Screening for posttraumatic stress disorder in young adult refugees from Syria and Iraq

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ABSTRACT

Introduction: In January 2016, 2057 refugees from civil war-torn Syria and Iraq, aged 18.0 to 24.9 years, were first-time entrants into the German unemployment register and thus potentially eligible for the labor market. Civil war and forced migration may affect individuals' mental health. Traumatic experiences in particular are assumed to represent a major barrier, e.g., to labor-market integration. This study aimed to screen the rates of posttraumatic stress disorder (PTSD). Former refugee studies have reported PTSD screening rates between 3% and 44%.
Method: A total of 8.5% (N = 175 of 2057) of respondents were randomly interviewed either by telephone or web-based interviews. A total of 84 respondents (48% out of 175 respondents) were screened using the Essen Trauma Inventory (ETI) based on the DSM-IV, and 91 (52%) respondents used the Short Screening Scale for Posttraumatic Stress Disorder (SSS-PSD). All respondents were additionally questioned regarding psychological impairment (Symptom Checklist 10) and health status (Short Form 12).
Results: Of the respondents, 59.4% reported at least one traumatic experience. The percentage of positive PTSD screenings obtained using the ETI was 9.5% (N = 84) and 6.6% (N = 91) using the SSS-PSD. The percentage of positive PTSD screenings obtained with both screening instruments was 8% (N = 175; 95%-CI: 3.9% to 12.1%). A total of 19.4% of the subjects were above the SCL-10 cut-off for psychiatric caseness.
Discussion: The PTSD rate in this sample was in the average range compared to previous estimates from large samples of refugees. Psychiatric caseness was high. The results should be considered for planning labor-market integration programs and the design of supportive schemes.

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1. Introduction

In 2015, approximately 890,000 asylum-seeking individuals arrived in Germany (Bundesagentur für Arbeit (BA)) [1]. Within this group, civil war refugees from Syria and Iraq represented a major subgroup out of which the majority was aged 20 to 25 years [2]. In 2015, 158,657 individuals from Syria and 29,784 from Iraq were first-time applicants for asylum [3].

Refugees who experienced the consequences of (civil) war or other forms of brute force in their country of origin or during forced migration are assumed to display a higher risk for mental disorders. Forced migration, traumatic experiences in the country of origin and during flight, and daily hassles due to poor social and material conditions in the receiving country contribute to postmigrational nonintegration [4–6].

The above-average prevalence of mental disorders, especially Posttraumatic Stress Disorder (PTSD), assessed by questionnaires or diagnostic interviews, is well-documented in refugee populations in general [7,8]. A recent study involving Syrian refugees with a median age of 18 years from Greek refugee camps reported a 75% prevalence rate of anxiety disorders (screened using the Refugee Health Screener-15) [9]. A prevalence of emotional and behavioral problems of 31% was reported in a study on adolescent Afghan refugees two years after arrival in the UK [10] (assessed using the Hopkins Symptom Checklist-37A [11]). The severity of anxiety and depressive symptoms had a positive association with the number of premigration traumatic events. For adolescents and young adults, the direct exposure to violence premigration, during and postmigration represents a main risk factor for the development of psychological disturbances and PTSD. In a study involving 135 young Somali refugees, cumulative trauma, perceived discrimination postresettlement and acculturative stressors increased the risk of PTSD symptoms [12].

The prevalence of PTSD in a randomly selected sample of Syrian refugees assessed in a Turkish refugee camp was 33.5% (clinical assessment) [13]. Data from a preselected sample of asylum seekers from

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one central reception center in southern Germany revealed a 32.2% PTSD screening rate [14]. A meta-analysis based on 20 refugee studies performed in Western countries and published between 1966 and 2002 reports PTSD prevalence rates for refugees of between 3% and 44% [4]. These studies focused on refugees from southeast Asian countries applying clinical or semistructured interviews.

In many cases, forced migration is related to additional risk factors, especially for young refugees, such as separation from the family, lower levels of social support, or perceived discrimination [15–17]. In the case of youth-aged migrants, these factors may also interfere with normal development and increase the probability of mental health problems [18]. In contrast, factors such as optimism or positively perceived social support may foster posttraumatic growth in young refugees [19].

Key barriers to the successful integration of subjects between 18 and 25 years of age in receiving countries are low educational level, mental disorders and unemployment, among other factors [20–22]; employment, income and education are rated as especially important health determinants in this age group [21]. PTSD symptoms in general and the PTSD symptoms of avoidance and hyperarousal specifically are positively associated with unemployment status and negatively associated with social and family functioning [23,24]. Avoidance as a core symptom of PTSD is positively associated with the maintenance of fear and psychological stress [25]. Depression in young refugees or PTSD in general is associated with lower levels of family social support and the level of education ([26] for PTSD-affected individuals [27]).

In this paper, we report a pilot study with a representative sample of 175 young refugees from Syria and Iraq. The sample was assessed for psychological impairment and PTSD using two different screening tools. The following aims of this study are threefold: to assess the feasibility of alternative PTSD screening instruments in the context of telephone or web-based interviews with young refugees, to estimate the prevalence of PTSD screening diagnoses (indications of PTSD), and to assess associated psychosocial factors. Based on the literature review, we expected a prevalence of indications of PTSD between 5% and 30% and hypothesized that the social origin, subjects' educational attainment, having relatives and friends in Germany, and housing conditions are associated with PTSD severity. Thus, we estimated a parsimonious multivariate model to test for possible confounding variables (e.g., social origin, education, living conditions, gender), moderating the observed prevalence of indications of PTSD. To the best of our knowledge, there are currently no representative studies on the prevalence of PTSD and psychological impairment in refugees entering the German unemployment register.

