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Outcomes of general health assessments of Ukrainian refugees in Denmark

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ABSTRACT

INTRODUCTION: Since 2022, Denmark has received approx. 50,000 Ukrainian refugees. We examined the sociodemographic characteristics, disease patterns and associated risk factors of Ukrainian refugees receiving a general health assessment (GHA) at the Migrant Health Outpatient Clinic, Hvidovre Hospital.

METHODS: This cross-sectional study based on a prospective inclusion of patients, included all Ukrainian adults assessed between April 2022 and December 2024. The GHAs included blood samples (biochemistry and screening for infectious diseases), a questionnaire, a medical interview and a physical examination. Data were analysed using descriptive and inferential statistics.

RESULTS: A total of 101 participants were included. Common findings were poor oral health (44%) and PTSD symptoms (22%). Screening for infectious diseases revealed previous hepatitis B infection (15%), tuberculosis infection (12%) and HIV infection (4%). COVID-19 vaccine adherence was low (50%). We also found that exposure to war trauma was associated with PTSD symptoms.

CONCLUSIONS: The study population had a significant burden of mental and physical health problems and indications of low vaccine coverage, highlighting the need for increased awareness of the health needs of Ukrainian refugees in Denmark and the importance of providing GHAs to at-risk individuals.

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TRIAL REGISTRATION: Ethical approval was granted by the Team for Medical Records Data, Capital Region of Denmark.

Since 24 February 2022, 6.2 million Ukrainian refugees have been registered across Europe [1]. Due to martial law prohibiting most men aged 18-60 years from leaving the country, most of these refugees are women and children [2]. By the end of 2024, 48,702 Ukrainian refugees had migrated to Denmark [3]. Ukrainian refugees gain full access to Danish healthcare, at a par with Danish citizens, when they receive residence permits and move from asylum centres into municipal accommodation [2].

Existing literature highlights a significant burden of communicable (CDs) and noncommunicable diseases (NCDs) among Ukrainians. In 2017, 91% of deaths in Ukraine were attributable to NCDs, with most of these deaths being linked to cardiovascular diseases. Among Ukrainian men who died in 2017, 30% were aged 30-65 years. This high rate of premature death was attributed mainly to lifestyle risk factors [4]. In 2022, Ukraine had the highest tuberculosis incidence in Europe, with 90 cases per 100,000 population, of which 25.2% were drug-resistant [5]. Ukraine also has the second-highest HIV incidence in Europe after Russia [6]. Furthermore, a

decline in vaccine coverage has led to outbreaks of vaccine-preventable diseases, such as a major measles outbreak in 2017-2019 [7].

To address refugees' health, various health reception assessments are offered across Europe [8]. In Denmark, municipalities may provide general health assessments (GHAs) to selected refugees with asylum-seeking or family reunification backgrounds. However, only the United Nations High Commissioner for Refugees (UNHCR)-quota refugees are systematically offered voluntary GHAs by law. The GHA includes a comprehensive evaluation and examination of physical and mental health status and is conducted, with regional variance, either by a general practitioner (GP) at a department of social medicine or at a specialised migrant health outpatient clinic (MHOC) [9].

In 2022, the Danish Health Authority recommended that Ukrainian refugees should have access to individual medical evaluations through their GPs. Systematic GHAs for all Ukrainian refugees were not advised; GPs were recommended to conduct broad evaluations upon initial consultations, focusing on the patient's medical background information and treatment needs [2]. The Municipality of Copenhagen opted to conduct GHAs at the MHOC exclusively for Ukrainians selected by social workers.

The large influx of Ukrainian refugees with quick and direct access to healthcare, coupled with the absence of systematic health assessments, has left the general disease patterns of Ukrainian refugees in Denmark largely unexplored. As existing literature suggests, this group may face significant health burdens. Danish healthcare professionals need to understand these disease patterns to provide effective care. Therefore, we studied sociodemographic characteristics, disease patterns and associated risk factors among Ukrainian refugees who underwent a GHA at the MHOC at Hvidovre Hospital.

