



Trauma, khat and common psychotic symptoms among Somali immigrants: A quantitative study

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ABSTRACT

Aim of the study: To investigate the relationship between (i) khat use and (ii) traumatic events, with measures of common psychotic symptoms and symptoms of anxiety and depression. To undertake this work in a Somali population of emigrants who have sought asylum in a non-conflict zone country.

Materials and methods: A secondary analysis of data on a population sample of 180 Somali men and women.

Results: Frequency of khat use was not associated with common psychotic symptoms or with symptoms of anxiety and depression, nor with traumatic events in this population. Traumatic events were related to low levels of psychotic symptoms and high levels of symptoms of anxiety and depression.

Conclusions: Khat use is not inevitably linked to psychotic symptoms in population samples of Somali men and women. The contrasts between these findings and those from studies in conflict zones and studies of people with mental health problems using khat suggest further investigations are necessary. These should take into account environmental and physiological interactions.

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1. Introduction

Khat (*Catha edulis*) has many names including kat, qad, and miraa. It is a plant substance; the leaves and twigs are chewed for its psychomotor stimulant effects (Toennes et al., 2003). Khat is and has been used as a culturally sanctioned stimulant in many parts of East Africa and the Arabian Peninsula, in particular in public and private social gatherings. Although an illegal substance in the US, its legal use among some migrant communities in Europe and elsewhere has caused alarm among policy makers and health care professionals. US drug enforcement agencies report 'that the adverse effects of khat chewing include anorexia, tachycardia, hypertension, insomnia, and gastric disorders; chronic khat abuse can result in physical exhaustion, violence, and suicide and depression; it is also reported to produce manic behaviors, hyperactivity, and hallucinations; there are some reports of khat induced psychosis. Widespread frequent use of khat can impact on economic productivity because it tends to reduce worker motivation' (<http://www.justice.gov/dea/concern/khat.html>). Such advice may highlight population health risks, and encourage stricter classifications of khat as an illegal or dangerous substance.

In contrast to this view, there is an emerging consensus among international health agencies that 'khat has a low abuse potential;

and that the harmful effects of khat are related to excessive use, associated with adverse social conditions related to displacement and social marginalization' (Fitzgerald, 2009). Certainly, in case reports it is linked with exacerbations of established psychoses; this raises alarm about regulation among practitioners and policy makers working with people who have mental health problems and use drugs (Warfa et al., 2006, 2007). However, a systematic review of the literature suggested that the case report evidence distorted the scientific debate and was not reflecting the population based risk of psychosis among people consuming khat, and therefore should not be used as the basis for regulation (Warfa et al., 2007).

Nonetheless, recent work among Somali people in war zones shows that khat use appears to correlate strongly with measures of psychosis and that the two may be linked (Odenwald et al., 2007). Confounding factors include that Somali people are likely to be chewing khat for cultural and social reasons, and that they live in or have fled from the civil war in Somalia; khat may be therefore be used as a cheap drug of choice to cope with adversity due to an unsafe and fragmented and dangerous society in which non-state armies and militia are determining the rules by which people live. Victims and perpetrators of violence may therefore be under immense psychological pressures to secure their safety and escape harm, whilst surviving local regimes. Furthermore, in war torn societies, and specifically in Somalia, people will have experienced traumatic events.

It is argued that traumatic events can lead to post traumatic syndromes and, as an external and environmental stressor, may lead to

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mental distress (Breslau, 2009). Khat use might then add to the risk of mental distress and specific mental disorders. Studies among Somali refugees show that psychosis measures on standardized instruments appears to correlate with the use of khat (Odenwald et al., 2007, 2009); drug use in general, and khat use specifically, has been shown to be higher in conflict zones (Odenwald et al., 2007). There may also be differing strengths of khat in conflict zones, and child soldiers may be especially vulnerable to the effects of trauma and the effects of an early onset of use; the latter may be more likely to lead to intractable mental health problems later.

