

Supplementary Material 2: Summary of Findings Table

Study	Population	Sample	Criteria for 'Khat User'	Psychiatric Measure*	Results
Ahmed and Emad 1998 [35]	Somali immigrants living in Liverpool	Convenience sample of 52 Khat users = 27	Unspecified	GHQ-28	- 11/27 khat users experienced psychiatric dysfunction, compared to 9/25 non-users (p=0.72)
Belew et al. 2000 [36]	Individuals aged 15+ from a specified community in Ethiopia	Random sample of 1200 participants Khat users = 326	Anyone who has chewed khat within the last 30 days	SRQ	- 100/326 khat-users experienced mental distress, compared to 28/554 non-users (OR = 8.31, 5.20-13.31, p=0.00) - 89/294 long-term users (over 2 years) experienced mental distress, compared to 28/554 never-users (OR = 8.14, 5.06-13.17, p=0.00)
Numan 2003 [37]	Yemeni population	Random sample of 800 participants Khat users = 67.9%	Frequent use – 4-6 days a week Heavy use – use everyday	SCL-90	- No significant differences (at p<0.05) in psychiatric symptoms: obsession-compulsion, depression, anxiety, paranoid ideation, psychoticism - Khat users had less phobic anxiety (37.7% vs 55.5%, p<0.05)
Odenwald et al. 2005 [38]	'General population' of Somalia	Random sample of 4854 Khat users = 78% of those with psychiatric issues, 4% of those without	Number of bundles in previous week recorded	CIDI, PANSS	- More positive screened individuals (mental problems severe enough to prevent employment or household tasks) chewed khat than negative screened individuals (46.6% vs 29.9%, p<0.001)
Deyessa et al. 2008 [39]	Women of reproductive age in rural Ethiopia	Random sample of 3200 Khat users = 40%	At least once per week	CIDI, ICD-10	- 5.9% of regular users had had a depressive episode in the last 12 months, compared to 3.1% of non-regular users (less than once per month) and 3.6% of non-users - AOR for regular vs non-users is 1.35 (0.92-1.99)

Odenwald et al. 2009 [40]	Armed combatants in Somali	8124 armed individuals (not random as still in conflict at time of study) Khat users = 36.4%	Anyone who has chewed khat within the last week	CIDI	- 8.9% of khat users experienced paranoid ideation compared to 2.6% of non-users
Damena et al. 2011 [41]	Adults in Jimma City, Ethiopia	Random sample of 1308 Khat users = 38%	Uses WHO-validated substance abuse questionnaire, but unsure what is classified as 'khat user'	SRQ-20	- 49/136 long-term khat chewers experienced mental distress, compared to 108/317 short-term khat chewers (less than two years), and 153/747 non-users
Tulloch et al. 2012 [42]	Adult Somali khat users living in South London	Secondary data based on 172 eligible Somali mental health patients Khat users = 47%	Anyone who has chewed khat within the last year	Diagnosis provided by service records	- 28/30 khat users experienced psychosis compared to 2/30 non-users (p<0.001)
Dessie et al. 2013 [43]	Students in Ethiopia	Random sample of 413 Khat users = 43%	Anyone who has ever used khat	SRQ-20	- 59/185 khat users experienced mental distress compared to 34/245 non-users (AOR = 2.23, 1.14-4.35, p<0.05)
Fekadu 2014 [44]	Holy water users from Entoto St Mary Church, Ethiopia	409 individuals selected using systematic random sampling Daily khat users = 12.7%	Khat use recorded as 'never' or 'daily', although no indication of the duration of daily usage	BPRS	- 42/53 daily khat-users experienced symptoms of mental illness compared to 208/363 non-users (AOR = 2.85, 1.42-5.70)
Widmann et al. 2014 [7]	Male Somali refugees living in a disadvantaged	Convenience sample of 33 users and 15 comparable non-users	SDS	CIDI, MINI	- 24% of khat users had psychotic symptoms compared to 0% of non-chewers (p=0.044)

