Casualties in Syria and the Physical and Mental Health Status of Syrian Refugees in Turkey

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Abstract

The purpose of this paper is to examine the extent to which the most important adverse health conditions of adult Syrian refugees (such as Diseases, Physical Immobility, and Mental Problems, and their health-related behavior) can be traced back to the conditions (often quite traumatic) in which they had lived before fleeing Syria. Given that Turkey is host to the largest number of Syrian refugees (over 3.6 millions, as of Nov 2019) and that, thanks to the fact that the World Health Organization (WHO) undertook in 2018 the largest (with over 10,000 individuals) and most comprehensive health survey that has been conducted on Syrian refugees, namely, *Health Assessment Survey of Syrian Refugees in Turkey*, this study focuses on the case of Syrian refugees in Turkey.

Our findings show that, while favorable locations in Turkey, access to electricity at home, health literacy, healthy diets and income in Turkey can have favorable impacts on the health of adult Syrian refugees, more importantly we also find that traumatic events, like having family members killed or injured in the war, are associated with worse health outcomes in virtually all forms.

Key words: Health Outcomes, Refugees, Conflict in Syria, Effects of Trauma
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I. Introduction: Health Studies on Refugees

The health status of refugees has long been a subject of great interest both to the agencies providing health services to the refugees and to governments as well as citizens in the

countries hosting refugees so as to prevent their diseases and other health problems from spreading to local populations. This accounts for why several existing studies report statistics on the percentages of refugees who suffer from various diseases and other health problems, especially mental ones since these are often among the most common.[1] As early as 1997, Silove et al (1997), reported the results of interviews with 40 asylum seekers in Australia from different countries showing that 37% of them were diagnosed with Post Traumatic Stress Disorder (PTSD). Of those who said they had experienced traumatic events, the percentage diagnosed with PTSD was 79%, of those who were also females, the percent with PTSD was said to be even higher.

Specifically, for Syrian refugees in Turkey, Alpak et al (2015), based on a sample of 352 Syrian refugees also showed PTSD to be high and to reach 71% for females who had witnessed at least two traumatic events (such as a killing, torture or sexual assault). Again for both Syrian Internally Displaced Persons (IDPs) and refugees in the Netherlands, Al Ibraheem et al (2017) constructed a quite sophisticated analytical model (a Path Model) that starts with a multiplicity of conflict conditions (which they call Syrian Oppressive Experience (SOE)) that bring to them a variety of traumas (Attachment Traumas, Personal Identity Traumas and Role Identity Traumas) which from there are filtered into more complex mental conditions such as PTSD, Complex PTSD, Existential Annihilation Anxiety, Suicidal Traits, and then more generally into Poor Health. Al Ibraheem et al (2017) also showed that various kinds of attachments, roles and personal identity characteristics, of IDPs

[1] See for example, Mitton (2018) on the high percentage of Syrian refugees in Jordan with mental problems and the need for health providers there to strengthen the provision of mental health treatment for Syrian refugees in that country. Sirin and Rogers-Sirin (2015) pointed to the extremely high percentages of Syrian refugee children suffering from mental problems in both Turkey and the United States. Indeed, they went so far as to point to the connection to prior experience with conflict by pointing out that Post-Traumatic Stress Disorder (PTSD) was indeed the most common mental problem found in these children. Javanbakhht et al (2019) showed the incidence of PTSD also to have been over 50% among male Syrian refugees in the US and the incidence of anxiety and depression to be almost as high among female Syrian refugees in the U.S. Georgiadou et al (2018) showed at least one form of mental illness to have exceeded 30% of adult Syrian refugees in Germany. See also Jurado et al (2017).

and refugees could mediate or moderate some of the links between traumatic events and mental and physical illness. They undertook such an analysis for both a sample of IDPs in Syria, and the Syrian refugees who had been forwarded to the Netherlands. While there were significant differences between the two samples, those reaching Netherlands being younger and better educated, in many respects the experiences and needs of the two samples seemed similar. The scope and scientific quality of the measures involved were very impressive. However, as the authors admitted, since the samples studied were not at all sampled randomly, essentially being self-selected under wartime conditions (indeed, with males far outnumbering females), the results could well be biased.

To our knowledge the study which has gone furthest in tracing out their experience with traumatic events in the civil war and/or difficulties in flight from Syria is Georgiadou et al (2018) which investigated Syrian refugees in Germany. Notably, these authors regressed the incidence of three different mental problems, namely, PTSD, Depression and Generalized Anxiety, on a number of conventional controls (for age, education, marital status and gender) but also on the number of traumatic events they had experienced in Syria and during their escapes from Syria. While neither the difficulty nor the duration of the escape journey was shown to do anything to increase any of these mental problems, the number of traumatic events witnessed was found to very significantly increase both PTSD and Depression symptoms but not Generalized Anxiety. Shortcomings of this as well as virtually all other studies cited here are that the samples were small (typically below 250), unbalanced (with women seriously underrepresented), far from randomly selected, and with relatively low response rates (40% or less not uncommon), suggesting that the results could be subject to serious selection biases.

As experience in both testing for traumatic conditions like PTSD among Syrian refugees and measuring some of the related phenomena and experience that might tend to preserve trauma

over time has grown, it has been possible to measure and test many more relevant factors. For example, Chung et al (2018) applied a number of the special tests to detect what they called "trauma centrality", including emotional control, fear of loss of life, social losses, depression, the suppression of various feelings, and PTSD, among Syrian refugees in Sweden. Once again, they found the incidence of PTSD to be about 30% among the refugees, and, by making use of demographic information as well as test scores on these various alternative mental conditions, including the aforementioned measure of traumatic experience "Trauma Centrality", they were able to make use of a Multiple Input Multiple Cause Model (MIMIC) that revealed interactions among a large number of factors in leading to PTSD and other unfortunate mental outcomes. This yielded a long list of factors that would aggravate their PTSD and other disorders as well as some factors which might mitigate them. These rare and small sample studies have been possible when someone has been able to afford the relatively high costs of collecting both the PTSD and other related tests of health and the detailed traumatic events histories of non-randomly selected refugees.

The present study attempts to bridge this gap by relating answers to a more limited set of questions about conflict-generated trauma in Syria to a broader set of precisely measured health outcomes among Syrian refugees, but based on a larger and more representative random sample of Syrian refugees. This is the *WHO Health Assessment Survey of Syrian Refugees in Turkey*, Turkey being the country holding by far the largest number of Syrian refugees.

II. Background on the Syrian Conflict

The conflict in Syria which started in 2011 emanated from the string of Arab Spring events which began in Tunisia in January 2011 and soon spread to Egypt, Yemen, Bahrain, Morocco, Yemen, Libya, and Syria. In the case of Syria, what started as peaceful

demonstrations relatively early in 2011 turned into violent repression, but subsequently triggering greater militancy by various dissident groups. Even by late 2011, the conflict had become one, not only between the government and its opposition, but also between different religious and ethnic groups. Indeed, according to a UN inquiry in 2014, the number of different groups fighting in Syria at that time was approximately 1000 (Sirin and Rogers-Sirin, 2015). The violence has continued off and on since late 2011, with peaks in early 2012, further in mid-2013 through mid-2015, but to a smaller extent after that, but with occasional upward spikes. Naturally, some regions, especially those hit by barrel bombing such as Aleppo, have received much greater devastation than other regions.

The conflict has displaced more than 12 million Syrians, over half of them remaining as IDPs within Syria. The conflict has resulted in almost half a million Syrian deaths, causing a sharp reduction in life expectancy of Syrians in Syria from 70 to 56. Over 45% of the displaced Syrians (about 5.6 million) have fled the country to become refugees, mostly to three of Syria's neighboring countries, Lebanon, Jordan and Turkey. Of these the largest number (over 3.6 millions) have become refugees in Turkey (World Bank Group (2017)). While at first the Syrian refugees in Turkey were located in camps quite near the Syrian border, more recently they have been increasingly settled or re-settled out of camp in Turkey's cities and towns. Presently, there are Syrian refugees living in all 81 of Turkey's provinces. The flows of refugees into Turkey over time have followed the same time pattern of peaks and troughs of conflict in Syria with peaks in late 2011, early 2012, especially mid-2013-mid-2015 but with much lower inflows since then. As a result, in mid-2018, when the aforementioned *WHO Health Assessment Survey of Syrian Refugees in Turkey* was undertaken, the vast majority of the adult refugees had already been living in Turkey for several years.

The fact that political, religious, and ethnic differences remain large in Syria and neither the Syrian government nor the international community seems anywhere near being able to either

resolve such differences, get the country back together as a functioning state or to welcome back its many millions of refugees, suggests that the status quo of almost 4 million refugees in Turkey and over 2 million more in other nearby countries like Lebanon and Jordan are likely to have to endure for some time. As such, this points to the importance and continued urgency of identifying the many different dimensions of refugee care and support that will have to be met to prevent further humanitarian catastrophes from occurring in the refugee-hosting countries such as Jordan, Lebanon, Turkey and others.

