

Evaluation of Health Status Among Syrian Refugees Living in Turkey: The Effects of Health Literacy, and Socioeconomic Factors

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Submitted to the
Institute of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
in
Economics

Eastern Mediterranean University
September 2022
Gazimağusa, North Cyprus

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ABSTRACT

Syria has faced a civil war, started in 2011, causing millions of people to flee to many neighboring and over the sea countries. Among other hosting countries, Turkey is the country hosting the most Syrian refugees with 3.74 million. Although hosting countries provide many opportunities, such as free health services, shelters for refugees, etc., it is inevitable for refugees to experience various health problems due to the war- or migration-related conditions they might face. These conditions may cause poor health, a decline in health quality, and even infectious diseases.

There are many reasons behind the health problems of refugees, such as post-war living conditions, post-war socioeconomic status, health literacy, language barriers, gender, education, war-related trauma, access to health care services, etc. This study aims to investigate, model, and evaluate the effects of demographic characteristics, socioeconomic status, war related conditions, and health literacy on the health status (i.e., mental health, the awareness of protective health services and chronic diseases) of Syrian refugees over the age of 15 who were living outside the camps in Turkey using different logistic regression methods, such as generalized logistic regression and multiple logistic regression. It was obviously found that most of the factors investigated were found to be strongly related to response variables that were investigated in this thesis to varying degrees.

Keywords: Syria, Civil War, Mental Health, Chronic Diseases, Awareness of Protective Health Services, Logistic Regression.

ÖZ

Suriye, 2011 yılında başlayan ve milyonlarca insanın komşu veya denizaşırı birçok ülkeye kaçmasına neden olan bir iç savaşla karşı karşıya kalmıştır. Diğer ev sahibi ülkeler arasında, 3,74 milyon ile en fazla Suriyeli mülteciye ev sahipliği yapan ülke Türkiyedir. Ev sahibi ülkeler, mülteciler için ücretsiz sağlık hizmetleri, barınak vb. birçok imkan sunsa da, mültecilerin savaş veya göçle ilgili koşullar nedeniyle sağlık sorunları yaşamaları kaçınılmazdır. Bu koşullar, kötü sağlık durumlarına, sağlık kalitesinde düşüşe ve hatta bulaşıcı hastalıklara neden olabilir.

Mültecilerin sağlık sorunlarının altında savaş sonrası yaşam koşulları ve sosyoekonomik durum, sağlık okuryazarlığı, dil engelleri, cinsiyet, eğitim, savaşa bağlı travma, sağlık hizmetlerine erişim gibi birçok neden bulunmaktadır. Bu çalışmanın amacı, genelleştirilmiş lojistik regresyon ve çoklu lojistik regresyon gibi farklı lojistik yöntemler kullanarak, Türkiye'de kamp dışında yaşayan 15 yaş üstü Suriyeli mültecilerin demografik özelliklerinin sosyoekonomik durumlarının, savaşla ilgili koşulların ve sağlık okuryazarlığının sağlık durumları (ruh sağlığı, koruyucu sağlık hizmetleri farkındalığı ve kronik hastalıklar) üzerindeki etkilerini araştırmak, modellemek ve değerlendirmektir. Araştırılan faktörlerin çoğunun, bu tezde araştırılan yanıt değişkenleriyle değişen derecelerde güçlü bir şekilde ilişkili olduğu açıkça bulunmuştur.

Anahtar Kelimeler: Suriye, İç Savaş, Ruh Sağlığı, Kronik Hastalıklar, Koruyucu Sağlık Hizmetleri Farkındalığı, Lojistik Regresyon.

DEDICATION

To My Lovely Daughters, and My Husband

ACKNOWLEDGEMENT

First and foremost, I am extremely grateful to my supervisor, Prof. Dr. Mehmet Balcılar, for his invaluable advice, continuous support, and patience during my Ph.D. studies. His immense knowledge and plentiful experience have encouraged me in all the time of my academic research. I would like to thank all the jury members in my Ph.D. committee for their kind help and support that have made my study. Additionally, I want to give my sincere regards to Prof. Dr. Mehmet Balcilar, Prof. Dr. Sevin Uğural and Prof. Dr. Salih Katırcıoğlu for teaching me throughout the duration of my coursework.

I would also like to express my thanks and respect to my mother and father for their continuous support and understanding during my academic career.

Finally, I would like to express my gratitude to my faithful husband, Ozan Gulcan, and my lovely daughters, Melis and Cansu. It would have been impossible for me to complete my studies without their assistance, patience, tremendous understanding, and encouragement.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
EMAH	Eastern Middle Eastern Adult Health Literacy
HIV	Human Immunodeficiency Virus
HS	Health Status
OLS	Ordinary Least Squares
OR	Odds Ratio
PO	Proportional Odds
PTSD	Post Traumatic Stress Disorder
SE	Standard Error
SES	Socioeconomic Status
STIs	Sexually Transmitted Infections
UNHCR	The United Nations Refugee Agency
WHO	World Health Organization

Chapter 1

INTRODUCTION

The protests in Tunisia, also known as the “Jasmine Revolution,” which was first initiated in 2010 by a Tunisian vegetable vendor (Mohamed Bouazizi, committing suicide in a public place), triggered protests in several Tunisian cities. The protests lasted until January 14, 2011, when Tunisia's autocratic Zine el-Abidin Ben Ali was dismissed after 23 years in power. Following the activities in Tunisia, these protests spread out to the neighboring countries, such as Egypt, Bahrain, Algeria, Lebanon, Oman, Morocco, Yemen, Jordan, Saudi Arabia, and Syria. These countries were also negatively affected by the protests started in Tunisia, and Syria is the one that has been the most devastated country, where the tragedy caused a major refugee crisis in March, 2011. The related immigration crisis affected many neighboring countries, such as Turkey, Lebanon, Iraq, and Jordan, and some other third countries.

Turkey is the country that hosted most of those refugees (3,74 million by 2021)¹. After the civil war and the refugee shocks, in many provinces, i.e., Kilis, Adana, Kahramanmaraş, Hatay, and Osmaniye, shelter centers were constructed by Turkish government. Starting from the first migration in 2011, a total of 51,603 Syrian refugees were placed to these shelters in five provinces and were provided certain living conditions and health services by Turkey². Besides, Syrian refugees living in camps

¹ For more detailed information refer to <https://en.goc.gov.tr/temporary-protection27>

² For more detailed information refer to <https://en.goc.gov.tr/temporary-protection27>

are more likely to access health services compared to those living out of camps. Moreover, health services and pharmaceutical products to all registered Syrians are offered free of charge, in cooperation with the Ministry of Health³. Similarly, the registered refugees living out of camps were also given the right to benefit from health services and free medication opportunities. On the other hand, these opportunities provided by the government to refugees led to the capacity problems in hospitals as well as the reactions of the local people (Tunç, 2015).

The prolongation of the war in later times caused more migration from Syria, and the number of shelters for refugees was insufficient compared to the number of immigrations. The increased number of refugees, therefore, resulted in settlement of them in many provinces outside the camps in Turkey.

The humankind has witnessed many wars throughout history and they all resulted in similar outcomes, such as deficient conditions for the basic living requirements. Being relevant to the historical examples, the Syrian civil war also generated refugees that may be deprived of a regular health system due to war-related immigration. This forced migration may also result in a deterioration of the refugees' quality of life, their living conditions, and cause the fight against new diseases. Furthermore, the difficulties in monitoring refugee health conditions may increase the possibility of emerging infectious diseases among both refugees and host country citizens.

To this end, it has been aimed to evaluate the underlying determinants of Syrian refugees' self-reported health status, and awareness of protective health services

³ For more detailed information please refer to <https://en.afad.gov.tr/turkey-response-to-syria-crisis>

among this refugee population in this present study using a questionnaire conducted in Turkey in 2018 in collaboration with the WHO Country Office in Turkey (Mipatrini et al., 2019).

Mainly, Chapter 2 examines the effects of pre-migration and post-war conditions (i.e., the number of years spent in Turkey, damaged house in Syria, the number of family member died during war, any injured family member during war, post-migration income, and post-migration employment status) on self-reported mental health status of female Syrian refugees using generalized ordered logistic regression models. A total of 3 443 female refugees over the age of 15 who were living outside the camps in Turkey were included in the analyses.

Chapter 3 investigates the chronic diseases, such as cardiac disease, diabetes, and hypertension incidence and the effects of demographic factors, socioeconomic status (i.e., education, income, and employment status), health-care use, such as having health insurance and health services use, health risk behaviors, i.e., tobacco use, Body Mass Index (BMI), and daily activity, and health literacy on the chronic diseases among 7202 Syrian refugees, who are over the age of 15 and living outside of refugee camp settlements in Turkey. Multiple logistic regression analysis was employed for each model to be estimated.

Chapter 4 has aimed to investigate the effects of pre-migration and post-war conditions of female Syrian refugees and health literacy on the awareness of protective health services (pap-smear screening, mammography screening, and HIV-testing) using multiple logistic regression for each model to be estimated.

All in all, this study attempts to examine the health status of Syrian refugees who migrated to Turkey following the civil war. A precise understanding of the health status of refugees, leads to have better point of view in order to apply proper health preventive policies for refugees living in Turkey, other neighbor countries, and 3rd countries.

Chapter 2

THE MENTAL HEALTH OF FEMALE SYRIAN REFUGEES

2.1 Introduction

For centuries, millions of people in many nations have been affected by wars resulting in forced migration to other countries. Forced migration is currently affecting an unprecedented number of individuals, both host population and migrated population, from all perspectives, such as health, economics, and socio-cultural. The United Nations Refugee Agency (UNHCR) reported that there are 82.4 million forcibly displaced individuals worldwide, including refugees, and asylum seekers who have fled their homes to avoid violence, war, and discrimination (UNHCR, 2021).

In March 2011, Syria faced a civil war resulting in a major refugee crisis worldwide. In recent years, an extraordinary number of Syrian refugees have been seen migrated to and resettled in the neighboring countries and overseas. Turkey, the country that hosted the majority of the refugees, has experienced a significant increase in Syrian immigration over the last decade. The first Syrian refugees arrived in Turkey in April 2011, and there are now a total of 3.74 million Syrians living in many provinces of Turkey.

It is commonly known that refugees face greater health risks compared to other population groups (Yavuz, 2015). War-related migration precludes refugees of a

regular health system, resulting in a decrease in quality of life of refugees and therefore increase the risk of their exposure to diseases. Among health issues that refugees suffer after migration are anxiety disorders, physical violence and related injuries, depression, sexual abuse, sexually transmitted infections (STIs), chronic diseases, sleep disorders, and poor mental health (Yavuz, 2015). Importantly, the risk of mental health problems is higher among immigrants or asylum seekers as a result of their exposure to abuse, trauma, and losses.

The World Health Organization (WHO) describes mental health as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (WHO, 2004). With the increase in war-related forced migration, several research on the mental health of refugees, who experience severe traumatic events and displace by conflict or forced migration, have been studied (Balcilar, Nugent, & Xu, 2021; Fazel, Reed, Panter-Brick, & Stein, 2012; Kaya, Kiliç, Çaman, & Üner, 2019; Lindencrona, Ekblad, & Hauff, 2008; Lustig et al. 2004; Silove, Sinnerbrink, Field, Manicavasagar, & Steel, 1997; Westermeyer, Vang, & Neider, 1983).

Murray et al. (2010) made an important contribution to the research with a review study relative to the refugee-based population. He indicated that refugees might report higher mental problems than the general population as a result of forced migration and post-migration problems. Moreover, Hassan et al. (2016) in their review study claimed that Syrian refugees, particularly children, and females, are more likely to develop mental health problems including depression, anxiety, and post-traumatic stress disorder due to the conflict-related migration.

There are many reasons of the mental health problems among refugees or asylum seekers. An important part of the previous studies has found that the major causes underlying the refugees' mental health problems are mainly conflict-related trauma, loss of family members, the difficulties they face en route to and within their host countries (Kaya et al., 2019; Miller, & Rasmussen, 2017; Fazel et al. 2012; Lustig et al. 2004).

De Jong et al. (2003) in his study, focusing on how common mental disorders among a total of 3048 participants who were survivors of armed conflict in Algeria, Cambodia, Ethiopia, and Palestine, stated that the prevalence of mental disorders was high due to their exposure to violence. Similar findings were reported in another study focusing on mental health (Steel et al., 2009). Accordingly, exposure to violence, torture, and trauma resulted in mental disorders, including post-traumatic stress disorder (PTSD) were found to be higher among migrants relative to non-migrant population. Furthermore, it has been reported that PTSD was linked to a variety of other factors, such as quality of camps and daily problems (De Jong et al., 2001).

Hynie (2018) in his study reviewed the social determinants of mental health in the post migration and summarized the effect of post-migration conditions on mental health and PTSD among refugees and asylum seekers. Besides, it has been proposed that pre-migration traumatic events as well as post-migration factors might explain mental illnesses or PTSD of refugees, and post-migration factors may increase their power to heal from pre-migration trauma (Hynie, 2018). While emotional and social support can help to mitigate the degree of PTSD symptoms and anxiety, uncertainty, financial concerns, and lack of social support can exacerbate the symptoms (Gorst-Unsworth, & Goldenberg, 1998). In brief, the social determinants affecting the mental health of

refugees were listed as income, employment, housing, language skills and interpretation, social support, social isolation, and discrimination (Hynie, 2018).

Furthermore, a Syrian refugee-based study mentioned that the major factors relative to the post-conflict stress experienced by refugees are safety of family members, grief, missing or deceased family members, and emotional or material losses (Hassan et al., 2016). Besides, language problems, unemployment, insufficient resources, and services to satisfy basic needs, limited access to services, physical violence and abuse, racism, and lack of social support were all shown to be as the common difficulties of post-migration experienced by refugees (Hassan et al., 2016).

The study of Quosh et al. (2013) recently revealed a comprehensive review in relation to the mental health of Iraqi and Syrian refugees. It was indicated that the time following migration and the experiences of migrated people in the host country had major effects on adaptation and stressors of refugees. Moreover, inadequate access to education, insecurity, lack of employment opportunities, forcible relocation, separation of families as a result of relocation, damaged houses and a lack of shelter, or overcrowding shelters, health-care services, and income were found to be refugees' primary problems in the post-migration. This study also reported that Syrian refugees experienced higher levels of anxiety, worry, fear, frustration, sadness, fatigue, and depression.

Recent studies on Syrian refugees noted that a group of people, who are affected by war-related migration, has been more prone to experience mental health issues such as depression, PTSD, physiological health issues, and anxiety (Kaya et al., 2019; Akgul et al., 2019).

A recent massive migration inflow to Turkey from Syria have increased the attention on handling the needs of refugees including health services received by refugees. For this purpose, in 2018, in coordination with World Health Organization (WHO) Country Office in Turkey, an extensive survey was employed to identify the needs and problems of Syrian refugees who were living out of camps (Mipatrini, Balcılar, Dembech, Ergüder, & Ursu, 2019). Although numerous research studies conducted have focused on Syrian refugees in Turkey, there is a limited number of studies on refugees' mental health. Since it is believed that females and children are more vulnerable from war conditions, and from the findings of the aforementioned studies on this issue, the current study aimed to investigate the incidence, and the underlying reasons for mental health problems among 3443 female Syrian refugees who resettled in Turkey following war-related migration.

2.2 Data and Methodology

2.2.1 Data and Questionnaire

The data comes from a questionnaire conducted in Turkey in 2018 in collaboration with the WHO Country Office in Turkey (Mipatrini et al., 2019). The primary aim of this extensive study conducted in collaboration with the WHO was to find out and understand more about the health status of Syrian refugees who were not living in camps. The report included information on demographics, socioeconomic factors, self-reported perceived health including chronic illnesses and mental health conditions, factors leading to chronic illnesses, use of healthcare services, satisfaction with healthcare services, health literacy of refugees, maternal and child health and access to healthcare, health status of children, the existence of acute conditions among children under five years old, vaccination rates among children, and the availability and use of prenatal and postnatal care by respondents (Mipatrini et al., 2019). The

survey was conducted utilizing an Arabic survey instrument and face-to-face interviews with the respondents by trained data collectors to obtain the data. Computer-assisted personal interviewing was used to collect survey responses. All of the field teams used survey materials that had been translated into Arabic, English, and Turkish (Mipatrini et al., 2019). This extensive survey led to the data being collected from more than 10,000 Syrian refugee respondents. However, a total of 3443 female Syrian refugees over the age of 15 who were living outside the camps in Turkey were included in our analysis. Only female participants were included, since it was believed that women and children are more prone to being traumatized due to war- and migration-related conditions.

