Non-communicable diseases among refugees claimants in Greek refugee camps – are their healthcare needs met?

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Abstract:

Little is known about the prevalence of non-communicable diseases (NCDs) among newly arrived refugees in Europe and whether their medical needs are met. To elucidate prevalence of NCDs and unmet medical needs in the different migration phases, we used survey data on 267 adult asylum-seekers at Greek refugee camps in 2016. Using multiple logistic regression analysis, we estimated determinants for unmet medical needs in Greece. The most prevalent reported NCDs in Greece were: back or neck pain (26.6%) and severe headache (24.7%). The prevalence of most NCDs in the migration phases followed a U- or J-shaped pattern: decreased during migration and increased after migration to Greece; thus, new cases of NCDs after arrival to Greece made up the vast majority of all cases. Accordingly, the refugee claimants were worse off further in the migration process. Unmet medical care needs were reported by 41.3% with one NCD after arrival in Greece. Compared with young adults, adults aged 51+ years were in increased risk of reporting unmet medical needs in Greece [odds ratio = 7.59; *p*=0.015]. This knowledge is important for healthcare systems in receiving countries to plan for improved access to healthcare services for refugees with NCDs.

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Background

During conflicts and wars, public health infrastructures, including disease surveillance and control as well as access to medical care, are often disrupted (Ismail, 2016). Due to the risk of communicable disease outbreaks and spread to the general population (Ismail, 2016), refugee-receiving countries often focus on tackling communicable diseases (Prymula, 2017, Eiset, 2017, Amara, 2014), even though the risk to the general population is repeatedly overestimated (Eiset, 2017), while somewhat neglecting non-communicable diseases (NCDs) in the refugee population (Amara, 2014, Hvass, 2017). This is also rooted in the emergency nature of the refugee influx, where other needs such as shelter, food, legal status and health issues needing immediately attention have first priority (Amara, 2014, Rehr, 2018). Many receiving countries also struggle with the provision of chronic care for refugees due to overstretched national healthcare systems and requirements of specialized and ongoing treatment, expensive medications (Amara, 2014, UNHCR, 2009, Rehr, 2018) as well as lack of public health systems to ensure continuity of care among persons "on the move" (Doocy, 2015). Yet, the need for NCD care in emergency settings are increasingly recognized and implemented (Rehr, 2018), which has also been evident due to the often protracted displacement in these settings (Ay, 2016).

NCDs such as diabetes, cardiovascular and chronic respiratory diseases are much more prevalent in the refugee population than communicable diseases such as tuberculosis and HIV (Pavli, 2017, Rehr, 2018), but not communicable diseases such as the cold. This also mirrors the general morbidity pattern in refugees' home countries (Rehr, 2018). Despite of these disease patterns, in refugee health research, although in general limited, communicable diseases and mental health have been most studied (Amara, 2014, Bradby, 2015, Eiset, 2017). A recent study, and one of the few of its kind, revealed that 21.8% of Syrian adult refugees living outside refugee camps in northern Jordan suffered from at least one NCD and 44.7% reported multi-morbidity; hypertension (14%) and diabetes (9.2%) were the most common NCDs (Rehr, 2018). Older age was associated with higher NCD prevalence, while higher education was negatively associated. Among those with regular medication needs, 23.1% reported medication interruption, mainly due to unaffordability (Rehr, 2018).

In Europe, refugees' health status and healthcare needs have recently gained increased focus after the so-called "European Refugee Crisis". In 2015, the European Union (EU) received more than 1.2 million asylum-seekers, of whom many were Syrian and Afghan, which were more than double that of the previous year (Eurostat, 2016). In the same year, Greece overtook Italy in the number of asylum-seekers and became the gate for refugee claimants and other immigrants on their route through Balkan and Eastern Europe to their desired destination countries, mainly Germany and Sweden (Eurostat, 2016, UNHCR, 2015). Terminology for this group is often ambiguous. In this paper, we use refugee claimants or asylum-seekers for persons whose request for sanctuary has yet to be processed (UNHCR, 2018a, Canadian Council for Refugees, 2018), while a refugee

is a person fleeing conflict or persecution and who has been granted refugee status from a government or UNHCR (UNHCR, 2018b).