2. Material and methods

The study serves as a pilot study for a representative panel study (WELLCOME). The multiwave WELLCOME study explores the association of refugees' migration experience and mental health and the process of integration into education, training and work, and social integration in Germany. The target group for the pilot study is young refugees from Syria or Iraq who are entitled to (temporary) asylum in Germany and who are listed as new entrants in the unemployment register of the German Federal Employment Services [1]. Enrollment in the unemployment register of the German Federal Employment Services provides both access to social benefits and institutional support for integration into educational opportunities or employment in Germany. In January 2016, 2080 (100%) refugees from Syria and Iraq, aged 18.0 to 24.9 years, were entered into the German unemployment register (Table 1). From that entry group, two representative subsamples were drawn randomly. The first group consisted of individuals for whom the unemployment registers provided phone numbers; this group was assigned to computer-assessed telephone interviews (CATI). For a second subgroup of individuals, the unemployment registers did not provide phone numbers; these individuals were assigned to computer-assisted web interviews (CAWI).

Table 1
Inclusion criteria.

- First-time enrollment in the unemployment register of the Federal Employment Agency in January 2016
- Refugees with Syrian or Iraqi citizenship
- Aged between 18.0 and 24.9 years
- Refugees at the beginning of their integration process, i.e., arrived in Germany after 2011
- Language skills in Arabic, English or German
- Available address
- Voluntary participation (informed consent)

Randomly selected individuals were contacted using a standardized procedure. The sampled subjects received a written invitation both in the German and Arabic languages providing comprehensive information regarding the procedure, the aims of the study, and data protection. In the case of no available phone number, the sampled subjects were allocated to the CAWI subsample, otherwise, they were included in the CATI subsample. The invitation letter additionally included an access code for the CAWI subsample. A total of 856 subjects (41.2% of 2080 subjects) with a German telephone number were allocated to the CATI subsample.

CATI: Subjects in the CATI subsample (N = 856) were contacted by telephone immediately after they received the invitation letter. Respondents could perform the interview in the Arabic, English or German language. To realize approximately 50 CATI interviews, 296 subjects (14.2% of 2080 subjects) were randomly chosen from the CATI subsample to recruit respondents. In 176 (8.5% of 2080 subjects) of the cases, contact could not be established according to the standardized procedure, primarily due to the participants changing their telephone number (Fig. 1). Structured telephone interviews were successfully conducted with 57 subjects (19.3% of 296 subjects) by 13 trained interviewers of the Institute for Applied Social Sciences (INFAS), Bonn, Germany. Only interviewers speaking Arabic as the native language were employed, and most of the interviews (91%) were performed in the Arabic language, 8% in the German language and 1% in the English language. Each interview lasted an average of 54 min.

CAWI: With the invitation letter, the 1201 CAWI subjects (57.7% of 2080 subjects) received an access code for the web-based questionnaire. A total of 118 subjects (5.7% of 2080 subjects) completed the web-based interview (offered in Arabic, German and English versions, adapted to smart phone screens). Interviews could not be completed by 28 subjects (1.3% of 2080 subjects), 189 subjects (9.1% of 2080 subjects) could not be reached by the invitation letter, and 865 subjects (41.6% of 2080 subjects) did not respond to the invitation for CAWI (nonresponse).

Subjects from the CATI and CAWI subsamples were allocated at random to either the PTSD measurement using the Essen Trauma Inventory (ETI) or the Short Screening Scale for Posttraumatic Stress Disorder (SSS-PSD). In accordance with other studies, the response rate in general was significantly higher for CATI compared to that of CAWI [28]. Females and lower qualified respondents participated to a lower degree in the CAWIs than in the CATIs. However, we found no difference in the prevalence of indications of PTSD between females (or males) assessed using CATI and females (or males) assessed using CAWI. In addition, no difference was found for indications of PTSD between lower qualified subjects assessed by CATI and lower qualified subjects assessed by CAWI. To take into account any unobserved bias due to the assessment method (CATI/CAWI), we controlled for this factor in the regression models to explore the association of social factors potentially associated with PTSD. A total of 23 contacted subjects (1.1% of 2080 subjects) were excluded from the sample ex post due to the respondents' answers regarding age.

