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ORIGINAL ARTICLE

Exploring the cascade of mental healthcare among people with HIV experiencing depressive symptoms in the UK and Ireland: The POPPY study

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Abstract

Introduction: Depressive symptoms are highly prevalent among people with HIV, which can negatively impact HIV-related outcomes. We explore the cascade of mental healthcare for people with HIV experiencing depressive symptoms.

Methods: People with HIV who were part of the Pharmacokinetic and clinical Observations in PeoPle over fiftY (POPPY) study (2013–2016) were included. A Patient Health Questionnaire-9 (PHQ-9) score ≥10 or Center for Epidemiologic Studies Depression Scale (CES-D) ≥16 was defined as moderate/severe depressive symptoms. Diagnosed depression and access to mental healthcare were self-reported. A cascade of mental healthcare was explored, defining individuals experiencing depressive symptoms; those among them reporting a diagnosis of depression; and of this latter group, the proportion reporting accessing mental healthcare. Demographic, social and clinical characteristics were assessed at each step using logistic regression.

Results: Of the 1009 participants (65.5% ≥50 years, 85.8% male, 85.1% white), 387 (38.4%) individuals were experiencing depressive symptoms, over half of whom (54.3%) reported a diagnosis of depression. Only 43.3% of individuals with diagnosed depression reported accessing mental healthcare. Men [odds ratio = 0.62, 95% confidence interval (CI): 0.42–0.92], people in a relationship (0.44, 0.33–0.59), those who were employed (0.28, 0.21–0.38) and those with university qualifications (0.54, 0.40–0.72) were less likely to experience depressive symptoms. Heterosexuals (0.30, 0.14–0.64) were less likely to report a diagnosed depression, whereas smokers were more likely to have a diagnosed depression (1.75, 1.10–2.77). Older individuals (2.36, 1.31–4.28) were less likely to have accessed mental healthcare.

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Conclusions: Our findings suggest the presence of unmet mental healthcare needs for people with HIV. We hope these findings will inform policies to streamline mental health services for people with HIV.

KEYWORDS

depression, epidemiology, HIV, key and vulnerable populations, quality of life, social support

INTRODUCTION

Continued success in HIV treatment means that HIV management in the UK now follows a chronic disease model for an ageing population of people with HIV [1]. As a result, the focus in healthcare has now shifted to improving quality of life given the additional health concerns in this population [2]. It has been well established that people with HIV have an increased risk of comorbidities, with poor mental health being one of the most prevalent.

In comparison to the general population, depressive symptoms and diagnosed depression have been consistently found to be more prevalent among people with HIV [3], even among those with a suppressed viral load on antiretroviral therapy (ART) [4]. Symptoms of depression including depressed mood, loss of interest, feelings of guilt or worthlessness, hopelessness or suicidal ideation can negatively impact HIV treatment outcomes (adherence, virological suppression, immune control), physical health outcomes and mortality [5, 6]. This impacts disease progression not only at an individual level but also at a population level, whereby there is an increased risk of HIV transmission.

Although symptoms of depression can be successfully managed in some people with HIV, there is a complex bidirectional relationship between HIV and depression which requires further investigation [7, 8]. Unlike many other illnesses, HIV intersects with long-standing social issues, including sexuality, drug abuse, socioeconomic status, ethnicity and gender, enhancing the levels of stigma experienced by individuals living with HIV and negatively impacting on health [9].

Consistent with previous data, Positive Voices 2022 found that, of those reporting symptoms of depression and anxiety, approximately half (49%) had been diagnosed with a mental health condition and only 30% had reported being treated for their symptoms [10, 11]. This therefore suggests an unmet need for mental healthcare in this population. This was further highlighted in a 2017 audit by the British HIV Association (BHIVA) which found that approximately 40% of HIV services did not have access to a psychological or mental health professional within their team [12].

Due to the impact of poor mental health, specifically depression, on people living with HIV, it is important to understand the extent to which mental healthcare needs are unmet in this population. In this analysis, we set out to explore a cascade of mental healthcare for people with HIV experiencing depressive symptoms. Here we describe the proportions and characteristics of the population that (i) are experiencing depressive symptoms, (ii) report a diagnosis of depression, and (iii) report accessing mental healthcare, to determine the unmet mental health needs of people with HIV accessing care in the UK and Ireland and to explore whether key demographic, social, lifestyle and clinical factors influence the likelihood of being in each stage of the cascade.

METHODS

The Pharmacokinetic and clinical Observations in PeoPle over fiftY (POPPY) study is a multicentre, prospective, observational study which aims to investigate the impact of HIV on the development and outcomes of comorbidities and pharmacotherapy among older people with HIV accessing care in the UK and Ireland [13]. Inclusion criteria included documented presence of HIV infection, self-defined white or black-African ethnicity, likely route of HIV acquisition via sexual exposure and ability to comprehend the study patient information leaflet. The study was approved by the UK National Research Ethics Service (NRES; Fulham London, UK number 12/LO/1409). Written informed consent was obtained from all participants prior to undertaking any study specific procedures.

Overall, 1009 people with HIV were recruited across seven clinical centres in the UK and one in Ireland between 2013 and 2016. Two groups of people with HIV were recruited from HIV outpatient clinics, one group aged ≥50 years, and a demographically similar group aged 20–49 years that was frequency matched to the older age group on gender, ethnicity, mode of HIV acquisition and participating clinic.