III. Analytical Framework: Methods and Data

A. Analytical Framework

Building off of the model proposed in Zivin and Neidell (2013) we can model a health production function of a representative individual. We can express individual health as a function of exposure to harmful sources such as Trauma (in the form of bombing, injury, ambient pollution levels), T, avoidance behavior, such as living in a desirable location in a city or town, where one can earn more income or having electricity in the home (so as to avoid air pollution from burning coal, wood or kerosene) or adopting a very healthy diet (A), and medical care M that negates the negative health consequences from Trauma etc.

$$H = H(T, A, M) \quad (1)$$

Both Avoidance behavior and Medical care can reduce the health burden from Trauma and in ways that may differ with respect to their timing and costs. Avoidance behavior may take place before or after some of the Trauma and before or after some of the Medical Care costs. For example, an individual may decide to purchase a bomb shelter, or flee to a safe location in another country (a refugee hosting country) early. In this case, the cost of avoidance behavior is the cost of the bomb shelter, oxygen mask or the residence in the refugee-hosting country (depending on the alternative chosen) and inclusive of any disutility associated with

the reallocations of time associated with taking on the avoidance behavior. Medical care costs, on the other hand, are likely to be incurred after the Trauma (such as the injury or damage to home arising from the bombing) and perhaps even after any the effects of any disease triggered by the conflict have been realized. Similarly, the cost of medical care expenditure includes both the direct cost of medical intervention and any disutility associated with the medical treatment. There could, however, be exceptions wherein medical attention would have to be incurred immediately after the Trauma just to be kept alive so as to make the exodus as a refugee somewhat later.

As in Zivin and Neidell (2013) we can make a distinction between an individual's health and an illness episode (Φ) and allow the production function to take the form:

$$H = H\,(M(\Phi), \Phi\,(T, A)) \qquad (2)$$

In this case Trauma and avoidance behavior jointly determine environmentally-driven illness episodes, whereas medical expenditure depends on occurrence and frequency of these episodes. This intuitively makes sense in the context of this study. For example, think of a potentially fatal illness like PTSD arising from a traumatic bombing event and avoidance behavior such as becoming a refugee, gaining access to electricity or adopting a very healthy diet. Additionally, since medical expenditure is meant to decrease the severity of an illness, an individual's health is determined by illness episodes and medical expenditure. We assume that concavity applies to this health function and its determinants in equation (2).

B. Data

The Health Assessment Survey of Syrian Refugees in Turkey (HASSRT) provides data from a randomly selected sample of over 4583 Syrian refugee households (with over 10 thousand

individuals) from out of camp sites[2] taken from the 15 Turkish provinces[3] with the largest numbers of refugees and weighted to be nationally representative of all Syrian refugees in Turkey. Its health data show that some 15% of the adults indicated that they had experienced some type of disease symptoms in the last two weeks, and more importantly, that about 40% of them said that over the last 30 days they had experienced at least moderate degrees of each of the following difficulties: distress and sadness, difficulty in concentrating, remembering things, moving around, and in taking care of themselves, carrying out their work or household activities, and that they experienced pain and sleep disorders.

Other strengths of the HASSRT survey are (1) that the sample was quite large (4583) as pointed out above, (2) that adult women and men and children of both genders were selected from the same sample households and appropriate age groups so that they can be matched, (3) the sample was selected in a way to make sure that all those selected were capable of answering the questions and committed to being available, thereby assuring a remarkably high response rate of 90% (among households), (4) the multistage character of the random sampling methodology to ensure that the sample was representative of out-of-camp numbers, of neighborhoods within the 15 provinces in Turkey from which the samples were selected, and according to their distance from Syria, and (5) the very substantial attention that was paid to training of field data collectors to assure high quality of the data collected (HASSRT 2018, p. 12-20).

While the information collected in many respects does not go beyond much of that collected from Syrian and other refugees from conflict in other parts of the world cited in Section II above, what is unique about this data source is that it contains information allowing the

[2] Over 90% of the Syrian refugees in Turkey lives out of camp sites over Turkey's 81 provinces.
[3] More than 85% of Syrian refugees in Turkey lives in the 15 provinces from which the HASSRT sample is taken.

analyst to trace the pattern of each different type of health problem among the refugees back to information about their income, location, education level, and experience with the conflict back in Syria.

For the health problems to be studied, the data source allows us to examine responses of each Syrian adult surveyed to three general types of health problems: diseases, physical and mobility problems and mental health problems, malnutrition and obesity as the two extreme outcomes detectible from body mass index (BMI), and different conditions within each of these general types. Specifically, among diseases, we examine the determinants of some 11 different disease categories: non-chronic disease, chronic disease, long term disability requiring home care, having symptoms believed to indicate chronic disease, cardiac disease, diabetes, cancer, sexually transmitted disease, asthma, chronic pulmonary disease, and other disease. Among physical and mobility health problems, we examine the following five specific types: difficulty in moving around, pain or discomfort, difficulty in self- care, difficulty at work or household activities, condition that limits ability to move. Finally, among mental health problems we make use of the following six categories; distress or sadness disability, difficulty in concentrating, depressive, lose interest in regular activities, sleep disorders and psychiatric disorders.

What is especially remarkable about the data from the HASSRT is that it allows us to tie each respondent in the health surveys back to where he or she had lived in Syria, income earned there and education, damage to home, and whether or not family members had been killed or injured, commonality of origins (a variable representing the percentage of people in one's current location in Turkey which came from the same location in Syria). We also make use of controls for age, gender, marital status, urban, province and city in Turkey, time (months) in Turkey and urban or non-urban location.

C. Model Estimation

Our basic estimation is of the following general form:

$$y_{it} = \alpha + \beta_1' CS_{it-1} + \beta_2' + \beta_3' (CS_{1it-1} \cdot CS_{2it-1}) + \partial CTX + \varepsilon_{it} \quad (1)$$

where y_{it} is the outcome variable, either health outcome or health behavior, of individual i at time t in Turkey where CS_1 and CS_2 different vectors of relevant conditions (especially gender) of the refugee i while still in Syria in period $t-1$, wherein their effects could be represented by interaction terms between them, CT represents a vector of relevant conditions in Turkey of refugee i in time period t, ∂CTX represents fixed effects for unobserved characteristics of the locations in Turkey where the refugees are living and ε_{it} represents the unexplained residuals.

IV. Empirical Results

Table 1 provides the list of all the variables used in the analysis, starting with specific measures of each of the three general types of health conditions (Diseases, Physical and Mobility Problems and Mental Health Problems) followed by the measures of health behavior (cigarette smoking) and healthy diet (fruits and vegetables). Then in the lower part of the table is a list of explanatory variables, divided first into those representing Conditions in Syria and then into those representing Conditions in Turkey. The table also contains descriptive statistics on all these measures.

As can easily be seen, the measures of disease presence are all binary (0,1) whereas the physical/mobility and mental health measures are also in some cases also measured in terms of severity of the problem (measured on a 1-5 scale). Even taking the scoring differences between these different kinds of health problems into account, one can see that the Incidence

of disease among the Syrian refugees in Turkey is considerably lower than those of Physical/Mobility and Mental Health Problems. Of the diseases, the most common are non-chronic diseases.

While in the full sample only 15.2% say they have ever smoked, of those who have ever smoked, over 90% are currently smoking, and the average number of cigarettes per day is over 5, but with the numbers ranging up to 70 per day. It is often believed that smoking may be encouraged by pressure and trauma in one's life but it can become addictive and have harmful effects on health in the longer run. Dietary behavior can be affected by health and other conditions but can also have either positive or negative effects on health in the longer run. As indicated, healthy diet measured by the frequency of consuming fruits and vegetables at the time of the survey seems to be quite satisfactory in the sample as a whole. But, from the BMI measures based on weight and height, it appears that significant percentages of the refugees are either malnourished or more frequently obese, in either case setting the stage for health problems in the years ahead.

Finally, from the bottom section of Table 1 one can see that as a result of the care that was taken in designing the sample, the gender balance in the sample is perfect (the female share being exactly 50%), but with considerable variation within the sample by education, marital status, and income. Some 74% of the sample are located in what are regarded as urban areas within Turkey and almost 84% of the sample Syrian refugees say that they have access to electricity in their home. Given the relatively low age of the adult sample (mean 31.49) and relatively large number of months in Turkey (43.6), it is quite clear that for most a significant portion of their lives has been as a refugee in Turkey.

Since all the health measure variables as well as the health behavioral measures were very current to the date at which the data was collected (June, 2018), whereas the other conditions

in Turkey such as months in Turkey, location in Turkey and especially conditions in Syria (among which we include age, education, income in Syria and damage to house in Syria and family members killed or injured in the war), virtually all the explanatory variables can all be considered largely exogenous to the health measure variables.