The migration process is normally divided into three phases: pre, during and post migration, each with different risk and protective factors. The migration process, including the cause of migration, duration and nature of "the move" as well as reception and living conditions in the host country, have a significant impact on the health status of persons (Pavli, 2017, Eiset, 2017, Bradby, 2015) and thus needs special attention; however, only a few studies takes this into account (Bradby, 2015, Eiset, 2017). Despite the great political and media focus, little is still known about the burden of NCDs among refugee claimants (Rehr, 2018, Bradby, 2015) and this is to our knowledge the first study to elucidate the burden of NCDs across the different migration phases. Furthermore, knowledge is lacking on whether refugee claimants' medical care needs are met in the different migration phases as well as the determinants for unmet medical care needs among refugee claimants in the Greek refugee camps (Bradby, 2015). This knowledge is important for healthcare systems in receiving countries so that they can plan for effective public health interventions and improved healthcare services for refugees and asylum-seekers in order to reduce disease complications and premature mortality from NCDs. Therefore, the objective of this study was to investigate patterns of NCDs as refugee claimants migrate, whether refugee claimants experience unmet healthcare needs before, during and after flight when living in Greek refugee camps and to elucidate sociodemographic determinants for unmet medical care needs in the Greek refugee camps.

Material and Methods

Study population, data collection and setting

Cross-sectional survey data among 367 newly arrived adult asylum-seekers staying at six refugee camps in Greece was used. The data collection took place between July 12 and September 19, 2016 which was the first phase of settlement in Greece under emergency conditions where hundreds of thousands had to be accommodated and looked after. The study population was sampled by selecting a single person from a family to fill in the survey in every third lodging in the refugee camps. Eligibility for the study was to be able to understand at least either English, Arabic or Farsi. Only adults aged 18 and older, answering the items on NCDs and unmet medical care needs were included in the current study, limiting the study sample to 267.

The survey, available in English, Arabic and Farsi, included 32 self-administered items on sociodemographic factors, migration history, physical and mental health, social network, living conditions and access to healthcare. The survey comprised closed-ended questions and took on average 30 minutes to complete. It was translated from English into Arabic and Farsi by experienced translators under the supervision of the Greek National Centre of Social Research (EKKE). In order to investigate the fluctuating study population in time, back-translation was not conducted. Likewise, face-validity of the survey was not checked as we were not allowed to enter the camps before fieldwork as all the camps were under emergency conditions. For participants needing clarifications, certified interpreters in Arabic and Farsi accompanied the researchers during data collection. The surveys were checked for completeness during field work, and in case of missing items, the participants were asked to complete all items to reduce missing responses.

The living conditions in the Greek refugee camps were harsh. The camps were overcrowded with poor sanitary conditions such as limited access to toilet and shower facilities, which hampered personal hygiene necessities, as well as inadequate plumbing and garbage removal. In terms of accommodations, refugee claimants at island camps were usually accommodated in tents subject to extreme temperatures in the winter and summer, and refugee claimants in urban camps were accommodated in warehouses and had to sleep on hard floors or concrete surfaces in public spaces. Access to healthcare was limited. Likewise, many camps were situated far from the city and thus far from more specialized healthcare services.

Outcomes

NCDs was measured by asking whether refugee claimants have experienced each of 11 stated health problems (listed in Table 2) and at the following periods: never up to now; before leaving home; while travelling or displaced internally in home country; while travelling or staying in a "third country"; since travelling or arriving to Greece. Participants were asked to report the health problem at all the time periods that applied. NCDs were further grouped into: no health problem, one health problem, two or more health problems at the different time periods. Unmet healthcare needs were measured by asking whether refugees have been unable to get the medical consultation or treatment they needed before leaving home; while travelling or displaced internally in home country; while travelling or staying in a "third country"; since travelling or arriving to Greece; or never up to now. Participants were asked to report all answer categories that applied. Unmet medical care need was defined if participants with at least one NCD answered that they were unable to get medical consultation or treatment for the specific time period in question. Variables were otherwise categorised as in Table I.

Statistical analysis

First, we inspected frequency distributions of NCDs and unmet medical care needs and carried out cross-tabulations of unmet medical care needs in relation to NCDs among participants with at least one NCD. To explore whether a similar distribution of the NCDs during the different migration phases were true on an individual level, we also carried out a frequency distribution analysis of new NCDs cases only. Second, to estimate sociodemographic determinants for unmet medical care needs in Greek refugee camps, we carried out multiple logistic regressions, adjusting for socio-demographic factors. Missing values were excluded in the analysis. Stata 13.1 was used for the analyses.