Methods

Study population

In this cross-sectional study, we analysed medical records of all (n = 101) adult Ukrainian refugees prospectively participating in a GHA at the MHOC, Hvidovre Hospital, from April 2022 to December 2024. All participants were housed in the Capital Region of Denmark and were individually referred by local social workers based on concerns about i) unresolved complex health issues and/or ii) health issues combined with challenging psychosocial circumstances. Individuals already socially well integrated or engaged in an ongoing relevant health treatment plan with no significant unresolved health issues were not referred. The number of eligible patients was unknown; however, 9,834 Ukrainian refugees were resettled in the Capital Region of Denmark during the study period [3]. Among all the patients referred (n = 105), four patients either declined the GHA or failed to attend their appointment for unknown reasons and were therefore not included in the study.

General health assessments and data collection

The GHAs were conducted by physicians experienced in migrant medicine, with professional interpreters available as needed. The GHAs involved: i) blood samples for biomarkers and infectious disease screening, ii) a structured questionnaire covering sociodemographic details, migration history, potential trauma, vaccination status and medical history, iii) a medical interview and lastly iv) a physical examination. Each assessment concluded with a plan for potential clinical specialist referrals and/or potential follow-up at GPs for further diagnosis/treatment, and included recommendations for social or municipal services. A REDCap database was established to store data from electronic patient records, survey responses, microbiology and blood chemistry analyses.

Statistical methods

Descriptive statistics were used to calculate categorical frequencies. Wilson score intervals were applied to calculate the 95% CI for the observed outcomes. Logistic regression models, adjusted for age and sex, explored associations between sociodemographic variables and four health-related outcomes. Potential confounders were individually added to the unadjusted model and retained in the final model if they meaningfully altered the estimate of the sociodemographic variable. Model fit was evaluated using the Hosmer-Lemeshow test, and predictor significance was tested with the type III likelihood-ratio test. Statistical significance was set at $p < 0.05$ (two-tailed). All analyses were conducted in R (4.4.2).

Ethics

All participants were informed about the study orally and in writing before the GHA and provided written consent. Ethical approval was obtained from the Team for Medical Records Data, Capital Region of Denmark.

Trial registration: Ethical approval was granted by the Team for Medical Records Data, Capital Region of Denmark.

Results

A total of 101 Ukrainian refugees aged ≥ 18 years were included in the study. The median age was 41 years (range: 18-87 years). Women comprised 66% of the population. Most had lived in Eastern Ukraine before displacement (53%). One third (34%) had no vocational or higher education. 61% had experienced acts of war, mainly in the form of bombings and missile attacks. The sociodemographic characteristics of the study population are shown in **Table 1**.

TABLE 1 Sociodemographic characteristics of the study population stratified by sex. Data are presented as % (n), and % are based on the number of respondents to each of the questions, unless otherwise stated.

	Women (66% (N_w = 67))	Men (34% (N_m = 34))	Total (100% (N_{tot} = 101))	Missing[a] (0 % (0))
Pre-invasion settlement[b]				20 (20)
Eastern Ukraine	44 (23)	69 (20)	53 (43)	
Northern Ukraine	29 (15)	17 (5)	25 (20)	
Southern Ukraine	13 (7)	10 (3)	12 (10)	
Western Ukraine	8 (4)	3 (1)	6 (5)	
Central Ukraine	6 (3)	0 (0)	4 (3)	
Age				0 (0)
18-24 yrs	7 (5)	9 (3)	8 (8)	
25-45 yrs	57 (38)	38 (13)	50 (51)	
46-66 yrs	22 (15)	44 (15)	30 (30)	
≥ 67 yrs	13 (9)	9 (3)	12 (12)	
Vocational or higher education				2 (2)
None	36 (24)	28 (9)	34 (33)	
Vocational education	19 (13)	25 (8)	21 (21)	
Short: < 2 yrs	3 (2)	6 (2)	4 (4)	
Medium: 2-4 yrs	18 (12)	19 (6)	18 (18)	
Long: > 4 yrs	24 (16)	22 (7)	23 (23)	
Children, n				1 (1)
0	27 (18)	45 (15)	33 (33)	
1-2	57 (38)	49 (16)	54 (54)	
≥ 3	16 (11)	6 (2)	13 (13)	
Having experienced acts of war?[c]				0 (0)
Yes	58 (39)	68 (23)	61 (62)	
No	42 (28)	32 (11)	39 (39)	
Time since flight, mos.[d]				5 (5)
0-5	17 (11)	22 (7)	19 (18)	
6-17	65 (42)	52 (16)	60 (58)	
≥ 18	18 (12)	26 (8)	21 (20)	
Marital status				1 (1)
Married/partner	25 (17)	39 (13)	30 (30)	
Married/partner, living apart	17 (11)	3 (1)	12 (12)	
Single/divorced/widow(er)	58 (39)	58 (19)	58 (58)	
Housing status				3 (3)
Living alone	22 (15)	42 (13)	29 (28)	
Living with family/other people	78 (52)	58 (18)	71 (70)	
Source of basic income				6 (6)
Job	6 (4)	6 (2)	6 (6)	
Governmental subsidies	92 (58)	91 (29)	92 (87)	
No governmental subsidies	2 (1)	3 (1)	2 (2)	
Learning Danish?				11 (11)
Yes	36 (21)	44 (14)	39 (35)	
No	64 (37)	56 (18)	61 (55)	