These previous studies reporting associations between khat use and psychosis were undertaken in particular contexts: war torn society, conflict, failures of security and safety, and high rates of traumatic events perhaps also leading to co-morbid PTSD, and perhaps anxiety and depression also; furthermore, the most vulnerable are young people, and perhaps young combatants. Convenience samples may also carry significant and multiple risk factors for mental disorders if compared with a more inclusive population sample. Nonetheless, the findings perhaps should be of relevance to Somali people who are khat chewers in Somalia, but perhaps do not apply to those who have fled Somalia, through other neighbouring East African countries, to reside in Europe and the US. The environmental context in these countries is quite different, with greater levels of safety and security, the absence of overt war; there is also less chance of being exposed to torture as part of inter-tribal warfare. Yet, there may be alternative stressors such as refugee camps and long delays before their legal status as refugees is confirmed. It is also unclear if research in true population samples would produce the same findings as research in samples at risk of mental disorders because of multiple adversities.

This paper aims to investigate the relationship between khat use and traumatic events with common psychotic symptoms. In this study we focus on symptoms of psychosis rather than psychotic illness diagnoses. There is a growing interest in new conceptualizations of common psychotic symptoms (van Os et al., 2009) and theories about the mechanisms that explain a higher incidence of psychotic disorders among migrants (Swinnen & Selten, 2007; Cantor-Graae and Selten, 2005; van Os et al., 2009). Psychotic disorders also have a multi-factorial aetiology and thus no single risk factor is thought to be sufficient to trigger a single episode or lead to a persistent psychotic disorder (van Os and Kapur, 2009), hence understanding the role of khat, or trauma, in psychosis requires a more complex explanation that is compatible with the proposed mechanisms by which psychosis is triggered.

In a systematic review of research in 10 countries, van Os et al. (2009) have shown that sub-clinical symptoms of psychoses are found with a median prevalence of 5% and a median incidence of 3%. Risk factors that shift the prevalence of these common, and often pre-clinical, psychotic symptoms are likely also to be risk factors future psychosis and more persistent diagnosed psychotic conditions over the life course (Dominguez et al., 2009). Furthermore, psychotic symptoms occur in some personality disorders, notably borderline personality disorder, which is associated with experience of early trauma and may make individual vulnerable to react to stressful situations with psychotic symptoms (Glaser et al., 2010). Therefore in the context of migrant communities, with a different first language, exposed to multiple traumatic events that can impact on personality development, and in the face of harsh economic realities and adversities involved in resettlement following migration, a study of psychotic symptoms may be enlightening and reflect social and environmental stressors interacting with khat use.

There are additional advantages to studying common psychotic symptoms. These are that psychotic symptoms are more common than diagnosed psychotic conditions, and therefore are more likely to yield analyses with adequate statistical power. Secondly, symptoms are simpler phenomena and do not require as complex

judgments about the cultural validity about diagnoses (Bhui et al., 2003). These benefits are especially useful where subjects are considered 'hard to reach', less willing to be involved in research (Warfa et al., 2006), and/or where there are no routinely collected data that enumerate a population sample across a large number of geographical regions. Therefore studies of common psychotic symptoms (CPS) or pre-clinical or at risk mental states are more likely to yield findings from smaller sampling frames, whilst allowing investigations of risk factors that remain of relevance to the future risk of psychotic disorders, and are especially valuable where there are methodological concerns about diagnosing psychotic conditions across cultural and ethnic groups (see Bhui et al., 2003, 2006).

2. Methods

Within this context this study undertakes a secondary analysis of data on a population sample of Somali men and women living in South London (Bhui et al., 2003). These data include measures of current khat use, past traumatic events, and standardized measures of symptoms of psychosis and anxiety and depression. The data have not previously been investigated using a theoretical framework of common psychotic symptoms that are found in the population. Indeed, the notion of common psychotic symptoms has not been investigated much in ethnic minority populations, or migrants, and estimates of prevalence have not been provided in at-risk populations of migrants. The contrasts between psychotic symptoms and symptoms of anxiety and depression have also not previously been studied.

It is hypothesized that current khat use is not associated with common psychotic symptoms in a population sample of emigrant Somalis, who have escaped a conflict zone, in contrast to the existing literature focusing mainly on case studies (Warfa et al., 2007) and studies taking samples within conflict zones (Odenwald et al., 2005; Odenwald et al., 2007). We hypothesise that past traumatic events are related to psychosis symptoms. We compare the role of current khat use with past traumatic events, and also contrast the findings for common psychotic symptoms with those for anxiety and depressive symptoms expecting similar trends.

