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DEMOGRAPHIC AND POST-MIGRATION FACTORS RELATED TO ANXIETY AND DEPRESSION SYMPTOMS AMONG UNDOCUMENTED MIGRANTS IN GENEVA

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PROJECT PARCHEMINS: INTERNSHIP SUMMARY

From August 15th until December 15th of 2018 I was a full-time intern in the research project Parchemins, a four-year interdisciplinary longitudinal study headed by Professor Claudine Burton-Jeangros of the University of Geneva and Dr. Yves Jackson of Geneva University Hospitals. The primary objective of the project is to assess the impact of regularization through the Operation Papyrus on the health and socioeconomic conditions of undocumented migrants in Geneva. The Operation Papyrus was a program officially in place from the beginning of 2017 until the end of 2018 aimed at regularizing long-term undocumented workers in the canton.

During the first two months of the internship, my primary tasks involved recruitment of potential participants and carrying out interviews. The study population comprised individuals older than 18 who had lived in Geneva without authorization papers for at least 3 years, migrated from outside the European Union, had not been refugees or asylum seekers, and were either still living in the canton without residency permit or had received their permit in the previous 3 months through Papyrus. My personal involvement in the recruitment process was threefold:

1) Two to three times per week I would visit the *Consultation ambulatoire mobile de soins Communautaires* (CAMSCO) a clinic that facilitates access to preventive, curative and rehabilitation care for target populations in the Geneva University Hospitals, namely individuals without health insurance, which includes residents without legal status. Thanks to the head of the CAMSCO unit Dr. Yves Jackson, the research team and I were able to visit the clinic and talk to patients in the waiting room about our project in the hope of finding individuals who met our population criteria and were willing to participate. I would individually approach every visitor, explain the objective of our research, hand them a flyer detailing the purpose of the study as well as our office phone number, and if they responded to the required criteria and were interested in participating, I would try to immediately set an interview date or take their contact information so I or a team member could call them at a later time. It was a slightly delicate process and a sometimes-uncomfortable experience, given that visitors were there because of health issues and did not always appreciate being bothered. But even though not all CAMSCO visits resulted in scheduled interviews or phone numbers, the team and I were able to recruit a significant number of participants through the clinic.

2) Once a week I would go to Unia, a trade union who held permanent sessions to inform, counsel and guide undocumented migrants in the preparation and submission of their Papyrus permit request. Throughout the course of the couple of hours that I would be there, I was able to talk to Unia visitors about our project and enlist study subjects, although this seemed to be the least fruitful of the recruitment methods.

3) For about two hours every other day, or during any free time, I would call potential participants using the available lists of phone numbers. These lists included names and contact information of individuals who were either gathered by the research team during CAMSCO visits or permanent Papyrus information sessions at unions like

Unia or *Syndicat interprofessionnel de travailleuses et travailleurs*, or sent to us by the unions and organizations themselves. Just like with the other recruitment methods, I would explain our study objectives and try to set up an interview time.

Until the end of the first wave of data collection in October 2018, I was able to conduct 50 interviews – in the form of a standardized questionnaire completed on a tablet – in French, English, or Spanish. All but one of the interviews I carried out took place at the University of Geneva. Interviews usually went smoothly – participants seemed mostly at ease, although at times there were some language comprehension issues, and other times I needed to re-explain the concept of anonymity in the middle of the meeting in order to reassure participants that their personal identity and their questionnaire answers would not be released to neither the authorities nor their employers.

Once the first wave of data collection terminated, I assisted field coordinator and researcher Aline Duvoisin in data cleanup with the use of the software SPSS Statistics. This consisted in finding any missing data and going back to the individual interview booklet kept for every participant to determine if 1) the answer was manually written by the investigator in the booklet and could be inserted in the data software, 2) the participant didn't know the answer and should thus be assigned a specific missing value, or 3) either the investigator or the participant skipped the question and should be assigned another type of missing value. Data cleanup also included finding any incoherent or invalid answers and either repairing them based on the information given by the investigator in the interview booklet, or by assigning a third type of missing value. In addition, I helped create new variables based on the existing data (like, for instance, a Body Mass Index variable based on the weight and height variables).

The data cleanup was crucial to the presentation of the preliminary study results during the November 6, 2018 symposium titled "Living without papers", held at the University of Geneva. In order to prepare for the symposium, I helped carry out the initial statistical analyses of the data collected during the first wave of Parchemins, and I also helped analyze certain variables in the Swiss Household Panel data as a way to compare the health and living conditions of undocumented migrants in Geneva to those of the Swiss population.

Lastly, throughout the entire duration of my internship, I assisted Parchemins PhD Candidate Liala Consoli in transcribing the semi-directive interviews she conducted for the qualitative research part of the study.

Overall, my internship with Parchemins was an incredible learning experience. From the get go, the recruitment process forced me to step out of my comfort zone and approach a vulnerable population in situations that were not always ideal, particularly during the CAMSCO visits. This taught me to better read behavioral cues, to know when to step back or to comfortably persist. It also taught me that persistence in participant recruitment is essential – there have been cases of individuals who were called three, four times to no avail, but on the fifth time they picked up the phone and agreed to meet with us.

It also gave me invaluable quantitative data analysis skills, both in terms of statistical knowledge and software knowledge. I first came into the project as an R-Studio user, unfamiliar with SPSS Statistics, but with the guidance of Aline Duvoisin, I was able to quickly learn how to write SPSS syntax and subsequently use the program for my master's

thesis. I also learned what it means to clean up a database – it takes a lot of time, a lot of patience, and a lot of careful thinking regarding the coherence of certain answers, and what missing values to assign where.