a) % based on total number of patients: 101.
b) Based on the division of Ukrainian oblasts (provinces) into greater regions by the Danish "Integration barometer" with Kyiv included in Northern Ukraine.
c) Include witnessing bombings, missile attacks or combat; experiencing or witnessing severe injuries, including among close relations; being detained by combatants; or being directly involved in combat.
d) Time since the patient started his/her flight at the time of consultation.

Table 2 summarises the results from selected blood samples and questionnaires on vaccination status. Screening for CDs primarily revealed antibody responses to previous hepatitis B-virus (HBV) infections (15%) and tuberculosis infections (TBI) (12%). No active TB cases were detected. Among HIV-positive patients (n = 4), two had a history of intravenous drug use, and all four were already linked to treatment in Denmark.

TABLE 2 Results on biomarkers, infectious disease screening and vaccination coverage stratified by sex.

	Women		Men		Total		
	yes, %[a] [95% CI][b] (n)	no, %[a] (n)	yes, %[a] [95% CI][b] (n)	no, %[a] (n)	yes, %[a] [95% CI][b] (n)	no, %[a] (n)	Missing, %[c] (n)
Biomarkers							
Vitamin D:							
Insufficiency: < 50 nmol/l	52 [40-63] (33)	48 (31)	43 [27-61] (13)	57 (17)	49 [27-61] (46)	51 (48)	7 (7)
Moderate/severe deficiency: < 25 nmol/l	5 [2-13] (3)	95 (61)	10 [3-26] (3)	90 (27)	6 [3-13] (6)	94 (88)	
HbA_{1c} concentration > 44 mmol/mol[d]	12 [6-22] (8)	88 (57)	10 [3-26] (3)	90 (27)	12 [7-20] (11)	88 (84)	6 (6)
Hgb concentration[e]: < 8,3 mmol/l (men) < 7,3 mmol/l (women)	12 [6-22] (8)	88 (57)	7 [2-21] (2)	93 (28)	10 [6-18] (10)	90 (85)	6 (6)
Communicable diseases							
Chronic hepatitis B[f]	0 [0-6] (0)	100 (64)	0 [0-11] (0)	100 (31)	0 [0-4] (0)	100 (95)	6 (6)
Previous infection[g]	10 [5-21] (7)	90 (57)	21 [11-40] (7)	79 (24)	15 [9-23] (14)	85 (81)	
Chronic hepatitis C[h]	0 [0-6] (0)	100 (64)	6 [2-21] (2)	94 (29)	2 [1-7] (2)	98 (93)	6 (6)
Previous infection[i]	3 [1-11] (2)	97 (62)	3 [1-16] (1)	97 (30)	3 [1-9] (3)	97 (92)	
Tuberculosis[j]	9 [4-19] (6)	91 (58)	17 [7-34] (5)	83 (25)	12 [7-20] (11)	88 (83)	7 (7)
Syphilis[k]	2 [0-8] (1)	98 (64)	0 [0-11] (0)	100 (31)	1 [0-6] (1)	99 (95)	5 (5)
HIV[l]	5 [2-13] (3)	95 (61)	3 [1-16] (1)	97 (30)	4 [2-10] (4)	96 (91)	6 (6)
≥ 1 chronic infectious disease(s)[m]	14 [7-24] (9)	86 (56)	23 [11-40] (7)	77 (24)	17 [11-25] (16)	83 (80)	5 (5)
Vaccination coverage							
Vaccinated according to local childhood vaccination schedule[n]	95 [87-98] (62)	5 (3)	91 [76-97] (30)	9 (3)	94 [87-97] (92)	6 (6)	3 (3)
Vaccinated against COVID-19[o]	45 [30-60] (17)	55 (21)	60 [39-78] (12)	40 (8)	50 [38-62] (29)	50 (29)	43 (43)
Vaccinated against hepatitis B[p]	8 [3-17] (5)	92 (59)	3 [1-16] (1)	97 (30)	6 [3-13] (6)	94 (89)	6 (6)

