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Depression and anxiety in labor migrants and refugees – A systematic review and meta-analysis

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ABSTRACT

Prevalence rates of depression and anxiety among migrants (i.e. refugees, labor migrants) vary among studies and it's been found that prevalence rates of depression and anxiety may be linked to financial strain in the country of immigration. Our aim is to review studies on prevalence rates of depression and/or anxiety (acknowledging that Post-traumatic Stress Disorder (PTSD) is within that class of disorders), and to evaluate associations between the Gross National Product (GNP) of the immigration country as a moderating factor for depression, anxiety and PTSD among migrants. We carried out a systematic literature review in the databases MEDLINE and EMBASE for population based studies published from 1990 to 2007 reporting prevalence rates of depression and/or anxiety and or PTSD according to DSM- or ICD- criteria in adults, and a calculation of combined estimates for proportions using the DerSimonian–Laird estimation. A total of 348 records were retrieved with 37 publications on 35 populations meeting our inclusion criteria. 35 studies were included in the final evaluation. Our meta-analysis shows that the combined prevalence rates for depression were 20 percent among labor migrants vs. 44 percent among refugees; for anxiety the combined estimates were 21 percent among labor migrants vs. 40 percent among ($n = 24{,}051$) refugees. Higher GNP in the country of immigration was related to lower symptom prevalence of depression and/or anxiety in labor migrants but not in refugees. We conclude that depression and/or anxiety in labor migrants and refugees require separate consideration, and that better economic conditions in the host country reflected by a higher GNP appear to be related to better mental health in labor migrants but not in refugees.

Background

The total number of migrants in 2006 was about 200 millions and is expected to rise until 2050 to 230 millions worldwide (Bhopal, 2007; United Nations, 2005 International Organization of Migration, 2008). The definition and range of persons defined as "migrants" are often unclear. A variety of persons may be considered "migrants", including those who migrated because of "pull" factors of the immigration country (i.e. labor migrants); as well as those who migrated because of "push" factors (i.e. refugees and/or asylum seekers) (International Organisation of Migration, 2007). Migration might influence social bonds of labor migrants and refugees as both groups of migrants spend part of their life in the host country and part in the emigration country. Refugees and asylum seekers may not have the possibility to return to their home country (Norwegian Refugee Council, 2008). Additionally, economic conditions in host countries vary (Scarlett & Kelsey, 2000).

Worldwide, depression and anxiety disorders (American Psychiatric Association, 1994) are the 2nd leading cause of "disability adjusted life years" (DALYS) in the age category 15–44 years for both genders and may affect persons of all cultural backgrounds (Carta, Bernal, Hardoy, & Haro-Abad, 2005; Lepine, 2002; Merikangas & Kalaydijan, 2007; Stein & Hollander, 2002). Nevertheless, there is wide variability in the rates of depressive- and anxiety disorders across nations (Bebbington, Hurry, & Tenant, 1981; Gorman, 2006; Munce & Stewart, 2007).

The impact of migration on mental health of labor migrants and refugees and asylum seekers remains a contested area in research (Moussavi, Chatterj, Verdes, Tandon, Patel, & Ustun, 2007); it is to date unclear if migration translates into an overall increase in the

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mental health burden (Glover, 1989; King, Coker, Leavey, Hoare, & Johnson-Sabine, 1994; Van, Castle, Takei, & Murray, 1996). Overall, the epidemiological evidence on mental health of migrants' remains limited (Garcia-Campayo & Sanz, 2002; Martinez & Martinez, 2006; Porter & Haslam, 2005). Research on labor migrants' mental health has focused on schizophrenia and other psychoses among migrants (Hemsi, 1967; Veling, Selten, Veen, Laan, Blom, & Hoek, 2006); research on refugees' mental health has focused on PTSD (Cardozo, Veragra, Agani, & Gorway, 2000; Mollica, Sarajilic, & Chernoff, 2001). This focus on PTSD as the main manifestation of mental health problems in refugees has come under criticism (Summerfield, 1998; Summerfield, 2001); but studies on depression and anxiety remain sparse and with controversial findings. While some evidence exists that labour migrants are less likely to suffer depression and anxiety than the indigenous population, other studies have identified significant within group variation. A previous systematic review on depression and anxiety among refugees showed that refuge may impact mental health of affected populations (Fazel, Wheeler, & Danesh, 2005). Nevertheless, it is unclear whether migration leads to an increase or to a decrease in mental health burden. Significant differences in the mental health among different groups of migrants have been found (Alegria et al., 2008). Additionally, there may be significant differences between migrant groups especially between refugees and labor migrants with a higher burden of depression and posttraumatic stress disorder among refugees and a lower burden of depression among labor migrants.

There is substantial evidence from developed and from developing countries (Myer, Stein, & Grimsrud, 2008) that lower socioeconomic status (SES) is associated with increased occurrence of mental ill-health. However, there are few data on macro-social determinants of depression and anxiety among migrants. The Gross National Product (GNP) is an economic indicator of the macro-social context of countries World Bank, 2008. Countries with higher GNP may be more likely to score highly on health related measures, such as life expectancy; therefore, GNP is used as a determinant of a person's quality of life (Janssen, Kunst, & Mackenbach, 2006). There might be limitations to the usefulness of GNP as a measure of quality of life in a comprehensive way as the GNP excludes unpaid economic activity, takes no account of the inputs used to produce the output and does not include factors that also affect quality of life, such as the quality of the environment and security from violence and crime. Additionally, GNP is the mean wealth rather than median wealth and countries with a skewed income distribution may have a relatively high per-capita GNP while the majority of its citizens have a relatively low level of income. Therefore, GNP is a measure of the possibility that countries may provide paid jobs, which might be one of the major motivations for migration for labor migrants (Blanchard & Illing, 2006). Therefore we use GNP as an aggregate measure for the macro-economic context of the host countries.

At least three methodological limitations apply in the evaluation of existing studies. As migrants are often physically, linguistically, and culturally difficult to access by researchers, studies on migrants' health are often conducted with small sample sizes and using non-random sampling methods (e.g. convenient samples) (Bhugra, 2004). The second limitation may be related to the instruments used. Frequently, measures are used in psychiatric epidemiology with individuals that differ from the population in which the instruments major limitation were originally developed and normed. This has been recognized as a. The third limitation relates to the fact that migration is considered a risk factor per se without taking into account impacts that may relate to macro-economic conditions and related individual opportunities of the host country (Carballo, Divino, & Zeric, 1998).

The aims of this review were 1) to address migrants' mental health by systematically evaluating studies measuring the prevalence rates of depression and/or, anxiety (acknowledging that PTSD is within that class of disorders) in migrants; 2) to study a possible association between the GNP of the host country and the prevalence rates of depression among refugees and labor migrants; and to 3) compare the retrieved studies with regard to the sampling strategy used (random vs. non-random).

Methods

Conflicting evidence exists on the reliability of self reported and of clinician administered questionnaires. We included studies conducted with both types of assessment methods. Reliability studies examining inter-rater reliability of self reported and of clinician administered questionnaires have shown good agreement between those methods (Ustun, Compton, Mager, et al., 1997). The included studies were evaluated for differences between the assessment methods in relation to the reported prevalence of depression and anxiety.

We evaluated studies including data on prevalence rates of depression and/or anxiety and/ or posttraumatic stress among migrants. Studies on syndromes (depression, anxiety, post-traumatic stress) and on disorders (depressive-, anxiety-, posttraumatic stress-) were included for further review. Syndromes and disorders were selected on the basis of their prevalence in the general population (depression and anxiety) or their relevance to the literature on migrants' mental health (depression, anxiety, and PTSD). Research studies on syndromes – assessed with self-administered questionnaires – and on disorders, assessed with clinician administered interviews or questionnaires were examined.

Search strategy

Peer-reviewed publications on migrant populations published between 1990 and 2007 and available in PubMed were considered (National Library of Medicine, 2008). We searched the reference literature and contacted authors of published reports who provided additional information on the published data. Keywords and terms used for the search included primarily *mental, *psych, *depress, *post-traumatic stress disorder, *PTSD, *stress, *anxiety, and *mental health AND *refugee, *migrant, *immigrant, *asylum (Ustun, 2002) seeker, *transient, *ethnic, *displaced person (Fig. 1). Approximately 3800 documents were retrieved, and the titles and abstracts (when available) were examined for all documents. 137 full-text articles were retrieved.

Refining the selection of studies

The search was limited to articles published in English. Study selection was performed in two stages. Firstly, abstracts were examined by two independent reviewers, using the following inclusion and exclusion criteria. Inclusion criteria were: publication since 1990 in peer-reviewed journal; study design: cross sectional or longitudinal; language: English; participants: more than 50; outcome measure: prevalence rates of depressive and/or anxiety and/or post-traumatic stress disorder; assessment instrument: validated self-, clinician or lay administered questionnaires based on the Diagnostic and Statistical Manual (DSM) or on the International Classification of Diseases (ICD). Exclusion criteria were: no original research (e.g. letters), editorials, case-studies and reviews, assessment with unstructured interviews.