	urban settlement in Kenya	Khat users = 69%			
Dachew et al. 2015 [45]	Undergraduate students from Gondar University, Ethiopia	872 patients selected using stratified, random sampling Current khat users = 16%	Questionnaire identifying 'current use'	SRQ-20	- 63/114 current khat users had mental distress, compared to 279/722 non-users (OR=1.96, 1.32-2.92, p=0.02)
Soboka et al. 2015 [46]	HIV patients at a specified facility in South West Ethiopia	All eligible adults invited to participate Sample of 389 Khat users = 93	Anyone who has chewed khat within the last month	K-6	- 52/93 khat-users experienced psychological distress, compared to 124/296 non-users (OR = 1.76, 1.10-2.82)
Zenebe et al. 2015 [47]	Psychiatric outpatients in Ethiopia	365 adult psychiatric outpatients of a specified hospital within 2-week study period Khat use = 64.4%	Anyone who has used khat within the last 30 days	Psychiatric diagnosis from psychiatric records	- 58/235 khat users had a major depressive disorder compared to 46/130 non-users (AOR = 1.43, 0.74-2.77) - 97/235 khat users had schizophrenia compared to 34/130 non-users (AOR = 0.87, 0.45-1.68)
El-Setouhy et al. 2016 [48]	Jazan region of Saudi Arabia	Volunteer sample of 70 males Khat dependent = 52.2%	SDS	Q16	- 13/35 dependent users felt depressed compared to 7/32 non-dependent users (OR = 2.30, 0.7-6.8) - 20/35 dependent users felt anxious compared to 10/32 non-dependent users (OR = 3.50, 1.2-10.0)
Hersi et al. 2017 [49]	Students in Somaliland	Stratified random sample of 570 Khat users = 19%	Use in last 12 months	SRQ-20	- 32% of khat users experienced psychological distress, compared to 17% of non-users (AOR = 2.87, 1.26-6.56)
Hunduma et al. 2017 [50]	Adults in Ethiopia	Random sample of 968 Khat users = 48%	Khat use in last 3 months	SRQ-20	- 86/434 khat users had a common mental disorder, compared to 48/467 non-users (OR = 2.16, 1.47-3.16)

Kerebih et al. 2017 [51]	Medical students in Ethiopia	Stratified random sample of 305 Khat users = 9%	Anyone who has ever used khat	SRQ-20	- 18/26 khat users experienced mental distress compared to 84/264 non-users (AOR = 6.91, 1.88-25.42, p=0.004)
Mossie et al. 2016 [52]	Adults in Ethiopia	Random sample of 650 Khat users = 34%	Khat use within the last 30 days	BDI	- 104/200 khat users had depression compared to 67/390 non-users (AOR = 10.07, 5.56-18.25)
Soboka et al. 2017 [53]	Adults with hypertension at a specified clinic in South West Ethiopia	All eligible adults invited to participate Sample of 396 Khat users = 79	Anyone who has chewed khat within the last month	K-6	- 27/72 current khat-users experienced psychological distress, compared to 98/324 non-users
Tariku et al. 2017 [54]	Students at a health sciences college in Ethiopia	Stratified random sample of 317 Khat users = 13%	Anyone who has ever used khat	Not specified	- 19/40 khat users experienced mental distress compared to 71/168 non-users (AOR = 2.29, 1.04-5.04)
Wondemagegn et al. 2017 [55]	Adolescents and adults in Nekemte town, West Ethiopia	Random sample of 359 participants Khat users = 49%	Anyone who has chewed khat within the last 30 days	DSM-IV	- 108/172 users experienced depression compared to 15/182 non-users (AOR = 25.36, 12.13-53.05, p=0.000) - 79/172 users experienced anxiety compared to 26/182 non-users (AOR = 5.49, 3.04-9.96, p=0.000)
Yeshaw and Mossie 2017 [56]	Staff of Jimma University, Ethiopia	Random sample of 363 Khat users = 41%	Anyone who has ever used khat	DASS-21	- 54/145 khat users had depression compared to 27/209 non-users (AOR = 4.99, 2.57-9.69) - 43/145 khat users had anxiety compared to 25/209 non-users (AOR = 2.94, 1.52-5.66) - 59/145 khat users had psychological stress compared to 41/209 non-users (AOR = 2.78, 1.49-5.21)
Bedaso et al. 2018 [57]	Prisoners in Ethiopia	Random sample of 335 Khat users = 14%	Unspecified, but appears to be chewing khat before incarceration	PHQ-9	- 36/48 khat users had depression, compared to 153/287 non-users (AOR = 2.48, 1.05-5.86, p=0.039)
Adraro et al. 2019 [58]	Prisoners in Ethiopia	Random sample of 300 Khat users = 46%	Anyone who has ever used khat	SRQ-20	- 119/139 khat users experienced mental distress, compared to 69/161 non-users (AOR = 4.33, 2.02-9.27, p<0.001)