Ethical considerations

The Greek Ministry of Migration granted permission for entrance to and conduct of the study at the refugee camps to the National Centre of Social Research (EKKE). The study was further approved by the Board of Directors of EKKE in accordance with the Rules of Procedure in the Official Government Gazette of the Hellenic Republic 219/1995. The survey was conducted in accordance with the International Association of Sociology Code of Ethics and ethical and legal framework laid out by EKKE. The study adhered to the Greek legislation on Personal Data Protection, implying that anonymity was ensured at every step of the survey process. All potential participants received oral information about the survey before filling-in.

Results

Study population

The study population comprised more males than females and was relatively young as only 13.1% was 51+ years of age (Table 1). The vast majority originated in Syria and Afghanistan. A high proportion was married with children, and more than half of the participants had 6-11 years of education. About 41% of the participants have left their home country in 2016, and about a quarter in 2014 or earlier on. The majority have stayed in Greece for less than 6 months. About one third reported a poor health status.

Non-communicable diseases

The majority did not report a NCD before arriving in Greece (Table 2). The most prevalent NCDs reported in Greece were: back or neck pain (26.6%), severe headache (24.7%) and allergies (21.4%), while heart or circulation problem (7.5%) and diabetes (5.2%) were the least commonly reported. In total, 17.2% suffered from 1 NCD, while 40.5% suffered from 2 or more NCDs after arrival to Greece. Disregarding the "before leaving home" category, a clear tendency of emerges of new NCD conditions along the migration journey was observed. Thus, the prevalence of the different reported NCDs pre-, during and after migration to Greece followed a somewhat similar pattern: they decreased during migration and increased significantly after

migration to Greece, e.g. in the case with allergies which was reported by 12.4% of the participants before leaving the home country, 4.9% during migration and by 21.4% after migration to Greece. The only exceptions from this U- or J-shaped pattern were skin problems, which showed a constant increase, yet, skin problems were still reported by an increased proportion after migration to Greece (18.4%) compared to pre-migration (3.0%). In the analysis with individuals reporting NCDs who did not report of these NCDs in the previous migration phase, it was clear that the vast majority reported new cases of NCDs after arriving to Greece; almost a quarter of the participants reported new cases of back or neck pain (24.7%) as well as severe headache (22.8%) (Table 2). Comparing all cases and new cases of NCDs only in the different migration phases, new cases of NCDs after arrival to Greece made up the bulk of all cases after arrival to Greece; e.g. 51 participants reported stomach or digestion problem after arrival to Greece of whom 44 were new reports of the disease after arrival to Greece. An analogous pattern was seen for all the other diseases. Likewise, in the analysis of new NCD cases only, a similar U- or J-shaped pattern was observed of the prevalence of NCDs along the migration journey.

Unmet medical care needs

Overall, a J-shaped trend was seen for unmet medical care needs in relation to migration phase among participants with 1 NCD: unmet medical care needs was reported by 34.1% before leaving home country, 28.6% while internally displaced in home country, 18.2% while in transit country and 41.3% after migration to Greece (Table 3). Among participants with 2 or more NCDs, a somewhat U-shaped pattern was observed for unmet medical care need during the migration phases. Unmet medical care needs was reported by 42.3% before leaving home country, 28.1% while internally displaced in home country, 39.5% while in transit country and 44.4% after migration to Greece. When investigating unmet medical need for each NCD separately in relation to migration phase, a diverging and not conclusive picture emerged, yet, the subset sizes were very low for many of the specific NCDs.

Sociodemographic determinants for unmet medical care needs in Greece

We could not detect any statistically significant differences in risk of reporting unmet medical care needs in Greece in relation to type of NCD among the 143 participants reporting at least one NCD (Table 4, Model I). In adjusted analyses, compared with young adults (18-30 years), older adults (51+ years) were in a much higher risk of reporting unmet medical care needs in Greece [odds ratio (OR) = 7.59, 95% CI = 1.49-38.56; p=0.015] (Table 4, model II). We could not detect any other socio-demographic determinants for unmet medical care needs in Greece.