Finally, doing research on such a vulnerable population sparked a life-long interest and helped me put into perspective my role in society, my role as a student, and my role as a hopefully future researcher.

The following article is based on the data collected in the first wave of the project Parchemins.

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INTRODUCTION

Migration may be associated with hopes of a better life, but it is also often accompanied by distressful experiences during all stages of the transition, regardless of legal status, age, gender, or origin. However, being undocumented, or lacking legal migration documentation, further complicates the passage (Hilfinger Messias, McEwen et al., 2015). Undocumented immigrants are likely to experience a variety of factors in their destination countries that distinctly impact their physical and mental health status, including social isolation and exclusion, limited access to health services, poor knowledge of the host country's language, low income levels, low education, and adverse effects of acculturation and discrimination (Castañeda, 2009; Hilfinger Messias, McEwen et al., 2015). In addition to the structural and environmental circumstances faced by undocumented immigrants, the stress of living in fear and insecurity due to lack of legal status can contribute to illness (Castañeda, Holmes et al., 2015), therefore making undocumented immigrants an at-risk population for mental disorders, particularly depression and anxiety (Garcini, Peña et al., 2017).

While post-immigration factors have been widely identified as important in immigrants' adaptation process and psychological wellbeing (Pernice and Brook, 1996; Um, Chi et al., 2015; Garcini, Murray et al., 2016; Chen, Hall et al., 2017; Chen, Ling et al., 2017; Garcini, Peña et al., 2017), the literature on demographic factors shows varied impacts on immigrants' mental health. Some researchers state that, for instance, age may negatively impact mental health, as "older undocumented immigrants may be susceptible to distress from age-related illnesses and disability without access to health care, difficulties finding and keeping employment, and longer time away from their families… which in turn may increase risk for a mental disorder" (Garcini, Peña et al., 2017). Other studies, focused on demographic factors like geographical distance between the country of origin and the destination country, have found greater distance to be related to higher depression and anxiety symptoms (Vega, Kolody et al., 1987; Levecque, Lodewyckx et al., 2007). In addition, a study on mental disorders among undocumented Mexican immigrants in the United States revealed that compared to married couples, single participants more often met the criteria for a mental disorder (Garcini, Peña et al., 2017). However, another study conducted on immigrants and refugees in New Zealand found that demographic characteristics such as age, gender, marital status, and educational level were not associated with depression and anxiety symptom levels (Pernice and Brook, 1996).

Despite the growing focus on immigrant populations in the public discourse and in public health research and practice, studies on undocumented immigrant health remain particularly underdeveloped in the area of psychological wellbeing (Garcini, Murray et al., 2016; Patler and Laster Pirtle, 2018). A study on the mental health of different migrant groups in the Swiss canton of Zurich found that 47.6% of undocumented immigrants reported clinically relevant symptoms of depression and anxiety, and found post-migration resources and resident status to be associated with mental health outcomes. However, the study was limited by its small sample size (Heeren, Wittmann et al., 2014). Another study on undocumented migrants in Sweden found that 68% of respondents suffered from anxiety symptoms, and 71% of them suffered from depression symptoms,

but this study seemed to also be limited by its relatively small sample size (Andersson, Hjern et al., 2018). Because of the unclear impact of demographic factors on immigrants' mental health, and because of the paucity of research on the mental health of undocumented populations, the present article thus contributes to the existing literature by further analyzing the demographic and post-migration factors related to symptoms of depression and anxiety within the undocumented immigrant community in Geneva, Switzerland.

DATA AND METHODS

Currently, between 44,000 and 84,000 undocumented immigrants reside in Switzerland, about 13,000 of which live in the canton of Geneva (Morlok, Oswald et al., 2015). In 2017, the canton officially launched the pilot Operation Papyrus, a program aimed to regularize long-term undocumented workers in Geneva, defined as individuals who are currently living in the country without valid immigration or residency documents. The program, discontinued at the end of 2018, had two primary objectives: to work as a system for monitoring and improving the economic sectors particularly affected by undeclared and underpaid work – like the domestic economy sector – and to act as a device for stabilizing and integrating undocumented residents meeting a set of strict criteria within an established legal framework.

This paper draws from the data collected during the first wave of the project Parchemins, an interdisciplinary longitudinal study whose primary objective is to assess the impact of regularization on the health and socioeconomic conditions of undocumented migrants in Geneva. The project, which results from a collaboration between the University of Geneva and the Geneva University Hospitals, will constitute a total of four yearly waves. By following the trajectories of participants residing without legal status, about half of which will have been regularized through Operation Papyrus, the study aims to observe the changes in their pathways caused by regularization by comparing the group of immigrants who have obtained a residence permit with that of non-regularized residents. This present article uses the first wave of the collected data with the aims of identifying the demographic and post-migration factors related to depression and anxiety symptoms among undocumented immigrants in Geneva.

DATA

Participants were recruited with the support of several members of the *Collectif de soutien aux sans-papiers de Genève*, namely the Geneva branches of Caritas, the *Centre de contact Suisses-Immigrés*, the *Centre social protestant*, the *Entraide protestante suisse*, Unia and the *Syndicat interprofessionnel de travailleuses et travailleurs*, organizations who played a key role in Operation Papyrus by holding permanent sessions to inform, counsel and guide undocumented migrants in the preparation and submission of their Papyrus permit request. Respondents were furthermore recruited through the help of CAMSCO (Consultation ambulatoire mobile de soins communautaires), a clinic that facilitates access to preventive, curative and rehabilitation care for target populations in the University Hospitals of Geneva, namely individuals without health insurance, which includes residents without legal status.