The data obtained from this survey included the following explanatory variables 1) characteristics of the sample population, such as age, marital status, pregnancy status, the number of children they have, pre-migration residency, education attainment, and tobacco use; 2) pre-migration and post-war conditions, such as the years spent following migration to Turkey, the number of family members died during war, any family member who injured during war, any damaged house during war in Syria, post-migration income, and post-migration employment status. Categorical and dichotomous variables included in the analyses were classified as followings: a) marital status: married, divorced/separated/widowed, single, b) pregnancy status: not pregnant and pregnant, c) pre-migration residency: Aleppo and other regions, d) Education: illiterate, literate, primary/secondary school graduates, high school graduates, university/post graduates, e) damaged house in Syria: undamaged, I do not know, minimally damaged, very damaged, completely damaged, f) family member injured in war: yes and no, g) post-migration employment status: employed and unemployed.

To measure self-reported mental health of female refugees, we included the followings as response variables: 1) distress, sadness or worry, 2) concentrating on or remembering things, 3) depression, 4) loss of interest in regular activities, and 5) sleep disorders. The five dimensions of self-reported mental health status studied in this study are measured using the survey questions as below:

- “*Distress/sadness or worry*” with the question: “Overall in the last 30 days, how much distress, sadness or worry did you experience?”
- “*Concentrating on or remembering things*” with the question: “Overall in the last 30 days, how much difficulty did you have with concentrating or remembering things?”
- “*Depression*” with the question: “Overall in the last 30 days, how many times did you feel constantly depressive?”
- “*Loss of interest in regular activities*” with the question: “Overall in the last 30 days, how many times did you lose interest in your regular activities?”
- “*Sleep disorders*” with the question: “Overall in the last 30 days, how many times did you face sleep disorders? (Not sleeping or sleeping too much).”

Answers to the questions in relation to the mental health were evaluated through the Likert scale, i.e., 1=none, 2= mild, 3=moderate, 4=severe, 5=extreme. For the purpose of the generalized ordinal logistic regression analysis, we recategorized the answers of response variables as following: “1= severe/extreme, 2=moderate, and 3=none/mild”.

2.2.2 Methodology

Regression techniques appear to be a superior method for studying the impact of explanatory variables on the dependent variables and the link between these variables. Furthermore, in the application of linear, logistic, and ordinal logistic regression

models, the dependent variables or model assumptions are important. Where categorical dependent variables are the focus of research, the ordinary least square (OLS) estimator is an unsuitable predictor for independent variables coefficients (Kwak, & Clayton-Matthews, 2002). Therefore, the logistic model (also known as the logit model) is used to predict the likelihood of a specific class or event, such as yes/no, and present/absent, occurring. A general equation for logistic regression model is as below (Hosmer, Lemeshow, & Sturdivant, 2013):

$$\pi(\mathbf{x}) = \frac{e^{\beta_0 + \beta_1 x}}{1 + e^{\beta_0 + \beta_1 x}} \quad (2.1)$$

The logit transformation of $\pi(\mathbf{x})$ is given as;

$$\begin{aligned} g(\mathbf{x}) &= \ln \left(\frac{\pi(\mathbf{x})}{1 - \pi(\mathbf{x})} \right) \\ &= \beta_0 + \beta_1 x. \end{aligned} \quad (2.2)$$

In statistics, there are three types of logistic regression models: binary logistic regression, multinomial logistic regression, and ordinal logistic regression. While in binary logistic regression, the response variable can only be one of two categories, in multinomial logistic regression, the response variable can be one of three or more categories, and there is no natural ordering among the categories. However, ordinal logistic regression assumes that the response variable belongs to one of three or more categories and that the categories are ordered naturally.

2.2.2.1 Ordinal Logistic Regression Model

Statistical approaches for examining categorical data have grown in popularity in recent years, notably for social and biological scientific fields, and many research studies in health science examine data in the form of categories, extent of disease (none, mild, severe) or job performance (inadequate, satisfactory, adequate), that are

not continuous. Although multinomial logistic regression models can be applied for these occasions, ordinal logistic regression model was suggested as more appropriate (Williams, 2006).

Ordinal logistic regression (also known as proportional odds or parallel lines model), a type of logistic regression analysis that is utilized when the response variable has more than two categories with natural order or rank, was first introduced by Walker and Duncan (1967), and then McChullagh (1980) enlarged to explain it in further detail. A general equation for the ordinal logistic regression model is expressed as below (Williams, 2006):

$$P(Y_i > j) = g(X\beta) = \frac{\exp(\alpha_j + X_i\beta)}{1 + \{\exp(\alpha_j + X_i\beta)\}}, \quad j = 1, 2, 3, \dots, M-1 \quad (2.3)$$

where M denotes the number of categories of the ordered response variable.

According to the studies, the ordered logit model's assumptions (proportional odds or parallel lines assumption) are commonly violated (Long and Freese, 2006). The ordered logit model's (proportionate odds/parallel lines) assumption can be tested in numerous ways, such as the Brant test (Brant, 1990). It checks the proportional odds assumption by estimating logit coefficients for underlying binary logistic regressions and providing chi-square test statistics for each predictor. The null hypothesis of Brant test is “parallel lines assumption holds”. The fact that the overall chi-square value is insignificant showing that the ordered logistic model assumptions have been satisfied and satisfying the assumptions of the ordered logit model denotes each logistic regression's coefficients (other than constants) are the same (Williams, 2006).

2.2.2.2 Generalized Ordinal Logistic Model

When the assumptions of the ordered logit model are violated, a generalized ordinal logistic model is the alternative technique used to investigate the ordered or ranked data (Williams, 2006; Fu, 1998). The generalized ordered logistic (gologit) model can be defined as below (Williams, 2006):

$$P(Y_i > j) = g(X\beta_j) = \frac{\exp(\alpha_j + X_i\beta_j)}{1 + \{(\exp(\alpha_j + X_i\beta_j))\}}, \quad j = 1, 2, 3, \dots, M-1 \quad (2.4)$$

where M denotes the number of categories of the ordered response variable. The odds that Y will take on each of the numbers 1, 2, 3 M can be determined using the equation above as below:

$$P(Y_i = 1) = 1 - g(X\beta_1) \quad (2.5)$$

$$P(Y_i = j) = g(X_i\beta_{j-1}) - g(X_i\beta_j), \quad j = 2, 3, 4, \dots, M-1 \quad (2.6)$$

$$P(Y_i = M) = g(X_i\beta_{M-1}) \quad (2.7)$$

The gologit model could alternatively be described as a “cumulative distribution function”, as seen below:

$$P(Y_i \leq j) = 1 - g(X\beta_j) = F(X\beta_j) \quad (2.8)$$

The ordered logit models and generalized logit models have the identical formulas, with the exception that in the ordered logit model, the β 's (but not the α 's) are the same across all values of j (Williams, 2006).

The findings of the generalized ordered logistic regression analyses in our study were provided in the form of odds ratios (ORs), the probability of an outcome event occurring divided by the probability that the event will not occur, with 95% confidence intervals.

2.3 Results

2.3.1 Descriptive Statistics

All statistical tests in this study were analyzed using STATA software version 14. Table 1 summarizes the descriptive statistics of 3443 female Syrian refugees who participated in the survey. The average age of those interviewed was 29.53 years, with 80.3% of married, 7.6% separated/divorced/widowed, and 12.1% singles. While the rate of pregnant participants was 5.6%, the average number of children they had is 2.22. Aleppo was stated as the pre-migration location of 61.1% of the refugees. The majority of the participants were non-smokers (97.2%) and primary/secondary school graduates (57.6%). The average number of years spent in Turkey among the respondents in the sample was 3.39. 41.4% of the migrants stated their houses were totally destroyed. 3.3% of participants have family members injured during the conflict, while the average number of family members who died during the war was 0.07. Furthermore, 95.9% of female Syrian refugees reported that they were unemployed after migration to Turkey. The participants' average income (in log) was found to be 6.86 following migration. It has been identified that 17% of refugees experienced severe/extreme distress/sadness or worry, 15.2% of whom reported that they had severe/extreme difficulties with concentrating on or remembering things, 14.7% of whom experienced severe/extreme depression, 13.7% of whom indicated that they had severe/extreme difficulties with losing interest in their regular activities, and 15.6% of whom experienced severe/extreme sleep disorders.

2.3.2 Empirical Results of Generalized Ordered Logistic Regression

Since the response variables in this study are ordered, we first applied ordinal logit model (also known as ordered logistic regression or proportional odds (PO) model) to estimate the models.

Table 1: Descriptive Statistics

Explanatory Factors:	N	%	mean	Std.dev.
Age	3443		29.53	9.246
Marital Status				
married		80.3		
seperated/divorced/widowed	3443	7.6	.32	.678
single		12.1		
Pregnancy				
pregnant	3261	5.6	0.06	.237
not pregnant		89.1		
Number of children	3303		2.22	1.839
Pre-migration residency	3303			
Aleppo		61.1	.64	.481
others		34.9		
Education	3443			
illiterate		24.5		
literate		8.7	1.54	1.005
primary/secondary school		57.6		
high school		7.1		
university/postgraduates		2.2		
Tobacco use	3443			
smoke		2.8	.03	.166
not smoke		97.2		
Years spent in Turkey	3303		3.39	1.430
Damaged home in Syria	3303			
completely destroyed		41.4		
very damaged		15.8	2.66	1.397
minimally damaged		8.6		
I do not know		24.6		
Undamaged		5.5		
Number of family member died during war	3303		0.07	0.392
Family member injured during war	3303			
yes		3.3	.03	0.182
no		92.7		
Post-migration income	2816		6.86	0.996
Post-migration employment status	3437			
employed		3.9	0.96	0.194
unemployed		95.9		
Distress/sadness or worry	3303			
severe/extreme		17.0	2.38	.769
moderate		25.4		
none/mild		53.5		
Concentrating/remembering things	3303			
severe/extreme		15.2		
moderate		24.3	2.43	.749
none/mild		56.5		

Depression	3303			
severe/extreme		14.7		
moderate		21.8	2.47	.745
none/mild		59.4		
Lose interest in your regular activities	3303			
severe/extreme		13.7		
moderate		20.9	2.50	.732
none/mild		61.3		
Sleep disorders	3303			
severe/extreme		15.6		
moderate		22.5	2.44	.756
none/mild		57.9		

For each logit model, reference categories for sample characteristics were determined as follows: I) marital status: married, II) pregnancy status: not pregnant, III) pre-migration residency: other, IV) education: illiterate, V) tobacco use: not smoke, VI) damaged house in Syria: undamaged, VII) family member injured in war: no, and VIII) post-migration employment status: employed. Categories of response variables coded as following: 1=severe/extreme, 2=moderate, 3=none/mild.

After running ordered logistic regression, the Brant test was used to determine whether the PO assumption (The null hypothesis is the proportional odds assumption holds) was violated for each model. Table 2 presents χ^2 tests and p values for each model, and the results showed that PO assumptions for each model were violated (a low p-value indicates that the coefficient violates the PO assumption). When the PO assumption is violated, generalized ordered logit model yields more accurate results (Williams, 2006). Therefore, we decided to use generalized ordered logistic regression to test the impact of sample population characteristics, pre- migration, and post- war conditions on the mental health of female refugees. The results of generalized logistic regression analyses were presented with the coefficient estimates (β), standard errors (SE), and

the odds ratios (OR) with CI 95%. Positive coefficient estimates increase the likelihood of being in a higher dependent variable category, whilst negative coefficient values imply being in the current or lower dependent variable group.

Table 2: Brant Test results of the PO assumption for each model

Response Variable	χ^2	P> χ^2
Distress/sadness/worry	29.83	0.005**
Concentrating on/remembering things	30.96	0.003**
Depression	25.11	0.022*
Loss of interest in regular activities	34.38	0.001**
Sleep disorders	31.27	0.003**

*** p < 0.01, ** p < 0.01, * p < 0.05

Tables 3 to 7 show the findings of the generalized ordinal models for all five measures of mental health. Considering the results obtained from logit regressions, the explanatory variables, i.e., marital status, pre-migration residency, education, tobacco use, damaged homes in Syria, years spent in Turkey, the number of family members who died during the war, and post-migration income, were determined as statistically significant factors affecting the mental health of refugees. However, the factors, i.e., age, pregnancy status, number of children they have, number of family members injured during the war, and post-migration employment status, were found to be insignificant.

According to the findings, female Syrian refugees who were separated/divorced/widowed were found to be more prone to experience mental health problems, such as depression, loss of interest in regular activities, and sleep disorders.

Table 3: Generalized Ordered Logistic Regression Results of Distress, Sadness, Worry

(1) Severe/Extreme						
(N =2774)	Distress/sadness/worry					
Sample characteristics:	β	Std. Err.	z	p> z	OR	(CI 95%)
Age	-.011	.006	-1.74	.081	.988	.975-1.00
Pregnancy ^a						
pregnant	.023	.223	0.10	.916	1.02	.660-1.58
Marital Status ^b						
separated/divorced/widowed	-.345	.188	-1.83	.068	.708	.488-1.02
single	.160	.185	0.86	.389	1.17	.815-1.68
Number of children	-.005	.029	-0.20	.844	.994	.939-1.05
Pre-migration residency ^c						
Aleppo	-.688***	.121	-5.65	.000	.502	.395-.637
Education ^d						
literate	.038	.222	0.17	.863	1.03	.671-1.60
primary/secondary school	-.493***	.133	-3.68	.000	.610	.469-.794
high school	-.052	.239	-0.22	.826	.948	.593-1.51
university/postgraduate	-.212	.386	-0.55	.582	.808	.379-1.72
Tobacco use ^e						
smoke	-.778**	.259	-3.00	.003	.459	.275-.763
Pre-migration&Post-war conditions:						
Years spent in Turkey	.122**	.036	3.36	.001	1.12	1.05-1.21
Damaged house in Syria ^f						
I do not know	.171	.505	0.67	.505	1.18	.716-1.96
minimally damaged	-.043	.286	-0.15	.878	.957	.545-1.67
very damaged	-.377	.252	-1.50	.134	.685	.418-1.12
completely destroyed	-.625**	.233	-2.67	.007	.534	.338-.846
Number of family members died	-.393**	.113	-3.46	.844	.674	.539-.842
Family members injured in war ^g						
yes	-.402	.255	-1.57	.115	.668	.404-1.10
Post-migration income (in log)	.233***	.056	4.12	.000	1.26	1.13-1.41
Post-migration emp. status ^h						
unemployed	-.183	.262	-.70	.484	.832	.497-1.39
LR R ²	0.0483					
Model Fit	$\chi^2_{40}=267.72$					

Note: Reference categories of explanatory variables are (a) not pregnant; (b) married; (c) other; (d) illiterate; (e) not smoke, (f) undamaged; (g) no, (h) employed. Response variables were categorized as (1) severe/extreme, (2) moderate, (3) none/mild.

*** p<0.001; ** p<0.01; * p<0.05.

Table 4: Generalized Ordered Logistic Regression Results of Concentrating on/Remembering Things

(N =2774)		(1) Severe/Extreme Concentrating/remembering things				
Sample characteristics:	β	Std. Err.	z	p>z	OR	(CI 95%)
Age	-.011	.006	-1.66	.098	.988	.975-1.00
Pregnancy ^a						
pregnant	-.073	.227	-.032	.748	.929	.595-1.45
Marital Status ^b						
separated/divorced/widowed	-.253	.195	-1.30	.195	.775	.528-1.13
single	.304	.196	1.54	.123	1.35	.921-1.99
Number of children	.017	.301	0.60	.551	1.01	.959-1.08
Pre-migration residency ^c						
Aleppo	-.663***	.125	-5.28	.000	.515	.402-.658
Education ^d						
literate	.030	.230	.13	.895	1.03	.656-1.61
primary/secondary school	-.454**	.138	-3.29	.001	.634	.484-.832
high school	.084	.250	.34	.737	1.08	.665-1.77
university/postgraduate	-.236	.408	-.58	.563	.789	.354-1.75
Tobacco use ^e						
smoke	-.532*	.270	-1.97	.049	.587	.345-.997
Pre-migration&Post-war conditions:						
Years spent in Turkey	.111**	.037	2.95	.003	1.11	1.03-1.20
Damaged house in Syria ^f						
I do not know	.232	.277	.84	.402	1.26	.732-2.17
minimally damaged	-.433	.295	-1.47	.142	.648	.363-1.15
very damaged	-.441	.272	-1.62	.105	.643	.377-1.09
completely destroyed	-.609**	.253	-2.41	.016	.543	.331-.893
Number of family member died	-.256*	.278	-2.37	.018	.773	.625-.956
Family member injured in war ^g						
yes	-.260	.278	-.94	.349	.770	.446- 1.33
Post-migration income (in log)	.415***	.062	6.63	.000	1.51	1.33-1.71
Post-migration emp. status ^h						
unemployed	.134	.260	.52	.605	1.14	.686-1.90
LR R ²	0.0620					
Model Fit	$\chi^2_{40}=31.26$					

Note: Reference categories of explanatory variables are (a) not pregnant; (b) married; (c) other; (d) illiterate; (e) not smoke, (f) undamaged; (g) no, (h) employed. Response variables were categorized as (1) severe/extreme, (2) moderate, (3) none/mild.