Full manuscripts were obtained for all publications included after the first evaluation. For further evaluation of the studies we excluded:

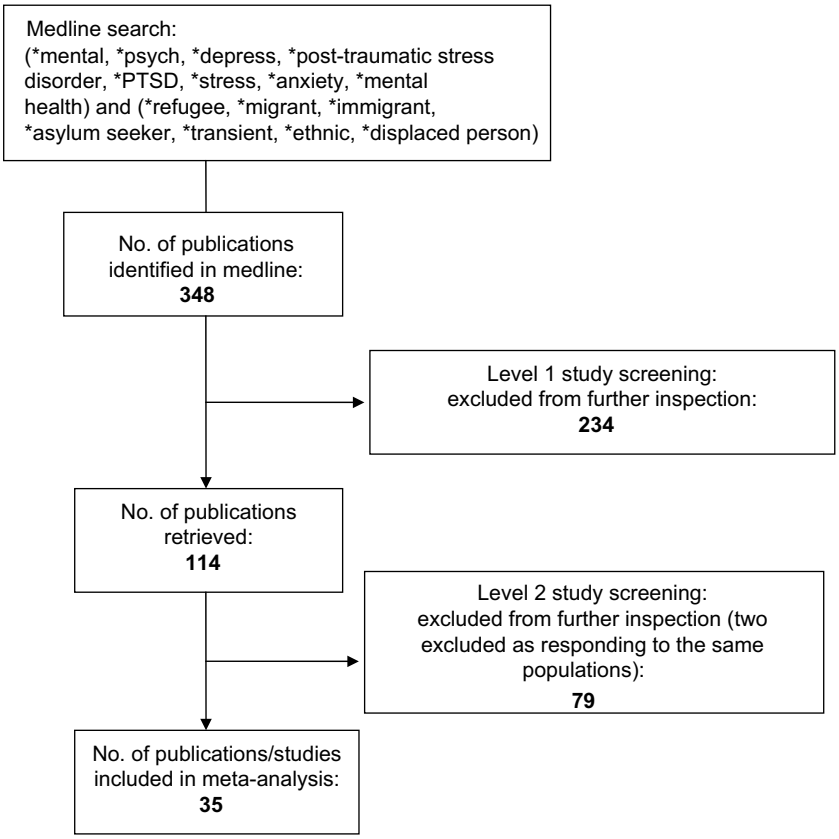

Fig. 1. Study selection diagram for the meta-analysis of studies published from 1994 to 2007: depression and anxiety among migrants.

- patients or clients;
- second generation immigrants;
- subjects younger than 16 or older than 65 years at the beginning of the study;
- Holocaust-, torture and concentration camps survivors (Bradley & Tawfiq, 2006; Fuertes & Martin, 2006; Garcia-Campayo & Sanz Carrillo, 2002; Gorst-Unsworth & Goldenberg, 1998; Hansen & Donohoe, 2003, Kirkcaldy, Wittig, Furnham, Merbach, & Siefen, 2006; Martinez & Martinez, 2006; Mghir, Fred, Raskin, & Katon, 1995; Porter & Haslam, 2005; Ramsay, Gorst-Unsworth, & Turner, 1993; Sullivan & Rehm, 2005).

In case of multiple publications relating to the same study, the latest reference in which relevant data were reported was considered.

Tabulating study data

Data from each study were tabulated according to the following factors: country of study, study population characteristics (age, sex, country of emigration, country of immigration, legal status); study design (sampling design, sample size); measures and outcome(s).

Statistical analysis

Prevalence rates for both syndromes (depression, anxiety and post-traumatic stress) and disorders (depressive-, anxiety-, PTSD) were extracted for each study sample, separately for men and women, if reported in the original study. Studies were grouped according to migration status (refugee vs. labor), sampling method (random vs. non-random), gender, and GNP of the host country. The latter marker was chosen due to the gradient in GNP levels ranging from below 5000 to above 30,000 US$ the countries of immigration. In contrast, there was only a small gradient in the GNP of country of origin among the studies with all except 2 studies conducted with participants emigrating from countries with GNP below 10,000 US$. Therefore, average differences in depression prevalence rates were not investigated with regard to GNP of the emigration country in this analysis. Combined estimates were calculated among the subgroups. Country of immigration was classified according to GNP-value (in US-dollars) of the year 2006 in five categories (0–4999; 5000–9999; 10,000–19.999; 20.000–29.999; >30.000) and prevalence rates were grouped accordingly for visual assessment. Prevalence rates were then combined in three (labor migrants) respectively two (refugees) categories of GNP. Data sets were created for those studies that were included in the meta-analysis and 95 percent confidence intervals were calculated for the different outcomes based on binominal distributions according to Wilson. We conducted a chi-square test of heterogeneity for risk difference among all studies and within the different subgroups with p-values below 0.05 indicating heterogeneity. The DerSimonian–Laird – estimator for proportions (DerSimonian & Laird, 1986) based on a random effects model was used. After further evaluation of the heterogeneity and the number of studies in the respective subgroups combined estimates were calculated. We used a spreadsheet program based on Excel and the statistical application META (Schulze, Holling, & Boehning, 2003).

Graphical analysis

The sample size was plotted against the proportion of symptoms for depression with 95 percent CI for each study, separately for "labor" and "refugee" migrants, in case this was possible because

Table 1
Descriptive information for studies on prevalence rates of depressive- anxiety- or posttraumatic stress-disorders among labor migrants and refugees included in the systematic review.

Authors, year of publication	Country of immigration	Country of emigration	Legal status, (years since immigration)	Sample size (no), age (range or mean age)	Sampling method	Assessment: name of instruments/ language	Confounder (additional to age, sex, marital status)	Prevalence rate %	
								disorder	symptoms
Alegria, M., Mulvaney-Day, N., Torres, M., Polo, A., Cao, Z., et al., 2007	USA	Mexico, Puerto Rico, Kuba, "other" Latin-american countries	Labor, (unspecified)	$n = 2554$, men: $n = 1127$, women: $n = 1427$; <18; mean unspecified	Multistage cluster sampling	World Mental Health Diagnostic Composite International Diagnostic Interview (WMH-CIDI) (Kessler & Ustun, 2004) (Spanish)	Income, education	Depressive: 16 (407/2554) men: 11 (129/1127); women: 20 (278/1427); anxiety: 17 (430/2554); men: 12 (137/1127), women: 21 (293/1427)	
Allden, Poole, Chantavanich, Ohmar, Aung, & Mollica, 1996	Thailand	Burma	Refugees (0–3)	$n = 104$, men: $n = 35$, women: $n = 69$; 18–59 mean unspecified	Non-probability sampling	Hopkins-Symptom-Checklist-25 (HSCL-25) (Mollica, Wyshak, de Marneffe, & Khuon, et al., 1987; Harvard-Trauma Questionnaire (HTQ) (Mollica et al., 1992 (Burmese)	Education, traumatic events, immigration year		depressive: 39 (40/104); men: 33 (11/33); women: 69 (28/69); post-traumatic: 23 (24/104); men: 33 (6/33); women: 69 (18/69); depressive/an-xiety: 24 (43/180)
Bhui, Abdi, Abdi, Pereira, Dualeh, Robertson, D, et al., 2003	United Kingdom	Somalia	Refugees (unspecified)	$n = 180$, men: $n = 91$, women: $n = 89$; 20–88, 40.4 (SD unspecified)	Probability sampling	HSCL-25, HTQ, Beck Depression Inventory (BDI), Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961; Brief Psychiatric Rating Schedule (Overall & Goreham, 1962) (Somali)	Income, education, housing, traumatic events		depressive/an-xiety: 24 (43/180), men: 22 (19/91), women: 28 (24/89)
Carta, Kovess, Hardoy, Morosini, Murgia, Carpiniello, 2002	France	Italy	Labor (unspecified)	$n = 153$, men: $n = 77$, women: $n = 76$; 18–78; 48.8 (SD = 7.6)	Probability sampling	Composite Diagnostic Interview Simplified (CIDIS) (Kovess, Fournier, & Lesage, 2001) (French, Italian)		Depressive: 18 27/153; men: 16 (12/77); women: 72 (15/76); anxiety: 16 (24/153);	
Carta et al., 2006	Argentina	Italy	Labor (unspecified)	$n = 210$, <18; 50,.9 (SD not specified)	Probability sampling	CIDIS (Italian, Spanish)	Education, income	Depressive: 27 56/210 ; men: 15 (14/98)l; women: 37 (43/112); anxiety: 6 (9/210)	
Fenta, Hyman, & Noh, 2004	Canada	Ethiopia	Refugees, labor (unspecified)	$n = 342$, men: $n = 203$: women: $n = 112$; 18–59, 35.3 (SD not specified)	Non-probability sampling	Composite International Diagnostic Interview 2.1 (CIDI 2.1) (World Health Organization, 1997) (Amarinha)	Education, age at migration, traumatic events	Depressive: 110 (34/342), men and women unspecified	
Fox & Tang, 2000	Gambia	Sierra Leone	Refugees (0–3)	$n = 55$, men: $n = 28$, women: $n = 27$; <18; 31.3 (SD = 8.9)	Purposive sampling	HSCL-25, HTQ (Krio, Mende, Mandinka)	Education, region, religion		symptoms: 86 47/55; depress-sive: 49 (27/55); anxiety: 80 (44/55), post-traumatic: 86 (47/55)
Gerritsen, Bramsen, Delville, van Willigen, & Hovens, 2006	Nether-lands	Afghanistan, Iran, Somalia	Refugees, (4–6)	$n = 410$, men: $n = 241$: women: $n = 169$; <18; 37.0, SD = 12.4	Probability sampling	Medical Outcomes Study (MOS) (McHorney, Ware, & Raczek, 1993), HSCL-25, HTQ, (Dari, Pashto, Farsi, Somali)	Education, legal status, traumatic events		depressive/anxiety: 56 (210/378); posttraumatic 52 (211/408), unspecified
Grant, Stinson, Hasin, Dawson, Chou, Andersson, 2004	USA	Mexico	Labor (unspecified)	$n = 4558$, men: $n = 2370$, women: $n = 2187$; <18, mean unspecified	Probability sampling	Alcohol Use Disorder and Associated Dis-abilities Interview Schedule-DSM-IV Version (AUDADIS-IV) (Grant, Dawson, & Hasin, 2001)	Region, education, socio-economic status	Depressive: 14 (642/4558) anxiety: 8 (556/4558)	