HBsAg = hepatitis B virus surface antigen; HCV = hepatitis C-virus; PCR = polymerase chain reaction; TBI = tuberculosis infection.
a) % based on the number of blood samples analysed or respondents to each question, unless otherwise stated.
b) [95% CI] contains the Wilson score CI at 95% for the proportion of positive outcomes.
c) % based on total number of patients: 101.
d) HbA_{1c} concentration > 44 mmol/mol is above the upper reference limits and associated with early-stage type 2 diabetes and metabolic syndrome.
e) Hgb concentration < 8,3 mmol/l for men and < 7,3 mmol/l for women is indicative for anaemia.
f) Defined as positive for HBsAg.
g) Defined as positive anti-HBc antibodies, positive anti-HBs antibodies and negative HBsAg.
h) Defined as positive confirmatory PCR test for HCV RNA in patients with a positive anti-HCV IgG avidity assay.
i) Defined as positive anti-HCV IgG avidity assay and negative confirmatory PCR test for HCV RNA.
j) Defined as positive interferon-gamma release assay for Mycobacterium tuberculosis indicating TBI.
k) Defined as positive for Treponema pallidum antibodies.
l) Defined as positive for either HIV-antigen or antibodies in an HIV combination test.
m) Defined as positive if a patient tests positive for ≥ 1 chronic infectious disease among; hepatitis B, hepatitis C, syphilis, TBI or HIV.
n) Defined as positive if the patient states that they are fully vaccinated according to their local childhood vaccination schedule.
o) Defined as positive if the patient states that they have received ≥ 1 doses of COVID-19 vaccination. The high amount of missing data is explained by patients not being systematically asked about COVID-19 vaccinations, especially in 2023 and 2024.
p) Defined as positive if positive anti-HBs antibodies ≥ 10 IU/l and negative for anti-HBc antibodies.

Most patients (n = 92) reported being vaccinated according to their local childhood vaccination schedule. Two patients stated that they had not followed the schedule, whereas four were unsure or could not recall their vaccination status. Regarding COVID-19 vaccines, 50% reported not receiving a single dose. Blood sample analysis for HBV showed that 6% had antibody responses consistent with vaccination.

Table 3 summarises the most common diagnoses in the study population, including oral health status, clinician-assessed psychiatric symptoms and the most frequent referrals. Among the NCDs, the most prevalent diagnoses were circulatory system diseases such as hypertension (25%). Physical examinations revealed that 44% of patients had poor oral health. Overall, 92% of patients required a clinical follow-up plan; 63% were scheduled for follow-up with their GP, and 64% were referred to one or more specialists. Common follow-up topics at GPs included monitoring vitamin D levels, vaccinations and managing hypertension. Psychiatry was the speciality most frequently referred to (30%), mostly due to symptoms of post-traumatic stress disorder (PTSD) (22%).

TABLE 3 Most frequent diagnoses, symptoms and referrals in the study population stratified by sex.