*** p<0.001; ** p<0.01; * p<0.05.

Table 5: Generalized Ordered Logistic Regression Results of Depression

(1) Severe/Extreme						
(N =2774)	Depression					
Sample characteristics:	β	Std. Err.	z	p>z	OR	(CI 95%)
Age	-.013	.006	-1.94	.053	.986	.973-1.00
Pregnancy ^a						
pregnant	.042	.238	.18	.857	1.04	.654-1.66
Marital Status ^b						
separated/divorced/widowed	-.454*	.190	-2.39	.017	.634	.437-.921
single	.150	.201	.75	.454	1.16	.783-1.72
Number of children	-.024	.238	-.82	.412	.975	.918-1.03
Pre-migration residency ^c						
Aleppo	-.603***	.128	-4.70	.000	.546	.425-.703
Education ^d						
literate	.043	.252	.17	.863	1.04	.637-1.71
primary/secondary school	-.625***	.144	-4.31	.000	.535	.402-.711
high school	-.275	.252	-1.09	.276	.759	.462-1.24
university/postgraduate	-.140	.420	-.33	.739	.869	.381-1.98
Tobacco use ^e						
smoke	-.613*	.265	-2.31	.021	.541	.322-.910
Pre-migration&Post-war conditions:						
Years spent in Turkey	.064	.039	1.64	.100	1.06	.987-1.15
Damaged house in Syria ^f						
I do not know	.202	.284	.71	.476	1.22	.700-2.14
minimally damaged	-.282	.307	-.92	.357	.753	.412-1.37
very damaged	-.424	.279	-1.52	.129	.653	.377-1.13
completely destroyed	-.487	.261	-1.86	.063	.614	.367-1.02
Number of family member died during the war	-.278*	.114	-2.42	.016	.757	.604-.948
Family member injured during the war						
yes	-.225	.283	-.80	.426	.798	.458-1.39
Post-migration income (in log)	.315***	.061	5.12	.000	1.37	1.21-1.54
Post-migration emp. status ^h						
unemployed	-.050	.596	-.18	.856	.951	.554-1.63
LR R ²	0.0512					
Model Fit	$\chi^2_{40}=265.22$					

Note: Reference categories of explanatory variables are (a) not pregnant; (b) married; (c) other; (d) illiterate; (e) not smoke, (f) undamaged; (g) no, (h) employed. Response variables were categorized as (1) severe/extreme, (2) moderate, (3) none/mild.

*** p<0.001; ** p<0.01; * p<0.05.

Table 6: Generalized Ordered Logistic Regression Results of Loss of Interest in Regular Activities

		(1) Severe/Extreme				
(N =2774)		Loss of interest in regular activities ⁱ				
Sample characteristics:	β	Std. Err	z	p>z	OR	(CI 95%)
Age	-.013	.007	-1.80	.071	.987	.973-1.00
Pregnancy pregnant	-.227	.239	-.95	.341	.796	.498-1.52
Marital Status ^b separated/divorced/widowed	-.595**	.196	-3.03	.002	.551	.375-.810
single	.019	.205	.09	.926	1.01	.681-1.52
Number of children	-.047	.031	-1.53	.127	.953	.896-1.01
Pre-migration residency ^c Aleppo	-.640***	.132	-4.82	.000	.526	.406-.683
Education ^d literate	-.214	.238	-.90	.369	.807	.505-1.28
primary/secondary school	-.551***	.149	-3.69	.000	.575	.429-.771
high school	-.251	.253	-.99	.322	.777	.473-1.27
university/postgraduate	-.630	.412	-1.53	.127	.532	.237-1.19
Tobacco user ^e smoke	-.166	.299	-.56	.578	.846	.471-1.52
Pre-migration&Post-war conditions:						
Years spent in Turkey	.043	.040	1.08	.278	1.04	.965-1.12
Damaged house in Syria ^f I do not know	.437	.291	1.50	.132	1.54	.875-2.74
minimally damaged	-.409	.305	-1.34	.179	.663	.365-1.20
very damaged	-.378	.281	-1.34	.179	.684	.394-1.18
completely destroyed	-.435	.263	-1.65	.098	.646	.386-1.08
Number of family member died during the war	-.313**	.108	-2.87	.004	.731	.457-1.44
Family member injured during the war ^g yes	-.205	.294	-.70	.485	.814	.457-1.44
Post-migration income (in log)	.383***	.066	5.79	.000	1.46	1.28-1.67
Post-migration emp. status ^h unemployed	-.365	.306	-1.19	.232	.693	.380-1.26
LR R ²	0.0569					
Model Fit	$\chi^2_{40}=86.37$					

Note: Reference categories of explanatory variables are (a) not pregnant; (b) married; (c) other; (d) illiterate; (e) not smoke, (f) undamaged; (g) no, (h) employed. Response variables were categorized as (1) severe/extreme, (2) moderate, (3) none/mild.

*** p<0.001; ** p<0.01; * p<0.05.

Table 7: Generalized Ordered Logistic Regression Results of Sleep Disorders

(1) Severe/Extreme						
(N =2774)	Sleep Disorders ⁱ					
Sample characteristics:	β	Std. Err.	z	p>z	OR	(CI 95%)
Age	-.0125	.006	-1.86	.063	.987	.974-1.00
Pregnancy pregnant	.214	.243	.088	.377	1.239	.770-1.99
Marital Status ^b seperated/divorced/widowed	-.451**	.188	-2.40	.016	.636	.440-.920
single	.186	.195	.95	.341	1.204	.821-1.76
Number of children	-.041	.029	-1.43	.153	.958	.905-1.01
Pre-migration residency ^c Aleppo	-.777***	.126	-6.13	.000	.459	.358-.589
Education ^d literate	-.012	.245	-.05	.961	.988	.610-1.59
primary/secondary school	-.576***	.140	-4.11	.000	.562	.426-.739
high school	-.717**	.218	-3.28	.001	.487	.317-.749
university/postgraduate	-.766*	.366	-2.09	.037	.464	.226-.953
Tobacco user ^e smoke	-.694**	.272	-2.55	.011	.499	.293-.851
Pre-migration&Post-war conditions:						
Years spent in Turkey	.042	.037	1.14	.255	1.043	.969-1.12
Damaged house in Syria ^f I do not know	.354	.308	1.15	.249	1.426	.779-2.60
minimally damaged	-.647*	.313	-2.07	.039	.523	.283-.967
very damaged	-.698*	.291	-2.40	.016	.497	.281-.880
completely destroyed	-.863**	.274	-3.14	.002	.421	.246-.722
Number of family member died during the war	-.280*	.110	-2.54	.011	.755	.608-.937
Family member injured during the war ^g yes	.178	.298	.60	.549	1.195	.666-2.14
Post-migration income (in log)	.249***	.062	4.01	.000	1.283	1.13-1.45
Post-migration emp. status ^h unemployed	-.223	.276	-.81	.419	.799	.465-1.37
LR R ²	0.0532					
Model Fit	$\chi^2_{40} = 281.9$					

Note: Reference categories of explanatory variables are (a) not pregnant; (b) married; (c) other; (d) illiterate; (e) not smoke, (f) undamaged; (g) no, (h) employed. Response variables were categorized as (1) severe/extreme, (2) moderate, (3) none/mild.

*** p<0.001; ** p<0.01; * p<0.05.

In terms of odds ratio, separated/divorced/widowed refugees are more likely to experience severe/extreme depression (OR=.634, CI 95%), to experience loss of interest in regular activities (OR=.551, CI 95%), and to have sleep disorders (OR=.636, CI 95%) compared to married female refugees.

Taking a look at the region where the refugees were located before their migration, it is obvious that refugees who were living in Aleppo before migration are more susceptible to suffer from severe/extreme mental health disorders. As shown in Tables 3 to 7, education has a considerable impact on the mental health of female Syrian refugees. Accordingly, people who had completed primary/secondary education had a higher risk of getting severe/extreme mental health problems than those who had not. Furthermore, tobacco users were more likely to experience anxiety, sadness, or worry (OR=.459, CI 95%), difficulty in concentrating or remembering things (OR=.587, CI 95%), depression (OR=.541, CI 95%), and sleep disorders (OR=.499, CI 95%).

The findings also showed a significant effect of having a damaged house in Syria, and years spent in Turkey following migration on the mental health of female refugees. As shown in Tables 3, 4, and 7, migrants who indicated their house as completely or very destroyed are more likely to have mental health problems, such as distress, sadness, or worry, difficulties in concentrating on or remembering things, and sleep disorders. It was also found that the incidence of distress, sadness, or worry (OR=1.129, CI 95%), and concentrating on or remembering things (OR=1.117, CI 95%) decreases with an increase in the number of years spent in Turkey. Another factor found to be strongly linked to the five measures of mental health was the number of family members who died during the war. The Tables 3 and 4 show that refugees with family members who died during the conflict had a greater probability of getting mental health problems,

such as distress, sadness, or worry (OR=.674, CI 95%), difficulties in concentrating on or remembering things (OR=.773, CI 95%), depression (OR=.757, CI 95%), loss of interest in regular activities (OR=.731, CI 95%), and sleep disorders (OR=.755, CI 95%). Apart from the other factors studied, however, a highly significant relationship between post-migration income and all five mental health indicators was found. Accordingly, with an increase in refugees' post-migration income, the odds of suffering all of these mental health indicators, i.e., distress, sadness, or worry (OR=.1.130, CI 95%), concentrating on or remembering things (OR=.1.515, CI 95%), depression (OR=.1.370, CI 95%), loss of interest in regular activities (OR=.1.467, CI 95%), sleep disorders (OR=.1.283, CI 95%), decreases.

2.4 Discussion

This research is the first to study at mental health on such a large refugee population, as well as the parameters influencing the mental health of female Syrian refugees who fled to Turkey after the Syrian civil war. The effects of years spent in Turkey, damage to residences in Syria, number of family members who died during the conflict, number of family members who were injured during the war, post-migration income, and work status were all analyzed to investigate on the mental health of female Syrian refugees.

The marital status was found to be one of the major factors that could have caused mental health problems in this study. Many studies that found a link between divorce and depression indicate an increase in depression with divorce (Marks, & Lambert, 1998; Kalmjin, 2007). It was also shown that females were more prone to experience depression symptoms and lower self-esteem compared to males after divorce (Marks, & Lambert, 1998; Simon, & Nath, 2004). Widowhood was also shown to be related to

mental health in the same way that divorce is (Carr, House, Kessler, Nesse, Sonnega, & Wortman, 2000; Lucas, Clark, Georgellis, & Diener, 2003). Parallel to the previous studies, the findings of logit estimates showed herein that separated/divorced/widowed female refugees were more prone to have mental health problems than married individuals.

Aleppo, one of the governorates in Syria, has suffered considerably more damage than other parts of Syria and Aleppo residents experienced more traumatic events due to the war-related conditions (Balcilar et al., 2021). Therefore, it is unsurprising that mental health problems were more prevalent among Aleppo residents. According to recent research on the mental and physical health of female and male Syrian refugees, those who lived in Aleppo before migration were more likely to suffer mental and physical problems (Balcilar et al., 2021). We also found a similar result related to the association between pre-migration residency and mental health, indicating that pre-migration residency of female Syrian refugees was an important parameter leading to problems in all of five measures of mental health.

Despite the fact that higher levels of education and income have been linked to better health in numerous studies (Browning, Cagney, & Wen 2003), we found that education was one of the most important determining factors, with a higher education being a risk factor in the development of poor mental health. The findings of this study revealed that as one's level of education increases, mental health problems become more prevalent. Although these findings contrast to the previous findings, they may indicate that the impact of education on health status might be independently evaluated whether persons are immigrants.

In this present study, there was a significant relationship between tobacco use and four of the five indicators of mental health among female refugees. Earlier studies have revealed that tobacco, one of the most widely used psychoactive chemicals, causes people to suffer from depression, anxiety, and psychiatric diseases (Warner, Kessler, Hughes, Anthony, & Nelson, 1995; Anthony, Warner, & Kessler, 1997; Mitchell, & Dahlgren, 1986). Importantly, the findings herein were consistent with earlier results that reported tobacco use was linked to mental health problems.

The findings showed that having a damaged house in Syria might have resulted to an increase in three of the five measures of mental health, such as distress, sadness, or worry, difficulties in concentrating on or remembering things, and sleep disorders. This outcome supported the earlier literature which investigated the link between having a damaged house and Syrian refugees' mental health (Balcilar et al., 2021). In addition to these findings, it has been previously reported that refugees whose houses had been damaged by war were more likely to suffer from depression, anxiety, and worry (Quosh et al., 2013). It can be concluded from the findings that the female Syrian refugees were exposed to serious psychological problems as a result of having a destroyed house.

Furthermore, the number of years spent in Turkey has been found to be related significantly with mental health of the refugees. The results suggest that the likelihood of suffering from mental health problems did decrease as the number of years spent in Turkey increases. As shown in Table 1, since the tragic incidents in Syria, refugees had spent such a long time (3.4 years) in Turkey. Although many refugees may experience mental health problems due to war-related trauma, they may feel more

secure in a country that has been free of conflict for such a long time, which has a positive impact on their mental health.

The number of family members who died in war was reported as one of the major factors triggering mental health problems of the female Syrian refugees following migration. Increasing number of family members who died during the war leads to an increase in all of the five indicators of mental health among female refugees. Current findings on the mental health of Syrian refugees have revealed that the loss of a family member is a significant determinant that appears to lead to poor mental health. (Quosh et al., 2013; Hassan et al., 2016; Cantekin, 2019). Therefore, the findings of this present study on the impact of the loss of family members on female refugees' mental health were comparable with previous studies.

It was reported that low income has been associated to a lower health-related quality of life in both men and women in previous studies (Zahran, Moriarty, Zack, & Kobau, 2003). Moreover, access to health care and health-related resources is strongly linked to personal or household income. With respect to the findings from the present study, post-migration income was found to have a significant effect on all of the five indicators of mental health among refugees. In the current study, it was clearly reported that female Syrian refugees with higher post-migration income had better mental health. Zeeman et al. (2021) made a contribution to this topic with their study related to income, mental health, and health behaviors. Accordingly, they revealed that higher income was linked to lower psychological distress. Hence, these findings might be linked to the increased likelihood of having access to health-related resources with a higher income.

In general, previous studies focused on Syrian refugees' mental health presented similar results parallel to our findings. Accordingly, it has been indicated that Syrian refugees face a variety of risks, including war-related trauma and grieving as a result of many losses, as well as postmigration stressful events such as familial concerns, communication and language barriers, discrimination, and financial stressors (Hassan et al., 2016(a); Hassan et al., 2015(b); Renner et al., 2020; Tinghög et al., 2017). Moreover, it has been found that anxiety, sadness, and PTSD are all linked to conflict-related and post-migration stressors (Tinghög et al., 2017). Access to schooling, employment, adequate housing, and access to health care services were also identified as challenges that might be faced by refugees who resettled in other countries (Council, 2014; Almoshmosh et al. 2019).

2.5 Conclusion

2.5.1 Concluding Remarks

As opined by previous studies focusing on the refugees' mental health, it is more common to suffer from mental health problems among refugees following migration. The aim of this study, therefore, was to examine the underlying pre-migration and post-war conditions related reasons of poor mental health among female Syrian refugees.

This study involves a total of 3443 female refugees, who fled to Turkey after conflict in Syria, over the age of 15 who were residing outside of refugee camps in Turkey. The data was obtained from a survey performed in Turkey in 2018 in cooperation with the WHO Country Office in Turkey.

To investigate the research questions, we first applied ordered logistic regression to investigate the effects of the explanatory variables on the response variables. In addition to that, Brant test was employed to check whether PO assumptions were violated. The results of Brant test suggested that PO assumptions were violated and generalized ordered logistic regression have been decided to be appropriate to apply for each response variables to be estimated.

According to the results obtained, it was obviously found that most of the factors investigated were found to be strongly related to response variables to varying degrees. Overall, education, pre-migration residency, tobacco consumption, a destroyed house during the Syrian civil war, the number of years spent in Turkey, the number of family members killed in the war, and post-migration income were found to be quite significant factors triggering the mental health issues among female refugees. Many of the findings were shown to be in accordance with earlier studies in the literature, which was undertaken on migrations in other areas of the world at various time periods. Since each migration has its own set of conditions, it is important to state that the explanations for the outcomes should well be interpreted separately from others.