(*continued on next page*)

Table 1 (*continued*)

Authors, year of publication	Country of immigration	Country of emigration	Legal status, (years since immigration)	Sample size (no), age (range or mean age)	Sampling method	Assessment: name of instruments/ language	Confounder (additional to age, sex, marital status)	Prevalence rate %	
								disorder	symptoms
Hovey & Magana, 2002	USA	Mexico	Labor (unspecified)	$n = 95$, men: $n = 37$: women: $n = 58$; 16–65, 30.1 (SD = 11.3)	Non-probability sampling	Personal Resource Questionnaire (Weinert & Brandt, 1987), Adult Self-Per-ception Scale (Messer & Harter, 1986), Personal Assessment Inventory (PAI) (Morey, 1991), Centre for Epide-miologic Studies Depression Scale (CES-D) (Radloff, 1977) (Spanish)	Education, religion, social support, acculturative stress		anxiety: 30 (28/95), men: 22 (8/37), women: 35 (20/58)
Kalafi et al., 2002	Iran	Afghanistan	Refugees (time not specified)	$n = 81$; 18–68, 29 (SD = 9.9)	Probability sampling	General Health Questionnaire (GHQ-28) (Goldberg & Blackwell, 1970) (Farsi, Pashtu)		Depressive and/or anxiety: 35 (28/81)	
Karno, J, Golding, Burnam, Hough, Escobar, Wells, 1989	USA	Mexico	Labor (time not specified)	$n = 1244$, men: $n = 591$, women: $n = 653$; 18–68, (SD not specified)	Probability sampling	Diagnostic interview schedule (DIS) (Burnamm, Karnom, Houghm, Escobarm, & Forsythe, 1983) (Spanish)	Education, socio-economic status		anxiety: 14 (170/1244)
Karunakara, U. K., Neuner, F., Schauer, M., Singh, K., Hill, K., Elbert, t., et al., 2004	Uganda	Sudan	(1) Labor migrants (0–3 years), (2) refugees (4–6 years)	(1) $n = 664$, men: $n = 164$, women: $n = 500$; 32.9, SD = 11.0; (2) $n = 1240$, 29.7 (SD = 9.6)	Probability sampling	Posttraumatic Diagnostic Scale (PDS) (Foa, 1995), (Lugbara, Juba, Arabic)	Education, working situation, religion, premigration traumatic events		posttraumatic: (1) 44 (217/664), men: 54 (88/164), women: 41 (205/500); (2) 56 (620/1240), men: 41 (112/274), women: 51 (493/966)
Khavarpour & Rissel, 1997	Australia	Iran	Refugees, students	$n = 413$; <18, mean not specified	Probability sampling	GHQ-28 (English, Farsi)	Education, religion, traumatic events		depressive and/or anxiety: 37 (152/4123)
Laban, Gernaat, Komproe, Schreuders, & de Jong, 2004 Laban, Gernaat, Komproe, van der Tweel, & de Jong, 2005	Netherlands	Irak	1: asylum seekers < 6 months, 2: asylum seekers<6 months	$n = 294$, 1: $n = 143$, men: 71, women: $n = 72$, <17 2: 151; <17, mean not specified	Probability sampling	HTQ, CIDI-2.1 (Arabic, Kurdish, Armenian)	Education, religion, traumatic events		1: depressive: 25 (36/143); 2: 44 (66/151), anxiety: 14 (20/143); 2: 31(47/151); posttraumatic: 1: 31 (94/143), 2: 41 (63/151)
Lee, Lee, Chun, & Yoon, 2001	China	Korea	Refugees (time un- specified)	$n = 170$, men: 81 women: $n = 89$; <18, 32.0 (SD = 11.2)	Non-probability sampling	HSCL-25, HTQ (Korean)	Education, traumatic events		depressive: 81 (137/170), anxiety: 90 (153/170), posttraumatic: 56 (95/170)
Lie, Lakke, & Nils, 2001	Norway	Miscellaneous countries	Refugees (time un- specified)	$n = 333$, men: $n = 216$, women: $n = 247$; 16–84, 38.3 (SD = 13.8)	Complete survey	HSCL-25, HTQ, Global Assessment Functioning Scale (GAF) (Endicott, Spitzer, Fleiss, & Cohen, 1976) (Arabic, Serbo-croatian, Somali, Vietnamese)	Education, religion, traumatic events, legal status, profession in home country		depressive and/or anxiety: 48 (160/333), posttraumatic 18 (61/333); unspecified
Marshal, Schell, Elliot, Elliot, Berthold & Chun, 2005.	USA	Cambodia	Refugees (time not specified)	$n = 490$, men: $n = 171$, women: $n = 319$; 35–75 52.0 (SD = 13.4)	Probability sampling	HTQ, CIDI, Survey of Exposure to Com-munity Violence (Richters & Saltzman, 1990), Alcohol Use Disorders Identifica-tion Test (Babor, de la Fuente, & Saunders, 1992), (Khmer)	Education, religion, English proficiency, pre-migration traumatic events, legal status		depressive: 51 (249/490) posttraumatic: 62 (304/490); unspecified
Mollica, Donelan, Tor, Lavelle, Elias, Frankel, 1993	Thailand	Cambodia	Refugees (0–3 years)	$n = 490$, men: $n = 171$, women: 319; <18, mean not specified	Multistage area probability sampling	GHQ, HSCL-25, HTQ, (Khmer)	Religion, education		depressive: 55 (546/993) posttraumatic: 15 (148/993); not specified
Mollica, McInnes, Sarajlic, Lavelle, Sarajlic, & Massagli. 1999	Croatia	Bosnia	Refugees (0–3 years)	$n = 534$, men: $n = 220$, women: $n = 314$, <18 50.4 (SD = 16.1)	Probability sampling	GHQ, HSCL-25, HTQ (Bosnian)	Ethnicity		depressive: 39 (209/534), posttraumatic: 26 (140/534)