Discussion

In this survey study among newly arrived adult refugee claimants living in refugee camps in Greece in 2016,

we found that the majority had a good or fair self-reported health; yet, 17.1% suffered from 1 NCD, while 42.1% suffered from 2 or more NCDs. The most prevalent NCDs reported while living in Greece were: back or neck pain (28.3%), severe headache (24.3%) and allergies (21.9%), while heart or circulation problem (7.3%) and diabetes (4.7%) were the least commonly reported. A clear tendency of emerges of new NCD conditions along the migration journey was vivid (disregarding the "before leaving home" category); the refugee claimants were worse off further in the migration process. The vast majority of new NCD cases reported was reported after arriving to Greece. Thus, the prevalence of most of the reported NCDs in the different migration phases followed a similar U- or J-shaped pattern: they decreased during migration and increased significantly after migration to Greece. Unmet medical care needs were reported by 28.6-55.0% after arrival in Greece; participants with heart or circulation problem reported highest proportion of unmet medical needs. Overall, a J-shaped trend was seen for unmet medical care need in relation to migration phase among participants with 1 NCD; while a U-shaped trend was observed for unmet medical care needs among participants with 2+ NCDs. Refugee claimants aged 51+ years had a significantly increased risk of reporting unmet medical care needs in Greece compared to young refugee claimants.

Prevalence on non-communicable diseases in relation to international literature

Similar to previous studies among refugees (Rehr, 2018, Yun, 2012), our study confirmed that the majority report to have a fair/good physical health. Still, a high proportion report to have one or more NCDs which has also been found previously (Doocy, 2015), e.g. in a US study which showed that 51.1% of the newly arrived adult refugees had at least one chronic NCD (Yun, 2012). Similarly the high prevalence of multi-morbidity (2 or more NCDs) in this study have also been demonstrated in the US study (Yun, 2012). Yet, in contrast to other studies, we found that most prevalent NCDs reported were back or neck pain, severe headache and allergies, while other studies have demonstrated diabetes, musculosketal disease, hypertension and chronic respiratory diseases as most common (Rehr, 2018, Yun, 2012, Amara, 2014, Doocy, 2015). However, this also reflects the item list of NCDs the participants were presented to and the study population in question who was characterized of being relatively young with the majority being men with medium length of education, thus, a study population with expected fewer health problems than a population with normal age and sex distribution. Standardised items are needed to compare across populations and countries.

Consistent with other studies among displaced refugees, which showed that older age was associated with higher NCD prevalence and the risk for NCD-multi-morbidities (Rehr, 2018, Strong, 2015), we found that older age was a risk factor for unmet medical care needs. In contrast to previous findings that revealed that higher education was inversely associated with unmet healthcare needs (Rehr, 2018), we could not detect any impact of educational level. This may be due to the small sample size.

The finding on emerge of new NCD cases as the migration journey progresses (the J- or U-shaped prevalences), with peak prevalence after migration to Greece, rely on self-reports and thus is not confirmed by clinical assessment. One hypothesis is that during flight there are other more important things than NCDs on the fleeing persons' minds, such as escaping from war and finding safety. Other hypotheses for the J- or U-shaped prevalence comprise recall bias or the fact that before and during flight individuals do not have access to healthcare, including diagnostic tools, so the NCDs are not diagnosed before healthcare access is restored. In line with this, living conditions in the different migration phases could also impact the results; for some NCDs such as diabetes it might be less relevant, but for others, such as breathing problems and allergies, living conditions may play a large role. Inherently, we do not have information on the study populations' living conditions before arrival to Greece, but the unsanitary living conditions in the Greek camps posed serious health threats. This might also add to the increased reported prevalence of NCDs after migration to Greece. Migration phases are also not as clear-cut as one might think; e.g. crossing the sea was often not a one-off movement, instead many were pushed back and tried again. These fluctuating migration phases cannot easily or clearly be captured by a closed question but was instead open for interpretation. This may affect the participants' report of NCDs in the different migration phases, albeit in which direction is unknown. The varying prevalences of NCDs could also be due to that the participants were asked about symptoms rather than diagnoses. Moreover, symptoms on poor (psychosomatic) health, which include headache, stomachache, etc., often increase with length of encampment (Nielsen et al., 2008, Nielsen, 2007, Hallas, 2007). A degree of selection bias (in the form of Berksonian bias) could also play a role: those who agreed to participate were likely to have more conditions at the time of being asked (an effect of the outcome) and they were also the ones that had actually gone through the migration (an effect of the exposure).