At study entry, information was collected on medical and social history, lifestyle factors, concomitant medication use, cognitive function, frailty and detailed patient-reported outcome measures (PROMs) covering mental health, physical health, chronic pain and quality of life. Data were linked to longitudinal clinical datasets to access historic data on ART use and longitudinal measures of CD4 T-cell counts and HIV-RNA [14, 15].

Data regarding depressive symptoms, clinical history of depression and access to mental healthcare were collected at study entry. Depressive symptomology was collected using the Patient Health Questionnaire-9 (PHQ-9) [16] and Center for Epidemiologic Studies Depression Scale (CES-D) [17] tools. The response agreement for moderate/severe depressive symptoms between PHQ-9 and CES-D was evaluated using Cohen's kappa coefficient.

The cascade of mental healthcare describes the progression of individuals through three stages: (i) the experience of depressive symptoms; (ii) a clinical diagnosis of depression; and (iii) access to mental healthcare. The proportion of individuals entering each stage is calculated based on the denominator of all individuals entering the previous stage. For inclusion, participants were required to have completed at least one depressive symptom questionnaire at study entry.

Diagnosed depression and access to mental healthcare were based on self-reported accounts of comorbidities and healthcare utilization. Key definitions and medications used are outlined in Table 1 and Appendix A (Table A1), respectively.

Demographic (age, sex, ethnicity, UK-born, mode of HIV acquisition), social (relationship status, employment status, education status), lifestyle [smoking status (past/current smoker vs. never smoker), alcohol use (past/current alcohol use vs. never consumed alcohol), self-reported recreational drug use in the prior 6 months], and clinical [hepatitis B/C coinfection, undetectable viral load (VL ≤ 50 copies/mL), CD4 count [≤500 cells/μL]] characteristics at study entry were summarized using frequencies and percentages.

The proportion of participants experiencing depressive symptoms, reporting a clinical diagnosis of depression, and accessing mental healthcare were described at study entry. We then assessed he proportion of individuals experiencing depressive symptoms who also reported a clinical diagnosis of depression, and the proportion of those with a clinical diagnosis who reported use of mental healthcare.

Next, we assessed whether there were differences in the cascade of mental healthcare when stratified by each of the characteristics described earlier. Proportions were compared using χ^2 tests.

Finally, factors associated with belonging in each stage of the cascade were assessed using logistic regression. Using a stepwise approach, demographic, social, lifestyle and clinical characteristics ($p < 0.10$) were included and retained in a multivariable model for each stage of the cascade.

TABLE 1 Definitions for each stage of the cascade of mental healthcare.

Depressive symptoms	Defined as moderate/severe symptoms determined by either a PHQ-9 score ≥10 or a CES-D score ≥16
Diagnosis of depression	Based on self-reported diagnosis of depression when asked about comorbidities. This was supplemented with individuals who reported current antidepressant use (Appendix A)
Accessing mental healthcare	Report of access to or use of any specialist mental healthcare including psychology, psychiatry, counselling, psychotherapy, and any talking therapy

Abbreviations: CES-D, Center for Epidemiologic Studies Depression Scale; PHQ-9, Patient Health Questionnaire-9.

RESULTS

Study participants

Overall, 94% (1009/1073) of POPPY participants living with HIV completed a PHQ-9 or CES-D questionnaire [participants aged ≥50 years, 94.6% (661/699); aged <50 years, 93.0% (348/374)] at study entry. Those who did not complete a screening questionnaire were more likely to be female (not completing: 25.0% vs. completing: 14.2%), reported a heterosexual HIV acquisition risk (34.4% vs. 23.3%), were of black African ethnicity (32.8% vs. 14.9%), were not born in the UK (54.7% vs. 36.8%) and were less likely to be in employment (15.6% vs. 50.8%) or have a university qualification (17.2% vs. 45.4%) than those who did complete a questionnaire.

Of those included in the analysis at study entry (Table 2), the majority were male (85.8%), reported acquiring HIV through sex between men (76.7%) and were of a white ethnic background (85.1%). Around half of participants had not completed a university-level qualification (54.6%) and were unemployed (49.2%). A quarter of participants reported being a current/ex-smoker (25.1%), 28.6% reported recent recreational drug use in the previous 6 months and around four-fifths of participants consumed alcohol (80.7%).

Approximately one in five participants had tested positive for hepatitis B/C coinfection (19.5%). The majority of those included had an undetectable VL (90.6%) and a CD4 count >500 cells/μL (70.1%) at their most recent clinic visit.

Prevalence

At study entry, over a third of participants [38.4% (387/1009); aged ≥50: 40.5% (268/661); aged <50: 34.2% (119/348)] were experiencing moderate/severe depressive symptoms as defined by either PHQ-9 and/or CES-D. Although the prevalence of moderate/severe depressive symptoms was higher when using the CES-D questionnaire (36.7%; 349/952) when compared with the PHQ-9 questionnaire (25.4%; 248/975), there was substantial agreement between the two measures (agreement 85.0%; kappa = 0.65; $p < 0.001$).

Among all individuals, 34.5% (347/1009) of eligible participants self-reported a diagnosis of depression [aged ≥50, 35.6% (235/661); aged <50, 32.2% (112/348)] and 17.8% (180/1009) reported accessing specialist mental health services [aged ≥50, 15.6% (103/661); aged <50, 22.1% (77/348)] in the 12 months before POPPY entry.

TABLE 2 Summary of characteristics of Pharmacokinetic and clinical Observations in PeoPle over fiftY (POPPY) study participants who had availability of depressive symptom questionnaires at baseline.