Fielded between October 2017 and October 2018, the first wave of the Parchemins study included 462 participants aged 18 or older, who had lived in Geneva for at least three years, migrated from countries outside the European Union, were not asylum seekers, and were residing in Geneva either without proper documentation or had

received their residency permit through the Operation Papyrus no more than three months prior to the interview. Although in this article we specifically discuss undocumented individuals, we deemed it appropriate to include in our analysis all participants, even those who recently received their residency permit. Two reasons stood behind this decision: first, it allowed us to conduct an analysis on a larger sample of individuals, and second, we believed that three months is not a long enough time for the change in legal status to significantly impact their mental health. Moreover, as is shown in the later section, we included their permit status in the analysis to measure any possible effects of the newly acquired residency authorization.

Data was collected via standardized questionnaire administered on a tablet by a researcher in French, Spanish, English, Portuguese, or Albanian, depending on the preferred language of the respondent. Interviews lasted about 45 minutes and were conducted either at the University of Geneva or at the participant's residence, with strict respect for anonymity and confidentiality. Before beginning the interview, respondents were informed about the objectives of the project, and they were asked to read an information sheet further detailing the study's procedures and informing them of their rights to withdraw from the interview at any desired time. They were then asked to sign a consent form. The study was reviewed and approved by the cantonal ethics committee.

MEASURES

DEPENDENT VARIABLES

Depression and anxiety are some of the most common mental disorders in the general population in Switzerland. According to a report by the Swiss Health Observatory, in 2012 about 30% of the Swiss population reported experiencing depressive symptoms (Schuler, Tuch et al., 2016), and about 15% of the population suffers from anxiety symptoms (Bürli, Amstad et al., 2015). Although the two disorders are often comorbid with one another (Hettema, 2008; Kroenke, Spitzer et al., 2010) and the genes for generalized anxiety disorder and major depressive disorder are very similar or possibly even identical, the environmental determinants are less strongly related (Kendler, Neale et al., 1992; Kessler, Gruber et al., 2008). Because our study analyzes demographic and environmental factors, we thus conducted separate analyses for depression and anxiety as dependent variables, and then compared the findings to one another.

Depression

Depression symptoms were measured using the Patient Health Questionnaire (PHQ)-9 scale, which was translated in all five languages. The PHQ-9 is a 9-item scale that "can be used either as a diagnostic algorithm to make a probable diagnosis for major depressive disorder (MDD) or as a continuous measure with scores ranging from 0 to 27 and cutoff points of 5, 10, 15, and 20 representing mild, moderate, moderately severe and severe level of depressive symptoms" (Kroenke, Spitzer et al., 2010, p.346). Respondents were asked if in the course of the previous two weeks they had experienced a series of 9 different scenarios and were given the answer choices "Never" "Rarely" "Often" and

"Almost every day", each of which was given a score from 0 to 3 respectively (See Appendix 1).

For the purpose of this analysis, we created a dichotomous dependent variable classifying individuals scoring less than 5 points as experiencing no depressive symptoms, and individuals scoring 5 or more as experiencing mild to severe depressive symptoms. In cases in which individuals responded to less than 5 of the 9 items on the scale, we assigned a missing value. In all other cases, we computed the mean of the scores and multiplied it by the number of items in the PHQ-9, which ensured that a score was assigned even to participants who responded to at least 5, but not all items.

Anxiety

Anxiety symptoms were measured using the Generalized Anxiety Disorder (GAD)-7 scale, originally developed to diagnose generalized anxiety disorder (Kroenke, Spitzer et al., 2010). It is a 7-item scale in which participants were asked if in the course of the prior two weeks they felt disturbed by a variety of problems, and they were given the same response set as in the PHQ-9 scale (See Appendix 2). Analogously to the PHQ-9 questionnaire, scores could range from 0 to 27, here with cutoff points of 5, 10, and 15 representing mild, moderate, and severe levels of anxiety symptoms (Kroenke, Spitzer et al., 2010).

We thus created a dichotomous dependent variable classifying respondents with a score lower than 5 as experiencing no anxiety symptoms, and respondents with a score of 5 or greater as experiencing mild to severe anxiety symptoms. Similarly to the depression variable, we assigned a missing value to individuals who responded to less than 4 of the 7 items on the scale. In all other cases, we computed the mean of the scores and multiplied it by the number of items in the GAD-7, guaranteeing a score even for those who completed most, but not all, of the anxiety questionnaire.

DEMOGRAPHIC FACTORS

Sex – Because in the general population women have twice the lifetime rates of depression than men and are more likely to have comorbid anxiety disorder (Altemus, Sarvaiya et al., 2014), we included sex as one of our demographic factors to analyze whether this is correlated with anxiety and depression symptoms in the undocumented population as well.

Age at the time of interview – It is important to note that we had originally planned to also include "Age at the time of arrival" in our analysis due to a study conducted on Asian immigrants in United States that found that immigrants who reached the host country as adults were more likely to experience major depression than those who immigrated at a younger age (Takeuchi, Zane et al., 2007). However, a Pearson correlation coefficient of 0.78 showed that in our study, the two variables were strongly correlated to one another, and including both of them in the analysis may have caused a confounding effect. Given the possible correlation between age and mental health, as stated by Garcini, Peña et al. (2017), we decided to keep "Age at the time of interview" in our analysis to be able to measure this effect.

