives of the oral health care system within the refugee community. Refugees are hesitant to seek help due to language barriers and discrimination by dental professionals (Wangdahl et al., 2018).

Furthermore, refugees are also less likely to participate in preventative oral health care practices due to the same barriers, such as language, finances, and health literacy that have hindered these individuals from seeking help from dental professionals (Solyman and Schmidt-Westhausen, 2018). These studies detail the barriers experienced by refugees and how each impacts the oral health status of these individuals.

Lastly, to demonstrate the strong association between socioeconomic barriers and oral health disparity, data highlighting prevalent oral health diseases in refugee communities compared to country natives was evaluated. Comparing DMFT index scores of the natives versus refugees indicates significant differences. In most cases, amongst children and adults, refugee participants had a much higher DMFT score when compared to citizens living in countries like Germany (Ani et al., 2019). The significant difference in DMFT further exemplifies how an individual's experiences as a refugee will worsen their oral health status.

As the number of refugees increases worldwide, oral health diseases within these populations will also continue to rise. Due to the lack of recent research regarding refugee oral health, it was somewhat challenging to find enough literature regarding refugee oral health. There are still many remaining questions in this field of study due to lack of available data. Questions include the long-term effect of dental neglect; specific ways migration can hinder oral hygiene, and more detailed solutions to how we could directly help refugees?

This literature review recognizes the various dental-related issues amongst refugee communities to bring more awareness of the increasing disparity in oral health. By addressing the oral health crisis and the underlying causes for these issues, it will emphasize the need for dental practitioners and research institutions to begin investing time and resources to help this population. Especially in these recent times of political unrest in multiple developing countries, the number of refugees and asylum seekers will only continue to increase. Thus, the dental and academic community must recognize the oral health crisis to provide quality care for refugee patients and help decrease the prevalence of debilitating oral health diseases.

While refugee numbers continue to rise, we must find and create ways to reduce barriers affecting the oral health of the refugee community. The Fédération Dentaire

Internationale (FDI) World Dental Foundation reflects how the dental and global health community should move forward in a future direction for addressing the oral health crisis amongst the refugee community. Currently, FDI World Dental Federation is leading the discussion regarding the refugee oral health crisis by creating the Refugee Oral Health Promotion and Care Project. The organization provides three main goals: developing an in-depth clinical guide on how to provide dental care for refugees, reinforcing oral health infrastructures, and offering preventative oral health interventions through the work of community health workers (“Refugee oral health promotion and care project,” n.d.). In conclusion, by focusing on these three main goals, we will reduce physical and social barriers experienced by the refugees and ultimately improve oral health and knowledge within the refugee community.

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## CURRICULUM VITAE