Ongeri et al. 2019 [59]	Khat-growing regions of Kenya	Random sample of 831 individuals aged 10+ Khat users = 36.8%	Unspecified	PSQ	- 18.6% of khat users experienced at least one psychotic symptom compared to 15.6% of non-users (p=0.26)
Atnafie et al. 2020 [60]	Khat chewers in Amhara region of Ethiopia	Convenience sample of 508 participants Khat dependent = 43%	SDS	DASS-21	- 33/207 khat-dependent users experienced stress compared to 57/271 non-dependent users (AOR = 1.70, 0.98-2.95) - 146/207 khat-dependent users experienced anxiety compared to 133/271 non-dependent users (AOR = 2.47, 1.57-3.81) - 41/207 khat-dependent users experienced depression compared to 80/271 non-users (AOR = 6.28, 1.67-23.61)
Hajure et al. 2020 [61]	Healthcare providers in Ethiopia	Convenience sample of 127 Khat users = 45%	Khat use in last three months	IES-R	- 37/57 khat users experienced psychological stress, compared to 14/70 non-users (AOR = 5.74, 1.83-18.1, p<0.001)
Hambisa et al. 2020 [62]	Students in Ethiopia	Random sample of 1022 Khat users = 24%	Khat use within last month	BDI	- 84/241 khat users had depressive symptoms compared to 190/781 non-users (OR = 1.60, 1.22-2.27)
Kelemu et al. 2020 [63]	Students in Ethiopia	Random sample of 404 Khat users = 27%	Anyone who has ever used khat	SRQ-20	- 70/111 khat users experienced mental distress, compared to 145/293 non-users (AOR = 3.09, 1.74-5.50)
Mekuriaw et al. 2020 [64]	Pregnant women in Ethiopia	Random sample of 845 Khat users = 11%	Investigates usage but unclear what quantifies a 'current khat user'	SRQ-20	- 39/71 khat users experienced mental distress, compared to 149/647 non-users (AOR = 3.57, 2.06-6.18, p=0.001)
Yitayih et al. 2020 [65]	Prisoners in a correctional	Random sample of 336 Khat users = 138	DAST-10	PCL:SV	- 32/138 khat users met the criteria for psychopathy, compared to 9/191 non-users

	institution in Jimma, Ethiopia				- 16/138 khat users had mental illness, compared to 15/191 non-users
Haile and Sahile, 2021 [66]	Adult primary healthcare attendees in Ethiopia	Stratified and systematic random sample of 384 Khat users = 39%	Unspecified	PHQ-9	- 67/108 khat users had depressive symptoms, compared to 40/276 non-users (AOR = 5.43, 2.55-11.56, p<0.01)
Hambisa et al. 2021 [67]	Hospitalised patients in Ethiopia	Systematic sample of 337 Khat users = 18%	Unspecified; discusses 'current khat use' and 'khat use in the previous three months'	K10	- 49/59 khat users experienced psychological distress, compared to 146/278 non-users (AOR = 4.16, 1.67-10.35)
Melaku et al. 2021 [68]	Medical students in Ethiopia	Systematic random sample of 260 Khat users = 22%	Anyone who has ever used khat	DASS-21	- 37/56 khat users had depression, compared to 99/204 non-users (OR = 2.07, 1.11-3.83) - 41/56 khat users had anxiety, compared to 117/204 non-users (OR = 2.03, 1.06-3.91) - 30/56 khat users had psychological stress, compared to 75/204 non-users (OR = 1.99, 1.09-3.61)

*List of abbreviated screening tools: GHQ-28 (General Health Questionnaire-28, for mental disorders), SRQ-20 (Self-Reporting Questionnaire - 20 items, for mental distress), SCL-90 (Symptom Checklist - 90 items, for psychological symptoms), CIDI (Composite International Diagnostic Interview - for psychiatric disorders), PANSS (Positive and Negative Syndrome Scale - for schizophrenia), ICD-10 (International Classification of Diseases, 10th revision), BPRS (Brief Psychiatric Rating Scale - for depression, anxiety and hallucinations), SDS (Severity of Dependence Scale), MINI (Mini International Psychiatric Review), K-6 (Kessler Psychological Distress Scale - 6 questions), Q16 (Questionnaire 16 for neurotoxic symptoms), BDI (Beck's Depression Inventory), DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, 4th edition), DASS-21 (The Depression, Anxiety and Stress Scale - 21 Items), PHQ-9 (Patient Health Questionnaire - 9 items, for depression), PSQ (Psychosis Screening Questionnaire), IES-R (Impacts of Events Scale - Revised), DAST-10 (Drug Abuse Screening Test-10), PCL:SV (Psychopathy Checklist: Screening Version), K10 (Kessler Psychological Distress Scale - 10 questions)