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Psychosocial risk among migrant workers: what we can learn from literature and field experiences

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Key words
Migrant workers; psychosocial risk; occupational safety and health

Parole chiave
Lavoratori immigrati; rischio psicosociale; salute e sicurezza sul lavoro

Summary
Background: *Mental health problems are possible in migrant workers (MWs), who are mainly employed in dangerous jobs and face many barriers to prevention and care.* **Objectives:** *To outline current scientific evidence about psychosocial risk among MWs; to present data from clinical and field experiences.* **Methods:** *Non-systematic literature review (PubMed, last 10 years); case series of 20 MWs, evaluated for mental and/or behavioural disorders at a public occupational health unit; applied field research, in enterprise contexts.* **Results:** *A relatively low number of publications about psychosocial risk among MWs was found. Individual migrants may find the experience of migration to be stressful, with increased rates of depression and/or anxiety disorders. Data from clinical case series suggest that MWs from some ethnic groups, with a medium-high level of education, employed in metal or manufacturing industries, might have an increased risk of developing psychiatric disorders. Preliminary data from our field study seem to confirm that MWs, predominantly employed in unskilled/manual jobs and more prone to work overtime, tend to present higher prevalence of psychiatric disorders.* **Conclusions:** *There is a growing need to improve the scientific knowledge on migration, work, and mental health, as well as to promote workplace prevention of mental disorders in MWs. This can be achieved also by reducing structural barriers to mental wellbeing: in particular, occupational physicians should answer to MWs' mental health needs, contributing both to diagnosis and management of MWs' work-related psychiatric disorders.*

Riassunto
«Rischio psicosociale nei lavoratori immigrati: cosa si apprende dalla letteratura e da esperienze sul campo». **Introduzione:** *Problemi di salute mentale sono possibili in lavoratori migranti (LM), che sono impiegati nei lavori rischiosi e affrontano ostacoli alla prevenzione e cura.* **Obiettivi:** *Delineare le evidenze scientifiche attuali sul rischio psicosociale nei LM; presentare dati da esperienze cliniche e sul campo.* **Metodi:** *Revisione non sistematica di letteratura (PubMed, ultimi 10 anni); casistica di 20 LM, valutati per disturbi mentali e/o comportamentali presso unità operativa ospedaliera pubblica di medicina del lavoro; ricerca applicata in aziende, sul campo.* **Risultati:** *È stato reperito un numero relativamente basso di pubblicazioni sul rischio psicosociale nei LM. Singoli LM possono*

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trovare stressante l'esperienza della migrazione, con un incremento di depressione e/o disturbi d'ansia. Dati rilevati dai casi clinicamente valutati suggeriscono che i LM provenienti da alcune etnie, con livello d'istruzione medio-alto, impiegati nell'industria dei metalli o manifatturiera presentano aumentato rischio di sviluppare disturbi psichiatrici. Dati preliminari dallo studio sul campo indicano che i LM, prevalentemente impiegati in lavori non qualificati/manuali e più inclini a svolgere lavoro straordinario, tendono a presentare una maggiore prevalenza di disturbi psichiatrici. **Conclusioni:** *Vi è una crescente necessità di miglioramento della conoscenza scientifica sul tema migrazione, lavoro e salute mentale, nonché di promuovere la prevenzione dei disturbi psichiatrici in LM nei luoghi di lavoro. Ciò potrà avvenire anche mediante la riduzione delle barriere strutturali al benessere mentale; in particolare, i medici del lavoro dovrebbero rispondere concretamente ai bisogni di salute mentale dei LM, concorrendo sia alla diagnosi dei disturbi psichiatrici lavoro-correlati nei LM che alla loro gestione.*

Introduction

Immigration can be a process of loss and change, posing significant psychosocial stress, with consequent possible effects on mental health. Mental health problems (such as stress-related disorders, anxiety disorders, depression, suicide) have been more commonly described in migrants, as compared to the population of the host countries. The development of such mental disorders has been attributed to the inability to meet the expectations set prior to the migration, in spite of good health on arrival. In fact, migrants face adverse economic situations, discrimination, lack of social integration with limited or poor access to health services; it is believed that these conditions are risk factors for mental diseases (2, 11, 29).

Migrant workers are generally exposed to many well-known psychosocial risk factors at work (28). In fact, they are mainly employed in low-wage, unskilled, physically and psychologically stressful jobs (the so-called "3D jobs", i.e. dangerous, dirty and demanding/degrading) (4, 30). Moreover, undesirable work conditions such as fast work pace, tight deadlines, performing multiple tasks at a time and long periods of concentration with insufficient break time are causes of increased job demand among migrants. Finally, lack of support from coworkers and supervisors is also common, mainly because of cultural and language barriers (2, 29).

Migrant workers have to face many barriers to care, such as low educational attainment, costs, fear of law enforcement, cultural barriers. Stressors, such as substantial isolation and lack of social networks that are known to contribute to higher levels of depression, are commonly reported by migrant workers. Language is both a barrier to care as well as a risk factor in itself; inability to communicate because of language issues presents both acute and chronic health risks. Language barriers are believed to render more difficult to access occupational safety information or to express health care needs (6).

An important factor that may influence the occupational health of migrant workers is the organization of work, particularly the work safety climate (3).

Indicators of poor mental health, such as elevated depressive symptoms or heavy alcohol use, are risk factors for occupational injuries and suicidal behaviour as well (19).

Mental disorders impose a significant societal burden, leading to functional impairment, decreased quality of life, low productivity, lost wages and impaired interpersonal relationships (2).

A recent review of the studies that have investigated occupational injury and illness rates among immigrant workers showed, as regards the psychosocial issue: predominance of immigrants in informal work arrangements; correlation between precarious work status and psychological distress; greater degree of chronic health problems or lower perception of one's health in case of unemployment or irregular employment; serious emotional toll of precarious work, including the impact of being isolated from family and community support, of inadequate living situations, and the economic effects

of injuries (39). It has also been postulated that analytical research as well as detailed reviews are needed to understand the mediating mechanisms between the employment and working conditions of immigrants and their physical and mental health, and their health behaviours (7). Moreover, relevant international agencies and associations declared that migrant workers are at very high risk for mental health/stress problems and that the psychosocial impacts of migrancy – as well as hard manual labour, poverty, social status, isolation and alienation, discrimination, etc. –, though not widely understood, are believed to be significant and need further research (10,12,14,22).

