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Corresponding author:
Solveig Kemna;
Email: solveig.kemna@charite.de

Characterizing of dropouts in the mental health of refugees and asylum seekers (MEHIRA) study examining the effects of a stepped and collaborative care model – a multicentered rater-blinded randomized controlled trial

Solveig Kemna[1], Max Bringmann[1], Carine Karnouk[1], Andreas Hoell[2], Mira Tschorn[3], Inge Kamp-Becker[4], Frank Padberg[5], Aline Übleis[5], Alkomiet Hasan[6], Peter Falkai[5], Hans-Joachim Salize[2], Andreas Meyer-Lindenberg[2], Tobias Banaschewski[2], Frank Schneider[7,8], Ute Habel[7], Paul Plener[9,10], Eric Hahn[1], Maren Wiechers[5], Michael Strupf[5], Andrea Jobst[5], Sabina Millenet[2], Edgar Hoehne[4], Thorsten Sukale[10], Martin Schuster[3], Raphael Dinauer[11], Nassim Mehran[12], Franziska Kaiser[7], Klaus Lieb[13], Andreas Heinz[12], Michael Rapp[3], Malek Bajbouj[1] and Kerem Böge[1]

[1]Department of Psychiatry and Psychotherapy, Charité -Universitätsmedizin, Campus Benjamin Franklin, Berlin, Germany; [2]Central Institute of Mental Health, Medical Faculty Mannheim, University of Heidelberg, Mannheim, Germany; [3]Department of Social and Preventive Medicine, University of Potsdam, Potsdam, Germany; [4]Department of Psychiatry and Psychotherapy, Psychosomatics and Psychotherapy, Faculty of Human Medicine, Philipps-University Marburg, Marburg, Germany; [5]Department of Psychiatry and Psychotherapy, University Hospital, Ludwig Maximilian University Munich, München, Germany; [6]Department of Psychiatry, Psychotherapy and Psychosomatics, Medical Faculty, University of Augsburg, Augsburg, Germany; [7]Department of Psychiatry and Psychotherapy, Rheinisch-Westfälische Technische Hochschule Aachen University and JARA-Institute Brain Structure Function Relationship (INM 10), Research Center Jülich and RWTH, Aachen, Germany; [8]University Hospital Düsseldorf, Düsseldorf, Germany; [9]Department of Child and Adolescent Psychiatry, Medical University of Vienna, Vienna, Austria; [10]Department of Child and Adolescent Psychiatry and Psychotherapy, University of Ulm, Ulm, Germany; [11]Department of Child and Adolescent Psychiatry and Psychotherapy, University of Tübingen, Tübingen, Germany; [12]Department of Psychiatry and Psychotherapy, Charité Universitätsmedizin, Berlin, Germany and [13]Department of Psychiatry and Psychotherapy, University of Mainz, Mainz, Germany

Abstract

Background. Dropout from healthcare interventions can negatively affect patients and healthcare providers through impaired trust in the healthcare system and ineffective use of resources. Research on this topic is still largely missing on refugees and asylum seekers. The current study aimed to characterize predictors for dropout in the Mental Health in Refugees and Asylum Seekers (MEHIRA) study, one of the largest multicentered controlled trials investigating the effectiveness and cost-effectiveness of a nationwide stepped and collaborative care model.

Methods. Predictors were multiply imputed and selected for descriptive modelling using backward elimination. The final variable set was entered into logistic regression.

Results. The overall dropout rate was 41,7%. Dropout was higher in participants in group therapy ($p = 0.001$; OR = 10.7), with larger satisfaction with social relationships ($p = 0.017$; OR = 1.87), with difficulties in maintaining personal relationships ($p = 0.005$; OR = 4.27), and with higher depressive symptoms ($p = 0.029$; OR = 1.05). Participants living in refugee accommodation ($p = 0.040$; OR = 0.45), with a change in social status ($p = 0.008$; OR = 0.67) and with conduct ($p = 0.020$; OR = 0.24) and emotional problems ($p = 0.013$; OR = 0.31) were significantly less likely to drop out of treatment.