Origin – Region of origin was determined by asking respondents to define their nationality, which we then placed in one of the following categories: Latin America, Asia, Africa, and Eastern Europe. For transparency purposes, it is important to note that in our sample, two participants did not perfectly fit in these categories: one Russian respondent, whom we placed in the Eastern Europe category, and one self-defined stateless person (*apatride)*, whom we placed in the Africa category based on Chad being his country of birth.

Education – Education level can influence post-migration adjustment. In the case of undocumented immigrants, individuals with high levels of education are likely to take up menial jobs once arrived in their destination country. The discrepancy between their educational background and their occupation may lower their self-esteem and thus negatively impact their mental health (Bhugra, 2004). Level of education was therefore coded into a dichotomous variable: 0=Less than university, 1=University/higher education.

Relationship status – Relationship status was also dichotomized. Individuals who were either married or in a relationship were grouped together, and those without a partner were placed in a second category. It is important to note that this variable only pertains to relationship status, not living situation, as some of our married participants did not live with their companion.

POST-MIGRATION FACTORS

Duration in Geneva – Although the healthy immigrant paradox suggests that immigrants' health often deteriorates over time (Constant, 2017), a study of undocumented Latino youth in the United States revealed that length of time in the US was not significantly related to psychological wellbeing (Patler and Laster Pirtle, 2018). Moreover, studies of both documented and undocumented immigrant Latino youth, as well as research on Mexican women in the US found that time in the country reduced the risk of depressive symptoms and anxiety (Vega, Kolody et al., 1987; Potochnick and Perreira, 2010). Because of these contrasting findings, we included years spent living in Geneva without interruption in our analysis by recoding the original numerical variable into a categorical variable, using the quartiles as cutoff points. This resulted in the following categories: "3-8 years", "9-11 years", "12-14 years", and "15 years or longer".

Permit status – In order to measure any eventual impact of the newly acquired legal status on mental health, we created a dichotomous variable with participants who received their residency permit within three months of interview in one category, and those without authorization in the other.

Language proficiency – Fluency in the language of the host country can facilitate the adjustment process (Bhugra, 2004), and inadequate language proficiency can be an acculturative stressor that may result in mental health problems, including depressive, anxiety, and psychiatric disorders (Takeuchi, Zane et al., 2007; Moussaoui and Agoub, 2010). In order to test for the relationship between language fluency and symptoms of anxiety and depression, we asked participants to self-evaluate their level of oral proficiency in French. They were given five response options: "Very good", "Good", "Sufficient", "Bad", "Very bad", and lastly "Do not know" in case they were not able to assess their language skills. We then recoded the variable into three categories: "Very

good/Good", "Sufficient", and "Bad/Very bad". Those who responded "Do not know" were assigned a missing value.

Ethnic/Racial discrimination – Existing research finds consequential evidence for the harmful effects of discrimination across a variety of mental health outcomes like depression and anxiety within both the non-migrant and migrant populations (Pascoe and Smart Richman, 2009; Um, Chi et al., 2015; Chen, Hall et al., 2017). Studies suggest that "perceived discrimination is related to an increased probability of manifesting clinical levels of mental illness" (Pascoe and Smart Richman, 2009, p. 537). Because a review of the literature on the subject shows that the most common type of perceived discrimination measured was racial or ethnic discrimination (Pascoe and Smart Richman, 2009), and because of the specific migrant population we are studying, we included only this type of discrimination in our analysis. We asked participants if during the prior 12 months, they had been the subject of discrimination related to their nationality, ethnic origin, or color. They had the option to answer "No", or "Yes" and then specify in which context they had this experience: in the labor market, in a public place, at the doctor, or in another situation. For the purpose of the analysis, we then dichotomized the variable into two categories: "Yes, experienced racial or ethnic discrimination" (no matter in what context) and "No, did not experience racial or ethnic discrimination."

Living situation – Because we were interested in determining if living with family members (including a partner) had an impact on depression or anxiety symptoms, we asked participants with how many family members they lived. We then created a dichotomous variable in which participants who responded "0" to the question were placed in the "Does not live with family" category, and participants who answered "1 or more" were placed in the "Lives with family" category.

Size of social network – Availability of social support has been shown to be of paramount importance in preventing depressive symptoms (Bhugra, 2003). In a study on immigrant Mexican women in the United States, Vega, Kolody et al. (1987) found that loss of emotional support from the country of origin was important in predicting depression. Establishing new social networks in the destination country was therefore necessary for satisfactory adjustment. Moreover, "sense of anxiety may pervade the migrant who may feel under stress and pressure due to a number of factors related to migration" such as, among others, a lack of social support (Bhugra, 2003, p. 253). In order to measure the availability of social support, we asked participants the following question: "How many people are close enough for you to rely on them for serious personal problems?" The possible answers were "0", "1-2", "3-4", "5-6" and "7 or more". We then created a dichotomous variable, with half of the respondents falling in the "0-2" category and the other half in the "3 or more" category.