As regards the global burden of mental and behavioural disorders, it has been estimated that they accounted for 176,626 Years Lived with Disability (YLDs) and 185,190 Disability Adjusted Life Years (DALYs) in 2010, representing one of the main contributors to YLDs and DALYs worldwide (along with musculoskeletal disorders, diabetes, ischaemic heart disease, and stroke) and showing a rising burden that impose new challenges on health systems (34,44). In particular, depression is one of the leading causes of disability and is projected to become the second leading cause of the global burden of disease by 2020 (45).

Work-related stress, depression and anxiety can be directly associated with the exposure to psychosocial hazards at work (45). In Europe, stress, depression and anxiety together are the second leading work-related health problem by diagnosis group, following only musculoskeletal disorders and accounting for about 14% of the total burden of occupational diseases in 2007 (15). In the UK approximately 15-30% of workers will experience some form of mental health issues during their working lives, resulting in an estimated 80 million working days lost every year, costing employers 1-2 billion pounds per annum (45). Although no specific prevalence data on mental and behavioural disorders among migrant workers are available in current European databases of occupational disorders, literature reviews on mental health risk in some immigrant groups in Europe showed: higher rates of schizophrenia, suicide, alcohol and drug abuse; difficulties in accessing psychiatric facilities; high risk of anxiety and depression; an overall increased risk of mental health problems in ethnic minorities, recent migrants and refugees (9, 41). Since migrants represent a fast growing proportion of the European population, and an increasingly important group on the labour market as well, greater attention needs to be paid to their employment and working conditions. Therefore, the peculiarities of these workers, including culture-specific perceptions and attitudes concerning work and occupational risks, must be taken into account when it comes to safety and health and related research. There are several occupational safety and health (OSH) issues that require special attention, such as the increase of migrant workers in high-risk sectors, cultural (e.g. language-related) barriers to communication and training in OSH, or the high prevalence of overtime work and related risks for accidents and ill health among migrant workers (13).

In Italy, mental and behavioural disorders represented 1.2% (N ≈ 550) of all the occupational diseases notified to the Workers' Compensation Authority (INAIL) in 2012: almost 7% (N ≈ 40) of these were notified among migrant workers, thus accounting for 1.4% of all the occupational diseases reported for this specific working population (N ≈ 2,700) (24-27).

It should also be noted that the assessment of all the risks represented within a work environment, explicitly including those associated with work-related stress as well as those related to the fact of being immigrant from other Countries, is mandatory by Italian law (art. 28, Legislative Decree 81/2008).

Given such a background, we wanted to address some research questions, such as:

- To what extent and relevance are psychosocial issues in migrant workers tackled in the current literature?
- Are there experiences of clinical assessment of psychosocial-related disorders among migrant workers in public occupational health clinics? What is their practical relevance?
- Are there field studies on psychosocial issues in migrant workers as compared to natives? Are they informative?

The aims of our contribution are, therefore:

- to outline the current scientific evidence about features, distribution and extent of psychosocial risks among migrant workers, through an extensive literature review;
- to present data from a clinical case list, stemming from a thirteen-year experience in a Northern Italy public occupational health unit, based at an university hospital;
- to present preliminary results from an applied research field experience.

Methods

Literature review

In order to report the available data on migrant workers' mental health status, a non-systematic scientific literature review was carried out, searching PubMed (by means of Mesh Database and Advanced Search) for ((("Transients and Migrants/psychology"[Mesh] OR "Emigration and Immigration/psychology"[Mesh]) AND ("work"[MeSH Terms] OR "work"[All Fields])) OR ("psychosocial AND work AND immigrant") Filters: Abstract available; published in the last 10 years).

After retrieval of 146 items from the database, two authors screened all the articles, based on titles and abstracts. Full texts were then obtained and read for 40 articles pertinent to our research questions and aims. Finally, for 17 relevant articles identified, significant information was extracted and discussed by the authors to be included in the paper.

Selection of clinical cases

We report data from a thirteen-year experience stemming from a Northern Italy public occupational health unit based at the university hospital of the city of Brescia, a highly industrialized area.

Migrant workers are outpatients, usually sent for evaluation of occupational diseases and/or fitness for work judgement by general practitioners, enterprises, occupational physicians, hospital wards, and public institutions. Migrant workers undergo the following clinical procedure: history collection, including general demographic data, occupational exposure assessments, clinical history; physical examination; instrumental/laboratory tests, chosen according to the relevant clinical questions; in some circumstances, documentation is acquired from general practitioners, enterprises and/or plant occupational physicians, and local health authorities. The worker, the practitioner, and the occupational physician receive a detailed clinical report concluding the assessment.

The case series of all migrant workers evaluated from January 2001 to June 2013 (N = 724) was entered in a dedicated Microsoft Access database. Data were then elaborated for descriptive statistics by means of Microsoft Excel, which enabled us to extract 20 (2.8% of total) cases specifically evaluated for mental and/or behavioural disorders.

Applied research field experience

We present some specifically selected preliminary data as a part of a larger ongoing field study, started in 2011 in the context of a three-year applied university research project named "Migrant workers' occupational safety and health. From scientific evidence to preventive interventions".

The applied study design is observational, both cross-sectional and longitudinal.

Both migrant workers and their Italian colleagues (paired 1:1 by gender and age ± 10 years) were interviewed by trained occupational physicians at enterprise level, in patronage offices and in infectious disease hospital ambulatories. All participants gave an informed consent prior to participating the study. Participation was unselected, voluntary and with no payment. In order to take into consideration the cultural and linguistic barriers documented by previous investigations (1, 35), at least a moderate fluency in Italian or English (as judged by the interviewer) was required to include the migrant in the study. The interview of very few recently arrived migrants was carried out with the help of subjects' Italian/English speaking relatives, or of specifically trained medical and non-medical personnel, belonging to the participating struc-

tures. This study was approved by the Institutional Review Board of the University of Brescia and by the Lombardy Region.

Each participant filled in a semi-structured questionnaire, including 67 questions for migrant workers and 61 questions for Italian workers.