2.1. Research questions

- 1) What is the prevalence of common psychotic experiences in a population sample of Somali emigrants settling in a non-conflict asylum country?
- 2) Are common psychotic symptoms more likely among those currently using khat and/or those previously exposed to traumatic events?
- 3) Are patterns of associations between current frequency of khat use and past traumatic events, with common psychotic symptoms, similar to patterns of associations with anxiety and depressive symptoms?

2.2. Sample frame

The data collection and sampling methods have previously been described (Bhui et al., 2003). In the absence of enumerated Somali populations we used a combination of participant methods and a local register of Somalis living in one part of London that was updated regularly by members of the original research team. This register was used by the local services to ensure they had access to all Somali people living in a defined geographical area, and was as near to a population sample as one could get given that 'Somali' was not a national census category and population samples of Somali origin could not be identified in any other way.

2.3. Measuring current use of khat

Khat use was measured as frequency of current use in the previous week. This was validated against the amount of money spent on khat per week. We did not have a measure of the strength of khat used, or the amount used earlier in Somalia.

2.4. Measuring symptom of psychosis

In the original study, symptom measures were selected as these were more easily adapted across cultures and languages (Bhui et al., 2003). Psychotic symptoms were measured using a well-established semi-structured interview called the Brief Psychiatric Rating Scale; using this we assessed hallucinations, delusions, thought disorder on subscales (Overall and Goreham, 1962). We did not include paranoia items from the BPRS as these are common and therefore of questionable pathological significance in a traumatized population escaping torture and war (see Bhui et al., 2003). The subscale scores for each type of common psychotic symptom were aggregated to produce a total overall score for common psychotic symptoms.

2.5. Measuring symptoms of anxiety and depression

Symptoms of anxiety and depression were measured by the Symptoms and Complaints checklist and scored in the standardized manner (SCL-90; Derogatis and Melisaratos, 1983). The anxiety and depression subscales were combined to produce a single total score for anxiety and depressive symptoms as a measure of common mental disorders as the anxiety and depressive symptoms are highly correlated (see Bhui et al., 2003).

2.6. Measuring trauma

Using domains listed in the Harvard Trauma Questionnaire (Mollica et al., 1992), we identified those who had experienced specified traumatic events. The total number of experienced traumatic events was used as a continuous measure of trauma. A more detailed breakdown of prevalence of specific traumatic experiences has previously been reported (see Bhui et al., 2003).

2.7. Statistical methods

The distributions of common psychotic symptoms, anxiety and depressive symptoms, measures of khat use and of traumatic event scores are presented first. Given the non-normal distribution of symptoms of psychosis, we undertook pair-wise spearman's correlations of age, gender, duration of stay in the UK (years), psychosis symptoms, anxiety and depressive symptoms, frequency of khat use, and trauma score. Finally multinomial logistic regression models were built with psychosis as an outcome. Given the non-normal distribution of psychosis symptoms and anxiety and depressive symptoms, these were each recoded to three categories representing all those scoring 0 (reference group), those in the lower 50th percent of scores above 0, and those in the upper 50th percent of those with scores above 0. Clearly the thresholds and range of scores differed between psychosis symptoms and anxiety and depressive symptoms. Multiple logistic regression models were run using the mlogit command in Stata 11.0 (Statcorp, LP. Texas, US; <http://www.stata.com>). This permitted the inspection of regression parameters of a number of risk factors (age, gender, current khat use, past traumatic events) against multiple levels of an ordinal outcome (common psychotic symptoms, and then anxiety and depression symptoms). Although statistically significant findings are often emphasised at $p=0.05$ level, in this paper, we present p values and confidence intervals and emphasise trends in odds

Table 1

Basic demographic and symptom characteristics of sample.