Finally, self-perceived symptoms might not be equivalent to medical needs. Aside from discrepancies between patients' reported symptoms and the clinical assessment of medical needs, including the availability of a treatment or cure, self-perceived symptoms also rely on factors such as health literacy, health beliefs, and health behavior. In relation to the used survey methodology among different ethnic groups, another concern is the existence of cultural differences in reference levels of health, in response style, and the connotation and validity of the questions used. Thus, despite the experienced and subjective report of symptoms, which to be true for the individual, the reported unmet medical needs may be under or overestimated from a clinical perspective.

Unmet needs in relation to international literature
Consistent with recent results among refugees in Jordan (Rehr, 2018, Ay, 2016), unmet medical needs, especially before leaving home and after arrival in Greece, were significant in our study population. The

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current study was carried out at a time under emergency conditions affecting the provision of healthcare in Greece (Stathopoulou, 2019), which also impact our findings of the high number of unmet medical needs. The significant report of unmet medical needs in Greece may also be rooted in the gap between the basic medical care that was provided in the Greek refugee camps and the nature of NCDs which often require specialized and ongoing treatment as well expensive medication in order to be managed. This study did not shed light on why the refugee claimants healthcare needs were unmet, yet, we know from other studies that following factors act as barriers for accessing healthcare: cost; literacy and language issues; lack of knowledge/confusion about entitlements; and long distance to healthcare providers (Bradby, 2015, Rehr, 2018, Ay, 2016, Pavli, 2017). More knowledge is needed which type of needs and why the refugee claimants' healthcare needs were not met in the Greek refugee camps as well as on the current situation of unmet medical needs in European refugee camps.

Strengths and weaknesses

Strengths of this study include the randomized sample procedure, the inclusion of participants from six refugee camps, use of translated survey tools as well as the availability of certified interpreters. Limitations include the very small sample size, which did further not allow for cluster analysis. The survey was not back-translated or pretested among the study population which reduces the validity of the survey instrument. Persons were not asked about diagnosed NCDs or which condition their unmet medical needs were related to. Therefore, we do not know for sure that their unmet medical needs were related to their NCDs as they could also have different medical needs which were unmet. Since the employed survey data was cross-sectional, we cannot assess trajectories of symptoms, and thus our interpretation of the U- or J-shaped pattern of the prevalence of the reported NCDs may be subject to some uncertainty. Additionally, the formulation of "third country" in some of the items in the survey may have lead some of the respondents to think of Greece instead of another transit country. Thus, some of the respondents' report of unmet medical needs "while travelling or staying in a "third country"" as different from "since travelling or arriving to Greece" may be subject to non-differential misclassification. Finally, we do not have information on which type of health needs and why their needs were not met, which were beyond the purpose of the survey.

Conclusion

In this relatively young group of refugee claimants in Greece, the majority were in a good or fair physical condition; however, many still suffered from a NCD and their medical needs were to a large extent not met. Whether this picture of unmet medical needs is a general situation or whether it is due to the specific conditions that prevailed in the camps during the time of the survey is unknown. Still, ensuring access to NCD healthcare

in Greece or other first-recipient countries is especially important as it is within the EU member states' control. The high number of persons who report NCDs underscore the need for availability of diagnostic tools and agents to ensure that the refugee claimants receive the right healthcare assistance and medication. Tools and guidelines to provide continuity of NCD care when people migrate, also within the EU countries, are likewise important. Many European countries that will receive this group of immigrants and refugees should take the disease patterns, including the high number of persons suffering from multi-morbidity, into consideration when planning for health reception and the organization of healthcare. Improved NCD care at refugee camp settings will not only benefit the individual immigrant and refugee but also benefit their new host countries as these new citizens can faster become active and integrated members of society.

References

AMARA, A. H., ALJUNID, S.M. 2014. Noncommunicable diseases among urban refugees and asylum-seekers in developing countries: a neglected healthcare need. *Globalization and Health,* 10(24).

AY, M.; GONZALEZ, P.A.; DELGADO, R.C. 2016. The Perceived Barriers of Access to Healthcare Among a Group of Non-camp Syrian Refugees in Jordan. *International Journal of Health Services,* 46**,** 566-589.