So far, 650 questionnaires (320 migrant workers and 330 Italian control workers) has been filled in and entered into a dedicated Microsoft Access database. We then elaborated data for descriptive statistics by means of Microsoft Excel, which enabled us to extrapolate information about psychosocial variables of interest [e.g. socio-demographic, socio-familiar, and individual (occupational and non-occupational) characteristics, type of contract, working hours, preventive and protective measures, health status, access to the services of the welfare state] for 198 subjects (99 migrant workers and 99 paired Italian control workers), interviewed at enterprise level. We approached 2 enterprises:

- a society of fast food and service stations, which employed 10,663 workers, of which 997 migrants; those migrants included in our preliminary sample were 79, representing about 8% of the society migrant working population;
- a cast-iron foundry, which employed 191 workers, of which 48 migrants. We included 20 of them in our interviews (42% of the foundry migrant workers).

To compare the prevalence of some selected variables among migrant versus Italian workers, two-tailed Fisher's exact test was applied (0.05 significance level).

Results

Literature review

Table 1 shows the main results of the review. The countries where the 17 relevant published studies had been performed were USA, Korea, Israel, United Arab Emirates, Spain, Denmark, Sweden and Italy. In most cases, studies were cross-sectional surveys and participants were interviewed by means of structured or semi-structured questionnaires. Besides one study (30) showing a high prevalence of clinically diagnosed post-traumatic stress disorder in immigrants, the available information on mental health issues was self-reported. Overall, the prevailing focus was on the association between work-related psychosocial factors (mainly represented by high job demand/strain, insufficient job control and/or low decision latitude, low social support, long hours and fast-paced work, wages perceived as insufficient and lower than coworkers, high job instability, poor work safety climate) and mental/behavioral disorders (e.g. depression, suicide, anxiety, the so-called problem drinking), as well as general health status (9). More in detail, migrant workers whose social relationships with other coworkers were poor (i.e. when receiving low social support and/or being victims of social discrimination) had significantly higher levels of psychological distress and mental health problems, as well as of reported problem drinking (16, 18, 43). Moreover, those experiencing both high job demands and a low decision latitude showed an increased risk of long-term illness and mental health problems (16, 40, 43). Among migrant agricultural workers and farmworkers in USA, a significant rate of major and minor depression was found, with a relevant impairment of individual ability to work (31); social isolation and working conditions were associated with both anxiety and depressive symptoms (21); farmworkers perceived their work safety climate to be poor and anxiety or depression was one of the top three health issues reported (3, 6). Depression as well as suicidal ideation and/or attempt were also correlated with physical illness, working in construction industry, low salaries, fast-paced work, working more than 8 h a day and abuse/discrimination within the work environment (2, 5, 19, 38). Work dissatisfaction, low and no economic support were shared risk factors for psychiatric disorders among Ecuadorian and Spanish women; higher education was inversely associated with possible psychiatric case (PPC) in Spanish women, but having university studies doubled the odds of being a PPC in Ecuadorians (11). A study performed in Korea showed that female migrant workers had significantly higher depression scores than males and that there were

Table 1 - Psychosocial risk among migrant workers: non-systematic literature review

Authors and year of publication	Country	Study design	Subjects and methods	Main outcomes
Griffin J, Soskolne V 2003	Israel	Cross-sectional survey	221 Thai male workers interviewed • structured questionnaire (demographic variables, occupational exposures to pesticides, migration stressors, social support, drinking behaviour, utilization of medical services) • psychological distress scale.	Migration stressors, quality of current social relationships, drinking behaviour, age and occupational exposure → significant association with psychological distress. Workers with higher migration stressors, poor social relationships with other Thai co-workers, consuming either no or large amounts of alcohol → significantly higher levels of psychological distress.
Sundquist J, Östergren PO, Sundquist K, Johansson SE, 2003	Sweden	Population-based, cross-sectional survey	Combination of 4 annual random samples covering 1994–97 from the Swedish Annual Level of Living Survey. Sub-sample (only employed persons; 10,072 Swedish-born persons, 710 labour migrants and 333 refugees aged 25–64 years) analysis.	High job demands and low decision latitude → increased risk (OR = 1.74; 95% CI: 1.42–2.13) of long-term illness. 63% refugees among unskilled/skilled manual workers → low decision latitudes in comparison with 17% of intermediate and senior salaried employees. Refugees with low social support → twice as high risk of long-term illness as Swedes with high-level work-related social support.
Carta MG, Bernal M, Hardoy MC, Haro-Abad JM and the "Report on the Mental Health in Europe" working group, 2005	Italy-Spain	Review	Indication of needs and (mental) health problems of immigrants. A review of the literature concerning mental health risk in immigrant. Addressing of the health policy toward immigrants and the access to health care services in Europe.	The reviewed literature among mental health risk in some immigrant groups in Europe concerns: highest rate of schizophrenia; suicide; alcohol and drug abuse; access of psychiatric facilities; risk of anxiety and depression; mental health of EU immigrants once they returned to their country; early EU immigrants in today disadvantaged countries; refugees and mental health. To highlight the importance of an integrated approach to mental health care that moves away from psychiatric care only as well as an adequate financing for research into the multicultural health demand.

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Authors and year of publication	Country	Study design	Subjects and methods	Main outcomes
Mazzoni SE, Boiko PE, Katon WJ, Russo J, 2007	USA (Oregon, Idaho and Washington)	Cross-sectional survey	315 adult Hispanic agricultural workers (northwest farmworker housing) interviewed to diagnose major and minor depression and assess disability.	Rate of major depression → 3.2% (n=10). Rate of minor depression → 6.3% (n=20). Female gender → significantly associated with depression (P<.02). Major and/or minor depression → increased disability (P<.001). Non-depressed subjects → significantly more likely (39% vs 3%) to be completely free of functional impairment (P<.001).
Hiott AE, Grzywacz JG, Davis SW, Quandt SA, Arcury TA, 2008	USA (North Carolina)	Cross-sectional survey	125 male migrant farmworkers interviewed • Migrant Farmworker Stress Inventory (MFWSI) • 3 mental health scales (PAI [anxiety], CES-D [depression], CAGE/4M [alcohol abuse]).	38% → significant levels of stress (MFWSI). 18.4% → impairing levels of anxiety. 41.6% → caseness for depression. 37.6% → answered yes to 2 or more questions on the CAGE. Social isolation and working conditions → associated with both anxiety and depressive symptoms. Social isolation → more strongly associated with anxiety. Working conditions → more strongly linked to depression.
Lurie I, 2009	Israel	Clinical series	Data from the Open Clinic's psychiatric and general medical files. No manipulation of the population at hand and no control group. Strength of correlation calculated by Odds Ratio. Correlations considered statistically significant at p-value < 0.05.	Trauma and stress-related psychopathology → high prevalence in immigrant patients treated at the clinic. Prevalence of PTSD (post-traumatic stress disorder) → high in immigrants (23%) and even higher in refugees (33%). Female immigrants → higher risk for psychiatric hospitalization. Relative rate of African patients → significantly higher than patients from other continents. Significant association between psychiatric hospitalization and suicide attempts.