Noh & Avison, 1996	Canada	Korea	Labor (time not specified)	$n = 1039$, men: $n = 551$, women: $n = 488$; <18 45 (SD not specified)	Probability sampling	CES-D (Korean)	Age at immigration (Korean)	Depressive: 5 (47/1039)	
Peltzer, 1999	Uganda	Sudan	Refugees (0–3 years)	$n = 100$ (19–65) 37.6 (SD not specified)	Probability sampling	HTQ (native languages)			posttraumatic: 32 (32/100)
Pernice & Brook, 1994	New Zealand	1: UK, 2: pacifics, 3: various	1: Labor (0–3), 2: Pacific islands (4–6), 3: refugees (4–6)	1: $n = 57$, 2: $n = 63$, 3: $n = 129$, mean not specified	Probability sampling	HSCL-25 (English, native languages)			1: depressive: 13 (8/57), 2: 32 (18/63), 3: 22 (29/129), 1: anxiety: 5 (3/57) , 2: 32 (18/63), 3: 12 (15/129)
Roth, Ekblad, & Agren, 2006	Sweden	Kosovo	Refugees (4–6)	$n = 218$, men:, $n = 96$, women: 122;<18, (SD not specified)	Probability sampling	HTQ, HSCL-25 (Albanian)	Education, traumatic events		posttraumatic: 36 (78/218)
Sabin, Lopez, & Nackerud, 2003	Mexico	Guatemala	Refugees (<10)	$n = 170$, men: $n = 71$, women: $n = 99$; 16–80, 37.9 (SD not specified)	Cluster based probability sampling	HTQ, HSCL-25 (Spanish, Kanjobal, Chuj)	Education, traumatic events		depressive: 39 (62/170), men: (51/160), anxiety: 54 (87/170), post-traumatic: 12 (21/170)
Schweitzer, Melville, Steel, & Philippe, 2006	Australia	Sudan	Refugees (0–3)	$n = 63$; <18, 34.2 (SD = 8.5)	Non-probability sampling	HTQ, HSCL-25, Post-Migration Living Difficulties (PMLD) (Mollica, McInnes, Poole, & Tor, 1998) (English, Arabic)	Education, profession, English proficiency, finances, social support		depressive: 13 (8/63), posttrau-matic: 13 (8/63)
Silove, Steel, Bauman, Chey, & Cowell, 2007	Australia	Vietnam	refugees (<10)	$n = 1161$, men: $n = 577$, women: $n = 584$; mean 41, SD = 14.2	probability cluster sampling	CIDI, SF-12, HTQ (Vietnamese, English)	English pro-ficiency, education, occupation		posttraumatic: 4 40/1161, unspecified
Steel, Silove, Pha, & Bauman, 2002	Australia	Vietnam	Refugees (<10)	$n = 1161$, men: $n = 577$, women: $n = 584$; mean 41, (SD = 14.2)	Probability proportional-to-size cluster sampling	CIDI, Phan Vietnamese psychiatric scale (PVPS), SF-12. HTQ (Vietnamese, English)	English proficiency, education, occupation	Depressive: 3 (37/1161), men: 2 (13/577), women: 3 (16/584); anxiety: 5 (57/1161), men: 3 (12/577), women: 4 (23/584), posttraumatic: 4 (40/1161), men: 2 (8/577), women: 2 (9/584)	
Sundquist, Johansson, De Marinis, Johanson, & Sundquist, 2005	Sweden	Bosnia	Refugees (4–6)	$n = 120$, 19–59 40.7 (SD not specified)	Probability sampling	HSCL-25, Post-traumatic Symptom Scale (Raphael, Lun-din, & Weisaeth, 1989) (PTSS-10), (Bosnian)	Education		posttraumatic: 28 (99/163 (28), un- specified
Tang & Fox, 2001	Gambia	Senegal	Refugees (0–3)	$n = 80$, men: $n = 41$, women: $n = 39$; <18–41.3 (SD = 15.9)	non-probability sampling	HTQ, HSCL-25 (native languages)	Education, religion		depressive: 59 (47/80), anxiety : 47 (37/80), post-traumatic: 10 (8/80), un-specified
Takeuchi, Chung, Lin, Shen, Kurasaki, Chun, 1998	USA	China	Labor (4–6)	$n = 1764$, men: $n = 882$, women: $n = 882$; 18–65, 41.3 (SD = 1.1)	Three-stage-probability-sampling	CIDI (English, Mandarin, Cantonese)	Education, socio-economic status	Depressive: 8 (136/1764), unspecified	
Turner, Bowie, Dunn, Shapo, & Yule, 2003	United Kingdom	Kosovo	Refugees (0–3)	$n = 842$; <18 38.1 (SD = 16.1)	non-probability sampling	War Trauma Questionnaire (Macksoud, 1992), Anxiety Inventory (Beck, 1987), GHQ-28, CAPS Interview (Weathers, Kean, & Davidson, 2001), Posttraumatic Diagnostic Scale (Foa, Cashman, Jaycox, & Perry, 1997) (English, Albanian)	Traumatic events before migration, family separation		depressive: 62 593/831, anxiety: (57) 470/831, posttraumatic: 68 (452/831), unspecified

(*continued on next page*)

Table 1 (*continued*)

Authors, year of publication	Country of immigration	Country of emigration	Legal status, (years since immigration)	Sample size (no), age (range or mean age)	Sampling method	Assessment: name of instruments/ language	Confounder (additional to age, sex, marital status)	Prevalence rate %	
								disorder	symptoms
Van Ommeren et al., 2001	Nepal	Bhutan	Refugees (2–4)	$n = 392$; <18, only men; 44.1 (SD = 12.6)	Non-probability sampling	CIDI (Bhutanese)	Religion, education, occupational status, family separation	Depressive: 16 (61/392), anxiety: 13 (49/392), post-traumatic: 15 (57/392)	
Vega et al., 1998	USA	Mexico	Labor, 1: urban, 2: town, 3: rural (<10)	$n = 3012$; 18–59, mean unspecified	Probability cluster sampling	CIDI, acculteration (Vega & Miranda, 1985), (Spanish)	Religion, education, occupational status, family separation	Depressive, 1: men: 13 (647/505), wmen: 16 (82/505); 2: men: 9 (42/494), wo-men: 14 (72/512), 3: men: 6 (30/501), wo-men: 13 (64/499)	
Williams et al., 2007	USA	Caribbean	Labor (time unspecified)	$n = 1621$, men: $n = 643$, women: $n = 978$; <18 (SD = 40.3)	Probability cluster sampling	CIDI (English, Spanish)	Income, education, age at immigration	Mental: 28 (452/1621), men: 31 (199/643), women: 25 (244/978)	

depression and anxiety were measured as separate outcomes. Forest plots were created separately for "labor" and "refugee" migrants including the combined estimate with 95 percent confidence interval.

Quality criteria

In the field of systematic reviews, scores are often allocated to reflect desirable features related to the validity of the study. Migrant studies are prone to a range of methodological problems like problems in determining the numerator and denominator for the calculation of rates. However, we are not aware of a quality scale or criteria developed as a result of a systematic consultation of experts (e.g. by a Delphi process). Therefore, no quality scoring was applied in this review.

Results

Fig. 1 presents a flow diagram outlining the systematic review process. A total of 37 publications including 35 migrant study populations addressing the prevalence of depression, anxiety and posttraumatic stress and/or respective disorders after migration were included in this review (Alegria et al., 2007; Allden et al., 1996; Bhui et al., 2003). Among these, 23 related to 20 refugee groups, 10 to labor migrants, and three to mixed groups. The studies included 24,051 migrants in total. Table 1 is a summary of details of the reviewed publications.

Participants

Men and women were included in the studies with one exception (Kalafi, Haqh-Shenas, & Ostovar, 2002). However, only 9 and 5 studies, respectively, reported separate prevalence rates of depression and anxiety, limiting our ability to conduct subgroup analysis by gender. Twenty-five studies included participants above 18 years, three studies included participants above 16 years, while others included participants above 19 years, 20 years, and 35 years, respectively. Four studies did not specify the age range of participants. 7 studies were from Africa, 11 studies from Asia, 6 studies from Europe, 6 from South America and 4 from miscellaneous regions. 8 studies were conducted in the United States, 2 in Canada, 5 in Australia and New Zealand (Table 2).

Table 2
Summary of characteristics of studies between 1994 and 2007 included in the meta-analysis that reported prevalence rates of depression, anxiety or posttraumatic stress disorder among migrants assessed with standardized instruments.

Sample characteristics	
Sex	Only men ($n = 1$); only women ($n = 1$); both ($n = 34$)
Age range	16–88
Countries of immigration	Africa ($n = 4$; 899 participants), Asia ($n = 7$; 1740 participants), Australia ($n = 4$; 850 participants), Europe ($n = 11$; 3.753 participants); United States ($n = 9$; 14.955 participants); South America ($n = 1$; 160 participants)
Legal status	Labor migrants ($n = 13$), refugees ($n = 21$), heterogeneous groups ($n = 2$)
Design characteristics	
Time of assessment after immigration	0–3 years ($n = 11$), 4–6 years ($n = 4$), >10 years ($n = 6$), not specifies ($n = 15$)
Sample size	50–4558 subjects
Assessment	Self-report only ($n = 29$); medical records ($n = 8$);

Prevalence rates

The prevalence of depression in the reviewed studies including depression ($n = 29$) ranged from 3 percent (Silove, Steel, Bauman, Chey, & Cowell, 2007) to 81 percent (Lee, Lee, Chun, & Yoon, 2001). Anxiety was reported in 19 studies with reported rates between 5 percent (Noh, Speechley, Kaspa, & Wu, 1992) and 90 percent (Lee et al., 2001). PTSD prevalence rates varied from 4 percent (Steel, Silove, Chey, Bauman, & Phan, 2005) to 68 percent (Turner, Bowie, Dunn, Shapo, & Yule, 2003) between studies. The mean weighted prevalence rates of depression and anxiety were almost twice as high among refugees as among labor migrants (Table 3). Figs. 2 and 3, respectively, present forest plots with the single estimates from all included studies and the combined estimate for depression, separately for labor migrants and for refugees.