		All participants ($n = 1009$)
Age group	≥50 years	661 (65.5%)
	<50 years	348 (34.5%)
Sex	Female	143 (14.2%)
	Male	866 (85.8%)
Race	Black African	150 (14.9%)
	White	859 (85.1%)
Born in the UK		638 (63.2%)
Mode of HIV acquisition	MSM	774 (76.7%)
	Heterosexual	235 (23.3%)
In a relationship		390 (38.7%)
Currently employed		513 (50.8%)
University qualification		458 (45.4%)
Current smoker		253 (25.1%)
Current alcohol use		814 (80.7%)
Recreational drug use (last 6 months)		289 (28.6%)
Hepatitis B/C coinfection		197 (19.5%)
Undetectable viral load		914 (90.6%)
CD4 T-cell count ≤500 cells/μL		294 (29.1%)

Abbreviations: MSM, men who have sex with men.

Cascade of mental healthcare

Among the 387 people with HIV experiencing depressive symptoms, 210 (54.3%) reported having a medical diagnosis of depression. Only 91 (43.3%) of this group also reported accessing mental healthcare (Figure 1).

The cascade of mental healthcare was stratified by each characteristic and the results are presented in Figure 2a–n. Key findings are highlighted in the following sections.

Demographic

A greater proportion of older people with HIV (40.5% vs. younger people with HIV, 34.2%; $p = 0.05$), women (49.7% vs. men, 36.5%; $p = 0.003$), those of black ethnic background (46.0% vs. white, 37%; $p = 0.04$) and those reporting a heterosexual HIV acquisition risk [45.1% vs. men who have sex with men (MSM), 36.3%; $p = 0.02$] were experiencing depressive symptoms. By contrast, women (40.9% vs. men, 57.3%; $p = 0.01$), those from a black ethnic background (33.3% vs. white, 58.8%, $p < 0.001$) and those reporting a heterosexual HIV acquisition risk (36.8.1% vs. MSM, 59.4%; $p < 0.0001$) who were experiencing depressing symptoms were less likely to report having a diagnosis of depression.

Age was the only demographic factor that was associated with access to mental healthcare; a smaller proportion of older people with HIV with a clinical diagnosis reported accessing mental health services (35.6% vs. younger people with HIV, 61.3%; $p = 0.001$).

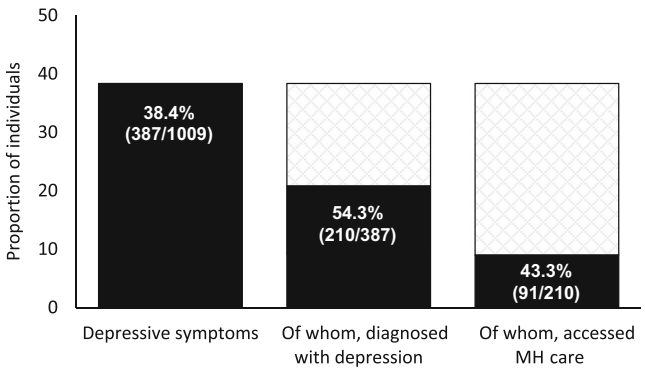

FIGURE 1 Cascade of mental healthcare, describing (from left to right) the proportion of people with HIV who report depressive symptoms; the proportion of those with depressive symptoms who have a diagnosis of depression; and the proportion of the latter who have accessed mental health services (MH care) at study entry.

Social

Individuals who reported not being in a relationship (47.5% vs. in a relationship, 23.9%; $p < 0.0001$), who were not currently in employment (54.5% vs. employed, 22.8%; $p < 0.0001$) and those who did not hold a university qualification (57.6% vs. university qualification, 27.3%; $p < 0.001$) were more likely to have depressive symptoms. Employment status was the only social factor that was associated with having reported a diagnosis of