BRADBY, H.; HUMPRIS, R.; NEWALL, D., PHILLIMORE, J. 2015. Public health aspects of migrant health: a review of the evidence on health status for refugees and asylum seekers in the European Region. *Health Evidence Network synthesis report 44.* Copenhagen Regional Office for Europe: WHO.

DOOCY, S.; LYLES, E.; ROBERTON, T.; AKHU-ZAHEYA, L.; OWEIS, A.; BURNHAM, G. 2015. Prevalence and care-seeking for chronic diseases among Syrian refugees in Jordan. *BMC Public Health,* 15**,** 1097.

EISET, A. H.; WEJSE, C. 2017. Review of infectious diseases in refugees and asylum seekers—current status and going forward. *Public Health Reviews,* 38

EUROSTAT 2016. Asylum in the EU Member States. Record number of over 1.2 million first time asylum seekers registered in 2015. Syrians, Afghans and Iraqis: top citizenships.

HALLAS, P., HANSEN, A.R., STAEHR, M.A., MUNK-ANDERSEN, E.; JORGENSEN, H.L. 2007. Length of stay in asylum centres and mental health in asylum seekers: a retrospective study from Denmark. *BMC Public Health,* 7**,** 288.

HVASS, A. M. F., WEYSE, C. 2017. Systematic health screening of refugees after resettlement in recipient countries: a scoping review. *Annals of Human Biology* 44**,** 475-483.

ISMAIL, S. A., ABBARA, A.; COLLIN, S.M.; ORCUTT, M.; COUTTS, A.P.; MAZIAK, W.; SAHLOUL, Z.; DAR, O.; CORRAH, T.; FOUAD, F.M. 2016. Communicable disease surveillance and control in the context of conflict and mass displacement in Syria. *International Journal of Infectious Diseases* 47.

NIELSEN, S. S., NORREDAM, M., CHRISTIANSEN, K. L., OBEL, C., HILDEN, J. & KRASNIK, A. 2008. Mental health among children seeking asylum in Denmark--the effect of length of stay and number of relocations: a cross-sectional study. *BMC. Public Health,* 8**,** 293.

NIELSEN, S. S., NORREDAM, M.; CHRISTIANSEN, K.L.; OBEL, C.; KRASNIK, A. 2007. Psykisk helbred blandt asylbørn i Danmark *Ugeskrift for Læger,* 169**,** 3660-3665.

PAVLI, A. MALTEZOU, H. 2017. Health problems of newly arrived migrants and refugees in Europe. *Journal of Travel Medicine,* 24**,** 1-8.

PRYMULA, R., SHAW, J. CHLIBEK, R. URBANCIKOVA, I.; PRYMULOVA, K. 2017. Vaccination in newly arrived immigrants to the European Union. *Vaccine.*

CANADIAN COUNCIL FOR REFUGEES. 2018. *Refugees and Immigrants: A glossary* [Online]. Available: http://ccrweb.ca/en/glossary [Accessed July 31 2018].

REHR, M., SHOAIB, M.; ELLITHY, S.; OKOUR, S.; ARITI, C.; AIT-BOUZIAD, I.; VAN DEN BOSCH, P.; DEPRADE, A.; ALTARAWNEH, M.; SHAFEI, A.; GABASHNEH, S.; LENGLE, A. 2018. Prevalence of non-communicable diseases and access to care among non-camp Syrian refugees in northern Jordan. *Conflict and Health,* 12.

STRONG, J., VARADY, C.; CHAHDA, N.; DOOCY, S.; BURNHAM, G. 2015. Health status and health needs of older refugees from Syria in Lebanon. *Conflict and Health,* 9.

STATHOPOULOU, T. 2019. Surveying the hard-to-survey. Refugees and unaccompanied minors in Greece. In Suarez-Orosco, M. (ed.), *Humanitarianism and Mass Migration*, California University Press

UNHCR 2009. UNHCR Policy on Refugee Protection and Solutions in Urban areas. Geneva: United Nations High Commissioner for Refugees.

UNHCR 2015. The sea route to Europe: The Mediterranean passage in the age of refugees.

UNHCR. 2018a. *Asylum-seekers* [Online]. UNHCR. Available: http://www.unhcr.org/asylum-seekers [Accessed July 31 2018].

UNHCR. 2018b. *Refugees* [Online]. Available: http://www.unhcr.org/refugees.html [Accessed July 31 2018].