In preparation for the WELLCOME main survey, the pilot study aimed to assess two alternative instruments for PTSD screening based on the DSM-IV standards because DSM-5-based PTSD-screening instruments were not available at the time the pilot study was prepared. We aimed
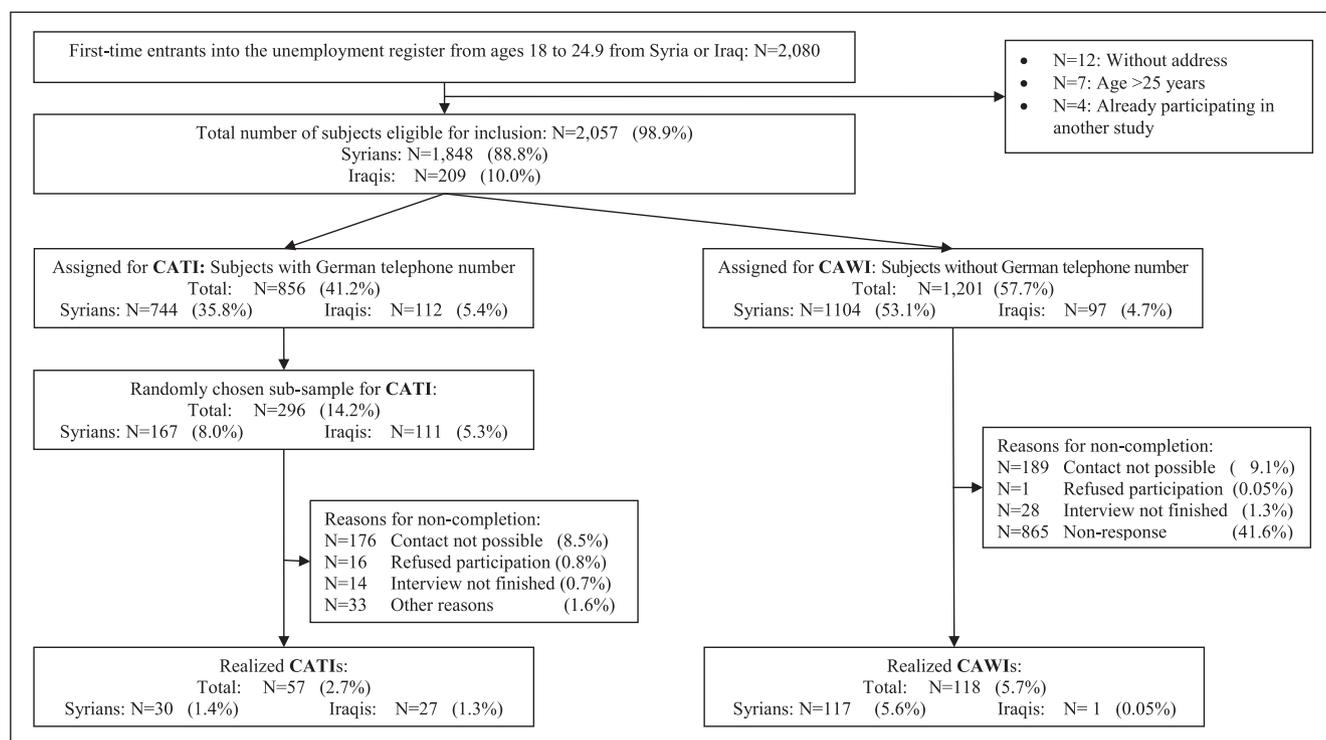
Fig. 1. Recruitment and drop-out.

at comparing the Short Screening Scale for Posttraumatic Stress Disorder (SSS-PSD [29]) as a screening tool and the Essen Trauma Inventory [30] as a short and more differentiated screening and diagnostic tool with regard to psychometric qualities and to determine their feasibility for the future epidemiological WELLCOME panel study. The sample was randomly assigned to one of these screening tools. Of the 175 respondents in the pilot study, 84 respondents were assessed using the ETI tool, and 91 respondents were assessed using the SSS-PSD tool. The ETI and the SSS-PSD were used to assess the one-month prevalence rate of indications of PTSD.

2.1. Essen trauma inventory adapted (ETI)

The ETI assesses PTSD according to the DSM-IV criteria A to F. It is characterized by excellent reliability (Cronbach's alpha = 0.95), clear factor structure and good construct validity. The ETI validation was based on standardized clinical interviews for PTSD [31] and on different questionnaires assessing PTSD symptoms and psychopathology that were already validated (e.g., the Posttraumatic Stress Scale [32] and the Peritraumatic Dissociative Experience Questionnaire [33]) [34]. The total sample consisted of 952 persons, including six subsamples (177 outpatients from a psychosomatic clinic, 39 outpatients from a trauma clinic, 71 psychiatric outpatients, 81 patients suffering from hepatitis C, 436 patients treated by general practitioners, and 117 healthy blood donors [30]). The ETI was implemented in a number of studies involving Arabic and Yazidi refugees living in Germany [35–37].

Assuming a high probability of potential traumatic events during, pre- and postmigration, to reduce time and effort for the subjects and to prevent them from retraumatization, the ETI trauma list was omitted. In the introduction to the PTSD section, the interviewer asks the respondent to think about his or her worst potentially traumatic event that is anchored to the four items for criterion A and the following PTSD symptom assessment (ETI or SSS-PSD). The number of items for criteria A1 and A2 was reduced from 4 × 4 to 2 × 2 (exposure to traumatic events and intense fear/helplessness). These four items for criterion A were presented to all subjects (N = 175). Respondents who could not report

a potentially traumatic event did not participate in the subsequent PTSD symptom assessment.

Three original ETI subscales were employed as follows: criteria B (intrusions, 5 items), C (avoidance, 7 items) and D (hyperarousal, 5 items). Criteria E (duration of the disturbance) and F (psychosocial impairment) were omitted. The items of the ETI subscales were rated on a 4-point Likert scale from 0 ("not at all") to 3 points ("very often"). If one A1 and one A2 item are given and the total sum of the items reflecting criteria B, C and D exceeds 26 points, a positive PTSD screening is indicated [34]. The rationale for implementing the ETI was threefold: First, the ETI was translated into different languages including a transculturally adapted Arabic version, which was used in immigrant or refugee settings [36]. Second, the ETI is comprehensive as it assesses clinically important symptoms of intrusion, avoidance, hyperarousal and indications of PTSD. Third, we considered the ETI an economical instrument for epidemiological research.

To test the factorial structure of the four items pertaining to criterion A in our sample, these items were subjected to a principal components factor analysis using Varimax rotation (PCA). The data were suitable for PCA (Kaiser-Meyer-Olkin (KMO) = 0.71; significant Bartlett's test of sphericity; communalities ≥0.550). The PCA revealed a one-factor solution, accounting for 72.4% of the variance. Cronbach's alpha was 0.84.