	N	Mean	Minimum	Maximum
Age	180	40.41	20.2	88.7
Trauma	174	10.13	1	17
Years in UK	178	8.11	1	16
Psychosis	179	3.57	0	18
Anxiety and depression	174	22.9	0	101
		<i>n</i>		%
Gender	180	Men	91	50.56
		Women	89	49.44
Marital	179	Married	139	77.65
		Never Married	18	10.06
		Separated	1	0.56
		Divorced	17	9.5
		Widowed	4	2.23
Employment 180	Student	21	11.67	
	Retired	3	1.67	
	Unemployed	12	6.67	
	Housewife	111	61.67	
	FT	17	9.44	
	PT	16	8.89	

rations, irrespective of significance, as well as take account of findings that approach significance at a $p < 0.1$ level.

3. Results

Data were available on 91 men and 89 women (see Table 1 for a summary; see Bhui et al., 2003 for a detailed demographic breakdown). Khat was used by 42.6% of subjects (75/176) on a weekly basis (mean frequency 1.3, range 0–7, $N = 176$ subjects). The amount of money spent on khat, amongst those acknowledging khat use, ranged between 0 and £3 a week, with a mean of £1.75 per week. The reported frequency of khat use correlated strongly with subjects reports of the amount of money spent on khat a week ($cc = 0.97$, $p < 0.0001$).

Formal clinical psychiatric diagnoses, made by a medical doctor of Somali origin who was the interviewer and a psychiatrist, were supported in a very small number of individuals (one person with a paranoid psychosis, 27 people with depression, one person judged to have a brief psychotic reaction, four people diagnosed clinically to have a personality disorder, and no people with a more formal diagnosis of bipolar disorder).

Grandiose symptoms were found among 32.4% of subject (58/179; mean 1.2, range 0–7), thought disorder symptoms were found amongst 31.3% (56/179; mean 1.2, range 0–6), and hallucination symptoms were found among 30.75% (55/179; mean score 1, range 0–6). All three psychotic symptoms were found amongst 20% (35/179) of subjects. 35.6% (62/174) of subjects reported anxiety and depressive symptoms (score of more than 0; mean score 22.95, range 0–101).

The pair-wise spearman's correlations show that khat frequency was less common amongst women and with greater age, but not with psychosis symptoms or anxiety and depressive symptoms (Table 2). Trauma, in contrast, was associated both with anxiety and depressive symptoms and with symptoms of psychosis. The number of years spent in the UK was negatively correlated with psychosis symptoms and with trauma score.

Multinomial logistic regression allows estimates of associations between the same set of exposures against different levels of an ordinal variable, in this instance psychotic symptoms (Table 3) and anxiety and depressive symptoms (Table 4); khat use and trauma were the risk factors; age and gender were included in the models. The results of these models in Tables 3 and 4 show that khat use appears not to influence the risk of psychotic symptoms nor of anxiety and depressive symptoms. However, reporting a past history

Table 2
Spearman's pair-wise correlation coefficients.

	<i>p</i>	AD	KF	TR	YUK	Age	Sex
P	1						
AD	0.65*	1					
KF	0.00	−0.07	1				
TR	0.17*	0.26*	0.07	1			
YUK	−0.36*	−0.31*	0.13	−0.31*	1		
AGE	0.05	0.01	−0.15*	0.18*	0.03	1	
Sex	−0.14	0.01	−0.50*	−0.26*	0.02	0.05	1

P, Psychosis symptoms. AD, anxiety and depressive symptoms; KF, khat frequency; TR, trauma; YUK, years in UK.

* Significance to a $p < 0.05$ level.

of experiencing traumatic events was associated with a greater risk of scoring in the lower band (below the 50th centile) of scores for psychotic symptoms but not the higher band (above the 50th centile). Trauma was also associated with a greater risk of scoring in the higher band of anxiety and depressive symptoms. When khat use and trauma were both included in models, these findings were sustained, that is khat use does not contribute to the risk of sub-clinical psychotic symptoms or anxiety and depressive symptoms.