YUN, K.; HEBRANK, K.; GRABER, L.K.; SULLIVAN, M.C.; CHEN, I.; GUPTA, J. 2012. High Prevalence of Chronic Non-Communicable Conditions Among Adult Refugees: Implications for Practice and Policy. *J Community Health,* 37.

Tables

Table 1: Characteristics of the study participants (n=267)

Population characteristics	N	%
Sex		
Male	163	61.0
Female	104	39.0
Age		
18-30	86	32.2
31-50	134	50.2
51+	35	13.1
Missing	12	4.5
Country of birth		
Afghanistan	87	32.6
Syria	134	50.2
Other[a]	42	15.7
Missing	4	1.5
Marital Status		
Married	215	80.5
Widow/single/divorced/separated	46	17.2
Missing	6	2.3
Children		
Yes	219	82.0
No	45	16.9
Missing	3	1.1
Highest educational level		
6 years or less	69	25.8
6-11 years	143	53.6
12+ years	47	17.6
Missing	8	3.0
Year of leaving home country		
2016	111	41.6
2015	64	24.0
2014 or before	67	25.1
Missing	25	9.4
Length of stay in Greece		
0-6 months	149	55.8
6+ months	101	37.8
Missing	17	6.4
Health status		
Good	82	30.7
Fair	71	26.6
Bad	105	39.3
Missing	9	3.4

[a]: Other: Guinea (1), Iran (20), Iraq (21), Israel (1), Kuwait (2), Lebanon (1)

Table 2: Prevalence of non-communicable diseases (NCD) (N=267)

All reported cases pre-, during and after migration*

	Never		Before leaving home		While travelling or displaced internally in home country		While travelling or staying in a transit country		Since travelling or arriving to Greece	
	N	%	N	%	N	%	N	%	N	%
0 NCD			174	65.2	207	77.5	207	77.5	113	42.3
1 NCD			41	15.4	28	10.5	22	8.2	46	17.2
2+ NCDs			52	19.5	32	12.0	38	14.2	108	40.5
Type of NCD:										
Stomach or digestion problem	179	67.0	20	7.5	12	4.5	28	10.5	51	19.1
Heart or circulation problem	225	84.3	13	4.9	5	1.9	7	2.6	20	7.5
High blood pressure	201	75.3	19	7.1	13	4.9	8	3.0	37	13.9
Breathing problems	205	76.8	22	8.2	14	5.2	12	4.5	33	12.4
Allergies	173	64.8	33	12.4	13	4.9	13	4.9	57	21.4
Back or neck pain	148	55.4	28	10.5	17	6.4	18	6.7	71	26.6
Muscular or joint pain in hand or arm	184	68.9	15	5.6	17	6.4	8	3.0	47	17.6
Muscular or joint pain in foot or leg	168	62.9	22	8.2	19	7.1	18	6.7	51	19.1
Skin problems	197	73.8	8	3.0	9	3.4	15	5.6	49	18.4
Severe headache	173	64.9	16	6.0	14	5.2	13	4.9	66	24.7
Diabetes	243	91.0	7	2.6	4	1.5	3	1.1	14	5.2
New reported cases pre- during and after migration **										
Stomach or digestion problem			20	7.5	4	1.5	21	7.9	44	16.5
Heart or circulation problem			13	4.9	4	1.5	6	2.2	19	7.1
High blood pressure			19	7.1	10	3.7	5	1.9	33	12.4
Breathing problems			22	8.2	8	3.0	7	2.6	27	10.1
Allergies			33	12.4	6	2.2	6	2.2	51	19.1
Back or neck pain			28	10.5	13	4.9	14	5.2	66	24.7
Muscular or joint pain in hand or arm			15	5.6	16	6.0	7	2.6	46	17.2
Muscular or joint pain in foot or leg			22	8.2	16	6.0	15	5.6	47	17.6
Skin problems			8	3.0	6	2.2	12	4.5	45	16.9
Severe headache			16	6.0	9	3.4	8	3.0	61	22.8
Diabetes			7	2.6	3	1.1	2	0.7	12	4.5

*The reported prevalences of NCDs in each migration phase are non-exclusive.