2.5.2 Policy Implications

Based on our findings, there are a number of recommendations that might help refugees' mental health. First of all, it might be helpful and important to offer counseling services to this refugee population for coping with their problems and rebuilding their lives that are affected by war- or migration-related traumatic events. Moreover, they might be involved in psychosocial groups, which allow refugees to share their own experiences with other refugees. Additionally, educational brochures, campaigns, or seminars might be provided to this population by institutions on the damaging effect of risk factors on mental health.

2.5.3 Suggestions for Further Studies

There may be some possible suggestions that could be addressed in future research studies. The primary suggestion for future research is that it is unknown whether female Syrian refugees had mental health problems before or after migration. Therefore, it would be appropriate to add this data to the analyses. Second thing is that language and cultural challenges can make migrants uncomfortable, depressed, or anti-social, resulting in poor mental health. Therefore, difficulties in language and cultural difficulties that might be faced by refugees in host countries should be added to the analysis for further studies.

Chapter 3

SELF-REPORTED CHRONIC DISEASES AMONG SYRIAN REFUGEES

3.1 Introduction

Chronic diseases (e.g., heart diseases, diabetes, hypertension) are accepted as the main causes of mortality and morbidity throughout the world. Chronic diseases are described as “conditions that last 1 year or more and require ongoing medical attention or limit activities of daily living or both” (CDC, 2021). The number of patients diagnosed with one of these disease states tends to increase annually as shown by many statistics. For instance, cardiac illnesses affected 17.9 million people in 2019, accounting for 32% of all deaths worldwide (WHO, 2021). Diabetes, one of the chronic diseases, is defined as a condition that happens when the pancreas fails to generate enough insulin. This failure makes millions of people suffer worldwide (WHO, 2021). Similarly, hypertension, a severe health condition and another type of chronic disease, raises the risk of heart-, brain-, kidney-related disorders, and is a leading cause of premature mortality globally (WHO, 2021). It affects approximately 1.28 billion people aged 30 to 79 globally, with the majority residing in low- and middle-income countries (WHO, 2021).

The development of chronic illness states is influenced by a number of variables, such as health literacy. The World Health Organization has defined health literacy as “the personal characteristics and social resources needed for individuals and communities

to access, understand, appraise and use information and services to make decisions about health” (WHO, 1998). This concept was first introduced in the early 1970s. Previous studies on health literacy showed that inadequate health literacy has been linked to poor health knowledge, a lack of knowledge about medical treatment, a lack of understanding and use of protective services, more hospitalizations and mortality, and a higher prevalence of chronic illnesses (Wu et al., 2013; Murray, et al., 2009; Peterson et al., 2011; Baker et al., 1998; Wangdahl et al., 2018; Andrus, & Roth, 2002; de Melo Ghisi et al., 2018). Notably, several studies have suggested that migrants, the elderly, illiterates, and persons with little income have inadequate health literacy, leaving the majority of people in these groups at risk of poor health (Baker et al., 1998a; Baker et al., 2007b). People with low health literacy may have problems with understanding disease-management information, including as reading appointment papers and pharmaceutical labels, interpreting spoken information from healthcare practitioners, and interpreting instructional resources (Schillinger et al., 2002; Mayeaux et al., 1996). Furthermore, Cajita et al. (2016) made a contribution to this topic with their review study on health literacy and heart failure. They mentioned that low health literacy could be an impediment to efficient self-health management, especially for chronic disorders including heart failure, which necessitate more self-care routines.

Various adult chronic illnesses, including that of cardiovascular disease, diabetes, and some various cancers, were found to be related to health risk factors such as smoking, obesity, lack of physical activity, and nutrition (McGinnis and Foege, 1993). Health behaviors, such as tobacco use, body mass index (BMI), daily activity, therefore, are strong determinants of health outcomes. Many chronic illnesses are caused by numerous risk behaviors, according to the Centers for Disease Control and Prevention

(CDC), including smoking use as well as secondhand smoke exposure, unhealthy diets, insufficient physical activity, and excessive alcohol consumption (CDC, 2021). Recent studies have also shown their significant effect on the development of chronic diseases (DSG, & Nyamdorj, 2008; Haire-Joshu et al., 1999; Messner, & Bernhard, 2014; Viridis et al., 2010; Zalesin et al., 2008). Therefore, determining the impact of BMI, tobacco use, and daily activity on chronic diseases would help researchers to identify the underlying reasons.

It is obvious that providing opportunities, such as health insurance or free access to health services, are vital steps to protect and improve health and therefore create healthy communities. Shelly et al. (2007) in their study mentioned that people who do not have health insurance have lower health status than those who have. Many studies have also found that a lack of health insurance is a primary cause of lower access to healthcare, less physician visits, a greater probability of not getting medical assistance for significant health problems, and a reduced utilization of recommended preventive care (Cheng et al., 2015; Ruthig et al., 2009).

Age, gender, marital status, and socioeconomic characteristics were also examined by many studies as factors relevant to chronic illnesses. Kulminski et al. (2006) in their study revealed that many diseases of adults appear at older ages, Van et al. (2006) showed that males are more likely to develop certain type of diseases compared to females. Additionally, due to the fact that marital status might have a major effect on one's lifestyle, married and single persons may have varied health behaviors (Cutler et al., 2008).

It is well known that education has an important role on one's health status and it has been shown that males or females who are lower educated are more likely to develop chronic diseases (Lowry et al., 1996). Education, according to several studies, contributes to the acquisition of abilities for building social, psychological, and economic advantages (Antonovsky, 1967; Robards et al., 2012). Winkleby et al (1992) made an important contribution to this topic with their study focusing on the effect of education, income and profession on health. Accordingly, they have proposed the idea that higher levels of education contribute to improved healthier lifestyles. Notably also, employment status, another major factor affecting health status, was noted as a parameter of obtaining income and improving living standards (Dray-Spira et al., 2003). It has been observed that having a higher socioeconomic status contributes to improved health outcomes, since it allows access to needed health services (Brunner, and Marmot, 1999; Liberatos et al., 1988). To the end, in assessing the health of the population, many socioeconomic and demographic parameters must be taken into account.

According to the UNHCR (2021), approximately 6.6 million Syrians have been reported as refugees as a result of the civil conflict in Syria. Since 2011, Turkey has contributed a lot to protecting the lives of millions of registered Syrians who have been forced to flee their country. Since the lack of access to a routine health service caused by war-related forced migration, the quality of life, living conditions, or health states of refugees may worsen and extensive research, therefore, may be needed to improve their quality of life or provide health services they demand. In this framework, an extensive survey was performed in 2018 in collaboration with the World Health Organization to identify and evaluate the living standards, healthcare needs and overall health of refugees residing in Turkey (Mipatrini, 2019).

Based on the literature findings, conducting a scientific study related to the health status of Syrian refugees will be helpful, since little information is known. The data including demographics, war-related conditions, socioeconomic status (SES), healthcare utilization, health-risk behaviors, and health literacy variables were included from this comprehensive survey for the analyses to assess the health status (i.e., cardiac disease, diabetes, and hypertension) of Syrian refugees in Turkey living outside of refugee camps.

3.2 Data and Methodology

3.2.1 Data and Questionnaire

The data related to the health status of Syrian refugees who fled to Turkey after the conflict were obtained from a survey which was conducted to collect information about refugees' living conditions and health status in 2018 in collaboration with the World Health Organization (WHO) Country Office in Turkey (Mipatrini, 2019). The primary aim of this extensive study conducted in collaboration with the WHO was to find out and understand more about the health status of Syrian refugees who were not living in camps. The report included information on demographics, socioeconomic factors, self-reported perceived health including chronic illnesses and mental health conditions, factors leading to chronic illnesses, use of healthcare services, satisfaction with healthcare services, health literacy of refugees, maternal and child health and access to healthcare, health status of children, the existence of acute conditions among children under five years old, vaccination rates among children, and the availability and use of prenatal and postnatal care by respondents (Mipatrini et al., 2019). The survey was conducted utilizing an Arabic survey instrument and face-to-face interviews with the respondents by trained data collectors to obtain the data. Computer-assisted personal interviewing was used to collect survey responses. All of

the field teams used survey materials that had been translated into Arabic, English, and Turkish (Mipatrini et al., 2019). This extensive survey led to the data being collected from more than 10,000 Syrian refugee respondents. However, our study included 7202 Syrian refugees over the age of 15 residing in 15 Turkish regions from 4068 households.

Closed-ended (yes/no) self-reported questions were used to determine the prevalence of chronic illnesses, such as cardiac disease, diabetes, and hypertension. The followings were the questions to identify the presence of chronic diseases:

- Do you have any chronic disease/discomfort? (Cardiac Disease)
- Do you have any chronic disease/discomfort? (Diabetes)
- Do you have any chronic disease/discomfort? (Hypertension)

Additionally, the following explanatory variables were included in the analyses to investigate the effects of them on chronic diseases: (a) demographics, such as age of the respondents, gender, marital status (married, single, separated/divorced/widowed), pre-migration residency (Aleppo, other regions), (b) war-related conditions, such as the number of family members who killed during the conflict, damaged houses in Syria (completely damaged, very damaged, less damaged, I do not know, and undamaged), years spent in Turkey following migration, (c) socioeconomic status (education (illiterate, literate but no formal schooling, primary/secondary school, high school, university/post graduates), pre-migration income, pre-migration employment status (employed, unemployed), (d) health-risk behaviors including tobacco use (current tobacco user, not current tobacco user but past user, not past and current tobacco user), the Body Mass Index (BMI) (underweight, healthy weight, overweight, obese) which is calculated manually using the height and weight of the respondents, daily activity

(minutes), (e) healthcare services use (having health insurance, healthcare use), and (f) health literacy of the respondents. “The Eastern-Middle Eastern Adult Health Literacy” (EMAHL13) screening instrument, developed to assess the health literacy in the Eastern and Middle Eastern areas, was used to assess the health literacy of refugees (Nair et al., 2016). Nine of 13 items from the EMAHL13 screening test were combined to obtain health literacy scores using the standard response scale (“never,” “rarely,” “sometimes,” “most times,” or “always”).

3.2.2 Methodology

Categorical and dichotomous variables were tested using chi-square tests. Differences in continuous explanatory variables (i.e., age, the number of family members who killed during the conflict, years spent in Turkey following migration, pre-migration income, Body Mass Index, health literacy) and chronic diseases (cardiac disease, diabetes, hypertension) were analyzed using t-test. On the other hand, the Wilcoxon test was used to examine differences due to the skewed distribution of scores for some of the continuous variables.

In recent years, logistic regression models have been widely applied in biology, health, economics, agriculture, and transportation (Aktaş, 2009). The logistic regression, which helps to ensure the identification of risk factors as probability, is a method for examining the relationship between outcome variables and independent variables in binary or multiple stages (Korkmaz et al., 2012). To analyze the possible predictors related to chronic diseases, logistic regression modeling, a technique commonly used to estimate the risk of occurrence of an event as any value between 0 and 1, was utilized separately for each outcome variable.

If there is only one predictor denoted by the vector $\mathbf{x}$, $\Pr(Y = 1|\mathbf{x}) = \pi(\mathbf{x})$ represents the conditional probability that the event is present. The logit of the binary logistic regression model can be expressed as below (Hosmer and Lemeshow, 2013):

$$g(\mathbf{x}) = \ln \left(\frac{\pi(\mathbf{x})}{1 - \pi(\mathbf{x})} \right) = \beta_0 + \beta_1 x_1 \quad (3.1)$$

where for the binary logistic regression model,

$$\pi(\mathbf{x}) = \frac{e^{\beta_0 + \beta_1 x_1}}{1 + e^{\beta_0 + \beta_1 x_1}} \quad (3.2)$$

Binary logistic regression model with multiple independent variables (multiple logistic regression) aims to investigate the relationship between one dichotomous, i.e., yes/no, or present/absent, and two or more predictors. Let the series of j independent variables represented by the vector $\mathbf{x}' = (x_1, x_2, x_3, \dots, x_j)$, and $\Pr(Y = 1|\mathbf{x}) = \pi(\mathbf{x})$ denotes the conditional probability that the event is present. If there are more than one predictor in the model, then multiple logistic regression equation model is as below (Hosmer and Lemeshow, 2013):

For j explanatory predictors:

$$g(\mathbf{x}) = \ln \left(\frac{\pi(\mathbf{x})}{1 - \pi(\mathbf{x})} \right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \dots + \beta_j x_j \quad (3.3)$$

where for the multiple logistic regression model,

$$\pi(\mathbf{x}) = \frac{e^{g(\mathbf{x})}}{1 + e^{g(\mathbf{x})}} \quad (3.4)$$

The findings of the multiple logistic regression analyses were provided in the form of coefficients and odds ratios (ORs) with 95% confidence intervals. The odds of the outcome event occurring divided by the probability of the event not occurring is how the odds of an occurrence are determined. When the value of a continuous variable is

increased by one unit, the odds ratio shows if the probabilities of the outcome increase (OR greater than 1) or decrease (OR less than 1) (Hosmer and Lemeshow, 1989). For categorical variables, the odds ratios denote the probability of outcome variables among different levels of categorical variables. IBM SPSS Statistics version 21.0 was used for all statistical analyses, and the hypothesis testing was based on 0.05 significance level.

3.3 Results and Discussion

3.3.1 Descriptive Statistics Results

A total of 7202 Syrian refugees from 4068 households are included, and the data statistics for all of the explanatory and outcome variables utilized in this study are summarized in Table 8. The average age of the respondents was 31.5, with 47.8% of the 7202 respondents were female and 52.2% were male. With a rate of 77%, married people comprise a significant group of participants.

Following migration, the average number of years spent in Turkey was 3.47. Before arriving in Turkey, the great majority of the respondents stated that they were living in Aleppo, Syria (60.1%), and the houses of many in Syria were completely destroyed (42.2%). The mean number of family members who died during the conflict was found to be 0.07. The average pre-migration income (in log) of Syrian refugees, one of the socioeconomic factors, was 8.47. As can be seen in Table 8, the highest frequencies of the respondents' educational level and pre-migration employment status were found to be primary/secondary school graduates (58.4%), and unemployed (63.0%), respectively. While the majority of the people in the study were not smokers in the past or present (81.9%), 13.4% of them were current tobacco users.

Table 8: Descriptive Statistics of Sample Population

Explanatory Variables:	N	%	Mean	Std.dev.
Demographic Factors:				
Age	7202		31.5	10.978
Gender	7202			
female		47.8		0.500
male		52.2	0.52	
Marital Status	7202			
married		77.0		
single		17.5	0.41	0.769
separated/divorced/widowed		5.5		
Pre-migration residency	6964			
Aleppo		60.1	0.38	0.485
Other		36.6		
War-related conditions:				
Damage to the house in Syria	6964			
completely destroyed		42.2		
very damaged		16.0		
less damaged		8.6	1.33	1.397
I do not know		24.0		
undamaged		6.0		
Family member who died during the war	6964		0.07	0.370
Years in Turkey	6871		3.47	1.397
SES factors:				
Education	7202			
illiterate		21.9		
literate but no formal schooling		9.0		
primary/secondary school		58.4	1.60	.994
high school		8.2		
university/post grad.		2.4		
Income in Syria (in log)	6146		8.47	1.962
Working status in Syria	7188			
working		36.8	0.37	0.482
not working		63.0		
Health Risk Behaviors:				
Tobacco use	6964			
current tobacco user		13.4		
not current tobacco user but past user		1.4	1.71	0.695
not past and current tobacco user		81.9		
BMI	6794			
healthy weight		58.2		
underweight		2.7	2.20	1.044
overweight		28.4		
obese		5.1		
Daily activity	6964		16.85	9.329

Health Services Use:				
Health insurance	6964			
yes		5.5	0.06	0.232
no		91.2		
Health-care services use	6964			
yes		65.1	0.67	0.469
no		31.6		
Health Literacy	6964		18.12	9.591

Although most of the participants (58.2%) had healthy weight, 2.7% were underweight, 28.4% were overweight, and 5.1% of whom were obese. Moreover, the average daily activity among refugees was found to be 16.85 minutes.

Despite the fact that Syrian refugees accessed health services at a high rate (65.1%), the great majority of them did not have health insurance (91.2%). In addition, refugees had a poor level of health literacy, with an average of 18.12.

3.3.2 Empirical Results of Risk Factors for Chronic Diseases

The multiple logistic regression estimates for the relationships between demographics, war-related conditions, socioeconomic status, health-risk behaviors, use of healthcare services, health literacy, and self-reported chronic diseases are presented in Tables 9, 10, and 11. The coefficient estimates (β), odds ratios (ORs), and confidence intervals (95%) for each model are given in each of these tables.