Feeling of social isolation – While the size of one's social network describes a more objective number of social contacts, perceived social isolation describes the subjective feeling of living without social connectedness or supports (Hawthorne, 2008). It is a social stressor that has been associated with poor mental health, including higher depression and anxiety symptoms, although in some studies the relationship differs among men and women (Hiott, Grzywacz et al., 2006; Hawthorne, 2008). Even though it is possible that individuals with heightened symptoms of anxiety and depression may have responded differently to questions about isolation, in this study we are not aiming to report causality but rather correlation, and it is therefore important to include this variable in our analysis. In order

to measure the feeling of social isolation, we asked the following: "In general, would you say that you feel very lonely, rather lonely, rather connected to people, or very connected to people?" We then recoded the variable in two categories: "Rather to very lonely" and "Rather to very connected to people".

Number of work hours per week – We divided participants' number of weekly work hours by quartiles in order to have an equal number of individuals in each category: 0-18 hours, 19-32 hours, 33-42 hours, and 43 hours or more.

Approximate equivalized household income – Immigrants' economic status has been found to be a predictor of mental disorder, as adverse economic conditions may reinforce low self-esteem and the occurrence of mood disorders and anxiety (Moussaoui and Agoub, 2010). In fact, a study on undocumented young adults in the United Sates found that general psychological wellbeing was predicted almost exclusively by socioeconomic status (Patler and Laster Pirtle, 2018). This is consistent with the stress process model, which "suggests that individuals from disadvantaged social status groups (i.e. low socioeconomic status) have greater exposure to stress (i.e. worrying about how bills will get paid), are limited in their resources to deal with the stress, and therefore may have increased health problems" (Patler and Laster Pirtle, 2018, p.44). However, a study on North Korean refugees in South Korea revealed that low income was not significantly correlated to depressive symptoms, as measured by the PHQ-9 scale (Um, Chi et al., 2015). Because of these contrasting findings, we included household income in our analysis.

In order to measure the approximate equivalized household income, we divided the total household income (meaning all the household members' income plus any eventual social benefits) by the number of household members converted into equivalized adults (made equivalent by weighing each according to their age using the modified OECD equivalence scale). According to the official definition, the household's disposable income should be calculated by deducting from the gross income all compulsory expenses, i.e. social security contributions, taxes, mandatory health insurance premiums and any alimony paid (EU, n.d.). However, we did not have reliable and exhaustive information on the latter two aspects, which is why we specify that this is an approximation. This is therefore the equal amount available to each member of the household for savings or expenses (including health insurance costs). For analytical purposes, we then created a new categorical variable by using quartiles as the cutoff points, which resulted in the following categories: "0 - 1'478 francs per month", "1'479 – 2'300 francs per month", "2'301 – 3000 francs per month" and "More than 3000 francs per month".

Ability to pay unexpected bills – In addition to household income, we used another variable to gauge participants' financial situation: we asked them whether or not they would be able to pay a bill of 1500 Swiss francs all at once, if needed.

Remittance – Remittance is defined as a transfer of money from a foreign worker to individuals in the country of origin. Although remittance has been linked to improved health and wellbeing for the family members in the home country, its impact on the mental health of immigrants themselves has been understudied (Ambugo and Yahirun, 2016). On one hand, remitting may be beneficial to immigrants' mental health by encouraging a sense of mattering to family and friends, which has been linked to a lower risk of depression symptoms (Taylor and Turner, 2001). On the other hand, the obligation of sending money to the home country may expose immigrants to economic hardship, which has been linked to psychological distress and depression (Ambugo and

Yahirun, 2016). In order to analyze how, and if, this potential stress factor may be correlated to symptoms of depression and anxiety, we asked participants whether or not they send money to their families in their country of origin and created a dichotomous independent variable.

Chronic illness – Although it is not a post-migration factor, we deemed it paramount to control for chronic illness, as "occurrence of physical illness, particularly chronic diseases like cardiovascular and respiratory diseases, negatively affects the mental health of migrants" (Moussaoui and Agoub, 2010, p. 102). We thus presented participants with a list of 14 health problems (including but not limited to chronic lung disease, heart disease, asthma, stroke, diabetes, and osteoporosis), asked them whether they chronically suffered from any of them, for how long, and whether they took medications as part of their treatment. For the purpose of our analysis, we then created a dichotomous variable: 0=Does not suffer from any chronic illness, 1=Suffers from at least one chronic illness.

ANALYTIC STRATEGY

Using SPSS statistics, we carried out two separate logistic regression analyses with anxiety and depression symptoms as dependent variables, and the 5 demographic and 11 post-migration factors as independent variables, all while controlling for chronic illness. We then compared the results of the logistic regression with depression as dependent variable to the logistic regression with anxiety as dependent variable.

RESULTS

Of the 462 participants interviewed, we included 417 (90.3%) respondents in our analysis and discarded 45 (9.7%) because of missing values. Table 1 reports the descriptive statistics of all study variables. Age ranged between 20 and 73 years old, with a median age of 43. The majority of participants came from Latin America (63.8%), most of them were women (72.9%), and 23.5% had a university or higher education degree, which seems to be representative of the undocumented immigrant population of this part of Switzerland (Morlok, Oswald et al., 2015). In terms of psychological distress, 45.1% of the respondents showed mild to severe depression symptoms, and 35.3% showed mild to severe anxiety symptoms.

Table 2 shows the results from the logistic regression analyses with depression and anxiety symptoms as dependent variables. In terms of demographic factors, anxiety and depression were alike in that neither education nor relationship status were statistically correlated with either disorder. On the other hand, our analysis shows a very slight statistically significant negative correlation between age and depression symptoms, but not between age and anxiety symptoms. As shown in Table 2, as one aged by 1 year, the chances of displaying mild to severe depression symptoms slightly decreased. Moreover, our results show that men were significantly less likely than women to experience symptoms of anxiety but not depression. Furthermore, respondents from Eastern European countries were less likely to experience symptoms of depression than Latin American participants, but there was no significant relationship between region of origin and anxiety.