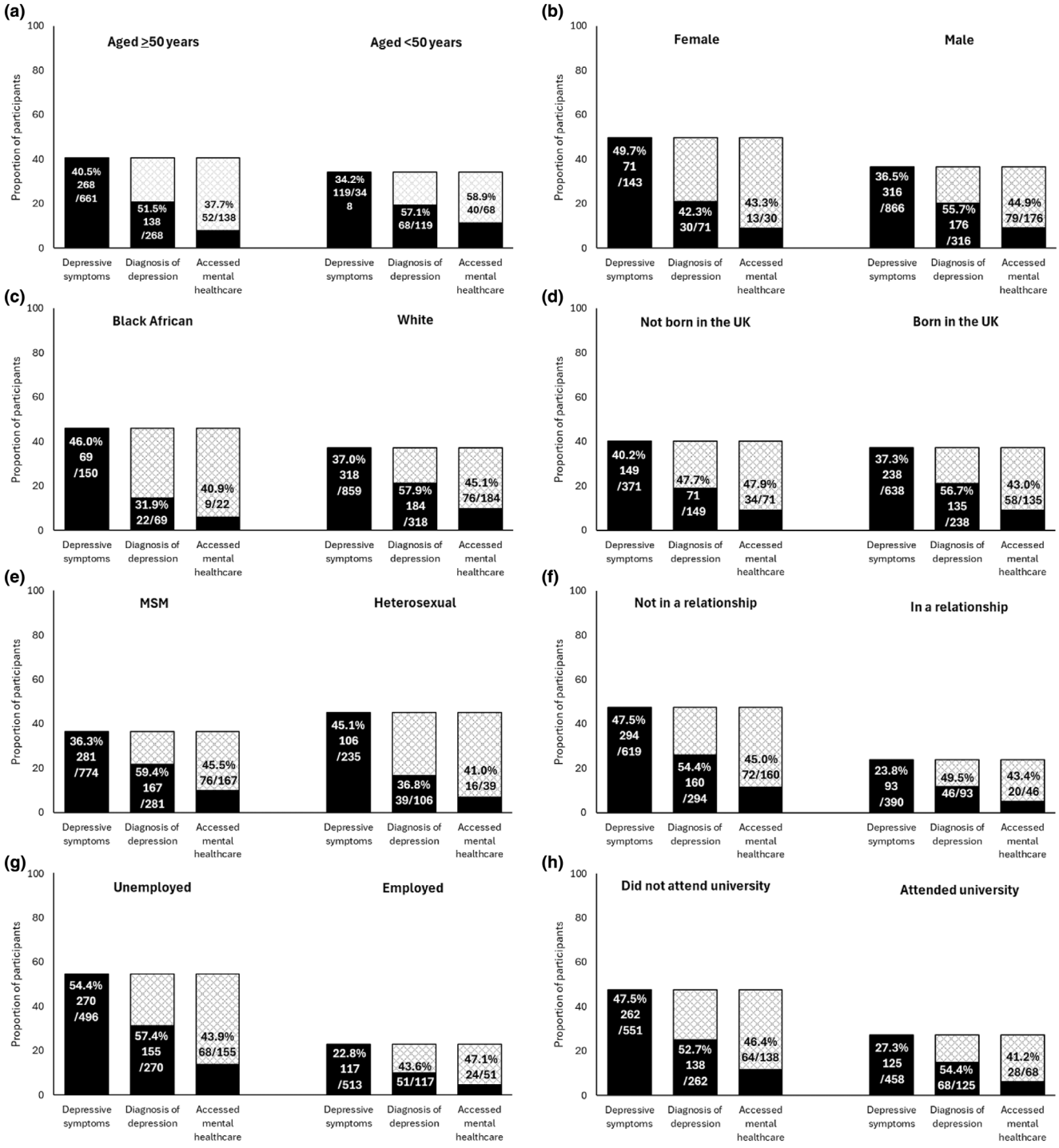

FIGURE 2 Cascade of mental healthcare, describing the proportion of people with HIV who report depressive symptoms, clinical diagnosis of depression and those who have accessed mental health services at study entry, stratified by: (a) age group, (b) gender, (c) ethnicity, (d) born in the UK, (e) mode of HIV acquisition, (f) relationship status, (g) employment status, (h) education status, (i) smoking status, (j) alcohol use, (k) recreational drug use, (l) hepatitis coinfection, (m) viral load, and (n) CD4 T-cell count.