We found positive and significant relationship between age and chronic diseases of the respondents as shown in Tables 9, 10, and 11. Older respondents are more likely to experience chronic diseases (OR=1.083, CI=1.065 to 1.102), diabetes (OR=1.089, CI=1.070 to 1.107), and hypertension (OR=1.072, CI=1.057 to 1.087) than younger respondents.

Table 9: Multiple Logistic Regression Results of Cardiac Disease

Dependent variable (Cardiac disease ^a)	β	SE	Prob.	OR (CI 95%)
Demographic Factors:				
Age	.080***	.009	.000	1.083 (1.065-1.102)
Gender ^b				
female	.231	.333	.488	1.260 (0.656-2.420)
Marital Status ^c				
married	-.798*	.393	.042	0.450 (0.209-0.972)
seperated/divorced/widowed	-.460	.518	.375	0.631 (0.229-1.743)
Pre-migration residency ^d				
Aleppo	-.098	.230	.670	0.907 (0.578-1.422)
War-related conditions:				
Number of family members died during war	.229	.175	.191	1.257 (0.892-1.773)
Damage to house in Syria ^e				
completely destroyed	-.075	.501	.880	0.927 (0.348-2.475)
very damaged	.285	.518	.582	1.330 (0.482-3.674)
less damaged	.548	.540	.310	1.729 (0.600-4.982)
I don't know	.282	.512	.582	1.326 (0.486-3.617)
Years spent in Turkey	.071	.079	.369	1.073 (0.920-1.252)
Socio-economic status:				
Education ^f				
illiterate	-.055	.664	.934	0.946 (0.258-3.478)
literate	-.057	.761	.941	0.945 (0.213-4.200)
primary/secondary school	-.326	.645	.614	0.722 (0.204-2.556)
high school	-.232	.728	.749	0.793 (0.190-3.299)
Pre-migration income (in log)	.074	.063	.243	1.076 (0.951-1.218)
Pre-migration working status ^g				
not working	-.304	.306	.321	0.738 (0.405-1.345)
Health risk behaviors:				
Tobacco use ^h				
current user	.757**	.246	.002	2.132 (1.316-3.455)
not current user but past user	.045	.644	.944	1.046 (0.296-3.699)
BMI ⁱ				
obese	1.217***	.322	.000	3.378 (1.799-6.345)
overweight	.581*	.235	.013	1.788 (1.129-2.833)
underweight	.397	.755	.600	1.487 (0.338-6.534)
Daily activity (minutes)	-.002	.012	.872	0.998 (0.974-1.022)
Health services:				
Health insurance ^j				
No	-.335	.395	.396	0.715 (0.330-1.551)

Healthcare use ^k				
no	-.976**	.297	.001	0.377 (0.211-0.674)
Health literacy	-.028	.015	.052	0.972 (0.945-1.000)
Pseudo R-Square	.203			
Model Fit	217.20			
Note: Reference categories are (a)no; (b)male; (c) single; (d) other; (e) undamaged; (f) university/postgraduate; (g) working; (h) not past and current tobacco user; (i) healthy weight; (j) yes; (k) yes. *** p<0.001; ** p<0.01; and p<0.05.				

Table 10: Multiple Logistic Regression Results of Diabetes

Dependent variable (Diabetes ^a)	β	SE	Prob.	OR (CI 95%)
Demographic Factors:				
Age	.085***	.009	.000	1.089 (1.070-1.107)
Gender ^b				
female	.129	.320	.688	1.138 (0.607-2.132)
Marital Status ^c				
married	-1.298***	.345	.000	0.273 (0.139-0.537)
Seperated/divorc./widowed	-1.010**	.478	.035	0.364 (0.143-0.930)
Pre-migration residency ^d				
Aleppo	-.110	.222	.622	0.896 (0.580-1.386)
War-related conditions:				
Number of family members died during war	.357*		.028	1.428 (1.039-1.964)
Damage to house in Syria ^e				
completely destroyed	-.182	.465	.695	0.833 (0.335-2.072)
very damaged	.519	.474	.273	1.680 (0.664-4.251)
less damaged	-.187	.548	.733	0.829 (0.283-2.429)
i don't know	-.156	.493	.752	0.856 (0.325-2.249)
Years in Turkey	.041	.077	.592	1.042 (0.896-1.212)
Socio-economic status:				
Education ^f				
illiterate	-.146	.674	.829	0.864 (0.231-3.240)
literate	-.763	.891	.392	0.466 (0.081-2.674)
primary/secondary school	-.101	.650	.877	0.904 (0.253-3.232)
high school	.302	.703	.668	1.352 (0.341-5.357)
Pre-migration income (in log)	.135*	.063	.032	1.144 (1.012-1.294)
Pre-migration working status ^g				
not working	-.159	.294	.589	0.853 (0.480-1.517)
Health risk behaviors:				
Tobacco use ^h				
current user	.228	.271	.400	1.256 (0.738-2.138)
not current user but past user	1.072**	.449	.017	2.921 (1.212-7.040)

BMI ⁱ				
obese	1.349***	.313	.000	3.855 (2.088-7.117)
overweight	.558*	.232	.016	1.747 (1.108-2.754)
underweight	.242	.761	.750	1.274 (0.287-5.660)
Daily activity (minutes)	-.024*	.012	.044	0.976 (0.953-0.999)
Health services:				
Health insurance ^j				
no	1.281*	.625	.040	3.600 (1.057-12.26)
Healthcare use ^k				
No	-.977**	.298	.001	0.377 (0.210-0.675)
Health literacy	-.034*	.014	.014	0.966 (0.940-0.993)
Pseudo R-Square	.221			
Model Fit	244.228			

Note: Reference categories are (a)no; (b)male; (c) single; (d) other; (e) undamaged; (f) university/postgraduate; (g) working; (h) not past and current tobacco user; (i) healthy weight; (j) yes; (k) yes. *** p<0.001; ** p<0.01; and p<0.05.

Table 11: Multiple Logistic Regression Results of Hypertension

Dependent variable (Hypertension ^a)	β	SE	Prob.	OR (CI 95%)
Demographic Factors:				
Age	.069***	.000	.000	1.072 (1.057-1.087)
Gender ^b				
female	.600*	.259	.021	1.822 (1.096-3.029)
Marital Status ^c				
married	-.611*	.292	.037	0.543 (0.306-0.963)
	-.658	.414	.112	0.518 (0.230-1.165)
Seperated/divor./widowed				
Pre-migration residency ^d				
Aleppo	-.073	.180	.684	0.929 (0.653-1.323)
War-related conditions:				
Number of family members died during war	.391**	.118	.001	1.479 (1.173-1.865)
Damage to house in Syria ^e				
completely destroyed	.101	.394	.797	1.106 (0.512-2.393)
very damaged	.592	.404	.143	1.808 (0.819-3.994)
less damaged	.336	.443	.448	1.400 (0.587-3.338)
i don't know	.190	.412	.645	1.209 (0.539-2.709)
Years in Turkey	.029	.060	.624	1.030 (0.915-1.159)

Socio-economic status:				
Education ^f				
illiterate	-.195	.517	.706	0.823 (0.298-2.267)
literate	-.855	.654	.191	0.425 (0.118-1.532)
primary/secondary school	-.261	.497	.599	0.770 (0.291-2.039)
high school	-.037	.549	.946	0.964 (0.329-2.825)
Pre-migration income (in log)	.079	.049	.102	1.083 (0.984-1.191)
Pre-migration working status ^g				
not working	-.107	.251	.671	0.899 (0.549-1.471)
Health risk behaviors:				
Tobacco use ^h				
current user	.370	.215	.086	1.447 (0.949-2.206)
not current user but past user	.680	.440	.122	1.974 (0.834-4.674)
BMI ⁱ				
obese	1.240***	.247	.000	3.456 (2.132-5.604)
overweight	.539**	.183	.003	1.714 (1.197-2.455)
underweight	.933*	.453	.039	2.543 (1.047-6.180)
Daily activity (minutes)	.001	.010	.925	1.001 (0.982-1.020)
Health services:				
Health insurance ^j				
No	-.226	.309	.464	0.798 (0.435-1.462)
Healthcare use ^k				
No	-.784***	.222	.000	0.456 (0.295-.0705)
Health literacy	-.024*	.010	.023	0.977 (0.957-0.997)
Pseudo R-Square	0.153			
Model Fit	242.02			

Note: Reference categories are (a)no; (b)male; (c) single; (d) other; (e) undamaged; (f) university/postgraduate; (g) working; (h) not past and current tobacco user; (i) healthy weight; (j) yes; (k) yes. *** p<0.001; ** p<0.01; and p<0.05.

We determined that age is a substantial risk factor for all of the chronic illnesses included in this study. This finding is consistent with results in the literature revealing an increased prevalence of chronic diseases in the older adult population (Carnethon et al., 2008; McEniery et al., 2007; Wei, 1992). While gender was found to be related with hypertension (OR=1.260, CI=0.656 to 2.420), it was not associated with cardiac disease (OR=1.138, CI=0.607 to 2.132) or diabetes (OR=1.138, CI=0.607 to 2.132). Accordingly, female respondents are more likely than male respondents to have been

diagnosed with hypertension. (OR=1.82, 95% CI= 1.096 to 3.029). As can be seen in Table 11, we found that female participants are more likely than male participants to have been diagnosed with hypertension by a factor of 1.8. However, this is in contrast to the findings of previous studies, which show that males do have a rather larger likelihood of suffering hypertension with age than women (Reckelhoff, 2001). Moreover, since women and children are more vulnerable in situations, such as war, conflict, or forced migration, our findings may have revealed more damaging effects of these conditions on females' health. Marital status is seen to be a statistically significant factor for all three chronic diseases. For married refugees, the probabilities of being diagnosed with cardiac disease (CI=0.209 to 0.972), diabetes (CI=0.139 to 0.537), or hypertension (CI=0.306 to 0.963) fall by 0.450, 0.273, and 0.543, respectively. Similarly, separated, divorced, or widowed refugees are 0.364 times less likely than never-married respondents to have been diagnosed with diabetes. As compared to single individuals, married refugees were found to be less likely to have been diagnosed with chronic diseases, such as cardiac disease, diabetes, or hypertension. In recent years, researchers, interested in the relationships between marital status and other health outcomes, have found that marital status is associated with health-related outcomes, including mortality (Manfredini et al., 2017). Accordingly, being married has been related to a lower risk of developing cardiac disease and a better overall health status (Manfredini et al., 2017). Moreover, earlier studies have also shown that married people had less prevalence of chronic diseases than unmarried people (Johnson et al., 2000). The factors for lower diabetes incidence among married or nonmarried couples are believed to be the positive influences of partnership on the individual's health-related behaviors and socioeconomic status (Haines et al., 2018; Johnson et al., 2000). Hence, our results are consistent with

previous studies on the association between marital status and individuals' diabetes status. It has been shown that hypertension is a leading risk factor for morbidity, mortality, and cardiovascular diseases (Greenland et al., 2003). Many studies have examined the association between hypertension and marital status (Kaplan, and Kronick, 2006; Wang, 2005). As marital status might influence one's lifestyle, married and unmarried persons may well have differing health-protection behaviors (Cutler et al., 2008).

While hypertension was shown to be more likely to have been diagnosed by respondents whose family members killed during the war, it was not determined to be a risk factor for cardiac disorder (OR=1.257, 95% CI= 0.892 to 1.773) or diabetes (OR=1.042, 95% CI= 0.896 to 1.212). Accordingly, refugees who lost a family member during the conflict are 1.47 times more likely to be diagnosed with hypertension. (95% CI= 0.892 to 1.773). Therefore, we observed higher odds of being diagnosed with hypertension among refugees who had a family member died during the conflict. A study on health status among Syrians conducted by Balcilar et al. (2021) found that both female and male refugees who had lost a family member in the conflict had a greater probability of experiencing hypertension.

Based on Table 10, while the refugees' pre-migration income was shown to be a significant predictor of the risk of developing diabetes (OR=1.114, 95 percent CI= 1.012 to 1.294), it had no effect on the incidence of cardiac disease or hypertension. The findings imply that it is more likely to be diagnosed with diabetes as one's income increases. The risk factors for diabetes have been found to be related to obesity, lifestyles, diet, race, recent immigration, and income (Hu, 2004; Pomerleau et al., 1997). Among those, obesity has been found to be more common among those with

greater socioeconomic status in developing economies (Mendez et al., 2004; Caballero, 2001; Sobal, and Stunkard, 1989). Even though socioeconomic status may have a positive impact on a person's health, it's also very likely that it may have the opposite effect, especially as it relates to obesity, lifestyle, and diet. Consequently, the impact of income on the development of diabetes cannot be ignored.

Tobacco use is also a major risk factor for heart disease and diabetes. Accordingly, tobacco users had a 2.13 (CI=1.316 to 3.455) times higher probability of being diagnosed with cardiac disease. Moreover, past tobacco users have a 2.92 times higher probability of being diagnosed with diabetes than those who have never used tobacco (CI=1.212 to 7.040). Notably also, BMI is a critical indicator for all chronic illnesses, as shown in Tables 9, 10, and 11. Accordingly, obese and overweight people are more prone to develop heart disease, diabetes, and hypertension. In addition, people who are underweight are 2.5 times more likely than those who are of healthy weight to be diagnosed with hypertension (CI=1.047 to 6.180). Daily activity, one of the health-risk factors, was found to be significantly related with diabetes. According to the findings in Table 10, when daily activity increases, the probabilities of being diagnosed with diabetes decrease by a factor of 0.976 (CI=0.953 to 0.999). Tobacco use has been previously linked to the development of various illnesses, particularly chronic disorders (Al-Delaimy et al., 2001; Al-Ibrahim, and Gross, 1990). In brief, the significant relation between tobacco-use and the development of cardiac disease is strongly known, and our results are consistent with the evidence in the literature (Krauss et al., 1998). Additionally, the odds of being diagnosed with cardiac disease, diabetes, and hypertension were found to be considerably high among obese and overweight refugees compared to participants of healthy weight. Since previous studies also found both obesity and overweight could lead to the development of the

chronic diseases analyzed here, our findings are consistent with what has been known so far (Gatimu et al., 2016; Salahudeen et al., 2004). The findings also reveal that the daily activity helps to decrease the odds of being diagnosed with diabetes. It is broadly accepted that physical activity improves glycemic control and lowers mortality risk (Hamasaki, 2016). Therefore, the results imply that the majority of chronic diseases may be avoided by addressing health risk behaviors such as tobacco use, poor nutrition, obesity, and lack of physical activity.

The use of healthcare services, which has been demonstrated to be negatively associated with cardiac disease (OR=0.377, 95% CI= 0.211 to 0.674), diabetes (OR=0.377, 95% CI= 0.210 to 0.675), and hypertension (OR=0.456, 95% CI= 0.295 to 0.705), is another predictor that has been proved to be significant in all analyzed chronic diseases. Accordingly, the odds of being diagnosed with all these investigated chronic diseases are less likely for those who do not use health services. On the other hand, only diabetes was shown to be linked to health insurance. The odds of being diagnosed with diabetes are 3.6 times higher for participants who have no health insurance than those who have it (95% CI= 1.057 to 12.26). Therefore, our findings on the relationship between health insurance and the incidence of chronic diseases revealed that immigrants without health insurance had a greater probability of being diagnosed with diabetes. It is well known that a lack of health insurance may result in a deterioration of health by limiting access to fundamental healthcare services (Franks et al., 1993). As can be seen in Table 8, among Syrian refugees in Turkey, the frequency of using health services is rather high, although the frequency of having health insurance is quite low. This is because of having been provided free access to health services and treatment by Turkey, although they reported possessing no legal health insurance (Assi et al., 2019).

The health literacy levels of Syrian refugees are clearly connected with diabetes and hypertension, as evidenced by the findings in Tables 10 and 11. According to the findings, refugees with greater health literacy are less prone to have been diagnosed with diabetes or hypertension than refugees with lower health literacy. Correspondingly, the probability of being diagnosed with diabetes falls by a factor of 0.966 (95% CI= 0.940 to 0.993) and the odds of being diagnosed with hypertension reduce by a factor of 0.977 (95% CI= 0.957 to 0.997) as health literacy rises. Therefore, health literacy was shown to be strongly related with diagnoses of diabetes and hypertension, but not cardiac illness, in the current study. Previous studies also reported that poor health literacy has been linked to increase in chronic diseases (Bailey et al., 2014; Pandit et al., 2009). As a result, the link between low health literacy and the occurrence of diabetes or hypertension revealed here is consistent with the previous findings (Bailey et al., 2014; Pandit et al., 2009). However, we found no effect of pre-migration residence, the number of years spent in Turkey, damage to houses during war, the employment status, or education on any of the chronic illnesses studied.