4. Discussion

This study of a population sample of Somali people shows that khat use is moderate, and that it is not, at least in a non-conflict zone, associated with common psychotic symptoms or with anxiety and depression symptoms. The study also demonstrated that khat use in this population was not related to traumatic experiences, although traumatic experiences were more likely to be associated with low level psychotic symptoms and high level anxiety and depressive symptoms. As expected, our population sample did not include many people with severe psychotic disorders. However, severe anxiety and depressive states are more common among immigrant communities and were also found amongst our sample. These findings emphasise the need for the treatment of anxiety and depressive states that are far more common than psychotic symptoms; and argue that trauma may lead to low levels of psychotic symptoms that are not easily diagnosed as psychotic disorders but confuse and confound clinical assessment and treatment plans.

Table 3
Multinomial regression of khat use and trauma for different levels of psychosis.

Psychosis score	<i>N</i> = 178	RR	95% CI	<i>p</i> value	<i>N</i> = 174	RR	95% CI	<i>p</i> value	
Nil		1				1			
Low	<i>Khat frequency</i>	1.03	0.8–1.33	0.81	<i>Trauma</i>	1.16	1–1.34	0.05	
	<i>Sex (w/m)</i>	0.24	0.09–0.69	0.008		<i>Sex</i>	0.28	0.11–0.75	0.01
	<i>Age</i>	1.01	0.98–1.05	0.49		<i>Age</i>	1.01	0.98–1.05	0.52
High	<i>Khat frequency</i>	0.77	0.58–1.03	0.08	<i>Trauma</i>	1.08	0.95–1.22	0.27	
	<i>Sex</i>	0.48	0.2–1.15	0.1		<i>Sex</i>	0.79	0.36–1.73	0.55
	<i>Age</i>	1.02	0.99–1.05	0.29		<i>Age</i>	1.02	0.99–1.05	0.16

Adjusted for age and sex. Psychosis levels include a nil score, low scores (scores of those in lower 50th percent but above 0) and high scores (upper 50th percent of those with scores greater than 0).

Table 4
Multinomial logistic regression of khat use and trauma for different levels of anxiety and depression.

Anx/Depn score	<i>N</i> = 170	RR	95% CI	<i>p</i> value	<i>N</i> = 169	RR	95% CI	<i>p</i> value	
Nil		1				1			
Low	<i>Khat frequency</i>	0.95	0.72–1.24	0.68	<i>Trauma</i>	1.02	0.99–1.17	0.9	
	<i>Sex (w/m)</i>	0.89	0.36–2.19	0.8		<i>Sex</i>	0.92	0.4–2.1	0.84
	<i>Age</i>	1	0.97–1.03	0.83		<i>Age</i>	1	0.98–1.04	0.71
High	<i>Khat frequency</i>	0.91	0.69–1.21	0.52	<i>Trauma</i>	1.33	1.13–1.56	<0.01	
	<i>Sex</i>	0.73	0.29–1.84	0.51		<i>Sex</i>	1.42	0.59–3.46	0.44
	<i>Age</i>	1	0.97–1.04	0.85		<i>Age</i>	1	0.94–1.03	0.92

Adjusted for age and sex. Anxiety and depression scores include a nil score, low scores (scores of those in lower 50th percent those with scores above 0) and high scores (upper 50th percent of those with scores greater than 0).

4.1. New theories on the nature of psychosis and environmental risks

The framework of sub-clinical psychotic symptoms, what we have called *common psychotic disorders*, appears useful and relevant to understand the higher risk of psychosis amongst those exposed to environmental stressors. Psychotic symptoms not amounting to psychotic disorders can arise in response to stress or amongst those with other vulnerability factors for mental disorders (Warfa et al., 2006). Some personality disorders are also characterized by transient psychotic symptoms, for example, schizotypal and borderline personality disorders. The former is related genetically to a higher risk of schizophrenia, and borderline disorders usually arise in the context of intense early trauma. Severe life events can also lead to enduring changes in personality, but these are rarely assessed in refugee populations escaping war and conflict. Thus the link between life events and environmental risk factors, including migration, and psychotic disorders may well be mediated through psychotic symptoms which in the context of other vulnerability factors also can plausibly lead to more severe psychotic disorders with functional impairments among migrants. The findings of other studies are consistent with our findings. In other words, the framework of sub-clinical psychotic symptoms are theoretically and practically useful and relevant to understand the higher risk of psychosis amongst those exposed to environmental stressors including migration, which may be the mechanism that explains the reported higher rate of psychotic disorders amongst migrants (Cantor-Graae and Selten, 2005). Indeed, severe psychosis has a higher incidence among migrants; this study reports quite a high prevalence of a single psychotic symptom (up to 30% of the sample), and a higher than expected prevalence of all three symptoms (20%) compared with data reported by van Os et al. (2009) in non-refugee and non-migrant populations. Although a definitive study of psychotic disorders requires a much larger sample as these are relatively uncommon, it is unlikely that associations between khat use and diagnosed psychotic disorder would be found in the absence of associations with common psychotic symptoms (van Os et al., 2009).