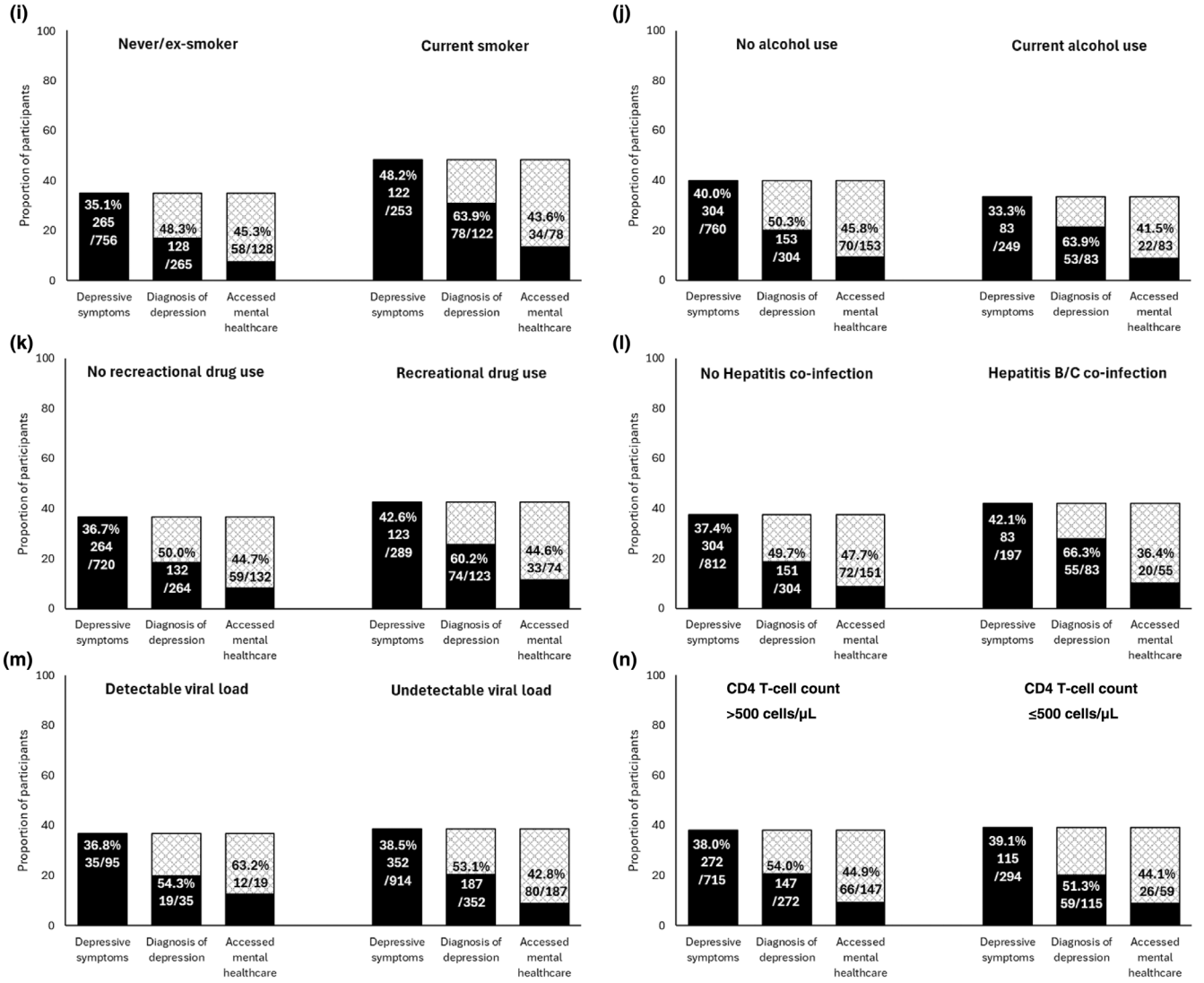

FIGURE 2 (Continued)

depression (not currently in employment, 57.4% vs. employed, 43.6%, $p = 0.01$).

Lifestyle

Participants who reported being current smokers (44.1% vs. never/ex-smoker, 37.0%; $p = 0.07$), no alcohol use (44.1% vs. alcohol user, 37.0%; $p = 0.07$) and recreational drug users (42.6% vs. no recreational drug use, 36.7%, $p = 0.08$) were more likely to be experiencing depressive symptoms. Although, smokers (63.9% vs. never/ex-smoker, 48.3%; $p = 0.01$) and recreational drug users (60.2% vs. no recreational drug use, 50.0%; $p = 0.06$) experiencing depressive symptoms were also found to have a higher rate of diagnosis, participants who reported no alcohol use (41.9% vs. alcohol user, 56.5%; $p = 0.02$) were less likely to report a diagnosis of depression.

Clinical

Hepatitis B/C coinfection was the only clinical factor that was associated with having a diagnosis of depression; participants reporting hepatitis B/C coinfection may be more likely to have reported a diagnosis of depression (66.3% vs. no hepatitis B/C coinfection, 49.7%; $p = 0.007$). Although there was a higher proportion of participants without hepatitis B/C infection (47.7% vs. 36.4%; $p = 0.15$) reporting access to mental healthcare compared with those who reported hepatitis B/C coinfection, this was not statistically significant. There was some evidence that participants with a detectable viral load were more likely to have

accessed mental healthcare compared with those an undetectable viral load (63.2% vs. 42.8%; $p = 0.09$).

Factors associated with each stage of the cascade of mental healthcare

Depressive symptoms

When exploring factors independently associated with depressive symptoms among those with moderate/severe depressive symptoms, we found evidence of associations between moderate/severe depressive symptoms and age [odds ratio (OR) for those aged <50 years = 0.76 (95% confidence interval, CI: 0.58–1.00) vs. ≥50 years; $p = 0.05$], sex [male: 0.58 (95% CI: 0.41–0.83) vs. female; $p = 0.003$], ethnicity [white ethnic background: 0.69 (95% CI: 0.49–0.98) vs. black African ethnic group; $p = 0.04$], mode of HIV acquisition [heterosexual: 1.44 (95% CI: 1.07–1.94) vs. MSM; $p = 0.02$], relationship [in a relationship: 0.35 (95% CI: 0.26–0.46) vs. not in a relationship; $p < 0.001$], employment [currently employed: 0.25 (95% CI: 0.19–0.32) vs. unemployed; $p < 0.001$] and education status [university qualification: 0.41 (95% CI: 0.32–0.54) vs. less than university level; $p < 0.001$], smoking status [current smoker: 1.73 (95% CI: 1.29–2.30) vs. non-smoker; $p < 0.001$], alcohol use [current alcohol use: 0.74 (95% CI: 0.54–1.02); $p = 0.07$] and recreational drug use [drug user: 1.28 (95% CI: 0.97–1.69); $p = 0.08$]. There were no associations of depressive symptoms with being born in the UK, hepatitis B/C coinfection, HIV viral load or CD4 count.

After adjustment, men [adjusted OR (aOR) = 1.84 (95% CI: 1.06–3.19) vs. women; $p = 0.03$] and those who reported smoking [1.71 (1.08–2.72) vs. non/ex-smokers; $p = 0.02$] were more likely to have symptoms of depression. By contrast, those who reported being in a relationship [0.44 (0.33–0.59) vs. those not in a relationship; $p < 0.001$], who were currently employed [0.28 (0.21–0.38) vs. those who reported being unemployed; $p < 0.001$] and who had a university qualification [0.54 (0.40–0.72) vs. those without a university qualification; $p < 0.001$] were protected from these symptoms. After adjustment, associations with age, mode of HIV acquisition, alcohol and recreational drug use were attenuated (Table 3).

Diagnosis of depression

In univariable analyses, we found strong associations between medical diagnosis of depression and sex [male, OR = 1.94 (95% CI: 1.15–3.28) vs. female; $p = 0.01$], ethnicity [white, OR = 2.85 (1.65–4.94) vs. black African ethnic origin; $p < 0.001$], place of birth [born in the UK, OR = 1.54 (1.02–2.33) vs. those not born in the UK; $p = 0.04$], mode of HIV acquisition [heterosexual, OR = 0.40 (0.25–0.63) vs. MSM; $p < 0.001$], current smoker [OR = 1.88 (1.21–2.93); $p = 0.01$], recreational drug user [OR = 1.57 (1.01–2.43); $p = 0.04$] and those with a hepatitis B/C coinfection [OR = 2.02 (1.21–3.37); $p = 0.01$]. There were no associations of depressive symptoms with relationship status, employment status, education status, HIV viral load or CD4 count.