We have inspected the correlation matrix in each different set of specifications and omitted individual variables to mitigate collinearity. We have also checked for the robustness of the results across different specifications and eliminated those variables which would greatly reduce the number of observations. Age of the refugee is measured in several different ways. The use of age group variables, when their coefficients are statistically significant, can be the most informative, but age by itself can sometimes capture the relationship between health and age when it is linear, and age and age squared when it is non-linear. There are nevertheless a few explanatory variables which can less safely be assumed to be exogenous. Since for the most part Syrian refugees have been free to move to their preferred location in Turkey, location is one which might not be purely exogenous. Two main considerations would seem to be especially important to the refugees, proximity to their origin in Syria, and perhaps more importantly access to employment opportunities. The latter consideration accounts for why (as shown in Table 1) large fractions of the refugees are located in the large cities like Istanbul and Ankara and locations and the former to largely urban areas near the Syrian border (like Hatay, Gaziantep, Sanlurfa, Mersin and Mardin (even though the latter seems to have very low income). In any case, especially since access to health care from one or more sources is available in virtually all provinces of Turkey, we deem it safe to assume that choice of location in Turkey is largely exogenous to health conditions and behavioral decisions of Syrian refugees in Turkey. The least safely exogenous variable is Health Literacy since this test was given quite near the time of data collection and such literacy could have been created by time in Turkey, experience in seeing doctors about existing

conditions or at least learning about how best to find needed health services. For this reason we have tended to exclude this measure in our specification despite the beliefs expressed in HASSRT (2018) that it was deemed important, but have for robustness purposes also carried out regressions with it included, but never finding that it affects the effects of other relevant variables except education which is (not surprisingly) fairly highly correlated with it. Given that income and housing conditions in Syria were quite highly correlated with those in Turkey, and because these conditions were the relevant ones for a larger portion of the lives of adult refugees, the explanatory variables used here include the log of Income in Syria but not that of income or housing in Turkey. Of relevance to Turkey, however, we do include time in Turkey (measured in months) and urban location since this could imply higher income but also greater pollution.

Table 2 presents the logit estimates for each of the 11 different disease measures based on a common specification that we found provided quite robust results, in this case using the age group dummy variables and other variables representing conditions in both Syria and Turkey. Not surprisingly, since some of these diseases differ quite considerably with respect to the age, gender and location of when and where they could be expected to appear, one can easily see that there are important differences in the parameter estimates of many of the explanatory variables across the different diseases. This is so for females since the coefficient for female is positively related to non-chronic disease but negatively related to cancer. Likewise, there is considerable variation in the direction of the relationships between the different provincial locations in Turkey and each different disease.

Yet, for the most part, one can see important similarities in the effects of many of both the Syria-based and Turkey-based characteristics on disease incidence across the various different columns of the table representing the different diseases. For example, of all diseases except non-chronic in column (1), those in two oldest age groups, Age Groups 5 and 6

(representing those aged 50 and above), tend to have the largest positive relationship with each disease. Of the columns in which the coefficient for Married (marital status) is statistically significant, its effect is always negative. Education is not always significantly related to any of the diseases but, when it is (for Other Disease, Diabetes, Chronic Disease and for females also for Cancer), that relationship is always positive. Also, location in an urban area is positively related to all the diseases except Sexually Transmitted Disease and Chronic Pulmonary Disease.

Of particular relevance to the objective of this paper are the effects of Log Income in Syria, Family Member Killed and Damage to House in Syria. Somewhat surprisingly, damage to the house in Syria seems to have little if any influence on most diseases and, as shown in the first two columns of Table 2, it is negatively related to both non-chronic diseases and chronic diseases. By contrast, however, notice that those who had a family member killed in the conflict in Syria since 2011 have tended to have *higher* probabilities of the various diseases than those who had not had that unfortunate experience. These effects seem to be especially large and significant in the case of Chronic Disease and Sexually Transmitted Diseases but also positive, large and highly significant for having symptoms believed to indicate chronic disease, cardiac disease, diabetes, cancer, asthma, and chronic pulmonary disease, Since the one type of disease that is most contagious and therefore of special concern to the Turkish host population, are the Sexually Transmitted ones, it is notable that these diseases seem to be most common among females and especially those who have had a family member killed in the Syrian Civil War. Finally, with the exception of its positive effect on Other Disease in the last column of the table, Log Income in Syria is shown to exert a more consistent negative influence on most diseases, suggesting that people with higher incomes in Syria may have been able to live a healthier life style and/or have better access to medical care while still living in Syria than were those with lower incomes.

Because of the fact that there could well be more characteristics than education which might have different effects between males and females in Table 2A (soon to be on an on-line Appendix) we present the results of alternative specifications, deliberately aimed at reducing multicollinearity but also allowing for the effects of all characteristics to vary between males and females. By and large, however, the effects are similar, since the effects of most of the other controls do not vary by gender.

Next, we turn to the corresponding empirical results for the physical and mobility problems of adult Syrians in Table 3. Except for the fact that in this case, the age effects are captured by Age and Age Squared instead of by dummies for the six different age groups, the specifications are almost identical to those in Table 2. In this table we can see that the coefficients in each row for any individual characteristic in either Syria or Turkey are likely to be quite similar in each of the first four columns of the table but also quite different than those in the last column (Having a Condition that Limits Mobility). For example, females are significantly more likely to suffer from the first four of these physical/ mobility health problems but not that last one. On the other hand, education tends to reduce the incidence of such physical problems primarily only among females. Other examples of these same differences between the first four columns and the last one, are those of Urban location in Turkey which is negatively related to each of the first four physical/mobility problems but positively related to the last. Health Literacy seems to have positive and significant effects on the first four of the five types of Physical/Mobility problems, again suggesting that this relationship could be the result of reverse causality, wherein those who had greater experience with such problems might well have become better informed about the problems and of where to go for care.

Then, turning to the relationships between income and violence experience of the Syrian refugees prior to their flight to Turkey and each of these Physical/Mobility problems, once

again it can be seen that having a family member killed in the war has positive and mostly significant effects on most of these individual types of physical/mobility problems, the strongest one being Pain or Discomfort. At the same time, however, Damage to one's house in Syria does not have a positive effect on any of them, and in the case of Difficulty in Moving as shown in column (1) it in fact has at least a somewhat significant negative influence. Income in Syria has a significant negative effect on Having a Condition that Limits Mobility but no significant effect on any of the other individual Physical/Mobility conditions.

Next, we turn to what, as noted above, are often found to be the most important and distinctive health problems in refugees from conflict situations, namely mental problems. In columns (1) through (6) of Table 4 we present the relationships between almost the same set of explanatory variables and each of the following six specific types of mental problems: distress or sadness disability, difficulty in concentrating, depressive, lose interest in regular activities, sleep disorders and psychiatric disorders, respectively. As in the case of most Physical/Mobility problems, age does not seem to play much of a role on incidence of mental problems, although more like the impact of age on diseases, age is slightly positively related to Psychiatric Disorders. What is quite different from the previous types of health problems is that, with the exception of Psychiatric Disorders, females are much more likely to suffer from each of these types of mental problems than males. If the females are educated, however, the adverse effect of female gender is at least slightly reduced in the first three cases.

We had thought that the effect of months in Turkey might be especially interesting in the case of mental problems since different perspectives on the mechanisms lying behind this effect could lead to very different effects. In particular, to the extent that refugees might be expected to become more comfortable living in Turkey as time goes on, the effect of months in Turkey on mental problems might be expected to be negative. On the other hand, to the extent that time in Turkey would be expected to increase anxiety stemming from nostalgia for

pre-war life in Syria, that same effect might be expected to be positive. As can be seen months in Turkey has no significant effects on the incidence of any of these mental problems, presumably indicating that either neither effect is significant or that in any case they offset each other.

Notice also that marital status also seems not to play much of a role in determination of the nature and strength of these mental problems. Those living in urban locations are slightly more likely to suffer from psychiatric disorders but not any of the other mental health problems. Interestingly, and in contrast to the case for diseases in Table 2 and physical and mobility problems in Table 3, Commonality in Origins has a positive and significant effect on each of the mental diseases. While often commonality of origin might be expected to have a negative effect on these mental problems since they would be more likely to be with people who had been their friends and neighbors back in Syria, in this case it would seem to suggest that the fact that those living near each other might bring back more frequently their shared traumatic experiences. In each column of the table it can also be seen that the incidence of each of these mental problems rises significantly with the number of family member killed in the war. In some of the specific mental problems, such as Difficulty in Concentrating, Lose Interest in Regular Activities and Psychiatric Disorders, the incidence of these mental health issues also seems to rise with the number of household members injured. By contrast, note that Damage to House in Syria tends to lower the likelihood of any such mental disease while Log of Income in Syria tends to raise the likelihood of most of these mental problems.

Since the effects of time spent in Turkey might well vary with the other explanatory variables, and consistent with the presence of an interaction term in in Table 4A we present results for the severity of the first form of mental health problems, namely, Distress, Sadness and Worry, but in this case for males and females separately, and with each one of three different interaction terms involving months in Turkey. The first of these (in columns (1) and

(2) of the table) includes its interaction with family members killed, whereas the second and third pairs of columns include its interactions with damage to the house in Syria, and income in Syria, respectively. Whereas in column (1) od Table 4, by itself Months in Turkey in Turkey did not exert a significant effect on Distress, Sadness and Worry, in Table 4A it exerts small but significant negative effects in columns (1), (2), (5) and (6) but sometimes significant positive ones in columns (3) and (4). Income in Syria now tends to have a negative effect on severity of Distress, Sadness and Worry, though more so for females, and in contrast to Table 4, Damage to House in Syria significant positive effects. The interaction terms of Months in Turkey, themselves, tend to be significant, positive in the case of both Family Members Killed and Income in Syria but negative for House Destruction in Syria. These results help explain the seemingly contradictory differences between Family Members Killed and House Destruction in Syria in the preceding paragraph. Once we include the interaction term of Months In Turkey and House Destruction in Syria, which tends to have a negative effect, the direct effect of House Destruction in Syria becomes positive and significant, more like the effect of Family Members Killed.