We found a lower risk of low grade psychotic symptoms among women, perhaps reflecting some protective influences such as employment and availability of benefits due to accompanying chil-

dren, and perhaps priority in housing. The lower risk of psychotic and anxiety and depressive symptoms associated with a longer time of residence in the UK suggests a reduction in symptoms over time. In contrast the lower reported number of traumatic experiences associated with a longer duration of stay in the UK may reflect recall bias, or that early settlers escaped the war and traumatic experiences.

The findings that women were less likely to have psychotic symptoms independent of traumatic experiences, age, and khat use warrants further study. For example, it may be that women are more active than men, have better access to social networks or are favourably treated by authorities in terms of housing and health services, especially if they have accompanying children; or it may mean that Somali male immigrants with psychological problems are using khat as an alternative to medical treatment. If khat is used as a coping mechanism or as an alternative treatment for poor mental health, as in the case of Somalis living in conflict zones (Odenwald et al., 2009), then what we are dealing with is dual diagnosis. However, our findings do not support this, again indicating differential effects in our sample and samples in conflict zones, either due to environmental differences or differences in the composition of samples.

Epidemiological data on gender and khat use and abuse amongst immigrant communities is limited although immigrant groups such as Somali refugees are at greater risk of exposure to the main post-migrations risk factors for drug misuse, including high rates of unemployment, homelessness, isolation and cultural shock (Bhui et al., 2006). Therefore, a more detailed analysis of these issues warrants new data on larger comparative samples, with a longitudinal design. In the mean time, it is particularly necessary for clinicians and policy makers to be aware of the specific healthcare needs of khat abusers (vs. users) with mental health problems. In a recent qualitative study (Warfa et al., 2006), we explored the experience of African–Caribbean, Black–African and White British service users with substance misuse. Although we found that some social and healthcare professionals were aware of the use of khat by Somali psychiatric patients, it was not clear if treatments for co-morbidity were available to Somali patients with histories of mental illness and khat abuse.

4.2. Limitations

The study may be limited by information bias that is common in studies of substance misuse; however, participant observation and same ethnic/language group interviewers in the study aimed to reduce any such bias. Reports of frequency of khat use were highly correlated with reports of khat cost per week. The high rate of common psychotic symptoms may reflect transitory pre-clinical psychotic symptoms captured in this population but not normally captured in research. Better measures of khat use are also required, including types of khat, strength of the specific type, and the manner in which it is chewed or consumed. We did not have a measure of the strength of khat chewed, and this could account also for different effects in Somalia and in London.

5. Conclusions

These findings emphasise the need for the treatment of anxiety and depression that are far more common than psychotic disorders

and slightly more common than psychotic symptoms; the findings suggest that trauma may lead to low levels of psychotic symptoms that are not easily diagnosed as psychotic disorders, these may confuse and confound clinical assessment and treatment plans and may be responsible for the numerous case reports proposing that khat causes psychotic disorders (Warfa et al., 2007). Future studies require larger samples to measure the relationship between common psychotic symptoms and the likelihood of developing psychotic disorders; and whether this differs by migrant status and ethnicity; and/or by khat abuse or use, by demographics, and/or by environmental risk factors.