Similarly, the 17 items referring to criteria B, C, and D were analyzed using PCA with the number of factors limited to three according to the theoretical background (KMO = 0.85; communalities ≥0.430). The structure is in accordance with the analyses by Tagay et al. [30], who also found an overlap of items for the intrusion and avoidance factors. The three factors accounted for 55.8% of the variance, and Cronbach's alpha for the 17 items was 0.89.

2.2. Short screening scale for posttraumatic stress disorder (SSS-PSD)

The SSS-PSD by Breslau [38], which was translated into German by Siegrist and Maercker, is a seven-item questionnaire [29]. Two scales evaluate the PTSD symptoms of hyperarousal and avoidance (2 and 5 items, respectively). The items are rated on a 4-point Likert scale

(1-"not at all", 2-"one time a week or less", 3-"2–4 times a week, 4–5 times a week or more"). An item is rated positively when the symptoms prevail at least two to four times per week. A cut-off score of ≥4 positively rated items out of seven plus two out of two positively rated items for criterion A2 justify the screening diagnosis of PTSD. Maercker et al. [39] reported a Cronbach's alpha of between 0.68 and 0.90 depending on the population screened. According to Menning et al. [40], the correlation between the diagnoses via the SSS-PSD and the Structured Clinical Interview-I for DSM-IV [31] is r = 0.90. The SSS-PSD is widely used in clinical and epidemiological studies [41]. Although the SSS-PSD does not assess intrusions, it's brevity predisposes it for implementation in telephone interviews.

In our study, the seven items were subjected to a PCA with the number of factors limited to two. The factorability was satisfactory (KMO = 0.78, communalities ≥0.460). Two items theoretically assigned to the avoidance scale showed an overlap by higher factor loadings on the factor of hyperarousal ("numbness" and "plans will not come true"). The two factors explained 58.3% of the variance. Cronbach's alpha for the seven items was 0.78.

2.3. Severity of avoidance/hyperarousal

The severity of avoidance/hyperarousal was calculated using the mean scores of the items from the ETI and the SSS-PSD, respectively. To make the ETI scales comparable to the SSS-PSD scales, we transformed the ETI answering format from zero to three into one to four. The mean scores of the items from criteria C and D from both questionnaires were collapsed into a joint variable reflecting an approximate estimation of PTSD symptom severity.

The ETI and the SSS-PSD scales for avoidance/hyperarousal were validated against DSM-IV-criteria, which gave us reason for this approximation [29,30,38]. In addition, both instruments used a similar wording and demonstrated homogeneous variances in our sample (ETI: mean = 1.8, SD = 0.59; SSS-PSD: mean = 1.6; SD = 0.57). Both instruments used a 4-point Likert scale pertaining to DSM-IV criteria C and D. The variable indication of PTSD and the severity of the PTSD symptoms of avoidance/hyperarousal served as independent variables to test the association with psychosocial factors.

2.4. Experience of violence

In addition to the ETI and the SSS-PSD, we used four items to assess violent experiences during the past twelve months. These items, initially tested and used in the European comparative youth study [42], pertain to the subjects' experience of being threatened, being involved in an armed confrontation, experiencing severe violence and having received medical treatment after a violent confrontation. As these measurements focus on experiencing violence within the last 12 months before the interview, they especially captured experiences of violence during migration and the postmigration time in Germany. They do not primarily address violence experienced in the country of origin as a possible factor causing the subjects' migration.

2.5. Symptoms checklist 10 (SCL-10)

The 10-item Hopkins Symptoms Checklist [43] evaluates psychological impairment. It focuses on anxiety and depressive symptoms during the previous two weeks on a 4-point scale. In addition to being a general measure of psychological impairment, the SCL-10 is used as a screening tool for mental disorders in different population samples. In a representative Norwegian study, Cronbach's alpha was 0.88, and a cut-off (≥1.85 points) differentiated between mentally healthy and disordered subjects, i.e., "psychiatric caseness" (sensitivity: 89% specificity: 98% [44]).

2.6. General health question

The general health single item question was derived from the 36-Item Short-Form Health Survey (SF-36) [45] and assesses health-related quality of life. In this study, the one-item-scale "general health question" was used to assess the subjects' perceived general physical and mental health on a 5-point scale, with a lower score indicating better perceived general health.

The questionnaires were either already validated in English and/or Arabic (e.g., the ETI) or were translated according to the EURO-Reeves translation-back-translation protocol (SSS-PSD, SCL-10, general health question) [46,47]. The Internal Evaluation Committee of the Institute for Employment Research and the Ethics Board of the Medical Faculty of the University Duisburg-Essen approved the study. Participation in the interview or completion of the online questionnaire was considered consent to participate. Subjects were offered an incentive of 10 € for participation. Data analyses were performed using SPSS 21 (IBM Corp. Armonk, NY, USA) and Stata 14 (Statacorp LLC College Station, Texas, USA).

3. Results

3.1. Sociodemographic data

A total of 153 (87.4%) of the 175 subjects were male; 18 subjects were males from Iraq (64.3% out of all Iraqis), and 135 were males from Syria (91.8% out of all Syrians). On average, the population was 22 years of age at the time of the interview (Iraqi: 22.7 years; Syrians: 21.9 years).

The majority of respondents were unmarried (71.4% of the Iraqi subjects and 84.3% of the Syrian sample). Approximately half of the subjects had received higher education (postsecondary vocational degrees, high school degrees or university degrees), and the refugees reported average to slightly above-average achievement levels in mathematics (relative to their former classmates). A total of 49.0% of the Syrian refugees' fathers had attained higher education degrees compared to that of 25.0% of the Iraqis refugees' fathers (Table 2).