Study design

Overall, 13 studies used non – probability sampling methods. For refugees we calculated the combined prevalence rates for depression in subgroups separately for probability and non-probability sampling. Interestingly, the rates were similar but the confidence intervals were also wide (45 percent, 36–54; vs. 37 percent, 15–60) (Table 3). For labor migrants we could not calculate the combined prevalence rates due to the small numbers in the subgroup using non-probability sampling ($n = 3$). The funnel plot shows, that prevalence rates for depression are distributed in a wide range with the width of confidence intervals relating to the number of subjects included, independent of study design. Refugee studies are more likely to be conducted using non-random methods.

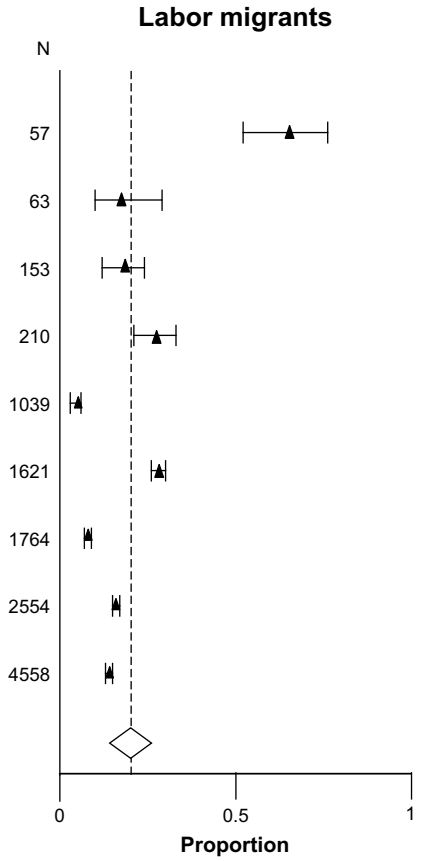

Fig. 2. Proportion of depression with 95 percent confidence intervals and the combined estimate among labor migrants.

Table 3
Combined prevalence rates of depression, anxiety and post-traumatic stress-disorders among refugees and labor migrants for studies between 1994 and 2007 according to study characteristics.

	Number of studies	Combined prevalence rate %	95% CI	Heterogeneity, variance
Characteristics of studies				
All studies				
Depression	27	35	25, 46	0.07
Anxiety	19	28	21, 35	0.03
PTSD	20	47	31, 63	0.13
Depression and/or anxiety	7	38	31, 45	0.007
Studies on refugees				
Depression	16	44	27, 62	0.13
Anxiety	10	40	17, 64	0.14
PTSD	18	36	23, 49	0.08
Depression and/or anxiety		40	26, 53	0.02
Depression by sampling method				
Probability sampling	7	45	36, 54	0.007
Non-probability sampling	9	37	15, 60	0.012
depression by GNP in US$				
>20,000	9	40	19, 62	0.11
<5000–19,000	7	42	27, 56	0.04
Studies on labor migrants				
Depression	9	20	14, 26	0.007
Anxiety	9	21	14, 29	0.012
PTSD	2*			
Depression and/or anxiety	2*			
Depression by GNP in US$				
>30,000	5	14	7, 21	0.006
10,000–30,000	4	31	15, 47	0.02

*Number of studies considered too small for combining the prevalence rates.

The studies used various instruments to assess depression and/or anxiety. Mostly, self-reporting instruments were used; others were clinician – administered or lay-administered instruments. Among the self-reporting instruments the Hopkins-Symptom-Checklist (HSCL-25) and the Harvard-Trauma-Questionnaire (HTQ) were the most used instruments. Among the non-self reporting instruments The World Mental Health Composite International Diagnostic Interview (WMH-CIDI) was the mostly used structured interview.

The 35 studies investigated in this review assessed migrants' mental health at different time points after immigration into the host country. Fourteen studies were conducted at unspecified time periods after immigration; while 21 specified the time period after immigration: eleven studies were conducted up to three years after immigration; ten studies later than three years after immigration.

GNP of the immigration country

We calculated the combined prevalence rates in subgroups of GNP of the immigration country. The combined prevalence rates of depression for labor migrants were the lowest (14 percent; 95 percent confidence interval 7–21) in the highest economic category of the immigration country's (GNP> 30,000 US$). Among refugees, the prevalence rates in the respective GNP categories were similar (Table 3).

Sample size

The prevalence rates of depression varied greatly among small and larger studies. Confidence intervals decreased with increasing

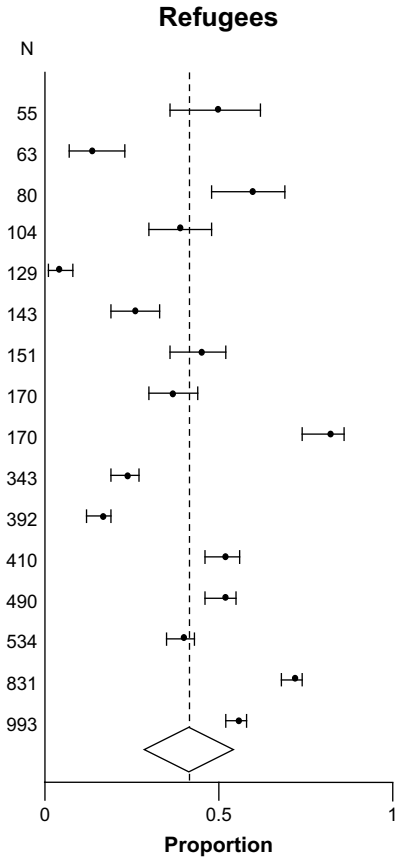

Fig. 3. Proportion of depression with 95 percent confidence intervals and the combined estimate among refugees.

sample size and a simultaneous tendency of the estimates towards the mean is suggested (Fig. 4).

Discussion

Our assessment suggests that prevalence rates of depression are almost twofold higher in refugees than in labor migrants (Figs. 2 and 3) (labor migrants 20 percent with 95 percent CI: 14, 26; refugees: 44 percent with 95 percent CI: 27, 62). The pooled prevalence rates of depression and anxiety among labor migrants are similar to the general US-population (22 percent for depression; 18 percent for anxiety) (Kessler, Chiu, Demler, & Walter, 2005). This review and meta-analysis is to our knowledge the first systematic review of prevalence rates of depression and anxiety in first generation labor migrants and refugees.

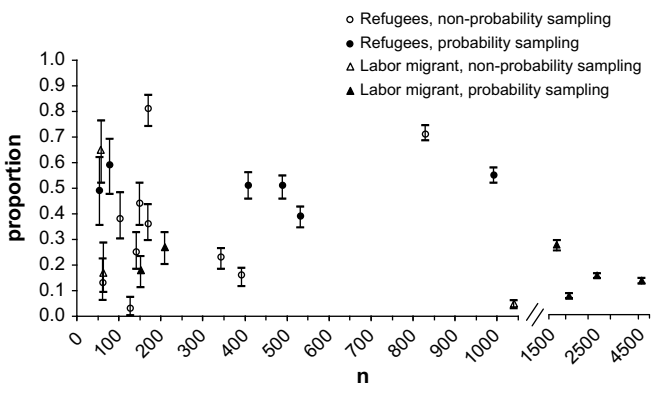

Fig. 4. Prevalence of depression (in proportion) and number of subjects in *refugees* and *labor* migrants in 25 studies.

The studies evaluated covered a wide age range of age groups (16–65 years), with most studies including participants above 18 years. Overall, our review suggests that the prevalence rates of depression and anxiety are generally lower among labor migrants than among refugees, and that a higher economic status of the host country may relate to lower symptom prevalence among labor migrants, but not among refugees. It has been discussed whether and how measures (self-report or administered questionnaires) and methods of assessment can influence the rates of depression and anxiety. This might introduce a systematic bias into studies, which should be addressed in further studies to investigate cultural sensitivity of instruments.

Several limitations of the present review must be acknowledged. First, time points of measurements with regard to 'time after migration' were heterogeneous. The studies in this review measured depression and anxiety at a range of time points after migration; a number of studies did not differentiate between migrants with a longer or shorter duration of stay in the host country. Prevalence rates of depression and anxiety may vary over time. This could explain some of the variation between the reported estimates. However, the number of studies with available information on time of assessment was too small to draw conclusions with regard to the effect of time of migration. Secondly, the restriction to English-language articles excludes studies published in other languages. Thirdly, we excluded non- published studies and reports. Cross-cultural validity of assessment instruments is still discussed (Tseng, 2003). However, mainly instruments used and tested in several populations like the HSCL-25 and the HTQ were used in the assessed studies. Additionally, we included in our review studies on depression and anxiety among 1st generation immigrants. There is a body of literature describing the phenomenon by which recent immigrants experience better overall health and mental health outcomes compared to later generations (see Williams et al., 2007) which goes beyond the scope of the current review.

The assessment of study methods showed that studies with probability sampling methods and with non-probability sampling methods resulted in similar combined prevalence rates among refugees; the number of studies in the subgroups were too small among labor migrants for further exploration of assessment methods.