According to previous studies, refugees are highly susceptible to NCDs (Ackerman, L. K. 1997 Naja et al., 2019). A recent study on the incidence of NCDs among Syrian refugees living out of camps in Jordan stated that 21.8% of adults had at least one NCD, including diabetes and hypertension (Rehr et al., 2018). Although the specific cause of this prevalence of NCD among refugees is unknown, it is hypothesized that the stress caused by migration related factors, changes in lifestyle that alter diet and physical activity may increase the susceptibility to various chronic diseases (Naja et al., 2019). Because of the high prevalence of NCDs among Syrians, host country health authorities should provide ongoing health care services, including awareness of

protective services for NCD, diagnosis, and therapy for this refugee population (Akik et al., 2019).

3.4 Conclusion

3.4.1 Concluding Remarks

Syria's civil conflict, which began in 2011, led millions of Syrians to flee to neighboring countries, mainly Turkey. As Turkey has hosted about 3.74 million Syrian refugees, many surveys on the effects of this huge influx have been conducted, with a particular focus on economic, cultural, health-related, and socioeconomic issues. The health status of refugees must also be studied more, as the conditions in which they live may pose potential health risks.

In this present study, a number of predictors including demographics, socioeconomic status, risk factors of health, war related conditions, health-care use, and health literacy, were analyzed to find out their relation to chronic diseases (i.e., cardiac disease, diabetes, and hypertension) of Syrian refugees living in Turkey following migration. In parallel to the previous studies on chronic diseases in both any population and the refugee population, age, marital status, pre-migration income, tobacco use, BMI, daily activity, health insurance, use of healthcare services, and health literacy were shown to be strongly linked with the development of one or more chronic illnesses among Syrian refugees.

To our knowledge, this is the most comprehensive refugee-based study that investigates the potential predictors of chronic illnesses among Syrian refugees residing in Turkey, based on a survey conducted with the WHO country office in Turkey.

3.4.2 Policy Implications

The findings of the analyses might be interpreted in a number of ways. Since chronic diseases tend to develop over time, it may be difficult to link the reported chronic diseases by Syrian refugees to the onset of the civil war in Syria, the conditions that followed the conflict, or immigration. This might mean that many of the chronic diseases facing Syrian refugees are already the result of Syrians' living conditions, which began at birth. From this point, it appears to be a useful place to start for detecting patients with chronic illnesses among Syrian refugees in Turkey, as evidenced by the findings of this survey. Additionally, it is important to provide some preventive or treatment programs. For example, we found that the high Body Mass Index and tobacco use are significant predictors of the development of chronic diseases among Syrian refugees, so that, preventive and treatment methods might focus on educational activities aiming to teach about the negative effects of both smoking and unhealthy diet. Higher health literacy is well recognized as a risk reduction factor in the development of various disease states, including chronic illnesses, thus these education programs should also include certain trainings aiming to improve health literacy of refugees. Therefore, an effective educational activity should be developed by policy makers for refugee population, and health care practitioners should be sensitive to refugees' health literacy deficits and language barriers. Furthermore, one of the most critical parts of Turkey's support on hosting Syrian refugees is its commitment to providing free health care to this population. This might be a considerable benefit in terms of lowering the prevalence of chronic diseases and increasing awareness of the development of chronic diseases as a result of unhealthy habits among Syrian refugees.

3.4.3 Suggestions for Further Studies

The results of this study should be viewed in light of a few limitations. First, Syrian refugees had a high prevalence of non-communicable diseases, regarding pre-conflict predictions of the rate of noncommunicable diseases in Syria. (NCDs). Therefore, it might be useful to include information about whether they had this disease before or after the conflict in further studies. Secondly, since tobacco consumption can be a trigger for many diseases, data related to how many years they have smoked should also be taken into consideration.

Chapter 4

AWARENESS OF PROTECTIVE HEALTH SERVICES AMONG FEMALE SYRIAN REFUGEES

4.1 Introduction

Refugees or asylum seekers may be deprived of access to a regular healthcare system as a result of massive migration triggered by forced migration. As a result, the quality of life for migrants may deteriorate, leading to unfavorable life situations and the risk of new diseases to fight both for refugees and host citizens. Notably also, female refugees, who are a more vulnerable group suffering from several healthcare issues, are at higher risk than other groups. These might also be valid for female Syrian refugees forced to migrate to the neighboring countries or overseas since 2011.

According to the United Nations High Commissioner for Refugees (UNHCR), there were 84 million people forcibly migrated globally, 48 million of whom were internally displaced and 26.6 million of whom were refugees (UNHCR, 2021). It has been revealed that refugees or asylum seekers have been facing with many health problems due to the forced immigration. Among these health problems, anemia, malaria, measles, physical violence and violence-related injuries, infections, sexual abuse, unwanted or risky pregnancies, sexually transmitted infections including HIV/AIDS, dental problems, depression, chronic diseases, anxiety, and sleep disorders are the general observed ones (Yavuz, 2015). Besides these health problems, low-rate use of protective health services among female refugees due to forced migration-related

conditions may also cause undiagnosed cases of cancer types that are only women-related, such as breast and cervical cancers (Erenoglu, 2020; Orhan and Gundogar, 2014; Bebis et al., 2012; Shah et al., 2008). This shows the importance of health care use among female refugees, since refugee women have more risks, depending on the case, for morbidity and mortality than males, and therefore, they require additional healthcare following migration (Erenoglu and Sozbir, 2020).

World Health Organization (WHO) indicated that cancer is among the top ten diseases that harm and even cause the death of millions of individuals all over the world. Breast and cervical cancers are two of the most prevalent diseases threatening women's health and their prevalence are considerably high in the population (Arbyn et al., 2020; Ramaswami et al., 2018). According to the most recent data, breast cancer, the most common disease among females compared to other cancer types, affected 2.3 million females worldwide in 2020, with 685,000 deaths. Additionally, cervical cancer, causing more than 300,000 women dying from the disease in 2018, was also shown to be the fourth most prevalent disease among women globally (Arbyn et al., 2020). In Syria, cervical cancer is in the top 10 prevalent cancer diseases among females between the ages of 15 and 44.

Cervical and breast cancers have been the subject of several techniques for screening and diagnosis, such as mammography and Pap smear tests which are the most commonly used techniques (Phaswana-Mafuya and Peltzer, 2018; Winters et al., 2017). The application of these techniques varies from one country to another, in such a way that while some nations do not recommend these methods to be used for patients of specific ages, others may claim that mammograms and/or Pap smears should be used for screening starting at younger ages (Nguyen et al., 2002). Moreover, several

scientific studies have confirmed the preventive role of these techniques in terms of early screening and diagnostic alternatives (Yip et al., 2018).

Many factors have been linked to the decision to use mammography or Pap smears for routine cancer screening in women, just as they have been with preventative health services (Barbosa et al., 2019; Anwar et al., 2018; Tavasoli et al., 2018). While the patient's decision influences the effectiveness of these strategies, awareness of preventive health services is also vital (Metwally et al., 2017; Otero-Sabogal et al., 2003). It has been shown that the awareness of health-protective services is crucial for early diagnosis and treatment of various types of cancer (Amuta et al., 2018). Despite the fact that the media programs and campaigns can raise awareness of women's health and diseases, the use of these activities is less common in some countries (Metwally et al., 2017; Otero-Sabogal et al., 2003).

In 2020, it was reported that 37.3 million people were living with HIV/AIDS globally. It has also been noted that a total of 19.3 million out of 37.3 million were women, and 240,000 women died from HIV-related causes (WHO, 2022). “The human immunodeficiency virus (HIV) targets the immune system and weakens people's defense against many infections and some types of cancer that people with healthy immune systems can fight off” (WHO, 2021). Vitale and Judy Ryde (2018) made an important contribution to the research with a study relative to the refugee women with HIV. They indicated that HIV not only damages and weakens the immune system, but it also has serious repercussions for people's physical and mental health.

Hankins et al (2002) reported that refugees were a high-risk population for developing HIV due to unfavorable pre-migration factors and, in many cases, traumatic travel.

Spiegel (2004) mentioned that the reasons for the prevalence of HIV among refugees may be the inadequacy of health treatments available to them, the abuse, and the violence they may face during their travel and in refugee camps. It is widely recognized that women are more vulnerable to HIV than males because of sociocultural and biological factors (Turmen, 2003). Moreover, violence against women, lack of education, and information, poverty, migration, and prejudice have all been identified as factors causing HIV infection in women (Turmen, 2003). Therefore, early diagnosis of STIs is vital for the health of refugee women, because migration-related factors such as tough living conditions, lack of access to healthcare services, poor health conditions, violence, sexual abuse, and low income may result in having more health problems than the host population (Yavuz, 2015; Council, 2005; Frantz, 2003).

There is no doubt that there are many factors affecting the awareness of protective health services. Among these factors, age, marital status, education, income, health literacy, lifestyle, access to healthcare, and parental cancer history have all been shown as considerations for the awareness of women for protective health services including cancer prevention and their decisions to utilize them (Tur-Sinai, & Shahrabani, 2020; Anwar et al., 2018; Lee et al., 2012; Ayinde et al., 2005). Low health literacy, a term that has become highly relevant to public health, may lead to a decline in use of preventative health services (Barbers et al., 2017) and health problems (Kilfoyle et al., 2016).

Since little is known about preventive health services in this refugee population, the purpose of this study was to examine the impact of female Syrian refugees' socioeconomic status (SES), healthcare usage, and health literacy on their awareness

of protective health services such as mammography, Pap smears screening, and HIV testing.

4.2 Data and Methodology

4.2.1 Data and Questionnaire

An extensive survey was administered in 2018 in coordination with the WHO Country Office in Turkey to determine the health status and living conditions of refugees (Mipatrini, 2019). The primary aim of this extensive survey conducted in collaboration with the WHO was to find out and understand more about the health status of Syrian refugees who are not living in camps. The report included information on demographics, socioeconomic factors, self-reported perceived health including chronic illnesses and mental health conditions, factors leading to chronic illnesses, use of healthcare services, satisfaction with healthcare services, health literacy of refugees, maternal and child health and access to healthcare, health status of children, the existence of acute conditions among children under five years old, vaccination rates among children, and the availability and use of prenatal and postnatal care by respondents (Mipatrini et al., 2019). The survey was conducted utilizing an Arabic survey instrument and face-to-face interviews with the respondents by trained data collectors to obtain the data. Computer-assisted personal interviewing was used to collect survey responses. All of the field teams used survey materials that had been translated into Arabic, English, and Turkish (Mipatrini et al., 2019). This extensive survey led to the data being collected from more than 10,000 Syrian refugee respondents. In our study, a total of 3442 female refugees, aged 15 and over, residing in the settlements outside of refugee camps were included using the data from the aforementioned survey.

In the study, the awareness of Pap smear screening, mammography screening, and HIV test were included as outcome variables. The outcome variables were measured by the questions as below:

- “Are you aware of Pap smear screening?”
- “Are you aware of mammography screening?”
- “Are you aware of HIV test?”

The answers to these closed-ended questions evaluated by asking respondents to answer “yes” or “no”, and the base category for each of the three response variables was identified as “no”.

Moreover, the followings were determined as the explanatory variables: (1) characteristics of the sample population, such as age, marital status (married, single), pre-migration residency (Aleppo or other regions), the number of years spent in Turkey following migration, and the number of pregnancies they had; (2) socioeconomic status, including education (illiterate, literate, primary/middle school, high school, or university/postgraduate), pre-migration income and post-migration income, and pre-migration employment status and post-migration employment status (employed or unemployed); (3) healthcare use, i.e., having health insurance and using health services; and (4) health literacy. For the categorical explanatory variables, base categories were organized as follows: (a) marital status: “single”, (b) pre-migration residency: “other”, (c) education: “illiterate”, (d) pre-migration and post-migration employment status: “unemployed”, (e) having health insurance: “no”, and (f) use of health services: “no”. Out of 13 questions from the Eastern-Middle Eastern Adult Health Literacy Screening instrument (EMAHL13), 9 of them were employed, and

scored on a 5-point Likert-type scale, such as “1=never,” “2= rarely,” “3=sometimes,” “4=most of the time,” and “5=always” to evaluate the health literacy of the female refugees (Nair et al, 2016).

4.2.2 Methodology

Categorical and dichotomous variables were tested using chi-square tests. Differences in continues explanatory variables (i.e., age, years in Turkey, number of pregnancies, pre-migration income, post-migration income, health literacy) and protective health services (pap-smear, mammograms screening, HIV testing) were analyzed using t-test. On the other hand, the Wilcoxon test was used to examine differences due to the skewed distribution of scores for some of the continuous variables.

To analyze the possible predictors related to awareness of protective health services, logistic regression modeling, a technique commonly used to estimate the risk of occurrence of an event as any value between 0 and 1, was utilized separately for each outcome variable. The logistic regression, which helps to ensure the identification of risk factors as probability, is a method for examining the relationship between outcome variables and independent variables in binary or multiple stages (Korkmaz et al., 2012).

If there is only one predictor denoted by the vector $\mathbf{x}$, and $\Pr(Y = 1|\mathbf{x}) = \pi(\mathbf{x})$ denotes the conditional probability that the event is present. The logit of the binary logistic regression model can be expressed as below (Hosmer and Lemeshow, 2013):

$$g(\mathbf{x}) = \ln \left(\frac{\pi(\mathbf{x})}{1 - \pi(\mathbf{x})} \right) = \beta_0 + \beta_1 x_1 \quad (4.1)$$

where for the binary logistic regression model,

$$\pi(\mathbf{x}) = \frac{e^{\beta_0 + \beta_1 x_1}}{1 + e^{\beta_0 + \beta_1 x_1}} \quad (4.2)$$

Binary logistic regression model with multiple independent variables (multiple logistic regression) aims to investigate the relationship between one dichotomous, i.e., yes/no, or present/absent, and two or more predictors. Let the series of j independent variables represented by the vector $\mathbf{x}' = (x_1, x_2, x_3, \dots, x_j)$, and $\Pr(Y = 1|\mathbf{x}) = \pi(\mathbf{x})$ denotes the conditional probability that the event is present. If there are more than one predictor in the model, then multiple logistic regression equation model is as below (Hosmer and Lemeshow, 2013):

For j explanatory predictors:

$$g(\mathbf{x}) = \ln \left(\frac{\pi(\mathbf{x})}{1 - \pi(\mathbf{x})} \right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \dots + \beta_j x_j \quad (4.3)$$

where for the multiple logistic regression model,

$$\pi(\mathbf{x}) = \frac{e^{g(\mathbf{x})}}{1 + e^{g(\mathbf{x})}}. \quad (4.4)$$

The results of the multiple logistic regression analyses were provided in the form of coefficients and odds ratios, determined with (ORs) with 95% confidence intervals. When the value of a continuous variable is increased by one unit, the odds ratio shows if the probabilities of the outcome increase (OR greater than 1) or decrease (OR less than 1) (Hosmer and Lemeshow, 1989). For categorical variables, the odds ratios denote the probability of having chronic diseases among different levels of categorical variables. IBM SPSS Statistics version 21.0 was used for all statistical analyses.

4.3 Results

4.3.1 Descriptive Statistics Results

Table 12 lists all the variables that were involved in this research, including descriptive statistics of the variables. The average age of the females in the study was 29.53 ± 9.24 , 19.7% of them were single, and 80.3% of them were married.

Table 12: Descriptive statistics of sample population

Explanatory Variables	(N)	%	Mean	Std. dev.
Characteristics of sample population:				
Age	3442		29.53	9.244
Marital Status	3442		.20	.398
married		80.3		
single		19.7		
Years in Turkey	3302		3.39	1.430
Pre-migration residency	3442		.36	.481
Aleppo		61.0		
Other		34.9		
Number of pregnancies	3301		2.57	2.231
Socio-economic status:				
Education	3442		2.46	1.005
illiterate		24.5		
literate		8.70		
primary/secondary school		57.6		
high school		7.10		
university/post graduate		2.20		
Pre-migration income (log)	3442		0.97	0.176
Post-migration income (log)	3442		0.96	0.194
Pre-migration employment status	3436		8.46	2.010
employed		3.20		
unemployed		96.6		
Post migration employment status	3436		6.86	0.996
employed		3.90		
unemployed		95.9		
Health-care use:				
Health insurance	3302		0.94	0.233
yes		5.50		
no		90.4		
Health services use	3302		0.30	0.458
yes		67.3		
no		28.7		
Health Literacy	3302		17.7	9.445
Response Variables:				
Awareness of pap-smear screening	3301		0.96	0.200
yes		4.0		
no		91.9		
Awareness of mammography screening	3301		0.95	0.210
yes		4.4		
no		91.5		
Awareness of HIV test	3302		0.95	0.220
yes		4.9		
no		91.1		

The majority of the respondents were Aleppo residents before migrating to Turkey with a rate of 61%. Following migration, the mean of years spent in the host country (Turkey) was found to be 3.39 ± 1.43 . The average number of pregnancies they had was 2.57. The highest proportion of the refugees was primary/secondary school graduates with a rate of 57.6%. Pre-migration and post-migration working status of the respondents were noted as unemployed at rates of 96.6% and 95.9%, respectively. While pre-migration income had a mean of 8.45 ± 2.01 , post-migration income had a mean of 6.86 ± 0.99 . Even though 90.4% of participants reported they had no health insurance, 67.3% revealed they had used health services. Furthermore, among the female refugees who participated in the research, the average score of health literacy was found to be 17.7.