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Authors and year of publication	Country	Study design	Subjects and methods	Main outcomes
Porthé V, Benavides FG, Vázquez ML, Ruiz-Frutos C, García AM, Ahonen E, Agudelo-Suárez AA and Benach J; for the ITSAL project, 2009	Spain	Qualitative study, based on analytic induction principles	Criterion sampling, based on the Immigration, Work and Health project [ITSAL] criterion. 44 undocumented immigrant workers from four different countries recruited. Each participant interviewed by investigators through semi-structured questionnaires and/or focus group.	Undocumented immigrants → perceived characteristics of precariousness → high job instability, disempowerment due to lack of legal protection, high vulnerability exacerbated by their legal and immigrant status, perceived insufficient wages and lower wages than co-workers, limited social benefits and difficulty in exercising their rights, long hours and fast-paced work. Undocumented immigrants → reported physical and mental problems associated with employment conditions and legal situation.
Grzywacz JG, Quandt SA, Chen H, Isom S, Kiang L, Vallejos Q, Arcury TA, 2010	USA (North Carolina)	Community-based, longitudinal survey	Prospective data (monthly intervals across one four-month agricultural season); Latino farmworkers (N=288). Depressive symptoms assessed using a 10-item version of Center for Epidemiologic Studies Depression (CES-D) scale. Work-related stress assessed using 4 items from job demand subscale of Job Content Questionnaire.	Depressive symptoms →U-shaped distribution across the season. Structural stressors (e.g. marital status) and situational stressors (e.g. pace of work, crowded living conditions, concerns about documentation) → predicted depressive symptoms. Levels of stress higher than usual → elevated depressive symptoms.
Al-Maskari F, Shah SM, Al-Sharhan R, Al-Haj E, Al-Kaabi K, Khonji D, Schneider JD, Nagelkerke NJ, Bernsen RM, 2011	United Arab Emirates	Cross-sectional survey	To determine the prevalence and correlates of depression among workers living in labour camps in Al Ain city, using Depression Anxiety and Stress Scale (DASS-42). 319 contacted workers → 239 fully completed the DASS-42.	Prevalence of a score >=10 ("depression") → 25.1% (60/239). Depression → correlated with physical illness (adjusted odds ratio-AOR = 2.9; 95% CI 2.26–5.18), working in construction industry (AOR = 2.2; 95%CI 1.56–3.83), earning less than 1,000 UAE Dirham per month (AOR = 1.8; 95%CI 1.33–3.16), working more than 8 h a day (AOR =2.7; 95%CI 1.19–6.27). 6.3% → thoughts of suicide. 2.5% → attempted suicide. People with suicidal ideation → more likely to have a physical illness (AOR = 8.1, 95%CI 2.49–26.67), earn less than 1,000 UAE Dirham per month (AOR = 5.98, 95%CI 1.26–28.45), work for more than 8 h a day (AOR = 8.35, 95%CI 1.03–67.23).

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Table 1 - Psychosocial risk among migrant workers: non-systematic literature review

Authors and year of publication	Country	Study design	Subjects and methods	Main outcomes
Del Amo J, Jarrín I, García-Fulgueiras A, Ibáñez-Rojo V, Alvarez D, Rodríguez-Arenas MA, García-Pina R, Fernández-Liria A, García-Ortúzar V, Díaz D, Mazarrasa L, Zunzunegui MV, Llácer A, 2011	Spain	Population-based, cross-sectional survey	Probabilistic sample from council registries: 1,122 subjects (50% Ecuadorian, 50 % women). Interview through home visits from September 2006 to January 2007. Possible psychiatric case (PPC) measured as score of C5 on the General Health Questionnaire-28.	Shared risk factors for PPC between Spanish and Ecuadorian women → having children (OR 3.1, 95% CI 1.4–6.9), work dissatisfaction (OR 4.1, 95% CI 1.6–10.5), low salaries (OR 2.5, 95% CI 1.1–5.9), no economic support (OR 1.8, 95% CI 0.9–3.4), no friends (OR 2.2, 95% CI 1.1–4.2). Having university studies → doubled odds of being a PPC in Ecuadorians. Shared risk factors for PPC in Ecuadorian and Spanish men → bad atmosphere at work (OR 2.4, 95% CI 1.3–4.4), no economic support (OR 3.5, 95% CI 1.3–9.5), no friends (OR 2.5, 95% CI 0.9–6.6), low social support (OR 1.6, 95% CI 0.9–2.9).
Arcury TA, O'Hara H, Grzywacz JG, Isom S, Chen H, Quandt SA, 2012	USA (North Carolina)	Cross-sectional survey	300 farmworkers, North Carolina 2009. Generalized estimating equations models used to investigate the association of work safety climate with health and safety outcomes.	Farmworkers perceived their work safety climate to be poor. 40% → elevated musculoskeletal discomfort. 5.0% → worked at least 1 day while injured or ill. 27.9% → elevated depressive symptoms. Odds of elevated musculoskeletal discomfort 12% lower and odds of working while injured or ill 15% lower with each 1-unit increase in the work safety climate. Work safety climate → not associated with depressive symptoms.
Ayalon L, 2012	Israel	Cross-sectional survey	178 Filipino home care workers who completed • Paykel Suicide Scale (five items that evaluate suicidal ideation - SIA - with increasing levels of intent) • Patient Health Questionnaire-9 (ranking each of the nine DSM-IV criteria for depression on a scale from 0 to 3).	35% → exposure to some type of abuse within their home/work environment. SIA → risk factors that met the significance level of .2 → caring for an older adult with dementia, exposure to everyday discrimination, exposure to major discrimination. Abuse within the home/work environment → only predictor of depressive symptoms. 3.4% → classified as depressed.