At least one experience of violence (being threatened, involved in an armed confrontation, experiencing severe violence and having received medical treatment after a violent confrontation) during the past 12 months was reported by 25.2% of the total sample (26.5%, 39 Syrians and 17.9%, 5 Iraqis). Of the refugees, 77.7% arrived in Germany within the year prior to the pilot interview (83.7%, 123 Syrians and 46.4%, 14 Iraqis). The median duration of flight from the country of origin to Germany was 8.5 months. Refugees from Iraq reported a significantly shorter flight duration compared to Syrians. The majority of both groups had relatives or friends living in Germany (77.6%). Approximately 61% of all respondents relied on their own financial resources to finance the flight. The proportion was not significantly higher for Syrian refugees (88 refugees, 59.9) compared to Iraqi refugees (18 refugees, 64.3%). Furthermore, 44.6% of the respondents (60.7% of the Iraqi refugees and 41.5% of the Syrian refugees) lived in their own apartments, 33.7% shared apartments, and 21.1% lived in shared accommodations for refugees. These findings indicate that the Iraqi typically arrived earlier in Germany with a shorter duration of migration, and a higher share of females from Iraq arrived in Germany. Thus, both groups differed significantly according to their migration characteristics.

3.2. Prevalence of indications of PTSD and psychiatric caseness

With regard to criterion A for PTSD, 59.4% of 175 total respondents reported at least one incident in which the respondents thought their own lives or the lives of others were in danger (A1) and in which the respondents experienced being helpless during that incident (A2; Syrians: 60.1%; Iraqi: 55.6%).

Table 2
Sociodemographic data by country of origin (percentages (number of subjects)).

	Iraqis	Syrians	Total	Group differences
N	28	147	175	
Age				
Mean	22.7 years	21.9 years	22.2 years	$z = -1.228$
SD	(2.71 years)	(2.72 years)	(2.2)	$p = 0.220$
Gender				
Male	64.3% (18)	91.8% (135)	87.4% (153)	$\chi^2 (1) = 16.24$
Female	35.7% (10)	8.2% (12)	12.6% (22)	$p \leq 0.000$
Duration of flight	3.1 (4.2)	9.6 (11.7)	8.6 (11.2)	$z = -2.964$
in months (Mean (SD))				$p \leq 0.005$
Own financial resources to finance flight	59.9% (88)	64.3% (18)	60.6% (106)	$\chi^2 (1) = 0.749$
				$p = 0.387$
Duration of stay	46.4% (13)	83.7% (123)	77.7% (136)	$\chi^2 (1) = 18.838$
in Germany: ≤1 year				$p = 0.000$
Marital status				
Single	71.4% (20)	84.3% (124)	82.3% (144)	$\chi^2 (1) = 2.69$
Married	28.6% (8)	15.7% (23)	17.7% (31)	$p = 0.101$
Relatives/friends in Germany: Yes	82.1% (23)	75.5% (111)	77.6% (134)	$\chi^2 (1) = 0.5768$
				$p = 0.448$
Living conditions in Germany				
Collective accommodation	17.9% (5)	21.8% (32)	21.1% (37)	$\chi^2 (2) = 4.690$
				$p = 0.096$
Shared apartment, no relatives	17.9% (5)	36.7% (54)	33.7% (59)	
Own apartment	60.7% (17)	41.5% (61)	44.6% (78)	
Missing	3.6% (1)	–	0.6% (1)	
Educational degrees attained in Syria/Iraq				
Primary school [a]	3.6% (1)	2.0% (3)	2.3% (4)	$\chi^2 (5) = 14.92$
General secondary degree [b]	32.1% (9)	12.9% (19)	16.0% (28)	$p = 0.011$
Academic high school degree	14.3% (4)	51.0% (75)	45.1% (79)	
Post-secondary vocational training	7.1% (2)	6.1% (9)	6.3% (11)	
University degree	3.6% (1)	6.8% (10)	6.3% (11)	
No degree	39.3% (11)	21.8% (32)	24.6% (43)	
Achievement level in mathematics at school [c]	3.0 (1.7)	2.7 (0.9)	2.7 (0.8)	$z = -1.746$
	3.0	3.0	3.0	$p = 0.081$
Father's education: high	25.0% (7)	49.0% (72)	45.1% (79)	$\chi^2 (1) = 5.461$
(upper-secondary or higher)				$p = 0.019$

Data source: IAB-WELLCOME study: pilot (N = 175) 2016.

[a] Primary school: Up to 6 years of schooling.
[b] General secondary degree: Education for 10 years.
[c] Self-rated; 1(best) to 5(worst).

The screening diagnosis according to the ETI standards was met by 9.5% of the sample (out of 84 total respondents; criteria A1 plus A2 and the total score for intrusion plus avoidance plus hyperarousal >26 points). With regard to PTSD symptoms (ETI: intrusion, avoidance and hyperarousal), refugees from Syria reported nonsignificantly higher total scores.

The screening diagnosis according to SSS-PSD standards was met by 6.6% of the sample (out of 91 respondents; criterion A2 and the total score for avoidance plus hyperarousal >3 points). Between the subjects assessed using the ETI and those assessed using the SSS-PSD, no differences were found with regard to the distribution of positive/negative indications of PTSD (Chi^2 = 0.51, df = 1, p = 0.475). The percentage of positive diagnoses obtained when the data from all subjects and both screening instruments were merged was 8.0% (out of 175 respondents; 95% confidence interval: 3.9% to 12.1%).

With regard to psychological impairment assessed using the SCL-10, the subjects scored 1.6 points on average (SD = 0.5; median = 1.4), indicating a low frequency of anxiety and depression (Table 3). Nevertheless, assuming a given SCL-10 cut-off of 1.85 points (psychiatric caseness [44]), 19.4% of the total sample are likely to qualify for a mental disorder.