In Tables 5A and 5B, we turn to another measure often seen as a forerunner to health problems, namely, extreme scores on the Body Mass Index (BMI). BMI scores of the adult Syrian refugees are computed from height and weight measures in metric terms (Weight in kilograms/ Height in meters squared). Those designated as malnourished are those with BMI scores below 18.5 and those overweight or obese with BMI scores above 25. As shown in in the descriptive statistics from Table 1, these calculations leave us with many more refugees classified as Obese (2436 or almost 35% of the sample than Malnourished (only 196 or less than 3% of the total). The logit estimates for Obese are shown in each of the six columns (1-6) of Table 5A and those for Malnourished in the six columns of Table 5B. In each case, the

results are presented based on three different specifications, and separately for males (in the odd-numbered columns) and females (in the even-numbered ones).

Based on the results across the columns for Age in the first row of both tables, it can be seen that for both males and females the likelihood of being obese rises with age, whereas, if anything, age tends to reduce that of being malnourished. While being married has no significant effect on obesity, it has a significant negative effect on being malnourished, but only for females. Neither months in Turkey nor urban location in Turkey has a significant effects on either Obese or Malnourished. Quite naturally, Log of Income in Syria has positive effects on Obesity and negative effects on Malnourished, though in the former case, significantly so only for males.

In contrast to all the other tables presented in this paper, having a family member killed in the war has no significant effect on either measure for either males or females. Damage to the house in Syria, however, lowers the likelihood of obesity among males but not females, but with no significant effects on Malnourished. There are quite a few cases in which some of the province in Table 5A locations have significant positive effects on Obese, in particular, Gaziantep, Hatay, Kahramanras, Kilis, Konya, Mardin, and Mersin (each in two of the six specifications), and especially Istanbul (in four specifications) and Kayseri (in five). Notably, in most such cases, the incidence of Obesity is higher in these provinces for females than for males. Given, the much smaller incidence of Malnutrition among the refugees in general, there are far fewer specifications by province in Table 5B with positive and significant coefficients for Malnourished, two for males in Istanbul, and two for females in Izmir.

As noted in the health modelling section (Section 3 above), there can be behavioral responses emanating from the refugees experience that may also affect their health, if not currently, at least in the future. One such form of behavior is smoking, a habit which is often accentuated by stress and depression of the type we have seen (from the literature cited in Section 1) that

has resulted from the conflict experience in Syria. Another is sticking to a healthy diet, including fruits and vegetables. In Table 6 we present the results of the effects of the same kinds of explanatory variables (in particular including three conflict events in Syria before arrival in Turkey) on these two quite different aspects of refugee behavior, tobacco use and sticking to a healthy diet.

The impacts on tobacco use are captured in the first three columns of Table 6 and those on healthy diet in the last two columns of the table. For tobacco use we examine in column (1) the factors contributing to any use of tobacco, in column (2) those affecting years of use (computed from age at which smoking started) and finally in column (3) to those affecting the average number of cigarettes consumed per day at the time of the survey.

In what follows, first, we trace the effects of the different row measures on each of the three indicators of tobacco use, one row at a time beginning with age. Age is positively related to all three of these smoking measures. Not surprisingly, it is positively related to number of years smoking and, since it is thought to be addictive, age is also positively related to cigarettes per day. Not surprisingly, females are less likely to smoke at present and to have been smoking many years. Yet, those who were smoking at the time of the survey were also smoking more cigarettes per day. Those currently in urban areas are likely to have been smoking longer than those in rural areas but currently are less likely to be smoking and to smoke fewer cigarettes per day. While in general married people are likely to have been smoking for about 1.7 years less than non-married people, this does not seem to apply to younger people who have married only since becoming refugees (and thus in Turkey). Notice that the effect of education on smoking behavior is quite different for females than for males, lowering current use and cigarettes per day but not years smoking. The same is true for people with higher Health Literacy scores. Notably, both Damage to House in Syria and Family Member Killed in War tend to lower the years of smoking, perhaps indicating that

this relatively recent experience with violence may have been what induced them to start smoking. Note also that both of these violent experience measures add significantly to the number of cigarettes smoked per day. These are indeed traumatic events that also seem to have been associated with mental problems as we have seen in preceding tables, as well as the small positive effect of Mental Disease Things on Number of Cigarettes in column (3) of Table 6.

Next, we go on to the last columns (i.e., columns 4 and 5) of Table 6 to examine the effects on the amounts of fruits and vegetables in meals. In column (4) are the results for the number of such portions per day and in column 5 are those for days per week in which fruits and vegetables are consumed. Especially for Portions per day, these are positively affected by age, implying however, that young refugees may be especially deprived of fruits and vegetables, as are females of all ages. Notice, however, that the positive effect of female on Days per week of fruits and vegetables, acts as an important offset to the negative effect of female on portions per day of fruits and vegetables. Education in general, and especially that of females, tends to help raise the healthy diet behavior. Somewhat alarmingly, income actually has a negative effect on portions per day of these healthy foods, though this is partially offset by its modest positive effect on days per week of fruits and vegetables. From the first effect at least, it would appear that people with higher incomes perhaps prefer more tasty foods and other consumption goods over healthy foods.[4] Months in Turkey, however, have small positive influences on both healthy food measures, indicating that the longer are the refugees resident in Turkey, they may now know better where to find these foods and perhaps are thinking more about their long-term health and productivity than soon after their arrival in Turkey in which they may have been narrowly focused on "just surviving".

[4] This finding is consistent with the rather strong effects of household income on overweight or obesity in Table 5.

Although in this case Damage to House in Syria and Family Member Killed in War have positive effects on both fruits and vegetables measures, in column 4, this positive effect is more than offset by the negative effect of Family Member Injured in War. Finally, note that in this case, Mental Depression Things have significant positive influences on both measures of healthy food behavior.

Overall, therefore, we see that, consistent with the harmful effects of conflict and violence on disease, physical/mobility problems and especially mental problems, some of these same influences also tend to increase tobacco use. This is also consistent with the commonly accepted view that cigarette smoking serves as a means of dealing with depression, PTSD and the like. At the same time, however, it is not a form of behavior which will improve health in the longer run. On the other hand, the likelihood that these same traumatic experiences with violence emanating from the war in Syria may be inducing healthier food behavior among refugees in Turkey would appear to be somewhat more promising outcome, although not yet one that is very clear.

V. Conclusion: Contributions Relative to Existing Literature, to the Traumatic Event Paradox and Implications for Policy and Further Research

Consistent with much of the more traditional literature on health in developing countries, some of the results in Table 2 have shown the relevance of standard mechanisms such as being younger, married, and having higher income, in reducing the likelihood of most diseases. This was especially true for Chronic Disease, Long-term Disability Requiring Home Care, Symptoms of Chronic Disease, Cardiac Disease and Asthma. Somewhat more remarkably, among this Syrian refugee population we saw virtually no effects of either gender or education in the incidence of disease. In these respects, however the picture was found to be very different for Physical/Mobility health Problems and Mental Problems in

Tables 3 and 4. In both these respects females were found to be much more likely to suffer from these problems, though more educated ones to a considerably lesser extent. So too, being younger married and better educated was shown to lower the possibility of being either obese or malnourished in Table 5, though in most of these cases primarily for females.

Similarly, the principal findings concerning the effects of conflict and trauma on mental illness in Tables 4 and 4A, namely the strong positive effect of having had a family member killed (or the numbers of family members killed in the war) on Mental Illnesses is consistent with virtually all existing findings of the existing studies on Syrian and other refugees discussed in Section I showing that refugees who have been subject to conflict-related trauma are much more likely to suffer from one or another of the different mental Problems identified in that table. The strengths of our finding with respect to family members killed are (1) that it shows that it applies to each of the six different mental disorders identified in that table rather than to simply a particular one like PTSD, as in the existing studies and that it applies more strongly to females, (2) that it also applies to most of the different diseases in Table 2 and the physical/mobility problems identified in Table 3, (3) that it is based on a considerably larger, randomly selected and gender-balanced sample than those in the other studies, (4) as suggested in Table 4A that this effect may grow with Months in Turkey, and (5) that it includes more in the way of relevant controls than in at least most of the existing studies.

To the best of our knowledge, quite different from studies in the Traumatic Event literature is the finding that damage to the house in Syria (although presumably another major source of trauma for Syrian refugees), has no such positive effect on any of the mental illness types in Table 4, though it does for the single case of Distress in Table 4A once interactions with Months in Turkey are added. According to some of the specifications in Table 5, it may also have contributed to lowering obesity among males.

These two somewhat contradictory findings constitute something of what we might identify as a "Traumatic Event Puzzle or Paradox". While damage to a home, family members killed or injured, witness to rape or murder, have all been regarded as examples of Traumatic Events large enough in magnitude and likely to linger on in the mind of the individual experiencing such events so as to trigger the onset of any one of these mental illnesses, why should this not apply in the case of damage to one's home in the case of Syrian refugees in Turkey?