In terms of post-migration factors, language proficiency, living situation, number of work hours per week, approximate equivalized household income, and permit status were not statistically correlated with neither depression nor anxiety symptoms. Duration in Geneva was significantly correlated with symptoms of depression, but only for certain lengths of time: in comparison to participants having spent 3-8 years in Geneva, those having been in the area for 9-11 years and 12-14 years were less likely to experience symptoms of depression. However, there was no significant relationship for those who have been in Geneva for 15 years or longer. Moreover, we did not find a significant correlation between duration and anxiety symptoms.

Racial discrimination was significantly correlated with both symptoms of depression and anxiety, with participants having faced discrimination being twice as likely to experience symptoms of depression and twice as likely to experience symptoms of anxiety. Feelings of isolation were also significantly correlated to both symptoms of depression and anxiety. As shown in Table 2, participants who reported feeling rather lonely or very lonely were more than 3 times more likely to experience symptoms of depression or anxiety in comparison to those who reported feeling connected to people. Unlike perceived social isolation, the effects of the size of one's social network differed between depression and anxiety. In comparison to participants reporting a social network of 3 or more, individuals with a smaller social network of 0-2 people were almost twice as

Table 1: Descriptive statistics

Variable	n	%
Depression		
Absence of depression symptoms	229	54.9%
Mild to severe depression symptoms	188	45.1%
Anxiety		
Absence of anxiety symptoms	270	64.7%
Mild to severe anxiety symptoms	147	35.3%
Age (Range : 20 – 73 years old)	Median: 43 years old	
Sex		
Female (Ref)	304	72.9%
Male	113	27.1%
Origin		
Latin America (Ref)	266	63.8%
Asia	88	21.1%
Africa	28	6.7%
Eastern Europe	35	8.4%
Education		
Less than university (Ref)	319	76.5%
University/Higher education	98	23.5%
Relationship status		
In a relationship (Ref)	200	48.0%
Single	217	52.0%
Duration in Geneva		
3-8 years (Ref)	105	25.2%
9-11 years	99	23.7%
12-14 years	103	24.7%
15+ years	110	26.4%
Permit status		
Residency permit received (Ref)	72	17.3%
Undocumented	345	82.7%
Chronic illness		
Yes (Ref)	300	71.9%
No	117	28.1%
Language proficiency		
Very good/good (Ref)	171	41.0%
Sufficient	166	39.8%
Bad/very bad	80	19.2%
Racial discrimination		
No (Ref)	280	67.1%
Yes	137	32.9%
Living situation		
Lives with family (Ref)	216	51.8%
Does not live with family	201	48.2%
Size of social network		
3 or more people (Ref)	205	49.2%
0-2 people	212	50.8%
Feeling of social isolation		
Rather to very connected to people (Ref)	297	71.2%
Rather to very lonely	120	28.8%
Number of work hours per week		
0-18 hours (Ref)	98	23.5%
19-32 hours	111	26.6%
33-42 hours	112	26.9%
43+ hours	96	23.0%
Approximate equivalized household income		
0.- - 1'478.- per month (Ref)	103	24.7%
1479.- - 2300.- per month	106	25.4%
2301.- - 3000.- per month	111	26.6%
> 3000.- per month	97	23.3%
Ability to pay 1500.- bill		
Yes (Ref)	143	34.29%
No	274	65.71%
Remittance		
Yes (Ref)	282	67.6%
No	135	32.4%

Table 2: Logistic regressions of depression and anxiety symptoms

	Depression symptoms: mild to severe		**Anxiety symptoms: mild to severe**	
	Demographic factors	Post-migration factors	Demographic factors	Post-migration factors
Age	0.944***	0.945***	0.966**	0.976
Sex: Male	0.633	0.795	0.462**	0.446*
Origin: Asia	0.854	0.944	0.782	0.908
Origin: Africa	1.683	1.281	2.862*	2.221
Origin: Eastern Europe	0.264**	0.335*	0.318	0.405
Education: University/Higher education	1.175	1.041	0.998	0.802
Relationship status: Single	0.985	0.947	1.158	1.244
Duration in GE: 9-11 years		0.416*		0.744
Duration in GE: 12-14 years		0.377*		0.744
Duration in GE: 15+ years		0.541		1.064
Permit status: Undocumented		0.883		1.23
French level: sufficient		0.595		0.75
French level: bad/very bad		0.721		1.942
Discrimination: Yes		2.203**		2.077**
Lives with family: No		0.796		0.696
Size of social network: 0-2		1.896**		1.009
Feeling of social isolation: Rather to very lonely		3.77***		3.467***
Hours of work/week: 19-32		1.562		0.768
Hours of work/week: 33-42		1.049		0.883
Hours of work/week: 43+		0.969		0.639
Approx household income: 1479-2300.- /month		0.741		0.908
Approx household income: 2301-3000.- /month		1.484		1.076
Approx household income: >3000.- /month		0.726		1.401
Ability to pay 1500.- bill: No		1.495		2.705**
Remittance: No		0.562*		1.205
Chronic illness: No		0.276***		0.348***

*p<0.1; **p<0.05; ***p<0.01

likely to experience depression symptoms. Size of social network was not significantly correlated with anxiety.