After adjustment, we found that those reporting a heterosexual HIV acquisition risk were less likely to have a diagnosis of depression [aOR = 0.30 (0.14–0.64); $p = 0.002$], whereas those who reported that they smoked had a higher odds of reporting a diagnosis of depression [aOR = 1.75 (1.10–2.77); $p = 0.02$]. Associations with sex, ethnicity, place of birth, mode of HIV acquisition, recreational drug use and hepatitis B/C coinfection were attenuated.

Accessing mental healthcare

In univariable analyses, age was the only factor to be associated with accessing mental healthcare among those with a diagnosis of depression. Those who were aged <50 years were more likely to have accessed mental healthcare than those aged ≥50 years (OR = 2.36 (1.31–4.28); $p = 0.004$). No multivariable analyses were explored as there were no further factors associated with accessing mental healthcare.

DISCUSSION

This study explores a cascade of mental healthcare, focusing on people with HIV experiencing depressive symptoms and accessing care in the UK. We report that among those reporting depressive symptoms, 45.7% did not report a medical diagnosis of depression and 76.5% did not report having access to any mental healthcare for their symptoms. We found important differences in the cascade of mental healthcare when stratified by key demographic factors. When adjusting for these, women, those not in a relationship, those who were unemployed and individuals with lower educational attainment were more likely to experience depressive symptoms heterosexual individuals and those who reported no smoking were less likely to report a diagnosis of depression; and older people were less likely to report having accessed support or treatment for their depression.

Notably, almost two in five (38.4%) people with HIV in this study had evidence of depressive symptoms, a

TABLE 3 Crude and adjusted odds ratios of demographic, social, lifestyle and clinical factors explored with each step of the cascade of mental healthcare.

		Depressive symptoms ($n = 1009$)				Diagnosis of depression[a] ($n = 387$)				Accessed mental healthcare[b] ($n = 210$)	
		OR (95% CI)	*p*-value	aOR (95% CI)	*p*-value	OR (95% CI)	*p*-value	aOR (95% CI)	*p*-value	OR (95% CI)	*p*-value
Age group	≥50 years	Ref.	0.05	Ref.	0.90	Ref.	0.57	Ref.	0.51	Ref.	0.004
	<50 years	0.76 (0.58–1.00)		1.03 (0.75–1.41)		0.88 (0.57–1.36)		0.86 (0.55–1.35)		2.36 (1.31–4.28)	
Sex	Female	Ref.	0.003	Ref.	0.02	Ref.	0.01	Ref.	0.23	Ref.	0.87
	Male	0.58 (0.41–0.83)		0.62 (0.42–0.92)		1.94 (1.15–3.28)		0.58 (0.24–1.39)		1.07 (0.49–2.33)	
Ethnicity	Black African	Ref.	0.04			Ref.	<0.001			Ref.	0.71
	White	0.69 (0.49–0.98)				2.85 (1.65–4.94)				1.19 (0.48–2.91)	
Born in the UK		0.89 (0.68–1.15)	0.37			1.54 (1.02–2.33)	0.04			0.82 (0.46–1.46)	0.50
Mode of HIV acquisition	MSM	Ref.	0.02			Ref.	<0.001	Ref.	0.002	Ref.	0.61
	Heterosexual	1.44 (1.07–1.94)				0.40 (0.25–0.63)		0.30 (0.14–0.64)		0.83 (0.41–1.69)	
In a relationship		0.35 (0.26–0.46)	<0.001	0.44 (0.33–0.59)	<0.001	0.82 (0.51–1.31)	0.41			0.94 (0.49–1.82)	0.86
Currently employed		0.25 (0.19–0.32)	<0.001	0.28 (0.21–0.38)	<0.001	0.73 (0.47–1.12)	0.15			1.14 (0.60–2.15)	0.69
University qualification		0.41 (0.32–0.54)	<0.001	0.54 (0.40–0.72)	<0.001	1.06 (0.69–1.62)	0.80			0.81 (0.45–1.46)	0.48
Current smoker		1.73 (1.29–2.30)	<0.001	1.87 (1.35–2.58)	<0.001	1.88 (1.21–2.93)	0.01	1.75 (1.10–2.77)	0.02	0.93 (0.53–1.64)	0.81
Current alcohol use		0.74 (0.54–1.02)	0.07			1.49 (0.92–2.41)	0.10			1.16 (0.56–2.40)	0.69
Recreational drug use (last 6 months)		1.28 (0.97, 1.69)	0.08			1.57 (1.01–2.43)	0.04			1.00 (0.56–1.77)	0.99
Hepatitis B/C coinfection		1.22 (0.89–1.67)	0.23			2.02 (1.21–3.37)	0.01			0.63 (0.33–1.18)	0.15
Undetectable viral load		1.07 (0.69–1.66)	0.75			0.77 (0.38–1.57)	0.48			0.44 (0.16–1.16)	0.10

TABLE 3 (Continued)

	Depressive symptoms ($n = 1009$)				Diagnosis of depression[a] ($n = 387$)				Accessed mental healthcare[b] ($n = 210$)	
	OR (95% CI)	*p*-value	aOR (95% CI)	*p*-value	OR (95% CI)	*p*-value	aOR (95% CI)	*p*-value	OR (95% CI)	*p*-value
CD4 T-cell count <500 cells/μL	1.05 (0.79, 1.38)	0.75			0.80 (0.52–1.24)	0.33			0.97 (0.53–1.78)	0.91

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; MSM, men who have sex with men; OR, odds ratio.