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Table 1 - Psychosocial risk among migrant workers: non-systematic literature review

Authors and year of publication	Country	Study design	Subjects and methods	Main outcomes
Baker D, Chappelle D, 2012	USA (Vermont)	Cross-sectional survey	120 Latino workers (mostly young, male Mexicans) surveyed on 59 Vermont dairy farms to develop a demographic profile and evaluate their self-assessed health status and barriers to care.	Anxiety or depression → one of top three health issues reported (12.9% currently experiencing; 8.6% experienced in past). Workers over the median age of 28 → more likely to be depressed than younger workers (p = .066). Isolation → most challenging aspect of dairy farm work. Fear of immigration law enforcement → primary barrier to care.
Font A, Moncada S, Benavides FG, 2012	Spain	Cross-sectional survey	Multistage cluster sampling was used (study population: 7,555 workers). The information was collected between 2004 and 2005 using a standardized questionnaire, and interviews were conducted in respondents' homes. The risk of poor mental health according to psychosocial factor, using the native, non-exposed workers as a reference, was calculated using log-binomial models. The prevalence ratio (PR) and confidence intervals (CI 95%) were estimated.	Immigrants who experienced high quantitative demands (PR = 1.46; CI 95%:1.34–1.59), high emotional demands (PR = 1.42; CI 95%:1.30-1.56), high demands for hiding emotions (PR = 1.35; CI 95%:1.21–1.50), low possibilities for development (PR = 1.21; CI 95%:1.09–1.33), low levels of support from co-workers (PR = 1.41; CI 95%:1.30–1.53), and low esteem (PR = 1.53; CI 95%:1.42–1.66) perceived worse mental health. Native workers exposed to these factors also perceived worse mental health than those who were not exposed and even, at times, they were at greater risk than exposed immigrants. These results indicate the importance of taking action to reduce psychosocial factors, as this would benefit both native and immigrant workers.
Lee H, Ahn H, Miller A, Park CG, Kim SJ, 2012	Korea	Cross-sectional survey	200 Korean-Chinese full-time migrant workers recruited. 170 completed questionnaires. Self-administered or face-to-face surveys conducted by trained data collectors.	30% → met criteria for depression. Female workers → significantly higher depression scores. Moderate positive correlations between depression and job demand (r=0.293, p<0.001), insufficient job control (r=0.208, p=0.003), interpersonal conflict (r=0.240, p=0.001) and acculturative stress (r=0.408, p<0.001).

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Authors and year of publication	Country	Study design	Subjects and methods	Main outcomes
Olesen K, Carneiro IG, Jørgensen MB, Flyvholm M-A, Rugulies R, Rasmussen CDN, Søgaard K, Holtermann A, 2012	Denmark	Cross-sectional survey	Two hundred and eighty-five cleaners (148 Danes and 137 non-Western immigrants) from 9 workplaces in Denmark participated in this cross-sectional study. The cleaners' immigrant status was tested for association with psychosocial work environment scales from the short version of the Copenhagen Psychosocial Questionnaire (COPSOQ) using ordinal logistic regression.	Models adjusted for age, sex, BMI, smoking, workplace, and perceived physical work exertion showed that non-Western cleaners compared with Danish cleaners reported significantly higher scores with regard to Predictability (OR = 3.97), Recognition (OR = 1.92), Quality of Leadership (OR = 1.81), Trust Regarding Management (OR = 1.72), and Justice (OR = 2.14). Therefore, the hypothesis of non-Western immigrants reporting worse psychosocial work environment than their Danish colleagues was not supported.
Tsai JH-C, Thompson EA, 2013	USA	Cross-sectional survey	Associations between known social determinants of mental health problems and substance use (social discrimination, job and employment concerns, and social support) were examined using structural equation modelling in a sample of 1,397 immigrants from the Filipino American Community Epidemiological Study.	Social discrimination and low social support were associated with mental health problems and substance use ($P < 0.05$). Job and employment concerns were associated with mental health problems, but not substance use. The integration of social factors into occupational health research is needed, along with prevention efforts designed for foreign-born ethnic minority workers.

moderate positive correlations between depression and job demand, insufficient job control, interpersonal conflict and acculturative stress (29).

A cross-sectional study performed among Danish cleaners showed that non-Western immigrant cleaners, who have been shown to have poorer health than their Danish colleagues, reported better psychosocial work environment than the natives; according to the authors, one possible reason could be the lower job expectations, resulting in higher perceived satisfaction (35).

Selection of clinical cases

As shown in table 2, out of the total population of 724 cases, 20 migrant workers were assessed for psychosocial issues. They were mainly men (65%), with a mean age of 41 years (range 19-56) and a medium/high level of education (20% primary school, 25% secondary school, 45% high school, 10% university degree). They mainly came from Albania (25%) and Morocco (25%), followed by Serbia (10%), Pakistan (10%), Senegal (10%), Egypt

Table 2 - Psychosocial risk among migrant workers: clinical case list assessed at a public hospital unit of occupational health, from January 2001 to June 2013