While a definitive resolution of this paradox may well require further research, e.g., by including more interaction terms like those in Table 4A, given that we are talking about Syrians no longer in Syria, and quite possibly also unlikely to return to Syria anytime soon (as was suggested in Balcilar and Nugent 2019), we offer the following suggestion as to a possible way to resolve that paradox. Death or injury to a family member is likely to be a source of distress, depression, etc. wherever the person who has witnessed it is likely to be in the rest of his or her life. However, for a refugee not currently thinking about return to Syria, loss of one's home due to aerial or other attack is only likely to make one sad and distressed soon after the event when one might still be considering returning to Syria. Indeed, having experienced that destruction but without having to return to that site again as time in Turkey has grown might make one feel better, and perhaps re-enforcing a mental decision that it is time to "move on" in one's life, to work harder both physically and mentally, quite possibly also accounting for its negative effect on obesity of males in Table 5.

Finally, with respect to policy implications, especially if the findings reported here could be supported by further robustness tests, some tentative policy implications would seem to be: (1) that the mental and other health needs of refugees from Syria (and other locations of major conflict for substantial periods of time) are indeed extremely important and their treatment urgently needed; (2) that these needs extend well beyond the mental health needs

so much emphasized in existing literature based on the traumatic events experienced by Syrian and other refugees to diseases of various kinds and physical/mobility that have been identified in the present study; (3) that, with respect to issues like the location of housing and medical services for the refugees, (a) only for a few diseases (like having symptoms believed to indicate chronic disease, diabetes, cancer, chronic pulmonary disease and Other Diseases and a "physical condition that limits ability to move" has the incidence of illnesses and hence increase the costs of various types of medical services tended to increase with time in Turkey, (b) refugees in Urban locations seem to be less needy of medical services for dealing with most physical/mobility problems but more needy in the case a "condition that limits ability to move" and Psychiatric Disorders; and (c) females are especially in need of services to help them deal with both most physical/mobility, mental illnesses, and, at least as they age, also obesity.

References

Al Ibraheem, B., I.A. Kira, J. Aljakoub and A. Al Ibraheem 2017. The Health Effect of the Syrian Conflict on IDPs and Refugees, *Peace and Conflict: Journal of Peace Psychology* 23 (2) 140-152.

Alpak, G, A. Unal, F. Bulbul, E. Sagaltici, Y. Bez, A. Aatinag 2015. Post-Traumatic Stress Disorder among Syrian Refugees in Turkey: A Cross-Sectional Study, *International Journal of Psychiatry Clinical Practice* 19, 45-50.

Balcilar, M. and D. Mipatrini 2018. *Health Assessment Survey of Syrian Refugees in Turkey*

Balcilar, M. and J.B. Nugent, 2019. The Migration of Fear: An Analysis of Migration Choices of Syrian Refugees, *Quarterly Journal of Economics and Finance*

Chung, M.C., M. Shakra, N. AlQarni M. AlMazrouei, S. AlMazrouei and S. Al Hashimi 2018. Posttraumatic Stress among Syrian Refugees ; Trauma Exposure Characteristics, Trauma Centrality and Emotional Suppression, *Psychiatry Interpersonal and Biological Processes* 81 (1) 54-70

Georgiadou, E., A. Zbidat, G.M. Schmitt and Y. Erim 2018. Prevalence of Mental Distress among Syrian Refugees with Residence Permission in Germany: A Registry-Based Study, *Frontiers in Psychiatry* 9,

Javanbakht, A., A. Amirsadri, H. Abu Suhaiban, M.I. Alsaud, Z. Alobaidi, Z. Rawi and C.L Arfken 2019. Prevelence of Possible Mental Disorders in Syrian Refugees Resettling in the United States Screened at Primary Care, *Journal of Immigration Minor Health* 21 (3), 664-667

Jurado. D., R.D. Alarcon, J.M. Martinez-Ortega Y. Mendieta-Marichal, L. Gutierrez-Rojas and M. Gurpegui 2017. Factors Associated with Psychological Distress or Common Mental Disorders in Migrant Populations Across the World, *Revista de Psiquiatria y Salud Mental*, 10, 45-58.

Mitton, H. 2018. The Less Visible Humanitarian Crisis: Refugee Mental Health Needs in Urban Jordan

Silove, D. ISinnerbrink, A. Field, V. Manicavasagar and Z. Steel 1997. Anxiety, Depression and PTSD in Asylum-Seekers: Associations with Pre-Migration Trauma and Post-Migration Stressors, *British Journal of Psychiatry* 170: 351-357.

Sirin, S.R. and L. Rogers-Sirin 2015. The Educational and Mental Health Needs of Syrian Refugee Children, Washington, D.C.: Migration Policy Institute

World Bank Group 2017. *The Toll of War: The Economic and Social Consequences of the Conflict in Syria*

Zivin, G.J. and M. Neidell 2013. Environment, Health and Human Capital, *Journal of Economic Literature* 51 (3) 689-730

Table 1: List of All Variables and Descriptive Statistics

		Descriptive Statistics				
Dependent Variables		N	Mean	Min-imum	Max-imum	Standard Deviation
Diseases						
	Non Chronic	8132	0.0815	0	1	0.274
	Chronic	8132	0.0125	0	1	0.111
	Long term Disability Requiring Home Care	8132	0.0177	0	1	0.132
	Symptoms Believed to Indicate Chronic Disease	8132	0.0084	0	1	0.0911
	Cardiac Disease	8132	0.0156	0	1	0.124
	Diabetes	8132	0.0172	0	1	0.13
	Cancer	8132	0.0016	0	1	0.04
	Sexually Transmitted Disease	8132	0.0028	0	1	0.0531
	Asthma	8132	0.0223	0	1	0.148
	Chronic Pulmonary Disease	8132	0.0071	0	1	0.0842
	Other Disease	8132	0.0144	0	1	0.119
Physical and Mobility Problems						
	Difficulty in Moving Around	7007	2.261	1	5	1.139
	Pain or Discomfort	7007	2.222	1	5	1.136
	Difficulty in Self-Care	7007	2.141	1	5	1.14
	Difficulty in Work or Household Activities	7007	2.164	1	5	1.138
	Condition that Limits Ability to Move	8132	0.0157	0	1	0.124
Mental Health Problems						
	Distress	7007	2.365	1	5	1.143
	Difficulty in Concentrating	7007	2.294	1	5	1.131
	Depressive	7007	2.201	1	5	1.154
	Losing Interest in Regular Activities	7007	2.168	1	5	1.145
	Sleep Disorders	7007	2.249	1	5	1.159
	Psychiatric Disorders	8132	0.0253	0	1	0.157
BMI	BMI as Measure of Nutrition	7007	24.21	0	252	4.78
	Malnourished BMI score< 18.5	196		0	1	
	Obese BMI Score >25	2436		0	1	
Unfavorable Behavioral Norms						
	Ever Use of Tobacco	7007	0.152	0	1	0.359
	Currently Use of Tobacco	1065	0.906	0	1	0.292
	Number of Years Smoking	3713	29.03	1	84	13.68
	Number of Cigarettes Per Day	3796	5.238	0	70	10.44

Favorable Behavioral Norm						
	Days Per Week Consuming Vegetables or Fruit	7007	6.047	0	14	2.96
	No of Portions of Vegetables and Fruit	7007	5.347	0	30	4.326
Explanatory Variables						
Background in Syria						
	Age	7247	31.49	15	85	11
	Gender (Female)	8132	0.5	0	1	0.5
	Education	7247	4.578	1	9	1.74
	Marital Status	8132	0.734	0	1	0.442
	Income in Syria (in logs)	6184	8.464	0.693	18.42	1.966
	Damage to House in Syria	8130	2.498	1	5	1.659
	Family Member Killed in War	8132	0.0601	0	9	0.344
	Family Member Injured in War	8132	0.0544	0	30	0.522
	Governorate of Origin in Syria					
	Daraa Governorate	19	0.003	0	1	
	Deir ez-Zor Governorate	174	0.025	0	1	
	Aleppo Governorate	4,353	0.621	0	1	
	Hama Governorate	170	0.024	0	1	
	Al-Hasakah Governorate	523	0.075	0	1	
	Homs Governorate	123	0.018	0	1	
	Idlib Governorate	591	0.084	0	1	
	Quneitra Governorate	4	0.001	0	1	
	Latakia Governorate	94	0.013	0	1	
	Raqqa Governorate	186	0.027	0	1	
	Rif Sham Governorate	63	0.009	0	1	
	As-Suwayda Governorate	6	0.001	0	1	
	Rif Dimashq Governorate	690	0.098	0	1	
	Tartus Governorate	11	0.002	0	1	
Background in Turkey						
	Months in Turkey	7272	43.61	0	142	18.31
	Income in Turkey (in logs)	6425	6.835	0.693	11.85	0.806
	Health Literacy	8132	1.735	0	5	1.21
	Commonality of Residencies in Syria snd Turkey	7007	0.583	0.001	1	0.326
	Electricity in House in Turkey	6783	0.837	0	1	0.369
	Urban Location	7000	0.74	0	1	0.439
	Province in Turkey					
	Adana	490	0.06	0	1	

Ankara	216	0.027	0	1
Bursa	337	0.041	0	1
Gaziantep	988	0.121	0	1
Hatay	1193	0.147	0	1
Istanbul	1422	0.175	0	1
Izmir	319	0.039	0	1
Kahramanmaras	272	0.033	0	1
Kayseri	172	0.021	0	1
Kilis	376	0.046	0	1
Konya	222	0.027	0	1
Mardin	290	0.036	0	1
Mersin	436	0.054	0	1
Osmaniye	134	0.016	0	1
Sanliurfa	1265	0.156	0	1