Number of weekly work hours and household income were not significantly correlated with neither depression nor anxiety. However, the inability to pay an unexpected bill of 1500 Swiss francs more than doubled the chances of experiencing anxiety symptoms, but was not correlated with depression symptoms. Furthermore, participants who did not send money to family in their country of origin were less likely to experience depression symptoms when controlling for all other demographic and post-migration factors, but remittance was not significantly associated with anxiety. Lastly, participants without a chronic illness were significantly less likely to experience symptoms of depression or anxiety.

DISCUSSION

DEMOGRAPHIC FACTORS

Our current study shows that the sex is correlated with symptoms of anxiety, but not with symptoms of depression. However, literature on the subject demonstrates that depression occurs less often in men than women, and men are less likely to experience co-morbid anxiety disorder (Altemus, Sarvaiya et al., 2014). A possible explanation for our differing results between the two mental health outcomes is that only 27.1% of our participants were males, which may have affected the statistical significance. In order to come to a more reliable conclusion regarding the relationship between sex and depression, and sex and anxiety among undocumented immigrants, it would be beneficial to conduct further research on a sample with a more even distribution of males and females.

Furthermore, our results showing that participants from Eastern European countries were less likely to experience depression symptoms than those from Latin America supports existing research stating that "the perception of great distance from place of origin and the difficulty of visiting both relate to higher depression" (Vega, Kolody et al., 1987). However, it is important to note that only 8.3% of respondents originated from Eastern Europe, which again may have impacted the statistical significance of the relationship and may explain the differing results between depression and anxiety.

Lastly, although we found a statistically significant correlation between age and depression, the odd ratio is so small (0.945), that we cannot conclude that age has a strong effect on depression symptoms, if at all. Overall, we cannot make definitive remarks regarding the relationship between demographic factors and mental health outcomes among undocumented migrants.

POST-MIGRATION FACTORS

The present study supports prior research illustrating that duration in the destination country can act as a protective factor against the negative effects of migration and acculturative stress as they relate to depression (Vega, Kolody et al., 1987; Potochnick and Perreira, 2010), as our study demonstrates that for a certain period of time, longer duration is negatively correlated with depression symptoms. However, our results indicate that the relationship between duration and depression symptoms dissipates over time, as we found no significant correlation for individuals who have lived in Geneva for 15 years or longer and depression.

After arriving in Switzerland, stressors like discrimination can become important determinants of mental health outcomes. As this analysis demonstrates, experiences of racial discrimination were associated with both depression and anxiety symptoms, which is concordant with the existing literature on the subject (Pascoe and Smart Richman, 2009; Um, Chi et al., 2015; Chen, Hall et al., 2017), as discrimination is an uncontrollable and unpredictable stressor that can be particularly harmful to health and can increase

vulnerability to illness (Pascoe and Smart Richman, 2009). This is because the perception of unfair treatment can harm one's self-esteem, it can result in individuals questioning their self-worth, can hinder opportunities to be active in social and economic environments, and can consequently increase the risk of mental health problems (Sullivan and Rehm, 2005; Um, Chi et al., 2015).

Consistently with prior research, feelings of social isolation were strongly associated with both depression and anxiety symptoms (Hiott, Grzywacz et al., 2006; Hawthorne, 2008). On the other hand, size of social network was significantly correlated with depression but not anxiety. A systematic review of studies on the mental health of undocumented immigrant adults in the United States found that specific symptoms of depression included feelings of low self-esteem, self-blame, and helplessness (Garcini, Murray et al., 2016). Individuals experiencing symptoms of depression in our study may have thus felt undeserving of the help of others and may have consequently under-reported the amount of people they felt they could rely on in case of serious personal problems. This could explain the differing relationship between social network and anxiety and depression.

The absence of a statistically significant correlation between approximate household income and mental illness suggests that when other conditions are controlled for, income alone may not contribute to improving psychological well-being among undocumented immigrants in Geneva, which is concordant with previous studies (Um, Chi et al., 2015). Interestingly, the inability to pay an unexpected bill was correlated with anxiety but not depression symptoms. The literature review carried out by Garcini, Muarray et al. (2016), identified anxiety symptoms among undocumented immigrants as including feelings of excessive worry, fear, and uncertainty. Our variable "Ability to pay an unexpected bill" may thus account for individuals' sentiments of economic uncertainty and worry for the future, which can explain its correlation with anxiety but not depression symptoms.

Moreover, the significant correlation between remittance and depression is consistent with the results of a previous study analyzing the impact of remittance on major depressive episode among immigrants in the United States (Ambugo and Yahirun, 2016). However, results did not show a significant relationship between remittance and anxiety. Although we have not found existing research on remittance and anxiety, we can hypothesize that having to financially support one's family from a distance may trigger feelings of self-blame for having left or for not having been able to provide the necessary support in the country of origin. In our sample, 39% of the participants had at least one child living abroad, and as transnational parents often struggle with feelings of regret and guilt over separation (Parreñas, 2001), these feelings of regret and guilt may be translated into feelings of self-blame. Because self-blame is a symptom of depression but not anxiety (Garcini, Murray, et al., 2016), it could explain the difference in the relationship between remittance and the two mental illnesses. However, further research on the subject is necessary to better understand the impact of remittance on mental health.