References

- Bhui, K., Abdi, A., Abdi, M., Pereira, S., Dualeh, M., Robertson, D., Sathyamoorthy, G., Ismail, H., 2003. Traumatic events, migration characteristics and psychiatric symptoms among Somali refugees—preliminary communication. *Social Psychiatry & Psychiatric Epidemiology* 38, 35–43.
- Bhui, K., Craig, T., Mohamud, S., Warfa, N., Stansfeld, S.A., Thornicroft, G., Curtis, S., McCrone, P., 2006. Mental disorders among Somali refugees: developing culturally appropriate measures and assessing socio-cultural risk factors. *Social Psychiatry & Psychiatric Epidemiology* 41, 400–408.
- Breslau, N., 2009. The epidemiology of trauma, PTSD, and other posttraumatic disorders. *Trauma Violence Abuse* 10, 198–210.
- Cantor-Graae, E., Selten, J.P., 2005. Schizophrenia and migration: a meta-analysis and review. *American Journal of Psychiatry* 162, 12–24.
- Derogatis, L.R., Melisaratos, N., 1983. The Brief Symptom Inventory: an introductory report. *Psychological Medicine* 13, 595–605.
- Dominguez, M.D., Wichers, M., Lieb, R., Wittchen, H.U., van Os, J., 2009. Evidence that onset of clinical psychosis is an outcome of progressively more persistent sub-clinical psychotic experiences: an 8-year cohort study. *Schizophrenia Bulletin* 162 (Epub ahead of print).
- Fitzgerald, J., 2009. Khat: a literature review. Louise Lawrence Pty Ltd. http://www.ceh.org.au/downloads/Khat_report_FINAL.pdf.
- Glaser, J.P., van Os, J., Lieb, R., Thewissen, V., Myin-Germeys, I., 2010. Psychotic reactivity in borderline personality disorder. *Acta Psychiatrica Scandinavica* 121 (2), 125–134.
- Mollica, R.F., Caspi-Yavin, Y., Bollini, P., et al., 1992. The Harvard Trauma Questionnaire. Validating a cross-cultural instrument for measuring torture, trauma, and posttraumatic stress disorder in Indochinese refugees. *Journal of Nervous & Mental Disease* 180, 111–116.
- Odenwald, M., Neuner, F., Schauer, F., Elbert, T., et al., 2005. Khat use as a risk factor for psychotic disorders: a cross-sectional and case-control study in Somalia. *BMC Medicine* 12, 3–5.
- Odenwald, M., Hinkel, H., Schauer, E., Neuner, F., Schauer, M., Elbert, T.R., Rockstroh, B., 2007. The consumption of khat and other drugs in Somali combatants: a cross-sectional study. *PLoS Medicine* 4, e341.
- Odenwald, M., Hinkel, H., Schauer, E., Schauer, M., Elbert, T., Neuner, F., Rockstroh, B., 2009. Use of khat and posttraumatic stress disorder as risk factors for psychotic symptoms: a study of Somali combatants. *Social Science & Medicine* 69, 1040–1048.
- Overall, J.E., Goreham, D.R., 1962. The brief psychiatric rating scale. *Psychological Reports* 10, 799–812.
- Swinnen, S.G., Selten, J.P., 2007. Mood disorders and migration: meta-analysis. *British Journal of Psychiatry* 190, 6–10.
- Toennes, S.W., Harder, S., Schramm, M., Niess, C., Kauert, G., 2003. Pharmacokinetics of cathinone, cathine and norephedrine after chewing khat leaves. *British Journal of Pharmacology* 56, 125–130.
- van Os, J., Kapur, S., Schizophrenia, 2009. *Lancet* 374, 635–645.
- van Os, J., Linscott, R.J., Myin-Germeys, I., Delespaul, P., Krabbendam, L., 2009. A systematic review and meta-analysis of the psychosis continuum: evidence for a psychosis proneness–persistence–impairment model of psychotic disorder. *Psychological Medicine* 39, 179–195.
- Warfa, N., Bhui, K., Phillip, K., Nandy, K., Griffiths, S., 2006. Comparison of life events, substance misuse, service use and mental illness among African–Caribbean, black African and white British men in east London: a qualitative study. *Diversity in Health and Social Care* 3, 111–121.
- Warfa, N., Klein, A., Bhui, K., Leavey, G., Craig, T., Alfred Stansfeld, S., 2007. Khat use and mental illness: a critical review. *Social Science & Medicine* 65, 309–318.