The reported estimates in the refugees' mental health data vary widely. This might be due to the heterogeneity of the population characteristics and differential exposure to violence in their home countries involving resettlement dynamics; these may include discrimination in the host country. Refugees might have been exposed to violence and political repression in their countries of emigration which is known to be associated with elevated rates of burden of mental ill-health. Labor migrants may have suffered economic hardship in their country of origin but they themselves have chosen to leave the home country to seek better economic opportunities in other countries than their country of origin. Refugees often have no choice where to settle, while labor migrants may choose their destination. Therefore, labor immigrants often migrate to communities with more social resources as well as economic resources (e.g. communities with dense social ties and large communities of migrants from similar regions) which may also contribute to better mental health. However, the confidence intervals in the available reports for both, refugees and labor migrants are wide and likely related to the relatively small sample size in many studies. In addition, the differences in recruitment

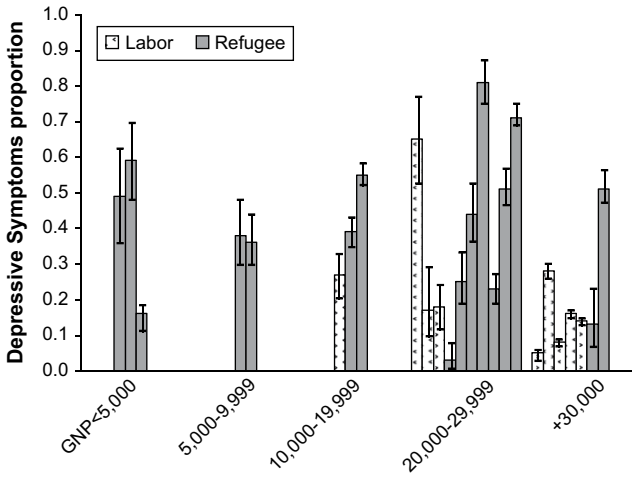

Fig. 5. Depressive symptoms by categories of GNP of the host country among labor migrants and refugees.

procedure contribute to the variability seen between the estimates. The heterogeneity on several levels limits the value of the combined estimates which should be interpreted cautiously and in the context of the overall study review.

This is the first systematic review investigating the association of the GNP of the host country with the prevalence rates of depression and anxiety among labor migrants and refugees. GNP is an economic measure which may indicate economic opportunities and the possibility to find paid jobs. Labor migrants are a self-selected group as these individuals with specific competences look for life opportunities in other countries where their competences might match better to the competences needed than in their home countries. The emigration might provide opportunities in countries where the economic situation offers job possibilities. Self selection might explain the lower prevalence rates of depression and anxiety among labor migrants. Lower prevalence rates of depression and anxiety were found in labor migrants who migrated into countries with a GNP above 20,000$. These self-selected migrants may be both in better mental health than the native born which is traditionally discussed as the "healthy labor immigrant effect" (Gushulak, 2007).

Among refugees an association of GNP of the host country with depression and/or anxiety is not found. This might be due to the fact that refugees may have suffered from severe stress in their country of emigration (e.g. exposure to war and/or violence) before their migration. Notably, the GNP of immigration countries was on average lower for refugees than for labor migrants, possibly relating to the fact that refugees often have no or only little choice where they seek refuge. The socio-demographic characteristics that are associated with health in general and with depression and anxiety of these migrants (e.g. age, gender, family bonds and education), may differ from the general population in both, the home country and the host country. This may also limit the ability to explain variations in mental health by the economic condition of the immigration country in refugees (Fig. 5).

In conclusion, this review supports the notion that economic factors of the host country might play a role as moderators of depression and/or anxiety in labor migrants (Lorant et al., 2003) who have a choice as to where they migrant, but less for refugees who have less choice. This review suggests that mental health of labor migrants, and of refugees should be addressed separately to develop targeted interventions aiming at the reduction of the substantial mental health burden.

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References

Alegria, M., Canino, G., Shrout, P., Woo, M., Duan, N., Vila, D., et al. (2008). Prevalence of mental illness in immigrant and non-immigrant U.S. Latino groups. *American Journal of Psychiatry, 165*, 359–369.

Alegria, M., Mulvaney-Day, N., Torres, M., Polo, A., Cao, Z., Canino, G., et al. (2007). Prevalence of psychiatric disorders across Latino subgroups in the United States. *American Journal of Public Health, 97*(1), 68–75.

Allden, K., Poole, C., Chantavanich, S., Ohmar, K., Aung, N. N., & Mollica, R. F. (1996). Burmese political dissidents in Thailand: trauma and survival among young adults in exile. *American Journal of Public Health, 86*(11), 1561–1569.

American Psychiatric Association (APA). (1994). *DSM-IV: Diagnostic and Statistical Manual of Mental Disorders*. Washington DC.

Babor, T. F., de la Fuente, J. R., & Saunders, J. (1992). *The alcohol use disorders identification test: Guidelines for use in primary health care*. Geneva, Switzerland: World Health Organization. 1992.

Bebbington, P., Hurry, J., & Tenant, C. (1981). Psychiatric disorders in selected immigrant groups in Camberwell. *Social Psychiatry, 16*(1), 43–51.

Beck, A. T. (1987). *Beck anxiety inventory*. NY: Psychological Cooperation.

Beck, A. T., Ward, C. H., Mendelsohn, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4*, 561–571.

Bhopal, R. S. (2007). *Ethnicity, race, and health in multicultural societies*. NY: Oxford University Press.

Bhugra, D. (2004). Migration and mental health. *Acta Psychiatrica Scandinavica, 109*(4), 243–258.

Bhui, K., Abdi, A., Abdi, M., Pereira, S., Dualeh, M., Robertson, D., et al. (2003). Traumatic events, migration characteristics and psychiatric symptoms among Somali refugees-preliminary communication. *Social Psychiatry and Psychiatric Epidemiology, 38*(1), 35–43.

Blanchard, O., & Illing, G. (2006). *Makroökonomie* (4th ed.). Munich: Pearson Studium.

Bradley, L., & Tawfiq, N. (2006). The physical and psychological effects of torture in Kurds seeking asylum in the United Kingdom. *Torture, 16*(1), 41–47.

Burnamm, M. A., Karnom, M., Houghm, R. L., Escobarm, J. I., & Forsythe, A. B. (1983). The Spanish diagnostic interview schedule: reliability and comparison with clinical diagnoses. *Archives of General Psychiatry, 40*(11), 1189–1196.

Carballo, M., Divino, J. J., & Zeric, D. (1998). Migration and health in the European Union. *Tropical Medicine & International Health, 3*(12), 936–944.

Cardozo, B. L., Veragra, A., Agani, I., & Gorway, C. A. (2000). Mental health, social functioning and attitudes of Kosovar Albanians following the war in Kosovo. *Journal of the American Medical Association, 284*, 569–577.

Carta, M. G., Bernal, M., Hardoy, M. C., & Haro-Abad, J. M. (2005). Report on the state of the mental health in Europe. Migration and mental health in Europe (the state of the mental health in Europe working group. Appendix 1). *Clinical Practice and Epidemiology in Mental Health* 1–13.

Carta, M. G., Kovess, V., Hardoy, M. C., Morosini, P., Murgia, S., & Carpiniello, B. (2002). Psychiatric disorders in Sardinian immigrants in Paris: a comparison with Parisians and Sardinian residents in Sardinia. *Social Psychiatry and Psychiatric Epidemiology, 37*(3), 112–117.

Carta, M. G., Reda, M. A., Consul, M. E., Brasesco, V., & Hardoy, M. C. (2006). Depressive episodes in Sardinian emigrants to Argentina: why are females at risk. *Social Psychiatry and Psychiatric Epidemiology, 41*(6), 452–456.

DerSimonian, R., & Laird, N. (1986). Meta-analysis in clinical trials. *Controlled Clinical Trials, 7*, 177–188.

Endicott, J., Spitzer, R. L., Fleiss, J. L., & Cohen, J. (1976). The global assessment scale. *Archives of General Psychiatry, 33*(6), 766–771.

Fazel, M., Wheeler, J., & Danesh, J. (2005). Prevalence of serious mental disorder in 7000 refugees resettled in western countries: a systematic review. *Lancet, 365*(9467), 1309–1314.

Fenta, H., Hyman, I., & Noh, S. (2004). Determinants of depression among Ethiopian immigrants and refugees in Toronto. *Journal of Nervous and Mental Disease, 192*(5), 363–372.

Foa, E. B. (1995). *Posttraumatic stress diagnostic scale manual*. United States of America: National Computer Systems, Inc.

Foa, E. B., Cashman, L., Jaycox, L., & Perry, K. (1997). The validation of a self-report measure of posttraumatic stress disorder: the posttraumatic diagnostic scale. *Psychological Assessment, 9*(4), 445–451.

Fox, S. H., & Tang, S. S. (2000). The Sierra Leonean refugee experience: traumatic events and psychiatric sequelae. *Journal of Nervous and Mental Disease, 188*(8), 490–495.