4.3.2 Empirical Findings

Age is not a significant determinant of Pap smear (OR= 1.02, 95% CI= .998 to 1.043) or HIV test awareness (OR= 1.012, 95% CI= .991 to 1.033), but it does make a considerable contribution to mammography awareness (OR= 1.027, 95% CI= 1.006 to 1.048) according to the logistic regression analyses conducted for the odds of the indicators of protective health services awareness. Only HIV testing awareness among these refugees was shown to be positively linked with the number of pregnancies (OR= 1.089, 95% CI= 1.014 to 1.169) and the number of years spent in Turkey (OR= 1.175, 95% CI= 1.039 to 1.329) as shown in Table 15. The likelihood of HIV test awareness increases by factors of 1.09 and 1.17 for every one-unit increase in the number of pregnancies and years spent in Turkey, respectively.

The findings reveal that having a high school degree or a university/postgraduate degree is associated with a higher probability of being aware of mammography and HIV test.

Table 13: Multiple Logistic Regression Results of Pap-Smear Awareness

Dependent Variable (Pap-Smear ^h)	β	SE	Prob.	OR (CI 95%)
Demographics:				
Age	.020	.011	.076	1.020(0.998-1.043)
Marital Status ^a				
married	.307	.268	.252	1.360(0.804-2.300)
Number of pregnancies	-.086	.052	.097	0.918(0.829-1.016)
Years in Turkey	.120	.069	.080	1.127(0.986-1.290)
Pre-migration residency ^b				
Aleppo	-.107	.218	.624	0.899(0.586-1.378)
Socio-economic status:				
Education ^c				
university/post grad.	.773	.506	.126	2.167(0.805-5.837)
high school	-.127	.406	.754	0.880(0.397-1.952)
primary/secondary school	-.019	.253	.940	0.981(0.597-1.611)
literate	.154	.391	.694	1.166(0.542-2.509)
Pre-migration income (in log)	.211***	.060	.000	1.235(1.098-1.389)
Post-migration income (in log)	-.254*	.113	.025	0.776(0.621-0.969)
Pre-migration employment status ^d				
employed	.566	.522	.279	1.760(0.633-4.897)
Post-migration employment status ^e				
employed	-.740	.646	.253	0.477(0.134-1.695)
Health-care use:				
Health insurance ^f				
yes	1.137***	.272	.000	3.116(1.828-5.313)
Health services use ^g				
yes	.258	.230	.262	1.295(0.824-2.034)
Health Literacy	.044***	.010	.000	1.045(1.025-1.065)
Pseudo R-squared	0.081			
Model Fit	82.291			

Note: Reference categories are (a) single, (b) other, (c) illiterate, (d)- (e)unemployed, (f)-(g)-(h) no. *** p<0.001; ** p<0.01; and p<0.05.

Table 14: Multiple Logistic Regression Results of Mammography Awareness

Dependent Variable (Mammography ^h)	β	SE	Prob.	OR (CI 95%)
Demographics:				
Age	.027*	.010	.010	1.027(1.006-1.048)
Marital Status ^a				
married	.369	.263	.162	1.446(0.863-2.423)
Number of pregnancies	.000	.042	.996	1.000(0.921-1.085)
Years in Turkey	.015	.064	.814	1.015(0.896-1.151)
Pre-migration residency ^b				
Aleppo	.232	.208	.266	1.261(0.838-1.895)
Socio-economic status:				
Education ^c				
university/post grad.	1.442**	.490	.003	4.228(1.619-11.04)
high school	.749*	.356	.035	2.114(1.053-4.244)
primary/secondary school	.367	.245	.134	1.444(0.893-2.334)
literate	.001	.401	.999	1.001(0.456-2.195)
Pre-migration income (log)	.093	.057	.103	1.097(0.981-1.227)
Post-migration income (log)	-.244*	.104	.020	0.784(0.639-0.962)
Pre-migration employment status ^d	.503	.481	.295	1.654(0.645-4.243)
employed				
Post-migration employment status ^e	-.426	.573	.458	0.653(0.212-2.009)
employed				
Health-care use:				
Health insurance ^f				
yes	.958**	.278	.001	2.607(1.512-4.496)
Health services use ^g				
yes	.221	.210	.294	1.247(0.825-1.884)
Health Literacy	.006	.010	.530	1.006(0.987-1.025)
Pseudo R-squared	0.045			
Model Fit	49.710			

Note: Reference categories are (a) single, (b) other, (c) illiterate, (d)- (e) unemployed, (f)-(g)-(h) no.
 *** p<0.001; ** p<0.01; and p<0.05.

Table 15: Multiple Logistic Regression Results of HIV Testing

Dependent Variable (HIV testing ^h)	β	SE	Prob	OR (CI 95%)
Demographics:				
Age	.012	.011	.271	1.012(0.991-1.033)
Marital Status ^a				
married	.238	.256	.354	1.268(0.767-2.096)
Number of pregnancies	.085*	.036	.019	1.089(1.014-1.169)
Years in Turkey	.162*	.063	.010	1.175(1.039-1.329)
Pre-migration residency ^b				
Aleppo	-.116	.193	.547	0.890(0.610-1.300)
Socio-economic status:				
Education ^c				
university/post grad.	.976	.531	.066	2.655(0.937-7.521)
high school	.915**	.335	.006	2.498(1.294-4.820)
primary/secondary school	.272	.243	.263	1.313(0.815-2.116)
literate	-.236	.416	.569	0.789(0.350-1.783)
Pre-migration income (log)	-.033	.056	.563	0.968(0.867-1.081)
Pos-migration income (log)	.151	.103	.143	1.162(0.950-1.422)
Pre-migration employment status ^d				
employed	.606	.475	.202	1.833(0.723-4.646)
Post-migration employment status ^e				
employed	-.539	.569	.344	0.583(0.191-1.780)
Health-care use:				
Health insurance ^f				
yes	.037	.374	.922	1.037(0.498-2.159)
Health services use ^g				
yes	.754**	.241	.002	2.125(1.325-3.408)
Health Literacy	.004	.010	.684	1.004(0.985-1.023)
Pseudo R-squared	0.045			
Model Fit	49.910			

Note: Reference categories are (a) single, (b) other, (c) illiterate, (d)- (e) unemployed, (f)-(g)-(h) no.
 *** p<0.001; ** p<0.01; and p<0.05.

The odds of being aware of mammography were 2.11 and 4.22 times higher for those who had high school and university/post-graduate degrees than those who were illiterates, respectively.

Compared to illiterates, those who had high school degree had higher odds of being aware of HIV test (OR= 2.498, 95% CI= 1.294 to 4.820). However, no link was found between education and pap smear awareness. We observed that refugee women's pre-migration incomes are strongly linked to Pap smear screening awareness (OR= 1.235, 95% CI= 1.098 to 1.389), but post-migration incomes are negatively linked to Pap smear (OR= .776, 95% CI= .621 to .969) and mammography awareness (OR= .784, 95% CI= .639 to .962).

One can observe that having health insurance has a considerable impact on the awareness of Pap smear and mammography screenings. Compared to female refugees who had no health insurance, those who had health insurance had higher odds of being aware of Pap smear screening by a factor of 3.1 (95% CI= 1.828 to 5.313), and had higher odds of being aware of mammography screening by a factor of 2.6 (95% CI= 1.512 to 4.496), respectively. Moreover, compared to female refugees who did not use health services, those who used these services had higher odds of being aware of HIV test by a factor of 2.12 (95% CI= 1.325 to 3.408). As shown in Table 2, our findings show that health literacy level is strongly linked to the awareness of Pap smear screening. Compared to those who have lower health literacy, female refugees whose health literacy score is higher have higher odds of being aware of Pap smear screening by a factor of 1.05 for every one-unit increase in health literacy score (95% CI= 1.025 to 1.065). On the other hand, no association between health literacy, the awareness of mammography screening and the HIV test was found.

However, there was no evidence that pre-migration location, marital status, or pre-migration and post-migration employment status were linked to increased or decreased awareness of Pap smears, mammography, or HIV testing.

4.4 Discussion

The sample population's overall awareness of all protective health services was observed to be fairly low. These findings may suggest that these refugee women were also uninformed of the appropriate screening and diagnostic tests in their pre-migration lives. There are some previous studies that have similar results relative to the awareness of protective health services. Accordingly, earlier studies focusing on the employment of these protective screening tests in the Middle East showed that it was quite low compared to the prevalence in the United States and Europe (Pengpid et al., 2020; Choridah et al., 2019). Moreover, Ahmad et al., (2013) reported that Middle Eastern or Asian refugees living in the U.S. and Canada had lower participation in cancer screening tests. Some other studies state that the underlying reasons for the low prevalence of usage of protective health services might be related to beliefs and religion (Matin and LeBaron, 2004). Hence, the current study's findings on female refugees' awareness of protective health services, such as pap smear screening, mammography screening, and HIV testing, are comparable to earlier findings.

Age has been linked to the awareness of screening tests in previous studies (Tekkel et al., 2007). However, in this study, we observed that age is only significant for mammography screening awareness. The risk of breast cancer in women increases with age (Mandelblatt et al., 1991) and many developed country health regulations recommend routine Pap smear screening and mammograms beginning around the age

of 40-50, unless there is a genetic risk to the cancers in concern (Liang et al., 1999; Phillips et al., 1998).

We also observed positive and significant associations between the number of pregnancies, the number of years spent in Turkey following migration and HIV testing awareness. Prenatal HIV testing is already a standard part of healthcare in the United States and Europe (Ben-Natan and Hazanoy, 2015). However, the rate of HIV testing among pregnant women are still low in many other countries (Ben-Natan and Hazanoy, 2015). Because pregnant women in Turkey are routinely tested for HIV in the early months of pregnancy, this routine testing may have increased HIV awareness among pregnant Syrian refugees who spent years in Turkey following migration. Moreover, Azaiza and Cohen (2006) reported that the awareness of screening for certain cancer types was already quite low among Muslim women. Barakat (1993) also indicated that awareness of HIV prevention was low among women.

It has also been shown that the impacts of education and pre-migration income on the awareness of protective health services were significant. Compared to the female refugees who are illiterates, females with higher education have more awareness of protective health services. Furthermore, it was shown that refugees who had higher income before migration were more likely to be aware of mammograms as a screening technique. Many research has shown that lower income and lower education are associated with lower cancer and diagnostic test awareness among individuals, which is consistent with our findings (Al Qadire et al., 2019; Al-Dubai et al., 2011; Macleod et al., 2009).

It has been found that having health insurance and using health services were significant predictors to the awareness of protective health services. Since it is commonly believed that refugees may have difficulties in obtaining healthcare services due to a variety of factors such as uncertainty, security concerns, language barriers, cultural differences, and financial constraints, it is vital to provide health care access to this population (Erenoglu, & Sozbir, 2020).

Health literacy has been confirmed to be a strong predictor of awareness of preventative health care. With respect to the findings, health literacy has been shown to be a highly significant indicator of awareness of protective health services among female refugees. This is an expected result considering the various studies that have shown positive associations between health literacy and cancer screening test awareness (Lindau et al., 2006; Guerra et al., 2005; Davis et al., 2002; Lindau et al., 2002).

Overall, our results showed that the awareness of all protective health services was quite low among the sample population. Similar findings from earlier studies regarding the awareness of protective health services are also available. Similar to our results, earlier studies on the use of health protective services revealed that it was fairly low among this refugee population (Barın, 2015; Erenoglu, & Sozbir, 2020).

4.5 Conclusion

4.5.1 Concluding Remarks

To our knowledge, this current study is the first of its type to examine the awareness of preventive health services among such a large group of female Syrian refugees residing in Turkey. The focus of this research was to assess and identify factors

affecting female Syrian refugees' awareness of preventative health services linked to cancers specific to women, such as breast and cervical cancers and Sexually Transmitted Infections (STIs), such as HIV. Multiple logistic regression models were employed to investigate the effect of aforementioned explanatory variables on each response variable (i.e., awareness of pap-smear, mammogram screenings, and HIV testing).

4.5.2 Policy Implications

Following a comprehensive analysis of the data, several suggestions may be made. First of all, there must be educational activities by Turkish institutions to increase awareness of protective health services and promote screening tests among Syrian refugees. Secondly, it is important to assess the level of health literacy among female refugees and take action to address any health literacy-related problems. Moreover, refugees should be supported and provided information about these health services by healthcare professionals in preventive healthcare services for early detection. It is also crucial that brochures or advertising campaigns should be utilized to make these diseases clearer. In addition, Turkish women have a high level of awareness of screening tests, which is close to rates in other developed and developing countries. Given the fact that Syrian and Turkish women now live in different provinces of Turkey, various Turkish organizations must undertake educational programs to raise knowledge of protective health services and encourage screening tests among Syrian refugees.

4.5.3 Suggestions for Further Studies

Although many predictors studied herein were found to be the factors affecting the awareness of protective health services among female Syrian refugees, there may be other factors to be considered. Therefore, the results of this analysis may be extended

for further research. Based on the current data, it may be difficult to make an absolute generalization about this population's awareness of preventive health services because of the diverse environmental, religious, cultural, and geographical factors. All in all, further research on the influence of the environmental, religious, cultural, and geographical factors may also be included to the analysis. Since language barriers may cause dissatisfaction and communication problems between this population and healthcare professionals, it might be critical to include the language barriers that refugees might face.

Chapter 5

GENERAL CONCLUSION

More than 10 years of conflict in Syria have left millions of Syrians migrating to and resettled in neighboring countries or overseas. It is generally known that refugees suffer more serious health risks than other populations due to war- or migration-related factors, such as trauma, violence, living conditions etc. Turkey has hosted the highest number of Syrian refugees since 2011. Therefore, in this study, it was aimed to examine the determining factors of self-reported health status, such as chronic diseases and mental health, and the determining factors of the awareness of health protective services among Syrian refugees in Turkey.

Overall, our results suggest that both preventive and curative policies are required to improve refugees' mental health and chronic diseases to help them to find ways of coping with the problems, and it is important to provide educational programs to encourage this refugee population to benefit from protective health services, such as pap smear, mammogram, and HIV testing.

We believe that detailed understanding of the demographic factors, socioeconomic status, war- or migration-related factors, health literacy, health risk behaviors, and healthcare utilization impacting refugees' health status would allow for disease prevention and provide awareness about protective health services strategies for refugees residing in Turkey, neighboring countries, and third countries.

The data used in this study were collected by a study (Mipatrini et al., 2019) by the World Health Organization and provided to the authors to use for research purposes. The World Health Organization conducted the study with the Ethical Committee Approval obtained on 2 March 2018 and an approval letter from the Ministry of Health of the Republic of Turkey received on 18 January 2018 (see Mipatrini et al., 2019, p. 13).