Source: World Health Organization, Health Assessment Survey of Syrian Refugees in Turkey

Table 2: Parameter Estimates between Individual and Background in Syria Characteristics and Diseases by Type

VARIABLES	(1) Non-chronic Disease	(2) Chronic Disease	(3) Long-term Discomfort and Disability Requiring Home Care	(4) A Condition that You Think is a Symptom of a Chronic Illness	(5) Cardiac Disease	(6) Diabetes	(7) Cancer	(8) Sexually Transmitted Diseases or Fertility Disorder	(9) Asthma	(10) Chronic Pulmonary	(11) Other Disease
Age Group_2, 20-29	-0.1764	-0.1826**	0.0459	-0.1589	0.0559	-0.0774	-0.1880	-0.0626	0.3136***	0.2706	-0.1529*
	(0.1112)	(0.0865)	(0.1162)	(0.1701)	(0.2645)	(0.4481)	(0.2556)	(0.2345)	(0.1011)	(0.2425)	(0.0915)
Age Group 3, 30-39	-0.2154*	-0.1064	0.3930***	-0.0926	0.0456	0.1776	-0.3980	-0.4003	0.4667***	0.4328**	0.2647**
	(0.1309)	(0.1053)	(0.1320)	(0.1290)	(0.2174)	(0.2652)	(0.3642)	(0.2563)	(0.0695)	(0.2013)	(0.1154)
Age Group 4, 40-49	-0.2109*	0.1579	0.6736***	0.1873	0.5721**	0.6192*	-0.2035		0.5326***	0.3869	0.3436***
	(0.1149)	(0.1572)	(0.1161)	(0.1907)	(0.2650)	(0.3346)	(0.4144)		(0.1189)	(0.3207)	(0.1325)
Age Group 5, 50-59	-0.2057	0.5717***	0.8277**	0.5942***	1.0546***	1.0021***	0.3186		0.5872***	0.1950	0.6734***
	(0.1872)	(0.1410)	(0.3420)	(0.2102)	(0.3504)	(0.3692)	(0.3789)		(0.2077)	(0.2504)	(0.1846)
Age Group 6, >=60	-0.9295***	0.8891***	1.2774***	0.3786	1.5039***	1.8023***	0.4407		0.9426***	1.1116***	0.9325***
	(0.3236)	(0.1616)	(0.2835)	(0.2336)	(0.2473)	(0.4301)	(0.5325)		(0.3066)	(0.0949)	(0.2273)
Female	0.3584*	0.4421*	-0.1781	-0.1655	0.0080	0.1173	-1.2483*	0.6513*	0.3570	0.0217	0.1408
	(0.1912)	(0.2635)	(0.2718)	(0.2778)	(0.3580)	(0.2296)	(0.6737)	(0.3945)	(0.2484)	(0.4034)	(0.4439)

Months in Turkey	-0.0009	0.0035	-0.0011	0.0078***	0.0025	0.0020	0.0052**	0.0075	0.0009	0.0076***	0.0057***
	(0.0025)	(0.0045)	(0.0024)	(0.0029)	(0.0037)	(0.0016)	(0.0025)	(0.0064)	(0.0026)	(0.0022)	(0.0012)
Commonality in Origins	0.3120	0.4518	0.4568	0.1387	0.0970	-0.0466	-0.0137	-0.1429	-0.0276	0.5029*	-0.0727
	(0.2633)	(0.2902)	(0.3249)	(0.2513)	(0.1970)	(0.0923)	(0.3679)	(0.3761)	(0.2155)	(0.2848)	(0.1868)
Education of selected respondent	0.0071	0.0892***	0.0005	0.0060	0.0120	0.1122***	-0.0948	0.0186	0.0770*	0.0237	0.0960**
	(0.0239)	(0.0247)	(0.0594)	(0.0286)	(0.0304)	(0.0424)	(0.1081)	(0.0326)	(0.0423)	(0.0862)	(0.0420)
Female X Education	-0.0778*	-0.0639*	0.0411	0.0532	0.0026	-0.0016	0.2797**	-0.0760	-0.0700	-0.0198	-0.0093
	(0.0436)	(0.0368)	(0.0535)	(0.0354)	(0.0670)	(0.0416)	(0.1371)	(0.0598)	(0.0452)	(0.0790)	(0.0722)
Married	0.1676	0.0453	-0.2675	-0.3101**	-0.2887**	-0.1535	0.1087	-0.1156	-0.3075***	-0.2538***	-0.1343
	(0.1092)	(0.1242)	(0.2502)	(0.1376)	(0.1227)	(0.2870)	(0.1904)	(0.4483)	(0.1025)	(0.0974)	(0.2598)
Urban	-0.5001	-0.1484	0.0026	0.1687	0.2058	0.1521	-0.0730	-0.2374	0.3955***	0.0350	-0.1399
	(0.3448)	(0.2663)	(0.2599)	(0.1989)	(0.2098)	(0.2014)	(0.1483)	(0.1522)	(0.1328)	(0.2623)	(0.2225)
Family Member killed in War	0.0637	0.9260***	0.2900	0.6164***	0.5373***	0.3448*		0.8126***	0.6416***	0.5903***	0.4351***
	(0.1113)	(0.1759)	(0.2431)	(0.1207)	(0.1842)	(0.1990)		(0.2611)	(0.1272)	(0.1490)	(0.1300)
Health Literacy Measure	0.1314	-0.0775	-0.0149	-0.0421	-0.0860	-0.0915	-0.2010	0.1710**	0.0349	0.2164***	-0.0313
	(0.0869)	(0.0569)	(0.1328)	(0.0890)	(0.0809)	(0.0859)	(0.1772)	(0.0772)	(0.0661)	(0.0549)	(0.0444)
Log Income in Syria	0.0572	-0.0217	-0.0220	0.0083	0.0547**	0.0269	0.0508	0.0286	-0.0216	-0.0647	0.1677***
	(0.0691)	(0.0414)	(0.0675)	(0.0371)	(0.0256)	(0.0407)	(0.0398)	(0.0452)	(0.0284)	(0.0574)	(0.0554)
Damage to House in Syria	-0.0493	-0.0824*	-0.0325	0.0170	0.0205	-0.0157	0.0133	-0.0218	0.0028	-0.0327	0.0496
	(0.0361)	(0.0466)	(0.0411)	(0.0399)	(0.0444)	(0.0316)	(0.0601)	(0.0697)	(0.0409)	(0.0399)	(0.0589)

Constant	-1.7347**	-2.7278***	-2.8573***	-2.8592***	-3.0918***	-3.2264***	-2.8721***	-3.6168***	-2.9458***	-3.3810***	-4.4414***
	(0.7570)	(0.6595)	(0.6421)	(0.4245)	(0.3477)	(0.5317)	(0.7778)	(0.8208)	(0.3734)	(0.4426)	(0.5326)
Observations	5,015	5,015	5,015	5,015	5,015	5,015	4,781	4,146	5,015	5,015	5,015
r_p^2	0.0596	0.142	0.0807	0.0691	0.148	0.163	0.103	0.119	0.0573	0.107	0.126

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Parents Physical and Mobility Problems

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Difficulty in Moving Around	Pain or Discomfort	Difficulty in Self-care	Difficulty in Work or Household Activities	Condition/Obstacle that Limits Your Ability to Move
Age of selected respondent	0.0155	0.0109	0.0151	0.0132	0.0524**
	(0.0194)	(0.0148)	(0.0142)	(0.0178)	(0.0225)
Age Squared	-0.0002	-0.0001	-0.0002	-0.0001	-0.0003
	(0.0003)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Female	0.2664**	0.3671***	0.2395*	0.2232***	-0.4030
	(0.1081)	(0.0990)	(0.1331)	(0.0712)	(0.4194)
Months in Turkey	-0.0003	-0.0001	0.0000	0.0008	0.0064**
	(0.0014)	(0.0018)	(0.0018)	(0.0020)	(0.0031)

Commonality in Origins	0.1562	0.0705	0.1747	0.2406	-0.3844**
	(0.1300)	(0.1651)	(0.1912)	(0.1774)	(0.1671)
Education of selected respondent	-0.0212	0.0036	-0.0238	-0.0011	-0.0397
	(0.0470)	(0.0487)	(0.0604)	(0.0557)	(0.0503)
Female X Education	-0.0426*	-0.0666***	-0.0386	-0.0397**	0.0559
	(0.0219)	(0.0244)	(0.0266)	(0.0190)	(0.0867)
Married	0.0684	0.0810	-0.0139	0.1005	-0.3216
	(0.1297)	(0.1157)	(0.1029)	(0.0953)	(0.2237)
Urban	-0.3976***	-0.2968***	-0.3913***	-0.3374***	0.9514***
	(0.0520)	(0.0715)	(0.0668)	(0.0703)	(0.1312)
Family Member killed in War	0.3029**	0.4449**	0.2735	0.3868*	0.0619
	(0.1417)	(0.1959)	(0.2086)	(0.2248)	(0.3306)
Health Literacy Measure	0.2971***	0.2776***	0.3094***	0.2932***	-0.0167
	(0.0548)	(0.0448)	(0.0524)	(0.0510)	(0.0521)
Log Income in Syria	0.0245	-0.0028	0.0146	0.0347	-0.1073***
	(0.0348)	(0.0400)	(0.0404)	(0.0362)	(0.0381)
Damage to House in Syria	-0.0954*	-0.0844	-0.0819	-0.0838	0.0216
	(0.0513)	(0.0571)	(0.0561)	(0.0580)	(0.0568)
Constant	-0.4080	-0.4873	-0.6182	-0.9929**	-4.5451***
	(0.3104)	(0.3912)	(0.4515)	(0.3940)	(0.7527)
Observations	5,015	5,015	5,015	5,015	4,477
r_p^2	0.121	0.129	0.148	0.158	0.140