[a]Among those who had moderate/severe depressive symptoms.

[b]Among those who had moderate/severe depressive symptoms and reported a diagnosis of depression.

proportion that is marginally higher than reported in other cross-sectional studies among people with HIV in the UK [18, 19]. However, it is important to consider the population and the validated tool used to measure depressive symptoms. Murphy et al. reported a prevalence of depressive symptoms of 33.8% in their sample of MSM using the Hospital Anxiety and Depression Scale (HADS) [18]. The Antiretrovirals Sexual Transmission Risk and Attitudes (ASTRA) study recruited heterosexual men and women from around the UK and reported a prevalence of 29% using the PHQ-9 questionnaire [19]. In this analysis, we used a unique combination of two validated screening tools (PHQ-9 and CES-D) in a sample that consisted predominately of white MSM. When restricting this analysis to those who completed the PHQ-9 questionnaire, the prevalence of depressive symptoms was reduced to 25.4%.

Among those with depressive symptoms, only approximately half had a medical diagnosis of depression (54.3%). This was much lower when compared to recent data from the US (74.0%) [20]. The lack of data assessing the burden of clinically diagnosed depression among people with HIV in the UK may reflect the intensive clinical assessments and the lack of psychological specialists within the service [12]. Considering these data were collected between 2013 and 2016, anecdotally, there have been isolated accounts of greater integration with third-party and voluntary sector organizations, which may have improved access to psychological services for detailed assessment in recent years. However, there still remains a requirement to petition for a more integrated approach to adapt the clinical management of people with HIV presenting with symptoms of depression [21, 22].

Of those with a diagnosis of depression, a smaller proportion reported accessing mental healthcare (43.3%). It has previously been reported that only a small proportion of individuals who screen positive for depressive symptoms report receiving any type of formal psychological support [23] (11% vs. 23.5% in this study). These findings are in line with previous accounts of unmet need for mental healthcare, as reported by Positive Voices [12] and, more recently, by the National AIDS Trust: HIV and Mental health report [24].

Interestingly, a service evaluation which offered internal referral to a psychologist if individuals were screened for moderate to severe depression found only 34.8% accepted the referral. Therefore, although screening for depression is accepted, referral to psychological services may be deemed as unacceptable [25]. Healthcare utilization in the POPPY study was collected based on the services that individuals reported accessing. As we do not collect information on services that have been offered and thereafter declined, we cannot comment on the acceptability of mental healthcare in this study.

In contrast to other UK data [26], this analysis highlights a disparity in age, with a higher prevalence of depression in those aged ≥50 years in the study. In the general population, depression in older people has a significant negative impact on health outcomes [27] and is the leading risk factor for suicide [28]. Although the POPPY study recruited a comparison group of HIV-negative individuals, the small numbers of people without HIV experiencing depressive symptoms did not allow us to carry out a detailed comparison. However, previous work suggests that because of the longstanding intersectional nature of HIV, the well-recognized relationship between HIV, stigma and depression [29], the earlier onset of age-related conditions [30] and worse daily functioning in this population [31], it is important to ensure services adopt person-centred approaches that are acceptable to this ageing population when screening for depression.

In addition to older age, women, those who were unemployed or who had lower educational attainment were more likely to screen positive for depressive symptoms. Associations between gender and depressive symptoms among people with HIV have been previously described in the literature [32–35]. In contrast to this study, there has been some evidence suggesting that people with HIV from a white ethnic background have a higher risk of depressive symptoms [34, 35]. However, these studies were based in the USA and therefore may not represent social contexts among people with HIV in the UK. Although there have been few studies to assess the association between education attainment and depressive symptoms in this population, previous studies have reported a relationship between financial insecurity (e.g. employment, income) and depressive symptoms in a range of settings [26, 33, 36–39]. In the context of the POPPY study, lower educational attainment may also be a proxy of financial insecurity.

As described earlier, few studies have considered the risk factors for a clinical diagnosis of depression among people with HIV. Among those with depressive symptoms in the POPPY study, women and individuals from a black African ethnicity were less likely to have reported a diagnosis of depression. By contrast, data from the UK general population suggest that diagnosed depression and symptoms were more common in women and those in the most deprived quintiles of the population [40]. Therefore, it is important to be aware of that people with HIV require a deeper understanding of their social contexts in their routine clinic settings, which may be different from those of the general population.

Our analysis further emphasizes the disparity in age, as the proportion of those clinically diagnosed with depression who had accessed mental healthcare was significantly lower in the older age group than in the younger age group. This suggests that older people living with HIV may be struggling to access the services they require. It is important to note that although these analyses may allude to an unmet need for the ageing population, this is unlikely to be unique to people with HIV [41]. Research in the general population suggests that the multi-faceted stigmatization resulting from the negative attitude to both old age and depression affects the ability of older individuals to seek and access care for depressive symptoms [42]. However, further research is required in order to gain a deeper understanding of whether, and, if so, why, the unique experiences of older people with HIV introduce additional barriers to accessing mental healthcare when compared with the general population.

Although we highlight an unmet need, this study has limitations. We used a combination of two screening questionnaires to identify participants who may be experiencing symptoms of depression. While both measures are widely used in research and clinical settings, these tools cannot replace a clinical diagnosis of depression; screening questionnaires merely provide a tool for healthcare professionals to determine whether further investigations are required.