No significant between-group differences were detected for any assessment instrument but one. The only exception pertained to the general health question was the following: Iraqi refugees rated their general health between "very good" and "good" in contrast to Syrian refugees, who rated it between "excellent" and "very good" (mean, (SD) and median: Iraqis: 2.5 (1.3) 2.0, Syrians: 1.8 (1.0) 2.0, Total 1.9 (1.1) 2.0; z = −3.066; p = 0.002).

3.3. Correlations between PTSD symptoms and psychological impairment

The correlations between the SCL-10 and the general health question with the PTSD criteria B, C, D and the total score measured with the ETI were significant between r = 0.27 and r = 0.66. The respective correlations for the SSS-PSD were between r = 0.21 and r = 0.57, and the correlation between hyperarousal and the general health question was insignificant (r = 0.01; Table 4).

3.4. Factors associated with the severity of avoidance/hyperarousal and indications of PTSD

We employed linear regression models to explore the association of social factors potentially associated with the severity of PTSD symptom avoidance and hyperarousal as assessed as a proxy variable by the ETI or SSS-PSD. In a stepwise manner, we included several trauma- and flight-related factors based on cross-sectional data. Due to the limited number of cases, we decided on a parsimonious modeling. In model 1, we included the number of violent experiences during the past twelve months. In model 2, the number of positively answered items pertaining to PTSD DSM-IV criteria A1 and A2 (experiencing threat and fear) were entered. In model 3, we added sources of financial funding and duration of flight; that is, whether family members and friends were living in Germany, the respondent's housing situation and legal residency status, and the educational level of the respondent's father. Model 4 additionally included the type of PTSD instrument (ETI vs. SSS-PSD) and controls for variables such as citizenship, gender and self-rated achievement level in

Table 3
Severity of PTSD symptoms and psychological impairment by country of origin (percentages, median (standard deviation)).

	Iraqis	Syrians	Total	Group differences
N	28	147	175	
A-criterion	78.6%	78.1%	78.2%	$\chi^2 (1) = 0.002$
(minimum 1 experience mentioned)				$p = 0.968$
PTSD screening: ETI				
N	13	71	84	
Intrusion	2.0	3.0	3.0	$z = -1.681$
				$p = 0.093$
Avoidance	3.0	5.0	5.0	$z = -1.867$
				$p = 0.062$
Hyperarousal	1.0	3.0	3.0	$z = -1.778$
				$p = 0.075$
PTSD screening: SSS-PSD				
N	14	77	91	$\chi^2 (5) = 3.934$
Number of positive items:				$p = 0.559$
0 positive items	78.6%	57.1%	60.4%	
1 positive item	7.1%	13.0%	12.1%	
2 positive items	0%	13.0%	11.0%	
3 positive items	7.1%	9.1%	8.8%%	
≥4 positive items	7.1%	7.8%	7.7%	
Severity of avoidance/hyperarousal	1.4	1.7	1.6	$z = -1.620$
				$p = 0.105$
Psychopathology and general health				
N	28	147	175	
SCL-10	1.3	1.4	1.4	$z = -1.181$
				$p = 0.237$
General health question	2.0	2.0	2.0	$z = -3.066$
(Mean)	(2.5)	(1.8)	(1.9)	$p = 0.002$

Data source: IAB-WELLCOME study: pilot (N = 175) 2016.

mathematics as a proxy of fluid intelligence. The final model 5 additionally controlled for the assessment method (CATI/CAWI).

In all models, the number of violent experiences and the number of positive criterion A items were positively associated with the severity of avoidance/hyperarousal. In model 3, the factors "no relatives in Germany," "living in one's own apartment" and "father's education: high" were negatively associated with symptom severity. Flight duration was positively associated with the severity of avoidance/hyperarousal. According to model 4, SSS-PSD respondents reported less severe avoidance/hyperarousal than did the ETI subsample. Model 5 showed no significant effect of the assessment method (Table 5).

An additional logistic regression model explored the association between the indications of PTSD and the same variables employed in the linear models shown above (with the exception of the criterion A

Table 4
Correlations between the ETI, SSS-PSD, SCL-10 and general health question.

	Intrusion	Avoidance	Hyperarousal	SCL-10	General health question
ETI[a]	0.851***	0.947***	0.894***	0.633***	0.343***
Total[b]					
Intrusion		0.709***	0.632***	0.443***	0.267*
Avoidance			0.795***	0.601***	0.363***
Hyperarousal				0.656***	0.276*
SSS-PSD[c]					
Total		0.954***	0.789***	0.567***	0.207*
Avoidance			0.569***	0.503***	0.260**
Hyperarousal				0.525***	0.036
SCL-10 (general health)					0.391***

Data source: IAB-WELLCOME study: pilot (N = 175) 2016.
* $p \le 0.05$.
** $p \le 0.01$.
*** $p \le 0.001$.
[a] N = 84.
[b] Total = total score of Intrusion, Avoidance, Hyperarousal.
[c] N = 91.

indicator, due to endogeneity). With respect to the reduced variance addressed by a logit model, the variable "number of violent experiences" (Exp(B) = 3.550; $p \le 0.001$) increased, and the variable "father's education: high" (Exp(B) = 0.896; $p \le 0.05$) reduced the relative risk for an indication of PTSD (PseudoR^2 = 0.248).