Fuertes, C., & Martin, L. M. A. (2006). The immigrant in primary care consultations. *Sistema Sanitaria de Navara, 29*(Suppl. 1), 9–25.

Garcia-Campayo, J., & Sanz, C. C. (2002). Mental health in immigrants: the new challenge. *Medicina Clinic, 118*(5), 187–191.

Gerritsen, A. A., Bramsen, I., Delville, W., van Willigen, L., & Hovens, J. (2006). Physical and mental health of Afghan, Iranian and Somali asylum seekers and refugees living in the Netherlands. *Social Psychiatry and Psychiatric Epidemiology, 41*(1), 18–26.

Glover, R. J. (1989). The pattern of psychiatric admissions of Caribean-born immigrants in London. *Social and Psychiatric Epidemiology, 24*, 29–56.

Goldberg, D. P., & Blackwell, B. (1970). Psychiatric illness in general practice. A detailled study using a new method of case identification. *British Medical Journal, 2*(5707), 439–443.

Gorman, J. M. (2006). Gender differences in depression and response to psychotropic medication. *Gender Medicine, 3*(2), 93–109.

Gorst-Unsworth, C., & Goldenberg, E. (1998). Psychological sequelae of torture and organized violence suffered by refugees from Iraq: trauma-related factors compared with social factors in exile. *British Journal of Psychiatry, 172*(1), 90–94.

Grant, B. F., Dawson, D. A., & Hasin, D. S. (2001). *The alcohol use disorder and associated disabilities interview schedule-DSM-IV Version*. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism.

Grant, B. F., Stinson, F. S., Hasin, D. S., Dawson, D. A., Chou, S. P., & Anderson, K. (2004). Immigration and lifetime prevalence of DSM-IV psychiatric disorders among Mexican Americans and non-Hispanic whites in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Archives of General Psychiatry, 61*(12), 1226–1233.

Gushulak, B. (2007). Commentary. Healthier on arrival. Healthier on arrival? Further insight into the "healthy immigrant effect". *Canadian Medical Association, 176*(10).

Hansen, E., & Donohoe, M. (2003). Health issues of migrant and seasonal farm workers. *Journal of Health Care for the Poor and Underserved, 14*(2), 153–164.

Hemsi, L. K. (1967). Psychiatric morbidity of West Indian immigrants. *Social Psychiatry, 167*, 193–196.

Hovey, J. D., & Magana, C. G. (2002). Cognitive, affective, and physiological expressions of anxiety symptomatology among Mexican migrant farm workers. Predictors and generational differences. *Community Mental Health, 38*(3), 23–27.

International Organization of Migration. (January 2008). http://www.iom.int/jahia/Jahia/pid/3. Accessed 15.01.08.

International Organization of Migration. (2007). Migration and the right to health. *A Review of European Community Law and Council of Europe Instruments*.

Janssen, F., Kunst, A. E., & Mackenbach, J. P. (2006). Association between gross domestic product throughout the life and old-age mortality across birth cohorts: parallel analyses of seven European countries, 1950–1999. *Social Science & Medicine, 63*(1), 239–254.

Kalafi, Y., Haqh-Shenas, H., & Ostovar, A. (2002). Mental health among Afghan refugees settled in Shiraz, Iran. *Psychological Reports, 90*(1), 262–266.

Karno, J., Golding, J. M., Burnam, M. A., Hough, R. L., Escobar, J. I., Wells, K. M., et al. (1989). Anxiety disorder among Mexican Americans and non-Hispanic Whites in Los Angeles. *Journal of Nervous and Mental Disease, 177*(4), 202–209.

Karunakara, U. K., Neuner, F., Schauer, M., Singh, K., Hill, K., Elbert, T., et al. (2004). Traumatic events and symptoms of posttraumatic stress disorder amongst Sudanese nationals, refugees and Ugandans in the West Nile. *African Health Sciences, 4*(2), 83–93.

Kessler, R. C., Chiu, W. T., Demler, O., & Walter, E. L. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62*(6), 617–627.

Kessler, R. C., & Ustun, T. (2004). The World Mental Health (WMH) survey initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *International Journal of Methods in Psychiatric Research, 13*(2), 93–121.

Khavarpour, F., & Rissel, C. (1997). Mental health status of Iranian migrants in Sydney. *Australian and New Zealand Journal of Psychiatry, 31*(6), 828–834.

King, M., Coker, E., Leavey, G., Hoare, A., & Johnson-Sabine, E. (1994). Incidence of psychotic illness in London: comparison of ethnic groups. *British Medical Journal, 309*(6962), 1115–1119.

Kirkcaldy, B., Wittig, U., Furnham, A., Merbach, M., & Siefen, R. G. (2006). Health and migration. Psychosocial determinants. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz, 49*(9), 873–883.

Kovess, V., Fournier, L., & Lesage, A. D. (2001). Two validation studies of the CIDIS: a simplified version of the Composite International Diagnostic Interview. *Psychiatric Networks, 4*, 10–24.

Laban, C. J., Gernaat, H., Komproe, I., Schreuders, A., & de Jong, J. T. (2004). Impact of long asylum procedure on the prevalence of psychiatric disorders in Iraqi asylum seekers in the Netherlands. *Journal of Nervous and Mental Disease, 192*(12), 843–851.

Laban, C. J., Gernaat, H. B., Komproe, I. H., van der Tweel, I., & de Jong, J. T. (2005). Postmigration living problems and common psychiatric disorders in Iraqi asylum seekers in the Netherlands. *Journal of Nervous and Mental Disease, 193*(12), 825–832.

Lee, Y., Lee, M. K., Chun, K. H., & Yoon, S. J. (2001). Trauma experience of North Korean refugees in China. *American Journal of Preventive Medicine, 20*(3), 225–229.

Lepine, J. P. (2002). The epidemiology of anxiety disorders: prevalence and societal costs. *Journal of Clinical Psychiatry, 63*(Suppl. 14), 4–8.

Lie, B., Lakke, P., & Nils, J. L. (2001). Traumatic events and psychological symptoms in a non-clinical refugee population in Norway. *Journal of Refugee Studies, 14*(3), 276–294.

Lorant, V., Deliège, D., Eaton, W., Robert, A., Philippot, P., & Ansseau, M. (2003). Socioeconomic inequalities in depression: a meta-analysis. *American Journal of Epidemiology, 157*(2), 98–112.

Macksoud, M. S. (1992). Assessing war trauma in children: a case study of Lebanese children. *Journal of Refugee Studies, 5*(1), 1–15.

Marshall, G. N., Schell, T. L., Elliott, M. N., Berthold, S. M., & Chun, C. A. (2005). Mental health of Cambodian refugees 2 decades after resettlement in the United States. *Journal of the American Medical Association, 294*(5), 571–579.

Martinez, M. M., & Martinez, L. A. (2006). Migration and psychiatric diseases. *Sistema Sanitaria de Navarra, 29*(Suppl. 1), 63–75.

McHorney, C. A., Ware, J. E., & Raczek, A. E. (1993). The MOS 36-Item Short-Form Health Survey (SF-36): II psychometric and clinical tests of validity in measuring physical and mental health constructs. *Medical Care, 31*(3), 247–263.

Merikangas, K. R., & Kalaydijan, A. (2007). Magnitude and impact of comorbidity of mental disorders from epidemiologic surveys. *Current Opinion in Psychiatry, 20*(4), 353–358.

Messer, B., & Harter, S. (1986). *Manual: Adult self-perception scale*. Denver: University of Denver Press.

Mghir, R., Fred, W., Raskin, A., & Katon, W. (1995). Depression and posttraumatic stress disorder among a community sample of adolescent and young adult Afghan refugees. *Journal of Nervous and Mental Disease, 183*(1), 24–30.

Mollica, R. F., Caspi-Yavin, Y., Bollini, P., Truong, T., Tor, S., et al. (1992). The Harvard Trauma Questionnaire: validating a cross-cultural instrument for measuring torture, trauma, and post traumatic stress disorder in refugees. *Journal of Nervous and Mental Disease, 180*(2), 107–111.

Mollica, R. F., Donelan, K., Tor, S., Lavelle, J., Elias, C., Frankel, M., et al. (1993). The effect of trauma and confinement on functional health and mental health status of Cambodians living in Thailand–Cambodia border camps. *Journal of the American Medical Association, 270*(5), 581–586.

Mollica, R. F., McInnes, K., Poole, C., & Tor, S. (1998). Dose-effect relationships of trauma to symptoms of depression and post-traumatic stress disorder among Cambodian survivors of mass violence. *British Journal of Psychiatry, 173*, 482–488.

Mollica, R. F., McInnes, K., Sarajlic, N., Lavelle, J., Sarajlic, I., & Massagli, M. P. (1999). Disability associated with psychiatric comorbidity and health status in Bosnian refugees living in Croatia. *Journal of the American Medical Association, 282*(5), 433–439.

Mollica, R. F., Sarajilic, N., & Chernoff, M. (2001). Longitudinal study of psychiatric symptoms, disability, mortality and emigration among Bosnian refugees. *Journal of the American Medical Association, 286*.