Although studies have found a strong, positive and significant effect of legal status on psychological wellbeing (Patler and Laster Pirtle, 2018), the lack of a significant correlation between permit status and mental illness in our study supports our initial reasoning behind using our full population sample: that 3 months is not a long enough time for change in legal status to have an impact on mental health. A more in-depth analysis of the

impact on immigration status on health will be conducted by the Project Parchemins in the next 3 years.

Lastly, controlling for chronic illness was necessary, as within both migrant and non-migrant populations, the evidence for the association between anxiety and depression and chronic illnesses like heart disease, stroke, diabetes, asthma, cancer, arthritis and osteoporosis is very strong (Ortega et al., 2006; Clarke and Currie, 2009; Moussaoui and Agoub, 2010). The present study has found support for such evidence, as participants without a chronic illness were less likely to experience symptoms of depression or anxiety, although the pathways between mental and physical illness comorbidities are not completely understood. It is possible that depression may lead to overeating and obesity, and consequently to a greater risk of cardiovascular disease or diabetes. On the other hand, facing stressors related to having a chronic illness may lead to the development of depression and anxiety (Ortega, Feldman et al., 2006).

Overall, our study largely supports the literature on the mental health of migrant populations, but it expands the findings specifically to undocumented communities, as research on the mental health of these populations is scant.

LIMITATIONS

Our findings must be interpreted with caution as this study was subject to several limitations, primarily in regards to population selection. Our participants were part of an already resilient population who has been able to live in Switzerland without authorization for at least three years and were thus able to overcome the obstacles first encountered when migrating. Moreover, the recruitment of respondents through unions and associations most likely led us to a sample of individuals determined to improve their legal status through Operation Papyrus or learn more about their rights as undocumented residents, which further adds to their probable resilience. Furthermore, a portion of our participants was recruited from a medical clinic, which may have caused an overrepresentation of undocumented individuals with health problems in our study. Although random sampling is inherently impossible for undocumented communities, our study most likely missed a part of the population that does not interact with local associations and may therefore be more vulnerable.

A second limitation of the present research was related to the relatively small percentage of men in our sample, which did not allow us to properly test the relationship between sex and mental health. Future research may benefit from a larger sample in order to avoid odds ratio bias in the statistical analyses.

Lastly, in some cases there was a language barrier between participant and researcher. Although our questionnaire was translated in five different languages and we had at least one researcher fluent in each language, we were not always able to speak the respondent's mother tongue. This sometimes led to miscommunication and confusion regarding the questions, and may have consequently resulted in some inaccurate answers. However, this seemed to be an issue that only impacted a small number of interviews, while most of them were conducted without communication issues.

CONCLUSION

Despite these limitations, our findings regarding the prevalence of depression and anxiety symptoms are concordant with prior literature on the subject, particularly with research conducted in Zurich, Switzerland (Heeren, Wittmann et al., 2014). This study provides significant evidence that post-migration factors affect anxiety and depression symptoms in the undocumented immigrant population of Geneva. Demographic factors like age and origin were correlated with symptoms of depression, and sex was correlated with symptoms of anxiety, although the findings for demographic characteristics may be disputed due to population selection. Most importantly, post-migration factors like experience of racial or ethnic discrimination and feeling of social isolation were correlated with both depression and anxiety symptoms among undocumented immigrants in Geneva. Furthermore, duration of stay in Geneva, size of social network, and remittance were correlated with depression, while the inability to pay an unexpected bill was correlated with anxiety symptoms.

Although our study largely supports the existing literature on the mental health of migrant populations and it provides additional insight on the mental health of undocumented migrants specifically, it is paramount that future research explores the impact of change in legal status on mental disorders. Furthermore, a better comparison between the factors related to mental health in authorized and undocumented migrants is necessary.

Depression and anxiety can be incapacitating illnesses that can impair functioning and render individuals unable to fulfill daily responsibilities (Newman, 2000; Sullivan and Rehm, 2005). Given that stress created from post-migration challenges is associated with mental health symptoms, research shedding light on the risk factors correlated with depression and anxiety can help facilitate the understanding of the health needs of the undocumented population. Because undocumented immigrants represent a marginalized group for whom access to mental health services is particularly limited, understanding the social and structural circumstances related to mental disorders can assist policy makers and public health professionals in a more efficient and appropriate allocation of public health services, it can inform advocacy efforts and help dismantle existing stereotypes – particularly given the strong correlation between racial discrimination and mental health – and these efforts would ultimately allow for the maintenance of a healthier workforce.

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APPENDICES

APPENDIX 1: PHQ-9 SCALE FOR DEPRESSION SYMPTOMS

In the past <u>two weeks</u>, how often have you been disturbed by the following problems?

	Never	Rarely	Often	Almost every day
Little interest or pleasure in doing things				
You feel sad, depressed or desperate				
Having difficulty falling asleep or staying asleep, or sleeping too much				
Feeling tired or having little energy				
Having little appetite or overeating				
Having low self-esteem				
Having difficulty concentrating				
Your loved ones tell you that you are particularly agitated or slowed down				
You thought you'd hurt yourself or you'd be better off dead				

APPENDIX 2: GAD-7 SCALE FOR ANXIETY SYMPTOMS

In the past <u>two weeks</u>, how often have you been disturbed by the following problems?

	Never	Rarely	Often	Almost every day
Feelings of nervousness, anxiety or tension				
Being unable to control your concern				
Worrying about everything				
Difficulty to relax				
Restlessness such that it is difficult to remain quiet				
Becoming easily angry or irritable				
Be afraid that something terrible may happen				