4. Discussion

Our study revealed an 8% prevalence rate of indications of PTSD and a high rate of psychiatric caseness in a representative sample of Syrian and Iraqi refugees who predominantly arrived in Germany within a year prior to study inclusion. To the best of our knowledge, this study is the first to assess psychological impairment and screening for PTSD in a small but representative sample of refugees shortly after their enrollment in the German unemployment register, thus becoming eligible for financial support and access to education or the labor market.

4.1. Prevalence rates for indications of PTSD

As in other studies on refugees from Syria or Iraq, the sample consisted mostly of male subjects [14]. Approximately 50% of the refugees were well educated (i.e., held a high school or university degree). Eight percent of subjects showed indications of PTSD as screened by the two screening instruments (merged data). Thus, the prevalence rate is markedly lower than in an epidemiological sample of Syrian refugees living in Lebanese camps assessed using the Mini International Neuropsychiatric Interview (27.2%; nonrandomized sample) [48]. It is also lower compared to the 29% prevalence rate for Iraqi, Iranian and other refugees from one central reception center in southern Germany (assessment by a psychiatrist; [14]) or compared to the prevalence rate of 35.7% for refugees from Arabia living in a North German admission center (screening instrument: ETI) [36].

However, the prevalence rate of this study is in accordance with studies on large samples of refugees. In a meta-analysis of 20 studies, Fazel and colleagues estimated the prevalence of PTSD to be 9% (99% CI: 8–10%) when the data basis was reduced to five large studies with 4567 subjects mostly from representative population samples [4]. The low percentage of positive diagnoses obtained with both screening instruments used in this representative pilot study may also reflect the random sampling procedure. In a meta-analysis of 181 surveys, Steel et al. [8] reported large intersurvey variability and an unadjusted weighted PTSD prevalence of 30.6%. While studies using random sampling methods were associated with lower rates of mental disorders, studies with smaller sample sizes reported higher prevalence rates [8]. The prevalence rates as screened separately by the ETI vs. the SSS-PSD (9.5% vs. 6.6%, respectively) differed nominally but not significantly, which may be interpreted in favor of the validity of the reported rates. The nominally higher prevalence rate may be associated with the fact that the number of DSM-IV-criteria assessed by the ETI is comparatively higher, which may increase the chances for a higher score.

The study by Laban and colleagues suggests another explanation for the low rates of indications of PTSD [49]. In a random sample of Iraqi refugees, the prevalence for anxiety, depression and somatoform disorders was significantly higher in the group of refugees who had resided for two years in the receiving country in contrast to those who recently had arrived. It may be assumed that adaptation processes in refugees who recently arrive to the receiving country may initially reduce postmigration psychopathology, but traumatic memories may return later.

In conclusion, the prevalence rate of our study, characterized by a small sample size and random sampling, differ from other studies with small sample sizes. Moreover, the prevalence rate of our study is in accordance with results from studies deploying random sampling. Thus, the prevalence rate of indications of PTSD in this pilot study needs validation by the longitudinal design of the main study.

Table 5
Factors associated with the severity of avoidance/hyperarousal (criteria C/D).

	Base	* A-criterion	* Resources	* Controls	* Method
	Model 1	Model 2	Model 3	Model 4	Model 5
Number of violent experiences	0.1822** (0.06)	0.1166* (0.06)	0.1562* (0.06)	0.1543* (0.06)	0.1490* (0.06)
Number of criteria A items		0.1013*** (0.03)	0.0851** (0.03)	0.0842** (0.03)	0.0862** (0.03)
Flight financed by own resources			0.1686* (0.09)	0.1926* (0.09)	0.2055* (0.09)
No relatives/friends in Germany			−0.3030* (0.15)	−0.3329* (0.15)	−0.3344* (0.15)
Duration of flight (months)			0.0105* (0.00)	0.0089* (0.00)	0.0092* (0.00)
Shared apartment, no relatives			−0.0861 (0.12)	−0.1059 (0.12)	−0.1020 (0.12)
Living in own apartment			−0.2527* (0.12)	−0.2329* (0.12)	−0.2404* (0.12)
Unlimited legal status as refugee			−0.2103 (0.14)	−0.2032 (0.14)	−0.2068 (0.14)
Father's education (upper secondary or higher)			−0.0146* (0.01)	−0.0137* (0.01)	−0.0162* (0.01)
ETI screening				0.2631** (0.09)	0.2532** (0.09)
Syrian				0.0973 (0.14)	0.0109 (0.16)
Male				0.0674 (0.14)	0.0366 (0.14)
Achievement levels in mathematics (1 = best mark)				0.0041 (0.04)	0.0053 (0.04)
CATI vs. CAWI					0.1304 (0.12)
Constant	1.6335*** (0.05)	1.4237*** (0.08)	1.5833*** (0.14)	1.2978*** (0.25)	1.1894*** (0.27)
Number of persons	163	163	153	153	153
Degree of freedom	1	2	10	14	15
F-test	10.1**	11.3***	4.28***	4.21***	4.20***
Adjusted R²	0.047	0.106	0.184	0.218	0.219
AIC (Akaike Information Criterion)	278.031	268.632	250.498	247.442	248.186
BIC (Bayesian Information Criterion)	284.218	277.913	283.833	292.899	296.673

Data source: IAB WELLCOME pilot 2016.
Note: Significance levels: Standard errors in parentheses.
  * $p < 0.1$.
 ** $p < 0.05$.
*** $p < 0.01$.

4.2. Evaluation of the ETI and SSS-PSD

Both instruments showed an adequate factor structure and equally high internal consistency and were suitable screening instruments with regard to acceptance, time and effort. Although the SSS-PSD with its seven items is less time consuming, the ETI differentiates between the DSM-IV-PTSD criteria A to D and provides the opportunity for a more differentiated analysis.