Mollica, R. F., Wyshak, G., de Marneffe, D., Khuon, F., & Lavelle, J. (1987). Indochinese versions of the Hopkins Symptom Checklist-25: a screening instrument for the psychiatric care of refugees. *American Journal of Psychiatry, 144*, 497–500.

Morey, L. C. (1991). *Personality assessment inventory: Professional manual*. Odessa: Psychological Assessment Resources.

Moussavi, S., Chatterj, S., Verdes, E., Tandon, A., Patel, V., & Ustun, B. (2007). Depression, chronic diseases, and decrements in health: results from the World Health Surveys. *Lancet, 370*, 851–858.

Munce, S. E., & Stewart, D. E. (2007). Gender differences in depression and chronic pain conditions in a national epidemiologic survey. *Psychosomatics, 48*(5), 494–499.

Myer, L., Stein, D. J., Grimsrud, A., Seedat, S., & Williams, D. R., et al. (2008). Social determinants of psychological distress in a nationally-representative sample of South African adults. *Social Science & Medicine, 66*(8), 1828–1840.

National Library of Medicine (Bethesda, MD). (2008). World Wide Web URL. http://www.ncbi.nlm.nih.gov,/omim/.

Noh, S., Speechley, M., Kaspa, V., & Wu, Z. (1992). Depression in Korean immigrants in Canada. Method of the study and prevalence of depression. *Journal of Nervous and Mental Disease, 180*(9), 573–577.

Noh, S., & Avison, W. R. (1996). Asian immigrants and the stress process: a study of Koreans in Canada. *Journal of Health and Social Behaviour, 37*(2), 192–206.

Norwegian Refugee Council. (January 2008). Internal displacement monitoring centre's internal displacement: global overview of trends and developments in 2005. http://www.internal-displacement.org. Accessed 14.11.07.

Overall, J. E., & Goreham, D. R. (1962). The brief psychiatric rating scale. *Psychological Reports, 1962*(10), 799–812.

Peltzer, K. (1999). Trauma and mental health problems of Sudanese refugees in Uganda. *Central African Journal of Medicine* 110–114.

Pernice, R., & Brook, J. (1994). Relationship of migrants' status (refugee or immigrant) to mental health. *International Journal of Social Psychiatry, 40*(3), 7–188.

Porter, M., & Haslam, N. (2005). Predisplacement and postdisplacement factors associated with mental health of refugees and internally displaced persons. A meta-analysis. *Journal of the American Medical Association, 294*(5), 602–612.

Radloff, L. S. (1977). The CES-D scale: a self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385–401.

Ramsay, R., Gorst-Unsworth, C., & Turner, S. (1993). Psychiatric morbidity in survivors of organized state violence including torture: a retrospective series. *British Journal of Psychiatry, 162*, 55–59.

Raphael, B., Lundin, T., & Weisaeth, L. (1989). A research method for the study of psychological and psychiatric aspects of disaster. *Acta Psychiatrica Scandinavica, 353*, 1–75.

Richters, J. E., & Saltzman, W. (1990). *Survey of exposure to community violence: Self-report version*. Rockville, MD: National Institute of Mental Health.

Roth, G., Ekblad, S., & Agren, H. (2006). A longitudinal study of PTSD in a sample of adult mass-evacuated Kosovars, some of whom returned to their home country. *European Psychiatry, 21*(3), 152–159.

Sabin, M., Lopez Cardozo, B., & Nackerud, L. (2003). Factors associated with poor mental health among Guatemalan refugees living in Mexico 20 years

after civil conflict. *Journal of the American Medical Association, 290*(5), 635–642.
Scarlett, S. L., & Kelsey, J. L. (2000). Use of race and ethnicity in epidemiologic research: concepts, methodological issues, and suggestions for research. *Epidemiological Reviews, 22*(2), 187–202.
Schulze, R., Holling, H., & Boehning, D. (Eds.). (2003). *Meta-analysis: New developments and applications in medical and social sciences*. Göttingen: Hogrefe & Huber.
Schweitzer, R., Melville, F., Steel, Z., & Philippe, F. (2006). Trauma, post-migration living difficulties, and social support as predictors of psychological adjustment in resettled Sudanese refugees. *Australian and New Zealand Journal of Psychiatry, 40(2)*(40), 179–187.
Silove, D., Steel, Z., Bauman, A., Chey, T., & Cowell, A. (2007). Trauma, PTSD and the longer-term mental health burden amongst Vietnamese refugees. A comparison with the Australian-born population. *Social Psychiatry and Psychiatric Epidemiology, 42*(6), 467–476.
Steel, Z., Silove, D., Chey, T., Bauman, A., & Phan, T. (2005). Mental disorders, disability and health service use amongst Vietnamese refugees and the host Australian population. *Acta Psychiatrica Scandinavica, 111*(4), 300–309.
Steel, Z., Silove, D., Pha, T., & Bauman, A. (2002). Long-term effect of psychological trauma on the mental health of Vietnamese refugees resettled in Australia: a population-based study. *Lancet, 360*(9339), 1056–1062.
Stein, D. J., & Hollander, E. (Eds.). (2002). *Textbook of anxiety disorders*. Washington DC/London: American Psychiatric Publishing.
Sullivan, M. M., & Rehm, R. (2005). Mental health of undocumented Mexican immigrants: a review of the literature. *Advances in Nursing Science, 28*(3), 240–251.
Summerfield, D. (1998). Trauma, post-traumatic stress disorder, and war. *Lancet, 352*(9131), 911.
Summerfield, D. (2001). The invention of post-traumatic stress disorder and the social usefulness of a psychiatric category. *British Medical Journal, 322*(7278), 95–98.
Sundquist, K., Johansson, L. M., De Marinis, V., Johanson, S. E., & Sundquist, J. (2005). Posttraumatic stress disorder and psychiatric co-morbidity: symptoms in a random sample of female Bosnian refugees. *European Psychiatry, 20*(2), 158–164.
Takeuchi, D., Chung, R., Lin, K., Shen, H., Kurasaki, K., Chun, C. A., et al. (1998). Lifetime and twelve month prevalence rates of major depressive episodes and dysthymia among Chinese Americans in Los Angeles. *American Psychiatric Foundation, 155*(10), 1407–1414.
Tang, S. S., & Fox, S. H. (2001). Traumatic experiences and the mental health impact of Senegalese refugees. *Journal of Nervous and Mental Disease, 189*(8), 507–512.
Turner, S. W., Bowie, C., Dunn, G., Shapo, L., & Yule, W. (2003). Mental health of Kosovan Albanian refugees in the UK. *The British Journal of Psychiatry, 182*, 444–448.
United Nations. (2005). *Trends in total migrant stock: The 2005 revision*. http://esa.un.org/migration. Accessed 24.01.08.
Ustun, T. B. (2002). WHO perspectives on international classification. *Psychopathology, 2002, 35*(2–3), 62–66.
Van, O. S., Castle, D. J., Takei, N., & Murray, R. M. (1996). Psychotic illness in ethnic minorities: clarification from the 1991 census. *Psychological Medicine, 26*(1), 203–208.
Van Ommeren, M., de Jong, J. T., Sharm, B., Komproe, I., Thapa, S. B., et al. (2001). Psychiatric disorders among Bhutanese refugees in Nepal. *Archives of General Psychiatry, 58*(5), 475–482.
Vega, W. A., Kolody, B., Aguilar-Gaxiola, S., Alderete, E., Catalano, R., & Caraveo-Anduaga, J. (1998). Lifetime prevalence of DSM-III-R psychiatric disorders among urban and rural Mexican-Americans in California. *Archives of General Psychiatry, 55*(9), 771–778.
Vega, W., & Miranda, M. R. (1985). *Stress and Hispanic mental health: Relating research to service delivery*. DHHS Publication No. ADM 85-1410. Washington, DC: U.S. Government Printing Office.
Veling, W., Selten, J. P., Veen, N., Laan, W., Blom, J. D., & Hoek, H. W. (2006). Incidence of schizophrenia among ethnic minorities in the Netherlands: a four-year first-contact study. *Schizophrenia Research, 86*(1–3), 189–193.
Weathers, F. W., Kean, T. M., & Davidson, J. R. T. (2001). Clinician-administered PTSD scale: a review of the first ten years of research. *Depression and Anxiety, 13*(3), 132–156.
Weinert, C., & Brandt, P. A. (1987). Measuring social support with the personal resource questionnaire. *Western Journal of Nursing Research, 9*(4), 589–602.
Williams, D. R., Haile, R., Gonzalez, H. M., Neighbours, H., Baser, R., et al. (2007). Disentangling mental health of black Caribbean immigrants. Results from the national survey of American life. *American Public Health Association, 97*(1), 52–59.
World Bank. (2008). http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0 Accessed 17.01.08.
World Health Organization. (1997). *Composite international diagnostic interview (CIDI) (Version 2.1)*. Geneva: World Health Organization.