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Mental Health Issues

VARIABLES	(1) Distress Sadness or Worry	(2) Difficulty in Concentrating	(3) Depressive	(4) Lose Interest in Regular Activities	(5) Sleep Disorder	(6) Psychiatric Disorders
Age Group 2, 20-29	-0.0088	0.0391	0.0845	0.1036	0.0771	-0.0070
	(0.0697)	(0.0738)	(0.0643)	(0.0632)	(0.0654)	(0.0052)
Age Group 3, 30-39	0.0393	0.1048	0.1552**	0.1641*	0.1622	0.0015
	(0.1004)	(0.0859)	(0.0702)	(0.0861)	(0.0975)	(0.0067)
Age Group 4, 40-49	0.0231	0.0941	0.1684***	0.1622*	0.1913**	0.0067
	(0.0872)	(0.0896)	(0.0535)	(0.0857)	(0.0803)	(0.0084)
Age Group 5, 50-59	0.0246	0.1388	0.1053	0.1589	0.1992	-0.0065
	(0.1086)	(0.1001)	(0.0946)	(0.1112)	(0.1194)	(0.0096)
Age Group 6, >=60	0.0727	0.2004	0.2504	0.2134	0.1450	0.0279
	(0.1256)	(0.1165)	(0.1745)	(0.1840)	(0.1712)	(0.0201)
Female	0.3263***	0.3473***	0.2341***	0.1617**	0.2385***	-0.0004
	(0.0538)	(0.0832)	(0.0679)	(0.0708)	(0.0735)	(0.0040)
Months in Turkey	-0.0030	-0.0039	-0.0011	-0.0018	-0.0015	0.0001

	(0.0028)	(0.0025)	(0.0022)	(0.0019)	(0.0023)	(0.0001)
Commonality in Origins	0.3730*	0.3816**	0.4641**	0.4533**	0.4691**	0.0156*
	(0.1752)	(0.1673)	(0.1748)	(0.1825)	(0.1620)	(0.0078)
Education of selected respondent	-0.0097	-0.0147	0.0077	-0.0005	0.0079	0.0013
	(0.0377)	(0.0388)	(0.0380)	(0.0387)	(0.0376)	(0.0008)
Female X Education	-0.0539***	-0.0614***	-0.0367**	-0.0263	-0.0338	0.0003
	(0.0150)	(0.0201)	(0.0164)	(0.0175)	(0.0194)	(0.0011)
Married	0.0675	-0.0091	-0.0365	-0.0456	0.0078	-0.0060
	(0.0927)	(0.1034)	(0.1072)	(0.0983)	(0.0977)	(0.0040)
Urban	0.1482	0.1347	-0.0020	-0.0267	-0.0254	0.0081**
	(0.1263)	(0.1217)	(0.1291)	(0.1190)	(0.1053)	(0.0034)
Number of people killed in one household	0.2109***	0.1082**	0.1979***	0.1560**	0.1359**	0.0242***
	(0.0634)	(0.0394)	(0.0460)	(0.0534)	(0.0551)	(0.0079)
Number of people injured in one household	0.0350	0.0533**	0.0519	0.0540*	0.0640*	0.0083*
	(0.0357)	(0.0208)	(0.0416)	(0.0277)	(0.0353)	(0.0040)
Health Literacy Measure	0.2639***	0.3112***	0.2775***	0.2933***	0.2871***	-0.0011
	(0.0752)	(0.0767)	(0.0781)	(0.0760)	(0.0717)	(0.0026)
Log Income in Syria	0.0238	0.0351*	0.0628**	0.0516**	0.0536**	0.0008
	(0.0138)	(0.0172)	(0.0211)	(0.0211)	(0.0181)	(0.0008)
Damage to House in Syria	-0.1366***	-0.1162***	-0.0927**	-0.0892***	-0.1128***	-0.0019*
	(0.0396)	(0.0352)	(0.0313)	(0.0283)	(0.0358)	(0.0010)

Constant	1.6614***	1.4439***	0.9122*	1.0355**	1.0612***	-0.0102
	(0.2792)	(0.2747)	(0.4289)	(0.4401)	(0.3354)	(0.0136)
Observations	5,015	5,015	5,015	5,015	5,015	5,015
r_p^2	0.1374	0.1556	0.1568	0.1526	0.1604	0.0208

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4A Results for Severity of Mental Health Problems in Form of Distress, Sadness and Worry as in Table 4 but with Time in Turkey Interaction Terms Added

	(1)	(2)	(3)	(4)	(5)	(6)
	Male	Female	Male	Female	Male	Female
Age	-0.000164	0.00345	0.0000219	0.00346	0.000193	0.00332
	(0.00336)	(0.00275)	(0.00334)	(0.00275)	(0.00336)	(0.00275)
Married	0.0883	0.0248	0.0723	0.0257	0.0607	0.0229
	(0.0954)	(0.0759)	(0.0950)	(0.0759)	(0.0958)	(0.0758)
Education	-0.000847	-0.0340*	-0.00133	-0.0338*	0.00121	-0.0338*

	(0.0219)	(0.0154)	(0.0217)	(0.0154)	(0.0219)	(0.0153)
Months in Turkey	-0.00467*	-0.00286*	0.0183**	0.000712	-0.0225***	-0.0150**
	(0.00191)	(0.00131)	(0.00627)	(0.00445)	(0.00658)	(0.00572)
Urban	0.463*	0.0781	0.428*	0.0807	0.452*	0.0816
	(0.207)	(0.112)	(0.205)	(0.112)	(0.206)	(0.112)
Log Income in Syria	-0.00385	-0.0422*	0.00219	-0.0445*	-0.113*	-0.107**
	(0.0262)	(0.0174)	(0.0260)	(0.0175)	(0.0459)	(0.0337)
Dummy_killed1	-0.423	0.532***	-0.0136	0.608***	-0.0432	0.614***
	(0.230)	(0.138)	(0.146)	(0.110)	(0.146)	(0.110)
Damage to House in Syria	0.0895*	0.110***	0.423***	0.156*	0.0990*	0.116***
	(0.0439)	(0.0276)	(0.0982)	(0.0614)	(0.0438)	(0.0277)
Time in Turkey * Family Member Killed in War	0.00618*	0.00122				
	(0.00275)	(0.00139)				
Time in Turkey * House			-0.00661***	-0.00105		

Destruction in Syria			(0.00177)	(0.00129)		
Time in Turkey* Income in Syria					0.00241** (0.000824)	0.00151* (0.000682)
Constant	1.043	3.385***	-0.0153	3.245***	1.881**	3.902***
	(0.574)	(0.286)	(0.640)	(0.337)	(0.637)	(0.369)
Observations	780	2078	780	2078	780	2078
Adjusted R-squared	0.412	0.157	0.418	0.157	0.414	0.158

Notes:

Standard errors in parentheses Province Fixed Effects Added

="* p<0.05 ** p<0.01 *** p<0.001"

Table 5: MALNOURUSHED and OBESE based on BMI Scores by Gender

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	OBESE as measured from BMI						***MALNOURISHED as measured from BMI***					
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age	0.0245**	0.0572***	0.0221***	0.0119***	0.0231***	0.0564***	0.0237	-0.0490**	-0.00092	-0.00116*	-0.00059	-0.0457**
	-0.00797	-0.00601	-0.00423	-0.00115	-0.00403	-0.00577	-0.0192	-0.018	-0.0139	-0.00048	-0.0133	-0.0165
Married	-0.363	-0.145	-0.00297	-0.0435	0.00233	-0.0844	0.25	-0.714*	-0.455	-0.0435**	-0.34	-0.710*
	-0.228	-0.179	-0.128	-0.0318	-0.123	-0.174	-0.728	-0.321	-0.371	-0.0133	-0.362	-0.3
Education of selected respondent	0.0224	-0.0704*	0.00356	-0.0143*	0.0127	-0.0750*	-0.0171	0.190*	0.0126	0.00590*	0.00349	0.204**
	-0.0521	-0.0334	-0.0288	-0.00644	-0.0276	-0.032	-0.15	-0.0779	-0.0917	-0.0027	-0.0892	-0.0744
Months in Turkey	0.00527	0.00403					0.00709	0.00911				
	-0.00452	-0.00285					-0.0143	-0.00635				
Urban	0.561	0.307	0.252	0.0614			12.75	-0.383	0.865	-0.0106		
	-0.476	-0.238	-0.195	-0.0472			-1003.5	-0.55	-0.755	-0.0198		
Log Income in Syria	0.243***	0.0603	0.124***	0.0121	0.135***	0.0516	-0.340*	-0.226*	-0.148	-0.00641*	-0.0862	-0.235*
	-0.0636	-0.0369	-0.0328	-0.00728	-0.0309	-0.0351	-0.158	-0.0968	-0.0969	-0.00305	-0.0943	-0.0913
Family Member Killed	0.144	0.0937	0.181	0.0181	0.143	0.0707	0.941	0.443	-0.253	0.0151	-0.306	0.405
	-0.327	-0.23	-0.192	-0.0461	-0.177	-0.225	-0.737	-0.498	-0.546	-0.0193	-0.539	-0.494
Damage to House in Syria	-0.0861	-0.0597	-0.225***	-0.0116	-0.241***	-0.0635	0.0765	-0.0449	0.0753	-0.00225	0.0519	-0.0985
	-0.101	-0.0578	-0.0495	-0.0116	-0.0469	-0.0555	-0.326	-0.138	-0.161	-0.00486	-0.155	-0.125
Adana	0.196	1.398***	0.675**	0.0611	0.594*	1.365***	1.226	1.198*	1.05	0.0271	0.832	1.124
	-0.444	-0.295	-0.258	-0.0717	-0.255	-0.289	-1.106	-0.605	-0.71	-0.03	-0.709	-0.588
Ankara	-0.675	0.579	0.108	-0.112	0.0121	0.538	1.947	-0.404	1.518*	-0.0212	1.246	-0.52