	Women, %[a] [95% CI][b] (n)	Men, %[a] [95% CI][b] (n)	Total, %[a] [95% CI][b] (n)	Missing, %[c] (n)
Diagnoses[d]				
Hypertension	24 [15-35] (16)	26 [15-43] (9)	25 [17-35] (25)	
Type 2 diabetes	6 [2-14] (4)	6 [2-19] (2)	6 [3-12] (6)	
Other heart disease[e]	6 [2-14] (4)	6 [2-19] (2)	6 [3-12] (6)	
Stroke or haemorrhage in the brain	3 [1-10] (2)	9 [3-23] (3)	5 [2-11] (5)	
Hypercholesterolaemia	3 [1-10] (2)	9 [3-23] (3)	5 [2-11] (5)	
Cancer	3 [1-10] (2)	6 [2-19] (2)	4 [2-10] (4)	
Poor oral health[f]	46 [35-58] (30)	39 [25-56] (13)	44 [34-54] (43)	3 (3)
Symptoms of depression/anxiety/stress[g]	30 [20-42] (20)	15 [6-30] (5)	25 [17-34] (25)	
Symptoms of PTSD[h]	21 [13-32] (14)	24 [12-40] (8)	22 [15-31] (22)	
Need for follow-up and/or referral	91 [82-96] (61)	94 [81-98] (32)	92 [85-96] (93)	0 (0)
Need for follow-up at GP	66 [54-76] (44)	59 [42-74] (20)	63 [54-72] (64)	
≥ 1 specialist referrals (all)	63 [51-73] (42)	68 [51-81] (23)	64 [55-73] (65)	
Psychiatry	30 [20-42] (20)	29 [17-46] (10)	30 [22-39] (30)	
Internal medicine specialties:	19 [12-30] (13)	18 [8-34] (6)	19 [12-28] (19)	
Infectious diseases	7 [3-16] (5)	9 [3-23] (3)	8 [4-15] (8)	
Cardiology	6 [2-14] (4)	3 [1-15] (1)	5 [2-11] (5)	
Gastroenterology	3 [1-10] (2)	3 [1-15] (1)	3 [1-8] (3)	
Surgical specialities:	9 [4-18] (6)	26 [15-43] (9)	15 [9-23] (15)	
Gastrointestinal surgery	4 [2-12] (3)	6 [2-19] (2)	5 [2-11] (5)	
Orthopaedic surgery	4 [2-12] (3)	6 [2-19] (2)	5 [2-11] (5)	
Urology	1 [0-8] (1)	9 [3-23] (3)	4 [2-10] (4)	
Neurology	9 [4-18] (6)	15 [6-30] (5)	11 [6-18] (11)	

GP = general practitioner; ICD-10 = International Classification of Diseases, 10th version
a) % based on the number of patients assessed in each of the categories unless otherwise stated.
b) [95% CI] contains the Wilson score confidence interval at 95% for the proportion of positive outcomes.
c) % based on total number of patients: 101.
d) Sum of positive assessments from the physician ("Yes, currently" and "Yes, previously") for the specified diagnosis in the structured questionnaire.
e) Refers to all chronic heart conditions except ischaemic heart disease, heart failure and acute myocardial infarction.
f) Defined as positive if assessed as having "poor oral health" by a physician; this includes physicians observing tooth decay, significant tooth loss, visible signs of oral infection, bleeding or swollen gums or other visible signs of dental problems during the examination.
g) Defined as positive if assessed as "possibly suffering from stress/depression/anxiety" by a physician.
h) Defined as positive if assessed as "possibly having PTSD" by a physician; this includes patients reporting symptoms consistent with ICD-10 criteria for PTSD when screened by the physician; no final diagnoses were made.

Table 4 presents the logistic regression results for each health outcome. In our sample, refugees from Eastern Ukraine were less likely to have received at least one COVID-19 vaccine dose than those from other regions (odds ratio (OR) = 0.24; 95% CI: 0.06-0.86, p = 0.035). Level of education was associated with poor oral health status (p = 0.041), with OR = 0.32 (95% CI: 0.12-0.82) for higher education and OR = 0.34 (0.10-1.06) for vocational education. Those who had experienced acts of war were more likely to exhibit symptoms of PTSD (OR = 5.6; 95% CI: 1.7-25.4, p = 0.011). No confounding effects for educational level and pre-invasion settlement were observed.