4.3. Psychopathology and psychosocial factors associated with PTSD symptoms

Compared to members of a representative Norwegian sample aged 16 to 25 years, the psychological impairment measured by the SCL-10 was slightly higher in this study (1.36 vs. 1.56 points, respectively [44]). Accordingly, the percentage of subjects screened as psychiatric cases was 11.4% in the total Norwegian sample, in contrast to 19.4% in our sample of Syrian and Iraqi refugees. These findings are in accordance with other studies reporting a high prevalence of distress and mood disorders [50,51].

In a stepwise linear regression model, the experience of violence and criterion A experience proved to be positively associated with the severity of the PTSD symptoms of avoidance and hyperarousal. The negative association between not having relatives in Germany and the severity of avoidance/hyperarousal was significant in two models. This result may be counterintuitive because relatives may represent a direct or indirect source of social support that is believed to reduce psychological impairment [27]. However, relatives living in the receiving country could exert social control that is perceived as stressful by the subjects [52]. Moreover, displacement stressors interacting with psychological symptoms have been shown to increase distress and tensions between partners or family members and to additionally impair mental well-being [53].

Refugees living in their own apartment showed fewer symptoms of avoidance/hyperarousal. This result is in accordance with qualitative and quantitative data showing that poor housing for refugees is related to feelings of insecurity [54] and is associated with a higher risk of mental illness or PTSD symptoms [55,56].

The educational level of the refugee's father represents another factor that is negatively associated with the severity of avoidance/hyperarousal. As in other PTSD studies, higher educational attainment and social class serve as protective factors [57]. Our result that refugees who were able to finance their flight using their own financial resources experienced less severe avoidance/hyperarousal supports this fact.

In the logistic regression model, exposure to violence was positively associated and the father's higher educational attainment was negatively associated with indications of PTSD. The other independent variables were not significantly associated with an indication of PTSD, probably due to the sample size and the categorical nature of the screening diagnosis, which implies a loss of information.

4.4. Strengths and limitations

This pilot study delivered robust indications of PTSD in young Syrian and Iraqi refugees who recently arrived in Germany before the survey was performed. Based on a random sample of subjects who were first-time registered at the German Federal Employment Service, we could demonstrate that both the SSS-PSD and the ETI instruments delivered statistically comparable prevalence rates for indications of PTSD.

Major limitations of this study pertain to heterogeneity and selection bias. The study population was based on refugees from the unemployment register only. In addition, the population was selected with regard to those who migrated to Germany most recently to exclude those who had already (partially) adapted to the host country (e.g., via entering vocational training). This procedure results in a well-defined representative sample of Syrian and Iraqi refugees eligible for the entrance into the labor market. Moreover, these factors may increase the risk of unobserved heterogeneity or selection bias. The gender distribution is unbiased due to the gross sample (N = 2080), but the proportion of females in the refugee population is as low as in our pretest sample.

With regard to the assessment method (CATI and CAWI), females and lower qualified subjects participated less often in the CAWI than in the CATI. Less access to the internet [58] might be one reason for that distributional effect. However, we found no differences for PTSD indications for these subgroups between the CATI and CAWI (group specific t-tests) and no effect of the assessment method in the linear regression model. Due to the relatively small sample size, we cannot totally rule out sample bias. Because of remarkably higher response rates, we favored the CATI method for the main survey.

Due to a lack of PTSD screening instruments based on the DSM-5 during the planning phase of the study, the diagnosis was based on two screening instruments based on DSM-IV criteria. It would be desirable to use a screening instrument based on DSM-5 to compare the PTSD prevalence rates with that of future studies. Although the ETI was already translated and we provided a thorough translation of the SSS-PSD and other instruments according to the EURO-Reeves translation-back-translation protocol [46,47], we did not test the instruments with regard to cultural equivalence [59]. Internal validation of the ETI or the SSS-PSD in this sample was not undertaken. The given prevalence rates refer to screening diagnoses.

Linear regression models (OLS) address the mean score of the items pertaining to avoidance and hyperarousal as assessed by the ETI and the SSS-PSD (severity of avoidance/hyperarousal). Although the two instruments differ in the wording and number of items, they are designed to measure similar constructs. Both instruments and their dimensions are similarly correlated with related measures (SCL-10 and general health question) with one exception. The positive low correlations between the general health question and the ETI and SSS-PSD hyperarousal scale show significance for the ETI scale only. As the ETI assesses criterion D via five items and the SSS-PSD via two items, it could be hypothesized that the ETI hyperarousal measurement may be more valid. The omission of criterion B can be justified by the fact that in subjects with PTSD, a high correlation between avoidance and intrusion symptoms is observed [60].

The cross-sectional measurement of the pilot study does not allow any conclusions with regard to the causality of the associations reported. Due to the multiwave design, the WELLCOME study has more analytical power.

5. Conclusions

The prevalence rates for the screening diagnoses of PTSD and/or psychiatric caseness in refugees who are first-time entrants into the German unemployment register are relevant for administering the process of integration into education or the labor market [61].

Early voluntary screenings for psychological impairment or psychiatric caseness may promote the vocational case manager's awareness of the specific refugee's psychological problems. This may facilitate the case manager's task of integration into the labor market. It may also promote the refugee's motivation to seek help in the psychiatric health service system. Analyses based on panel data from the main study should focus on the role of the family with regard to mental health and health service utilization and on the development of PTSD symptoms over time [62]. These findings may help to develop support schemes for young refugees in Germany to address mental health problems and to improve the integration of the refugees into the educational system and employment.

Declarations of interest

Declaration of interest: none.

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