** New case=did not experience NCD in previous migration phase(s).

Table 3: Prevalence of unmet medical care needs pre-, during and after migration to Greece by refugees reporting a non-communicable disease (NCD) (N=267)

| | Unmet medical care needs | | | | | | | |
| | Before leaving home | | While travelling or displaced internally in home country | | While travelling or staying in a transit country | | Since travelling or arriving to Greece | |
	n/N	%	n/N	%	n/N	%	n/N	%
0 NCD	174		207		207		113	
1 NCD	14/41	34.1	8/28	28.6	4/22	18.2	19/46	41.3
2+ NCDs	22/52	42.3	9/32	28.1	15/38	39.5	48/108	44.4
Type of NCD								
Stomach or digestion problem	9/20	45.0	3/12	25.0	12/28	42.9	20/51	39.2
Heart or circulation problem	7/13	53.8	1/5	20.0	3/7	42.9	11/20	55.0
High blood pressure	9/19	47.4	3/13	23.1	3/8	37.5	17/37	45.9
Breathing problems	13/22	59.1	4/14	28.6	5/12	41.7	14/33	42.4
Allergies	14/33	42.4	2/13	15.4	4/13	30.8	26/57	45.6
Back or neck pain	11/28	39.3	7/17	41.2	10/18	55.6	33/71	46.5
Muscular or joint pain in hand or arm	8/15	53.3	6/17	35.3	4/8	50.0	22/47	46.8
Muscular or joint pain in foot or leg	9/22	40.9	5/19	26.3	9/18	50.0	27/51	52.9
Skin problems	2/8	25.0	2/9	22.2	5/15	33.3	21/49	42.9
Severe headache	7/16	43.8	5/14	35.7	4/13	30.8	29/66	43.9
Diabetes	3/7	42.9	1/4	25.0	1/3	33.3	4/14	28.6

Table 4: Odds ratio describing the association between unmet medical care needs in Greece and non-communicable disease (NCD) (N=143)

	Model I* (N=X)		Model II** (N=X)	
	OR (95% CI)	*p*	OR (95% CI)	*p*
Number of NCDs				
1 NCD	Ref.		Ref.	
2+ NCD	1.11 (0.43-2.85)	0.825	1.65 (0.56-4.80)	0.362
Type of non-communicable disease				
Stomach or digestion problem	Ref.		Ref.	
Heart or circulation problem	2.11 (0.65-6.84)	0.214	1.64 (0.46-5.85)	0.446
High blood pressure	0.98 (0.37-2.63)	0.975	1.00 (0.33-3.08)	0.999
Breathing problems	0.89 (0.37-2.15)	0.794	0.88 (0.33-2.34)	0.789
Allergies	1.25 (0.56-2.80)	0.584	1.37 (0.56-3.35)	0.495
Back or neck pain	1.43 (0.66-3.10)	0.364	1.89 (0.82-4.33)	0.134
Muscular or joint pain in hand or arm	0.78 (0.29-2.08)	0.624	0.84 (0.29-2.42)	0.750
Muscular or joint pain in foot or leg	1.97 (0.76-5.10)	0.161	2.00 (0.72-5.55)	0.185
Skin problems	0.64 (0.27-1.53)	0.317	0.61 (0.23-1.62)	0.324
Severe headache	1.03 (0.48-2.21)	0.932	1.08 (0.47-2.51)	0.857
Diabetes	0.24 (0.05-1.21)	0.084	0.23 (0.04-1.25)	0.089
Sex				
Male			Ref.	
Female			0.87 (0.38-1.98)	0.738
Age				
18-30			Ref.	
31-50			1.21 (0.48-3.07)	0.688
51+			7.59* (1.49-38.56)	0.015
Country of birth				
Afghanistan			Ref.	
Syria			0.65 (0.26-1.66)	0.365
Other[a]			3.16 (0.95-10.46)	0.060
Marital Status				
Widow/single/divorced/separated			Ref.	
Married			0.86 (0.27-2.81)	0.808
Children				
No			Ref.	
Yes			0.76 (0.22-2.65)	0.662
Highest educational level				
6 years or less			Ref.	
6-11 years			0.76 (0.29-2.03)	0.590
12+ years			0.91 (0.27-3.11)	0.879

95% CI indicates 95% confidence interval.

*Statistically significant associations (p<0.05):

[a]: Other: Guinea, Iran, Iraq, Israel, Kuwait, Lebanon, Turkey

*Model I: Unadjusted

**Model II: Adjusted for sex, age, country of birth, marital status, children, and educational level.