TABLE 4 Associations between selected physical and mental health outcomes and specific predictors.

	Total, n[a] (n)[b]	Missing, n (n)[b]	OR [95% CI]	p value
Received ≥ 1 dose(s) of COVID19-vaccine	58 (29)	43[c]		
Level of education[d]:		1[e] (1)		0.639[f]
No vocational or higher	18 (7)		1 (ref.)	
Vocational	10 (6)		2.04 [0.41-11.08]	0.387
Higher	29 (15)		1.58 [0.47-5.47]	0.458
Pre-invasion settlement[d]:		8[e] (3)		
North-, West-, Central, or Southern Ukraine	19 (13)		1 (ref.)	
Eastern Ukraine	31 (13)		0.24 [0.06-0.86]	0.035
Sex[g]:		0[e] (0)		
Male	20 (12)		1 (ref.)	
Female	38 (17)		0.54 [0.17-1.60]	0.269
Positive for ≥ 1 infectious disease(s)	96 (16)	5[c]		
Level of education[d]:		1[e] (1)		0.194[f]
No vocational or higher	33 (8)		1 (ref.)	
Vocational	19 (2)		0.33 [0.05-1.58]	0.205
Higher	43 (5)		0.35 [0.09-1.21]	0.105
Pre-invasion settlement[d]:		19[e] (4)		
North-, West-, Central, or Southern Ukraine	36 (5)		1 (ref.)	
Eastern Ukraine	41 (7)		1.01 [0.25-4.07]	0.991
Sex[g]:		0[e] (0)		
Male	31 (7)		1 (ref.)	
Female	65 (9)		0.55 [0.18-1.71]	0.290
Assessed as having poor oral health	98 (43)	3[c]		
Level of education[d]:		2[e] (1)		0.041[f]
No vocational or higher	33 (20)		1 (ref.)	
Vocational	20 (7)		0.34 [0.10-1.06]	0.070
Higher	43 (15)		0.32 [0.12-0.82]	0.020
Pre-invasion settlement[d]:		20[e] (9)		
North-, West-, Central or Southern Ukraine	36 (14)		1 (ref.)	
Eastern Ukraine	42 (20)		1.47 [0.56-3.97]	0.434
Sex[g]:		0[e] (0)		
Male	33 (13)		1 (ref.)	
Female	65 (30)		1.34 [0.57-3.21]	0.427
Assessed as having PTSD symptoms	101 (22)	0[c]		
Having experienced acts of war?[d]:		0[e] (0)		
No	39 (3)		1 (ref.)	
Yes	62 (19)		5.6 [1.7-25.4]	0.011

PTSD = post-traumatic stress disorder; ref. = reference category for comparison.
a) n is based on the number of patients who were asked about, assessed or screened for the given outcome in each category.
b) (n) indicates the number of individuals positive for the given outcome in each category.
c) n reflects the number of individuals with incomplete information for the outcome variables.
d) Adjusted for age and sex.
e) n reflects the number of individuals with complete information for the given outcome variable but incomplete information for the predictor variables.
f) p value for the specified variable, derived from the Type III likelihood-ratio test, which assesses the variable's individual contribution to the model's fit after accounting for other variables.
g) Adjusted for age.

Discussion

We analysed the GHAs of 101 Ukrainian refugees examined between April 2022 and December 2024. The primary health issues identified in the population were symptoms of mental disorders (primarily PTSD), NCDs related to the circulatory system and poor oral health. We also found a notable prevalence of CDs and indications of low vaccination rates among the population. Follow-up with GPs was needed for 63% of the population, whereas 64% required referral to one or more specialists.

The frequent psychiatry referrals underscore that mental health is a major concern for this population. Exposure

to acts of war was associated with symptoms of PTSD, aligning with existing literature [10]. Our PTSD findings also align with a large Danish survey in which 24.4% of Ukrainian refugees reported symptoms of PTSD [11].