Diagnosis of depression and healthcare utilization in this context were based on self-reported data and therefore are solely based on the individual's understanding of a diagnosis and mental healthcare. In terms of diagnosis, national guidance requires an appropriate professional to carry out a mental health assessment [43]. The POPPY study did not have access to this data. Interestingly, Rait et al. reported in the UK general population that while incidence of recorded diagnoses of depression in general practice decreased between 1996 and 2004, the incidence of recorded depressive symptoms increased in this period [37]. Therefore, it is plausible that a healthcare professional may have discussed depressive symptoms in their routine clinical review, and that the individual has perceived this as a diagnosis of depression.

Similarly, we cannot be sure of where, or for what specific purposes, participants may have accessed mental healthcare. The current model of care outlined by the Standards for Psychological Support for Adults Living with HIV [44] suggests that psychological support should be delivered through a network of providers with different levels and types of expertise. Lower levels of psychological support have previously been delivered through the voluntary sector or HIV support services. Some participants may or may not have reported accessing these based on their understanding of mental healthcare.

Finally, this is a cross-sectional analysis using a snapshot of data collected between 2013 and 2016, and

therefore we cannot comment on: (i) the current status of diagnosis of depression and/or access to mental healthcare; (ii) the changes in depressive symptomology, diagnosis and access to mental healthcare over time; or (iii) the sequence of events.

CONCLUSION

In summary, using data from a cohort of people ageing with HIV, we found a high burden of depressive symptoms. Of those experiencing depressive symptoms, half reported having been diagnosed with depression and one in four reported accessing mental healthcare. We found key differences in the cascade of mental healthcare by demographic, social and lifestyle factors. In line with the literature, this suggests an unmet need of mental healthcare for people with HIV requiring a deeper understanding of social contexts and emphasizing the importance of person-centred care for people living with HIV. We hope these findings will help to inform policies in order to streamline methods of accessing mental health services for diagnosis and management of symptoms of depression among people with HIV.

AUTHOR CONTRIBUTIONS

CS, AW, MB, FAP and PWGM designed and obtained funding for the POPPY study. HO developed the initial concept and data analysis plan for the present analysis (with CS), undertook the literature review, performed all data analyses and prepared the first draft of the manuscript. FP, MB, PM and AW provided clinical interpretation of study findings and are members of the POPPY study management team. JA, IW, JV and MJ provided intellectual input to the POPPY study design and supported study recruitment, data collection and clinical management. MS provided liaison with the HIV patient community for all aspects of the study design and management. All authors provided a critical review of the draft manuscript and have seen and approved the final version.

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CONFLICT OF INTEREST STATEMENT

AW reports grants, speaker honorarium or advisory board fees from Gilead Sciences, ViiV Healthcare, BMS, Janssen and MSD. FP reports grants and personal fees from Gilead Sciences, ViiV Healthcare and Janssen. MB has received travel and research grants from, and has been advisor for, Janssen, Roche, ViiV, Bristol-Myers Squibb, Merck Sharp & Dohme, Gilead, Mylan, Cipla and Teva. PM reports grants and/or personal fees from Gilead Sciences, MSD, ViiV Healthcare and Janssen. JA reports grants from Imperial College and personal fees and/or non-financial support from Gilead Sciences, ViiV, MSD and Jansen. CS has received funding from Gilead Sciences, ViiV Healthcare and MSD for membership of data safety and monitoring boards, advisory boards, and speaker panels and for preparation of educational materials. HO, JV, IW, MS, MJ and CP report no conflicts of interest.

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APPENDIX A

TABLE A1 Antidepressants used in the diagnosis of depression data.

Agomelatine	Duciltia	Manerix	Prozac	Venaxx XL
Allegron	Duloxetine HCl	Maprotiline HCl	Prozep	Vencarm XL
Alventa XL	Edronax	Mianserin HCl	Prozit	Venlablue XL
Amitriptyline HCl	Efexor XL	Mirtazapine	Reboxetine	Venladex XL
Amitriptyline/Perphenazine	Efexor	Moclobemide	Rodomel XL	Venlafaxine
Amoxapine	Escitalopram	Molipaxin	Seroxat	Venlalic XL
Amphero XL	Faverin	Motival	Sertraline HCl	Venlaneo XL
Anafranil Sr	Fluanxol	Nardil	Sinepin	Venlasov XL
Anafranil	Fluoxetine HCl	Nefazodone HCl	Sinequan	Vensir XL
Brintellix	Flupentixol HCl	Nortriptyline	Sunveniz XL	Venzip XL
Cipralex	Fluvoxamine Mal	Olena	Surmontil	Vexarin XL
Cipramil	Foraven XL	Optimax Wv	Tardcaps XL	ViePax XL
Citalopram HCl	Gamanil	Optimax	Tifaxin XL	ViePax
Citalopram Hydrob	HealthAid	Oxactin	Tonpular XL	Vortioxetine
Clomipramine HCl	Imipramine HCl	Oxitriptan	Tranylcypromine Sulf	Zispin
Concordin-10	Isocarboxazid	Paroxetine HCl	Trazodone HCl	
Cymbalta	Lamb	Phenelzine Sulf	Trimipramine Mal	
Depalta	Lofepramine HCl	Politid XL	Triptafen	
Depefex XL	Lomont	Prepadine	Trixat XL	
Dosulepin HCl	Lustral	Prothiaden	Tryptophan	
Doxepin	Majoven XL	Protriptyline HCl	Valdoxan	