Source of commitment; reason of assessment	Gender; age (years); country of origin; level of education; residence seniority in Italy (years); life habits	Main sector - job task; job seniority (years); current type of contract	Psychiatric diagnosis (DSM IV-TR); year of first diagnosis; treatment	Fitness for work judgement
enterprise; fitness for work	M; 22; Albania; secondary school; 7; smoker, occasional drinker	metal industry – transfer machine (for gas pipes and taps threading) operator; 7; formally employed worker	Schizoid Personality Disorder; 2001; antipsychotic drugs	fit with limitations (occupational accident risk) and prescriptions (work organization and content)
enterprise; fitness for work	M; 43; Togo; high school; 12; non-smoker, occasional drinker	metal industry – continuous furnace heat treatment operator; 4; formally employed worker	Schizophrenia, Paranoid Type; 2001; access to a psychosocial center and antipsychotic drugs	fit
enterprise; fitness for work	F; 19; Albania; secondary school; not known; smoker, occasional drinker	health sector - dental assistant; apprentice	Borderline Personality Disorder; 2001; psychotherapy	fit
enterprise; fitness for work	M; 35; Serbia; high school; 9; not known	metal casting – crane operator in a steel foundry; 3; formally employed worker	Previous episodes of Psychotic Disorder with Delusions; 2001; psychotherapy	fit
enterprise; fitness for work	M; 26; Senegal; secondary school; 6; non-smoker, non-drinker	rubber industry – assigned to the moulding of gaskets; 3; formally employed worker	Schizophrenia, Undifferentiated Type; 1997; access to a psychosocial center and antidepressant drugs	fit with limitations (shift/night work)
general practitioner; "occupational stress"	M; 36; Romania; high school; 10; smoker, non-drinker	collective catering - cook; 4; formally employed worker	Non-occupational Panic Disorder With Agoraphobia; 2005; antidepressant drugs	/ (Recommendations for a careful fitness for work evaluation, with particular focus on the prevention of danger to third parties)

(continued)

Table 2 - Psychosocial risk among migrant workers: clinical case list assessed at a public hospital unit of occupational health, from January 2001 to June 2013

Source of commitment; reason of assessment	Gender; age (years); country of origin; level of education; residence seniority in Italy (years); life habits	Main sector - job task; job seniority (years); current type of contract	Psychiatric diagnosis (DSM IV-TR); year of first diagnosis; treatment	Fitness for work judgement
general practitioner; "occupational psychiatric disorder"	F; 50; Serbia; university degree; 12; non-smoker, occasional drinker	health sector – physician (anesthesiology and intensive care); 7; formally employed worker	Non-occupational Major Depressive Disorder, Single Episode; 2006; untreated	/
enterprise; fitness for work	M; 56; Egypt; primary school; 9; smoker, non-drinker	metal industry – assigned to the preparation of charges for continuous furnace heat treatment; 5; formally employed worker	Delusional Disorder, Persecutory Type; 2008; access to a psychosocial center and antipsychotic drugs	fit with limitations (professional drive)
general practitioner; "occupational exposure to carbon monoxide"	F; 23; Morocco; primary school; 4; non-smoker, non-drinker	plastics industry – assigned to the hot moulding of parts for automotive interiors; 3; atypical worker	No occupational disease. Convulsive syncope in patient with Dysthymic Disorder; 2007; antidepressant drugs	/
general practitioner; "mobbing"	M; 45; Morocco; high school; 21; smoker, non-drinker	transports - road transportation of various types of goods; 4; formally employed worker	Non-occupational Adjustment Disorder With Mixed Anxiety and Depressed Mood; 2008; access to a psychosocial center and antidepressant drugs	/
general practitioner; "occupational stress"	F; 53; Ethiopia; primary school; 31; non-smoker, non-drinker	health sector - auxiliary nurse; 17; formally employed worker	Non-occupational Adjustment Disorder With Anxiety; 2009; access to a psychosocial center and antidepressant drugs	/

(continued)

Table 2 - Psychosocial risk among migrant workers: clinical case list assessed at a public hospital unit of occupational health, from January 2001 to June 2013

Source of commitment; reason of assessment	Gender; age (years); country of origin; level of education; residence seniority in Italy (years); life habits	Main sector - job task; job seniority (years); current type of contract	Psychiatric diagnosis (DSM IV-TR); year of first diagnosis; treatment	Fitness for work judgement
general practitioner; "anxious reactive depression"	F; 46; Morocco; secondary school; 13; non-smoker, non-drinker	metal industry – drill operator in a factory specialized in the production of brass hinges for WC; 9; formally employed worker	Adjustment Disorder With Mixed Anxiety and Depressed Mood compatible with referred adversative work situation; 2009; access to a psychosocial center and antidepressant drugs	/
general practitioner; "occupational stress"	F; 49; Albania; high school; 15; non-smoker, non-drinker	health sector – health visitor; 11; formally employed worker	Non-occupational Somatization Disorder; 2009; access to a psychosocial center and antidepressant/ anxiolytic drugs	/
general practitioner; "occupational reactive depression"	F; 42; Albania; high school; 4; non-smoker, occasional drinker	hotels and restaurants sector – chambermaid in a hotel; 3; unemployed	Major Depressive Disorder, Recurrent, compatible with referred adversative work situation; 2010; access to a psychosocial center and antidepressant/ anxiolytic drugs	/
general practitioner; "psychosis"	M; 50; Pakistan; high school; 11; smoker, non-drinker	metal casting – calendering machine operator in an aluminium foundry; 9; formally employed worker	Non-occupational Bipolar Affective Disorder; 2003; access to a psychosocial center and antidepressant/ anxiolytic/mood stabilizers drugs	/

(continued)

Table 2 - Psychosocial risk among migrant workers: clinical case list assessed at a public hospital unit of occupational health, from January 2001 to June 2013

Source of commitment; reason of assessment	Gender; age (years); country of origin; level of education; residence seniority in Italy (years); life habits	Main sector - job task; job seniority (years); current type of contract	Psychiatric diagnosis (DSM IV-TR); year of first diagnosis; treatment	Fitness for work judgement
general practitioner; "depression"	M; 50; Morocco; high school; 23; smoker, occasional drinker	chemical industry – coating machine operator in a factory specialized in the production of spreadable polyurethane; 13; unemployed	Adjustment Disorder With Mixed Anxiety and Depressed Mood compatible with referred adversative work situation; 2009; access to a psychosocial center and antidepressant drugs	/
general practitioner; "major depression in mobbing"	M; 46; Pakistan; primary school; 24; not known	metal industry – lathe and milling machine operator; 18; formally employed worker	Major Depressive Disorder, Single Episode, Without Psychotic Features compatible with an adversative work situation; 2012; access to a psychosocial center and antidepressant/ anxiolytic drugs	/
general practitioner; "anxious depression"	M; 35; Morocco; high school; 13; smoker, non-drinker	metal industry – welder and grinding wheel operator; 12; unemployed	Non-occupational Schizophrenia, Paranoid Type, Continuous; 2012; antipsychotic drugs	/
general practitioner; "stress"	M; 54; Albania; secondary school; 18; non-smoker, non-drinker	metal industry – assembly worker in a factory specialized in the production of components for plastic industry moulds; 16; formally employed worker	No occupational disease	/
general practitioner; "work-related depression with somatization"	M; 41; Senegal; university degree; 13; smoker, occasional drinker	catering - fast food operator; 5; formally employed worker	Non-occupational Panic Disorder Without Agoraphobia; 2012; anxiolytic drugs in case of need	/