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APPENDICES

Appendix A: The Results of Wilcoxon Rank Sum Test and Kruskal-Wallis Test of Mental Health

Explanatory Variables	Distress/worry/sadness			P-Value for comparison*
	Severe/ Extreme	Moderate	None/ Mild	
	%	%	%	
Marital status				
married	13.6	20.9	45.7	
sep./divorced/widowed	2.4	1.8	3.6	.022
single	1.8	3.7	6.4	
Pregnancy				
pregnant	1.0	2.0	3.0	.000
not pregnant	17	24.6	52.5	
Pre-migration residency				
Aleppo	13.1	17.4	33.1	.000
others	4.6	9.1	22.7	
Education				
illiterate	4.2	7.4	12.7	
literate	1.1	2.8	5.0	
primary/sec. school	11.1	14.5	32.0	.000
high school	1.0	1.5	4.5	
uni. /post graduates	0.3	0.4	1.5	
Tobacco use				
smoke	0.9	0.8	1.2	.000
not smoke	16.9	25.6	54.5	
Damaged house in Syria				
completely destroyed	10.0	12.7	20.5	
very damaged	3.1	5.4	7.9	
minimally damaged	1.2	2.1	5.7	.000
I do not know	2.6	4.8	18.3	
undamaged	0.8	1.6	3.3	
Family member injured during war				
yes	1.1	0.7	1.6	.000
no	16.7	25.8	54.1	
Post-migration employment status				
employed	0.8	1.2	2.1	.000
unemployed	17.0	25.4	53.6	

Concentrating on/remembering things				
	Severe/ Extreme	Moderate	None/ Mild	
Explanatory Variables	%	%	%	P-Value for comparison *
Marital status				
married	12.3	19.9	48.0	
sep./divorced/widowed	1.9	1.9	4.0	.092
single	1.5	3.6	6.8	
Pregnancy				
pregnant	1.0	1.5	3.4	.000
not pregnant	15.0	23.8	55.3	
Pre-migration residency				
Aleppo	11.5	16.5	35.6	.000
others	4.3	8.8	23.3	
Education				
illiterate	4.0	7.4	12.9	
literate	0.9	2.3	5.7	
primary/sec. school	9.7	14.0	33.9	.000
high school	0.9	1.3	4.8	
uni. /Post graduates	0.3	0.3	1.7	
Tobacco use				
smoke	0.7	0.8	1.5	.000
not smoke	15.1	24.5	57.4	
Damaged house in Syria				
completely destroyed	8.7	12.8	21.7	
very damaged	2.8	5.6	8.0	.000
minimally damaged	1.4	1.8	5.8	
I do not know	2.1	3.5	20.0	
undamaged	0.7	1.6	3.5	
Family member injured during war	0.8	1.0	1.6	.000
yes	15.0	24.3	57.3	
no				
Post-migration employment status	0.8	1.0	2.2	.000
employed	15.1	24.3	56.7	
unemployed				

Depression				
	Severe/ Extreme	Moderate	None/ Mild	
Explanatory Variables	%	%	%	P-Value for comparison*
Marital status				
married	11.5	18.5	50.2	.060
sep./divorced/widowed	2.2	1.5	4.2	
single	1.6	2.8	7.6	
Pregnancy				
pregnant	0.8	1.4	3.7	.000
not pregnant	13.6	20.4	60.1	
Pre-migration residency				
Aleppo	11.2	15.8	36.6	.000
others	4.1	6.9	25.4	
Education				
illiterate	3.4	6.2	14.7	.107
literate	0.8	1.6	6.4	
primary/sec.school	10.0	13.3	34.3	
high school	0.9	1.3	4.8	
uni. /post graduates	11.0	15.1	74.0	
Tobacco use				
smoke	0.8	0.7	1.5	.000
not smoke	14.5	22.0	60.5	
Damaged house in Syria				
completely destroyed	8.1	11.4	61.9	.000
very damaged	2.9	4.7	23.7	
minimally damaged	1.3	2.3	8.9	
I do not know	2.3	3.1	5.3	
undamaged	0.7	1.3	20.3	
Family member injured during war				
yes	0.8	0.7	1.9	.000
no	14.5	22.0	60.1	
Post-migration employment status				
employed	0.7	1.1	2.2	.000
unemployed	14.6	21.7	59.7	

Losing interest in regular activities				
	Severe/ Extreme	Moderate	None/ Mild	
Explanatory Variables	%	%	%	P-Value for comparison *
Marital status				
married	10.7	17.4	52.1	.020
sep./divorced/widowed	2.1	1.4	4.3	
single	1.5	17.4	7.5	
Pregnancy				
pregnant	0.8	1.4	3.7	.000
not pregnant	13.6	20.4	60.1	
Pre-migration residency				
Aleppo	10.6	15.0	38.1	.000
others	3.7	6.8	25.9	
Education				
illiterate	3.3	5.6	15.4	.731
literate	1.0	1.2	6.6	
primary/sec. school	8.8	13.3	35.5	
high school	1.9	1.3	4.8	
uni. /post graduates	0.3	0.3	1.6	
Tobacco use				
smoke	0.6	0.5	1.8	.000
not smoke	13.7	21.2	62.1	
Damaged house in Syria				
completely destroyed	7.6	10.8	24.7	.000
very damaged	2.8	4.8	8.9	
minimally damaged	1.4	2.1	5.4	
I do not know	1.8	3.1	20.8	
undamaged	0.7	1.1	4.0	
Family member injured during war				
yes	0.8	0.7	1.9	.000
no	13.5	21.1	62.0	
Post-migration employment status				
employed	0.5	1.0	2.4	.000
unemployed	13.8	20.8	61.5	

Explanatory Variables	Sleep disorders			P-Value for comparison*
	Severe/ Extreme	Moderate	None/ Mild	
	%	%	%	
Marital status				
married	12.4	18.7	49.0	.187
sep./divorced/widowed	2.1	1.8	3.8	
single	1.6	2.8	7.5	
Pregnancy				
pregnant	0.8	1.6	3.6	.000
not pregnant	15.6	21.9	56.5	
Pre-migration residency				
Aleppo	12.4	15.7	35.5	.000
others	3.8	7.7	24.8	
Education				
illiterate	3.5	6.5	14.3	.000
literate	0.8	1.8	6.3	
primary/sec. school	10.2	13.5	33.9	
high school	1.3	1.4	4.3	
uni. /Post. graduates	0.4	0.2	1.6	
Tobacco use				
smoke	0.8	0.7	1.5	.000
not smoke	15.5	22.7	58.9	
Damaged house in Syria				
completely destroyed	9.1	11.0	23.1	.001
very damaged	3.2	4.8	8.5	
minimally damaged	1.5	2.0	5.4	
I do not know	1.8	4.2	19.6	
undamaged	0.6	1.4	3.8	
Family member injured during war				
yes	0.6	0.9	1.9	.000
no	15.6	22.5	58.5	
Post-migration employment status				
employed	0.7	1.2	2.1	.000
unemployed	15.6	22.2	58.2	

Appendix B: The Results of Chi-Square, T-Test, Wilcoxon Rank Sum

Test

Explanatory Variables	Cardiac Disease (Yes)		Cardiac Disease (No)		P-Value for Comparison*
	Mean/%	SD	Mean/%	SD	
Age	45.75	15.54	31.26	10.70	.000
Gender					
female	0.7%		47.1%		.002
male	1.2%		51.0%		
Marital Status					
married	1.4%		75.6%		.000
sep./divorced/widowed	0.2%		5.3%		
single	0.2%		17.3%		
Years in Turkey	3.71	1.32	3.46	1.39	.047
Pre-migration residency					
Aleppo	1.2%		61.0%		.782
other	0.7%		37.2%		
Damage to house in Syria					
completely destroyed	0.6%		43.0%		
very damaged	0.4%		16.2%		.078
less damaged	0.3%		8.6%		
I do not know	0.5%		24.4%		
undamaged	0.1%		5.9%		
Family member died in war	.14	.413	.07	.369	.000

Explanatory Variables	Cardiac Disease (Yes)		Cardiac Disease (No)		P-Value for Comparison*
	Mean/%	SD	Mean/%	SD	
Education					
illiterate	0.7%		21.3%		
literate	0.1%		8.9%		
primary/secondary school	0.8%		57.6%		.001
high school	0.1%		8.0%		
university/post grad.	0.1%		2.4%		
Income in Syria (in log)	9.11	1.98	8.46	1.95	.000
Working status in Syria					
working	0.9%		36.0%		.003
not working	0.9%		62.3%		
Tobacco use					
current tobacco user	0.6%		13.2%		
not current tobacco user	0.1%		1.4%		.000
but past user	1.2%		83.6%		
not past and current tobacco user					
BMI					
healthy weight	0.7%		61.0%		
underweight	0.0%		2.8%		.000
overweight	0.8%		29.2%		
obese	0.3%		5.1%		
Daily activity	16.58	8.66	16.86	9.34	.039
Health insurance					
yes	0.2%		5.5%		.170
no	1.7%		92.6%		
Health services use					
yes	1.6%		65.8%		.000
no	0.3%		32.4%		
Health Literacy	14.31	8.01	18.19	9.60	.000

* χ^2 Test for categorical variables, T-test and Wilcoxon rank sum test for continuous variables.

Explanatory Variables	Diabetes (Yes)		Diabetes (No)		P-Value for Comparison*
	Mean/%	SD	Mean/%	SD	
Age	46.29	15.23	31.22%	10.67	.000
Gender					
female	0.7%		47.1%		.039
male	1.2%		51.0%		
Marital Status					
married	1.4%		75.5%		
single	0.2%		17.2%		.000
sep./divorced/widowed	0.3%		5.3%		
Years in Turkey	3.68	1.307	3.46	1.39	.068
Pre-migration residency					
Aleppo	1.2%		60.9%		.930
other	0.7%		37.1%		
Damage to house in Syria					
completely destroyed	0.7%		42.9%		
very damaged	0.5%		16.1%		.007
less damaged	0.2%		8.7%		
I do not know	0.4%		24.5%		
undamaged	0.1%		5.9%		
Family member died in war	.18	.828	.07	.355	.000

Explanatory Variables	Diabetes (Yes)		Diabetes (No)		P-Value for Comparison*
	Mean/%	SD	Mean/%	SD	
Education					
illiterate	0.7%		21.2%		.000
literate	0.1%		9.0%		
primary/secondary school	0.9%		57.5%		
high school	0.2%		8.0%		
university/post grad.	0.1%		2.4%		.000
Income in Syria (in log)	9.02	1.59	8.46	1.96	
Working status in Syria					
working	0.9%		36.0%		
not working	1.0%		62.1%		.033
Tobacco use					
current tobacco user	0.4%		13.4%		
not current tobacco user	0.1%		1.3%		
but past user	1.5%		83.3%		.000
not past and current tobacco user					
BMI					
healthy weight	1.2%		61.0%		
underweight	0.0%		2.8%		.000
overweight	0.9%		29.2%		
obese	0.3%		5.1%		
Daily activity	15.35	8.98	16.88	9.33	
Health insurance					.092
yes	0.0%		5.6%		
no	2.0%		92.4%		
Health services use					
yes	1.7%		65.6%		.000
no	0.3%		32.4%		
Health Literacy	14.95	8.78	18.18	9.59	

* χ^2 Test for categorical variables, T-test and Wilcoxon rank sum test for continuous variables.

Explanatory Variables	Hypertension (Yes)		Hypertension (No)		P-Value for Comparison*
	Mean/%	SD	Mean/%	SD	
Age	41.85	15.22	31.19	10.65	.000
Gender					
female	1.5%		46.3%		.45
male	1.5%		50.7%		
Marital Status					
married	2.3%		74.6%		
single	0.3%		17.1%		.000
Sep./divorced/widowed	0.4%		5.2%		
Years in Turkey	3.56	1.32	3.46	1.39	.29
Pre-migration residency					
Aleppo	2.2%		60.0%		.048
other	1.0%		36.9%		
Damage to house in Syria					
completely destroyed	1.2%		42.4%		
very damaged	0.8%		15.8%		
less damaged	0.4%		8.5%		.001
I do not know	0.6%		24.2%		
undamaged	0.1%		5.9%		
Family member died in war	.20	.56	.07	.36	.001

Explanatory Variables	Hypertension (Yes)		Hypertension (No)		P-Value for Comparison*
	Mean/%	SD	Mean/%	SD	
Education					
illiterate	1.0%		20.9%		
literate	0.1%		8.9%		
primary/secondary school	1.6%		56.8%		.000
high school	0.2%		7.9%		
university/post grad.	0.1%		2.3%		
Income in Syria (in log)	9.11	1.49	8.45	1.97	.000
Working status in Syria					
working	1.1%		35.7%		.88
not working	1.9%		61.2%		
Tobacco use					
current tobacco user	0.7%		13.1%		
not current tobacco user	0.1%		1.3%		.000
but past user	2.3%		82.4%		
not past and current tobacco user					
BMI					
healthy weight	1.2%		60.5%		
underweight	0.1%		2.7%		.000
overweight	1.4%		28.7%		
obese	0.5%		4.9%		
Daily activity	16.88	8.97	16.85	9.3	.140
Health insurance					
yes	0.2%		5.5%		.170
no	1.7%		92.6%		
Health services use					
yes	2.5%		64.8%		.000
no	0.6%		32.1%		
Health Literacy	15.86	8.86	18.19	9.60	.000

* χ^2 Test for categorical variables, T-test and Wilcoxon rank sum test for continuous variables.

Appendix C: The Results of Chi-Square, T-Test, Wilcoxon Rank Sum

Test for Protective Health Services

Explanatory Variables	Pap-smear (Yes)		Pap-smear (No)		P-Value for Comparison*
	Mean/%	SD	Mean/%	SD	
Age	30.49	8.29	29.52	9.31	.228
Marital Status					
married	3.5%		76.8%		.276
single	0.7%		19.1%		
Number of pregnancies	2.42	1.94	2.58	2.24	.000
Years in Turkey	3.54	1.37	3.39	1.43	.205
Pre-migration residency					
Aleppo	3.0%		60.7%		.071
Others	1.2%		35.1%		
Education					
illiterate	0.9%		2.0%		
literate	0.3%		6.7%		.047
primary/secondary school	2.3%		55.3%		
high school	0.4%		8.5%		
university/post grad	0.2%		23.4%		

Explanatory Variables	Pap-smear (Yes)		Pap-smear (No)		P-Value for Comparison*
	Mean/%	SD	Mean/%	SD	
Pre-migration income (log)	9.33	2.20	8.41	1.99	.000
Post-migration income (log)	6.81	.80	6.86	1.004	.000
Pre-migration employment status	0.2%		3.0%		.215
employed	4.0%		92.8%		
unemployed					
Post-migration employment status	0.1%		3.9%		.658
employed	4.1%		92.0%		
unemployed					
Health insurance					
yes	0.8%		5.0%		.000
no	3.4%		90.8%		
Health services use					
yes	3.2%		66.9%		.087
no	3.2%		28.9%		
Health Literacy	22.23	9.57	17.55	9.39	.000

* χ^2 Test for categorical variables, T-test and Wilcoxon rank sum test for continuous variables.

Explanatory Variables	Mammogram (Yes)		Mammogram (No)		P-Value for Comparison*
	Mean/%	SD	Mean/%	SD	
Age	31.61	9.16	29.46	9.26	.005
Marital Status					
married	4.0%		76.3%		.061
single	0.6%		19.1%		
Number of pregnancies	2.76	2.10	2.56	2.23	.000
Years in Turkey	3.44	1.46	3.39	1.42	.669
Pre-migration residency					
Aleppo	3.3%		60.3%		.038
Others	1.3%		35.0%		
Education					
illiterate	1.0%		23.4%		
literate	0.3%		8.6%		.019
primary/secondary school	2.6%		55.0%		
high school	0.5%		6.5%		
university/post grad	0.2%		2.0%		

Explanatory Variables	Mammogram (Yes)		Mammogram (No)		P-Value for Comparison*
	Mean/%	SD	Mean/%	SD	
Pre-migration income (log)	9.04	2.04	8.42	2.00	.000
Post-migration income (log)	6.80	.800	6.86	1.00	.000
Pre-migration employment status	0.2%		3.0%		.215
employed	4.4%		92.4%		
unemployed					
Post-migration employment status	0.2%		3.8%		.832
employed	4.5%		91.6%		
unemployed					
Health insurance					
yes	0.7%		5.1%		.000
no	3.9%		90.3%		
Health services use					
yes	3.5%		66.6%		.102
no	1.1%		28.8%		
Health Literacy	19.23	9.44	17.67	9.44	.048

* χ^2 Test for categorical variables, T-test and Wilcoxon rank sum test for continuous variables.

Explanatory Variables	HIV Testing (Yes)		HIV Testing (No)		P-Value for Comparison*
	Mean/%	SD	Mean/%	SD	
Age	30.37	9.22	29.52	9.27	.247
Marital Status					
married	4.4%		75.9%		.046
single	0.7%		19.0%		
Number of pregnancies	2.98	2.25	2.55	2.22	.000
Years in Turkey	3.67	1.24	3.38	1.43	.003
Pre-migration residency					
Aleppo	3.2%		60.4%		.743
Others	1.9%		34.5%		
Education					
illiterate	1.0%		23.3%		
literate	0.2%		8.6%		
primary/secondary school	2.9%		54.6%		.000
high school	0.7%		6.3%		
university/post grad	0.2%		2.0%		

Explanatory Variables	HIV Testing (Yes)		HIV Testing (No)		P-Value for Comparison*
	Mean/%	SD	Mean/%	SD	
Pre-migration income (log)	8.71	2.26	8.44	1.99	.149
Post-migration income (log)	7.06	1.19	6.85	.98	.000
Pre-migration employment status	0.2%		3.0%		.259
employed	4.9%		91.9%		
unemployed					
Post-migration employment status	0.2%		3.8%		.684
employed	4.9%		91.1%		
unemployed					
Health insurance					
yes	0.3%		5.4%		.610
no	4.8%		89.5%		
Health services use					
yes	4.3%		65.8%		.000
no	0.8%		29.1%		
Health Literacy	19.47	10.27	17.65	9.39	.026

* χ^2 Test for categorical variables, T-test and Wilcoxon rank sum test for continuous variables.