	-0.463	-0.369	-0.303	-0.0787	-0.298	-0.362	-1.032	-1.149	-0.766	-0.033	-0.765	-1.136
Bursa	0.0176	-0.0921	0.342	-0.230**	0.252	-0.138	0	1.358	0.891	0.0195	0.598	1.247
	-0.662	-0.345	-0.277	-0.0719	-0.271	-0.337	(.)	-0.738	-0.824	-0.0302	-0.813	-0.709
Gaziantep	-0.226	0.881**	0.0531	-0.0489	-0.0372	0.854**	0	-0.72	-0.562	-0.0277	-0.818	-0.776
	-0.555	-0.277	-0.24	-0.0672	-0.235	-0.27	(.)	-0.799	-0.925	-0.0282	-0.919	-0.789
Hatay	0.147	0.941**	0.293	-0.0375	0.0397	0.713**	0	-0.18	-0.203	-0.0223	-0.946	0.0805
	-0.512	-0.304	-0.257	-0.0745	-0.212	-0.257	(.)	-0.736	-0.909	-0.0312	-0.776	-0.585
Istanbul	0.224	1.272***	0.583**	0.0298	0.459*	1.181***	1.445	1.107	1.414*	0.0253	0.943	1.129*
	-0.401	-0.274	-0.222	-0.0681	-0.208	-0.259	-1.005	-0.6	-0.598	-0.0285	-0.58	-0.563
Izmir	-0.384	1.024***	0.737**	-0.0113	0.649**	0.941***	0	1.169*	0.113	0.034	0.213	1.289*
	-0.569	-0.288	-0.256	-0.0731	-0.247	-0.277	(.)	-0.583	-0.876	-0.0306	-0.774	-0.556
Kahramanmaras	-0.119	1.335***	0.344	0.0497	0.39	1.270***	0	-0.626	0.15	-0.0265	-0.285	-0.699
	-0.561	-0.346	-0.311	-0.0814	-0.292	-0.33	(.)	-1.138	-1.159	-0.0341	-1.162	-1.133
Kayseri	0	1.962***	1.154***	0.184*	1.045**	1.930***	0	0	0.226	-0.0412	-0.0617	0
	(.)	-0.366	-0.323	-0.0807	-0.32	-0.36	(.)	(.)	-1.196	-0.0338	-1.189	(.)
Kilis	0.482	1.234**	0.166	0.0173	-0.188	0.889**	0	-1.349	0.362	-0.044	-0.76	-1.088
	-0.866	-0.403	-0.342	-0.0881	-0.274	-0.315	(.)	-1.278	-1.406	-0.0369	-1.173	-1.149
Konya	-1.438	1.153**	0.387	0	0.332	0.925**	0	0.669	1.830*	0	1.385*	0.262
	-1.178	-0.384	-0.32	(.)	-0.299	-0.357	(.)	-0.894	-0.717	(.)	-0.693	-0.864
Mardin	-0.315	1.156**	-0.0259	0.0162	-0.311	0.873**	14	-0.21	1.953	-0.0203	0.806	0.308
	-0.662	-0.41	-0.37	-0.0956	-0.304	-0.326	-1003.5	-0.995	-1.109	-0.0401	-0.801	-0.836
Mersin	1.036	1.148**	0.324	0.00341	0.26	0.815**	0	-0.0506	0.127	-0.0151	-0.996	0.28
	-0.722	-0.376	-0.324	-0.0873	-0.243	-0.279	(.)	-0.822	-1.348	-0.0366	-1.116	-0.62
Osmaniye	0	0.414	0.0345	-0.12	0.38	0.813	0	0	0	-0.054	0.349	1.637*

	(.)	-0.734	-0.581	-0.132	-0.362	-0.42	(.)	(.)	(.)	-0.0555	-1.141	-0.675
Sanliurfa	0	0	0	-0.189**	0	0	0	0	0	-0.0143	0	0
	(.)	(.)	(.)	-0.0732	(.)	(.)	(.)	(.)	(.)	-0.0307	(.)	(.)
Constant	-3.747***	-3.744***	-2.340***	-0.00762	-2.143***	-3.158***	-16.12	-0.698	-3.849**	0.160**	-3.282***	-0.555
	-0.853	-0.486	-0.387	-0.119	-0.318	-0.378	-1003.5	-1.09	-1.252	-0.0498	-0.973	-0.786
Observations	773	2078	2581	2078	2792	2205	585	1986	2559	2078	2791	2129
Pseudo R-squared	0.076	0.091	0.052	0.098	0.052	0.085	0.058	0.107	0.07	0.024	0.054	0.11

Notes: Obese and Malnourished Based on BMI Scores with Cutoffs from the work bank. <18.5 is considered as Malnourished and >25 as OBESE

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001"

Table 6: Tobacco Use and Healthy Food Behavior

	(1)	(2)	(3)	(4)	(5)
VARIABLES	**Use of Tobacco**	**Number of Years Smoking**	**Number of Cigarettes Per Day**	**Fruits and Vegetables Per Day**	**Days Per Week**
Age of selected respondent	0.0020***	0.9521***	0.0583***	0.0216***	0.0017
	(0.0005)	(0.0143)	(0.0188)	(0.0060)	(0.0043)
Female	-0.1133***	-19.9049***	14.4779***	-0.6603**	0.3934*
	(0.0273)	(2.4303)	(3.0704)	(0.3237)	(0.2303)
Urban	-0.0525***	1.5000**	-2.3420***	0.2560	0.8864***
	(0.0197)	(0.6016)	(0.7941)	(0.2340)	(0.1665)

Married	0.0260*	-1.6698***	0.7020	0.0405	0.3592***
	(0.0146)	(0.4350)	(0.5669)	(0.1731)	(0.1232)
Married in Turkey	-0.0123	1.5519**	-0.0610	0.1873	-0.0883
	(0.0138)	(0.6735)	(0.8799)	(0.1636)	(0.1164)
Months in Turkey	0.0002	0.0002	0.0178*	0.0174***	0.0048**
	(0.0003)	(0.0081)	(0.0106)	(0.0031)	(0.0022)
Log Income in Turkey	-0.0078	-0.5662**	0.3868	-1.4446***	0.2325***
	(0.0070)	(0.2576)	(0.3391)	(0.0836)	(0.0595)
Education of selected respondent	0.0191***	-0.2844***	0.2798**	0.2007***	0.3587***
	(0.0041)	(0.0997)	(0.1300)	(0.0482)	(0.0343)
Female X Education	-0.0236***	1.5973***	-1.6961***	0.1671***	-0.0427
	(0.0053)	(0.5083)	(0.6470)	(0.0627)	(0.0446)
Damage to House in Syria	0.0078***	-0.2968***	0.2541**	0.4396***	0.1390***
	(0.0030)	(0.0907)	(0.1189)	(0.0351)	(0.0249)
Family Member Injured in War	-0.0561**	1.5361**	-1.0916	-0.8109***	0.2376
	(0.0257)	(0.7712)	(1.0042)	(0.3052)	(0.2171)
Family Member killed in War	0.1630***	-4.0210***	5.3728***	0.2506	0.7113***
	(0.0227)	(0.6847)	(0.8869)	(0.2689)	(0.1914)
Health Literacy Measure	-0.0097*	0.6211***	-0.3389*	0.0399	0.0106
	(0.0049)	(0.1549)	(0.1999)	(0.0587)	(0.0418)
Mental Disease Things	0.0007	-0.1711	0.7100*	1.2517***	0.6141***

	(0.0098)	(0.3019)	(0.3971)	(0.1163)	(0.0828)
Constant	0.2776***	-1.9486	1.0910	12.2811***	0.5309
	(0.0770)	(2.5539)	(3.3483)	(0.9139)	(0.6503)
T	5,199	2,734	2,797	5,199	5,199
R-squared	0.1262	0.6853	0.0483	0.1195	0.0690
Number of City	13	13	13	13	13

Standard errors in parentheses