(5%), Ethiopia (5%), Romania (5%) and Togo (5%); the mean duration of their permanence in Italy was 12.8 years (range 4-31, 60% more than 10); 45% were smokers and 35% occasional drinkers. With regard to their working conditions: they were mostly formally employed workers (75%), with a mean job seniority in Italy of 7.7 years (range 3-18, 30% more than 10); their main areas of employment were metal (35%) and manufacturing (15%) industry, followed by health (20%), catering/hospitality (15%), metal casting (10%) and transport (5%) sectors. It should be noted that none of them were self-employed. As for the source of commitment, they were sent by general practitioners (70%) and enterprises (30%). The main reasons of assessment requested by general practitioners were represented by depression, stress or mobbing. At the enterprise level, fitness for work judgement was requested for all workers mainly affected by schizophrenia and other psychotic disorders; some limitations and/or prescriptions and/or recommendations were finally expressed in some cases, aimed at addressing and managing particular situations such as high occupational accident risk, shift/night work, professional driving, danger to third parties. It should also be noted that for 10 (50%) cases the first diagnosis of a neuropsychological disorder occurred at the end of the hospital assessment.

A total of 4 (20% of assessed cases) work-related psychopathological conditions (e.g. stress and mobbing, i.e. compatible with an adversative work situation) were diagnosed (table 2), 50% in men (1 from Morocco, aged 50, unemployed at the time of assessment but previously formally employed in the chemical industry; 1 from Pakistan, aged 46, formally employed in the metal industry) and 50% in women (1 from Morocco, aged 46, formally employed in the metal industry; 1 from Albania, aged 42, unemployed at the time of assessment but previously formally employed in the hotel and restaurant sector). In accordance with the Italian legislation, all these work-related psychiatric disorders were mandatorily notified to the local health authority and reported to INAIL, accounting for 1.8% of all the occupational diseases/work-related disorders (N=224) notified from January 2001 to June 2013 by our hospital unit.

Applied research field experience

In both companies the mandatory assessment had been performed according to the Italian law. Moreover, an occupational health service was available at enterprise level, coordinated by a qualified occupational physician.

For both migrant workers (N=99) and Italian controls (N=99) there was a slight prevalence of males (N=54, 54.5%) compared to females (N=45, 45.5%). The mean age was respectively 37.6 (range 21.6-55.5) for Italian workers and 34.5 (range 19.2-58.2) for migrant workers. These came mainly from East Europe (N=34, 34.3%; Romania, Albania, Serbia, Moldavia, Poland and Russia), followed by Asia (N=26, 26.3%; Philippines, Bangladesh, Sri Lanka, Pakistan and China), Africa (N=23, 23.2%; Morocco, Egypt, Ghana, Congo, Ivory Coast, Nigeria and Senegal) and Central-South America (N=16, 16.2%; Ecuador, Peru, Brazil, Argentina, Colombia, Cuba and Dominica). The top three countries of origin were, in order, Romania (N=17, 17.1%), Philippines (N=13, 13.1%) and Morocco (N=12, 12.1%). Gender and nationality appeared to have a substantial influence on the type of job engaged: in fact, the migrant workers employed in fast food and service stations where mainly women (N=45, 57%) from Asia, East Europe and Central-South America, while the migrant workers from the cast-iron foundry were all men from East Europe and Africa. All the interviewed migrant workers were regular, but only 15 (15.1%) of them had Italian citizenship. No relevant problems were encountered as regards language or cultural issues.

A significantly higher level of education was detected among migrant workers compared to Italian controls (16% vs. 3% university degree, p=0.0028). As for housing conditions, home ownership prevalence was significantly higher among Italians as compared to migrant workers (64% vs. 43%, p=0.0066). With regard to working conditions: a significantly higher level of satisfaction towards actual job was registered among migrant workers (96% vs. 87%, p=0.0397), who resulted to be also more prone to work overtime (68% vs. 56%, p=0.1077). A significantly higher prevalence of dif-

ficulties in having access to the services of the welfare state was registered among migrants (16% vs. 3%, p=0.0028). About 50% of both migrant and Italian workers referred to have had some general health problem over the last year (45% vs. 48%, p=0.7759). On the other hand, we found a higher prevalence, although not statistically significant, of clinically diagnosed depression (3% vs. 0, p=0.2462), anxiety (5% vs. 1%, p=0.2116) and sleep disturbances (2% vs. 0%, p=0.4975) among migrants as compared to natives. No work-related psychiatric disorders were notified by the occupational physicians.

Discussion

Under negative circumstances, migration and the related experience of encountering a different society could be associated with violent uprooting, disruption of social and cultural connections with the home country, discrimination and xenophobia. Therefore, it is fundamental to ask whether migration acts as a risk factor for mental ill health. On the other hand, under positive circumstances, many migrants move to obtain a better life and environment, therefore migration might be beneficial to mental health.

Our review of the international literature showed how the existing research on migration in general, without focus on occupational issues, and mental health investigates areas such as psychiatric breakdown, dementia, depression, schizophrenia, and the symptom profiles of different ethnic groups. It seems that migration by itself does not necessarily cause migrants to display proneness for depression or other psychological problems. Nonetheless, individual migrants may find the experience of migration to be stressful and would benefit from social support from both the already established migrant ethnic community and the host community (32).

On the other hand, a relatively low number of publications about psychosocial risk among migrant workers was found, which may reflect a low interest of occupational health researchers on this topic. Such a finding is clearly in contrast with the relevant literature having identified this theme as a research priority (7, 10, 13). Moreover, only 3 (7.5%) of the 40 full-texts read and 1 (5.9%) of the 17 articles finally selected were written by Italian researchers (9, 17, 2). It must also be noted that all but one (19) of the studies were cross-sectional, therefore providing prevalence data; moreover, only 4 studies (11, 16, 35, 40) performed a comparison between migrant and national workers, thus obtaining risk measures (e.g. Odds Ratio) that are the more relevant for evidence-based occupational health. Finally, it should be underlined that, besides one case series study providing data on clinically diagnosed disorders (30), the available information on migrant mental health were based on self-reports or self-perception.