While prevalence estimates of NCDs among Ukrainian refugees vary across studies, circulatory system diseases are consistently reported as the most prevalent NCDs for adult Ukrainian refugees [12, 13] and Ukrainians alike [4]

The prevalence of CDs was notable. The HIV prevalence of 4% in our study group is high, compared with a prevalence of 1.5% found in a larger German study on the health status of Ukrainian refugees. However, the prevalence rates of TBI (13%), anti-hepatitis C-virus (HCV) antibodies (4.4%), and anti-hepatitis B core (HBc) antibodies (12%) in the German study were consistent with our findings [12]. Notably, the prevalences of TBI and HIV in our study exceeded those of the general Danish population, where the TBI prevalence is estimated at 3.2% among adolescents and adults [14] and the HIV prevalence is reported to be < 0.1% [15].

Previous cross-sectional studies of newly resettled refugees in Denmark with various backgrounds have reported high rates of PTSD symptoms (28.3% and 33%, respectively), TBI (20.3% and 12%) and HBV (1.8% and 1%), but lower HIV rates (0.1% and 2%) than our study [16, 17]. Horn et al. also reported fewer specialist referrals [17]. The higher referral rate among Ukrainians may stem from the fact that only a selected subgroup received GHAs based on suspected health issues, unlike the systematic assessments in previous studies.

Recall bias may have affected the self-reported adherence to Ukraine's childhood vaccination schedule, as other studies show suboptimal immunisation and vaccine coverage among Ukrainians [7, 12]. This is also reflected in our findings of low COVID-19 and HBV vaccination coverage.

Lastly, the high prevalence of poor oral health observed in our study is consistent with findings from a group of Ukrainian refugees in Norway, where 31% self-assessed their oral health status as being poor or very poor [18].

In 2022, the Danish Health Authority recommended that GPs should conduct initial health evaluations of Ukrainian refugees, focusing on, i.a., physical and mental health, vaccination status and infectious diseases [2]. These recommendations align with 2022 recommendations published by the European Centre of Disease Prevention and Control (ECDC), which also advises, i.a., assessing vaccination status at first contact and identifying Ukrainian refugees needing treatment for mental health issues, NCDs or CDs [19]. The exact extent to which Ukrainian refugees in practice receive initial health evaluations from their GPs remains unknown. However, a recent survey of Danish GPs revealed that 65% of the GPs had limited or no knowledge of the official recommendations for managing newly arrived Ukrainian refugees and that only one-third followed these recommendations [20].

Thus, there is a risk of missing critical diagnoses for both mental and physical health among Ukrainian refugees. Previous research has supported systematically offering GHAs to all refugees due to a high number of detected health problems and the individual and societal benefits in addressing these problems [16]. While further evidence is needed to determine the cost-effectiveness of providing GHAs to all Ukrainian refugees, for now, our findings suggest that full GHAs should be prioritised, particularly for individuals suspected of suffering from health issues.

Limitations

This study has several limitations to consider when interpreting our findings. First, the study population consisted of individuals referred to GHAs due to concerns about health issues, which likely skewed the population towards individuals with more severe health burdens than the broader population of Ukrainian refugees in Denmark. This, along with the lack of specific eligibility criteria and the reliance on non-health professionals for referrals, introduces a selection bias. Second, the small sample size in this study contributes to

a substantial margin of error in the estimates and limits the statistical power to detect small but clinically meaningful associations. Third, the GHAs in this study were primarily conducted for clinical purposes, which accounts for some missing data. Finally, recall bias may have influenced some of the self-reported data.

Conclusions

The Ukrainian refugees in our study were extensively burdened by health issues, with 92% requiring follow-up care or specialist referrals. These issues included mental health disorders, NCDs, CDs, poor oral health and indications of low vaccination coverage. The high number of health issues detected underscores the need for awareness among healthcare providers, not least GPs, and the importance of offering GHAs to those at the greatest risk. Research on larger study populations is needed to provide accurate prevalence estimates of health problems among displaced Ukrainian adults and children in Denmark.

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