To the best of our knowledge, our study is the first case series of migrant workers with mental and/or behavioral disorders, stemming from the experience of a public occupational health hospital unit, to be published. In fact, only few other limited experiences are available both in Italian (20) and in international literature (39), referred to either specific occupational diseases/work-related disorders (e.g. asthma and other respiratory disorders, lumbar and upper limb musculoskeletal disorders) and/or specific sectors (e.g. agriculture; household services; construction, garment, cleaning and food industry). As compared to Italian national official statistics, specifically referred to migrant workers, we found a slightly higher although not statistically significant prevalence of work-related mental disorders (1.8% vs. 1.4%, p=0.5548).

Migrant workers from Morocco, Albania and Pakistan, aged between 40 and 50, with a medium-high level of education, currently or previously employed in metal or manufacturing industry appeared to have an increased risk of developing such disorders. No gender differences were found. It should be here underlined that many occupational and non-occupational psychiatric disorders found in our case series had never been diagnosed and/or managed before, either at work or in primary care settings. Moreover, the type of limitations and/or prescription expressed reflect what was expected according to the main diagnostic questions; these diagnoses should foster preventive actions at pri-

mary, secondary and tertiary levels. Another emerging issue from our case series is that migrant workers seem to require greater healthcare, because of a high level of unmet health needs, which could increase individual vulnerability and susceptibility to occupational hazards; this requires a more focused case-management approach within the occupational health settings. Moreover, since it is has been estimated (23) that there are more than 126,000 regular migrant workers in the province of Brescia (accounting for 62.5% of all the migrants), the number of cases assessed at our public hospital unit of occupational health appears to be very low. Possible explanations for this could be little attention from the commitment (general practitioners, enterprises, occupational physicians, public institutions), economic problems, cultural and religious barriers. In fact, it is interesting to note how the number of Italian workers specifically evaluated for mental and/or behavioural disorders in the same period was almost thirteen times as much (i.e. 258, about 20/year). In the end, public hospital units of occupational health are available and capable to perform the assessments needed for a full diagnosis, therefore representing an important and unique opportunity for preserving and improving migrant workers' health.

In agreement with previous investigations (7, 8, 12, 13, 36, 37, 39), the preliminary and descriptive data from our applied research field study seem to confirm that: migrant workers are predominantly employed in unskilled/manual jobs, regardless of their medium-high level of education, with a sort of labour market segmentation guided by gender and nationality; their housing conditions are worse than Italian colleagues'; as for their working conditions, they are more prone to work overtime and, thus, to develop fatigue and related consequences; this last finding, together with significant difficulties to access the welfare state services, imply that migrant workers are particularly vulnerable to develop mental health problems (e.g. depression and anxiety disorders), suggesting that a special and focused attention should be paid by occupational physicians. Finally, as suggested by previous studies (35), the higher job satisfaction found among migrant workers could be the result of lower expectations and, therefore, a less negative view of the psychosocial work environment typical of this working population. Anyway, complete data will be available next year and will allow to further assess our preliminary findings.

Some limitations and weaknesses of the study should certainly be acknowledged. In fact, the relatively small sample size, the mainly cross-sectional nature of study design, possible selection and information bias arising from data collection through interviews, and some cultural issues, could affect representativeness and internal/external validity of the study. We have, however, tried to tackle these limitations and we believe our field experiences do have some strengths: the results were statistically significant, there was a fair accordance with the available literature, the number of participants was not that small as compared to other studies and the resulting percentages could be considered at least partly representative of the study base. Moreover, we collected objective longitudinal data, stemming from several consecutive years of health surveillance, mandatorily performed at enterprise level by occupational physicians and retrieved by individual clinical charts. Therefore, given that very sophisticated sampling methods (e.g. cluster sampling) and random selection of participants according to stringent epidemiological criteria can be very difficult to perform in occupational settings for practical issues, we chose to perform an applied research with a pragmatic approach. Our choice, though perhaps offering limited internal validity and methodological soundness, allowed a fair "real life" external validity (i.e. representativeness of everyday heterogeneous contexts and generalizability) (33). We are therefore confident that the presented data are informative and useful from the occupational health physician's point of view and expendable in workplaces, especially in risk assessment and health surveillance contexts.

In conclusion, the occupational health community is increasingly turning its attention to the effects of work on migrant workers and researchers have identified examples of disparities in occupational health outcomes. Migrant workers in Europe, Italy included, suffer from occupational health and safety inequalities and present unrecog-

nized and underestimated general and mental health impairments (7,10,13,41). On the basis of our literature review and clinical and field experiences, we believe there is a need for the following key actions:

- from the epidemiological side:
  - improvement of scientific knowledge and data availability/quality. In fact, in order to overcome the current epidemiological approach, mainly based on subjective, self-reported data, it is necessary to collect objective data where the information is generated, such as at the enterprise level where immigrant work, as well as in hospitals or health care facilities where diagnoses are made;
  - fostering of observational longitudinal studies, which can inform policies on mental health care by providing mental health data and information on mental health determinants, as well as promotion of effectiveness evaluation of new/existing interventions, thus strengthening the evidence-base for prevention programmes;
- from the occupational side:
  - promotion of mental wellbeing and prevention of mental disorders in the workplaces, for instance by means of focused and multidisciplinary risk assessments, according to shared international best practices and the principles of corporate social responsibility, also stated by the legislation;
  - concrete and timely responses to migrant workers' mental health needs, through focused health surveillance, case management and health promotion performed by a qualified, accountable and motivated occupational physician; in this respect, there should also be a more collaborative dialogue with general practitioners, especially for non-occupational disorders;
  - more social protection and compensation opportunities for work-related psychiatric disorders in migrant workers;
  - programmes to reduce the strain of unemployment and to support work re-entry following periods of sickness absence; job retention initiatives to maintain in employment those who develop mental health problems whilst in work; multi-level workplace improvement programmes that address role clarity and expectations, workplace relationships, stress management; job design and organisational culture; awareness raising and training for occupational health staff, human resources personnel and managers on mental health in the workplace.

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