Conclusion. Overall, the outcomes of this study suggest that predictors assessing social relationships, social status, and living conditions should be considered as topics of psychological treatment to increase adherence and as predictors for future research studies (including treatment type).

Introduction

In a time marked by multiple concurrent crises, the world faces a growing number of displaced people (UNHCR, 2024). Refugees and asylum seekers (RAS) are confronted with numerous stressors, such as exposure to conflict, unsafe migration conditions, separation from social

networks, or uncertain asylum procedures (Priebe, Giacco, & El-Nagib, 2016). Research on the mental health of RAS consistently shows substantial rates of post-traumatic stress disorder (PTSD) and depression (Blackmore et al., 2020; Fazel, Wheeler, & Danesh, 2005; Hoell et al., 2021; Lushchak et al., 2024; Morina, Akhtar, Barth, & Schnyder, 2018; Steel et al., 2009). Impaired mental health can hinder integration processes (Hoell et al., 2021). The host country's complex healthcare system lacking culturally sensitive treatment options also constitutes a potential post-migration stressor (Langlois, Haines, Tomson, & Ghaffar, 2016; Priebe et al., 2016). Conversely, health systems can become burdened by an increasing number of patients with specific mental health needs they are not prepared for (Berwick & Shine, 2020; Jefee-Bahloul, Bajbouj, Alabdullah, Hassan, & Barkil-Oteo, 2016). In Germany, RAS show elevated levels of psychological distress, with higher rates in older refugees, those living in refugee accommodation and those under threat of deportation (Walther et al., 2020). Anxiety and depressive symptoms are associated with specific post-migration stressors, such as material stressors, dire current living conditions, and/or discrimination (Behrendt et al., 2023; Schilz et al., 2023).

Additionally, help-seeking behavior of RAS is often relatively low (Byrow, Pajak, Specker, & Nickerson, 2020). Barriers to service-seeking include limited mental health literacy, stigma, and structural reasons such as language barriers, financial hardship, lack of health insurance or unfamiliarity with local support systems (Byrow et al., 2020). Moreover, lacking trust in authorities can impair help-seeking behavior (Byrow et al., 2020). This underlines the need for accessible, culturally sensitive treatment options for RAS (Jefee-Bahloul et al., 2016; Priebe et al., 2016). Such treatments - e.g. Self-Help Plus (SH+), Group Problem Management Plus (gPM+), and the Step-by-Step digital intervention - have been tested in large randomized, controlled trials (RCT) for RAS from the Middle East/North Africa (MENA) region resettled in various countries, such as Turkey, Jordan, Lebanon, and Western European countries (Acarturk et al., 2022; Cuijpers et al., 2022; Purgato et al., 2021).

The Mental Health in Refugees and Asylum Seekers (MEHIRA) study, a multicentered, randomized, controlled trial evaluated the effectiveness of a Stepped Care and Collaborative Model (SCCM), in which participants were allocated to different mental health interventions explicitly developed for refugees in Germany according to the severity of depressive symptoms (Böge, Karnouk, Hahn, Demir, & Bajbouj, 2020a, 2020b; Böge et al., 2022). These included a watchful waiting approach at Level 1, app-based or peer-to-peer interventions at Level 2, group therapy at Level 3, and individual psychotherapy and/or psychotropic medication at Level 4. SCCM combines various high- and low-threshold interventions with collaborative elements, resulting in more individualized treatment schemes (Bower & Gilbody, 2005). This follows the recommendations of the pyramid for mental health care provision of the World Health Organization (WHO), which aims to reduce stigma and improve access resource-efficiently (Funk et al., 2009). The MEHIRA study showed a significant, cost-effective reduction of depressive symptoms, demonstrating a model for providing mental health services in circumstances where resources are limited (Böge et al., 2022).

Nonetheless, the dropout rate in MEHIRA was high, with 41.7% of participants attending less than 50% of treatment sessions (Böge et al., 2022). Dropout is a common challenge in clinical studies and health system research, hindering a broader dissemination of treatments that would otherwise be effective (Swift & Greenberg, 2012). It has been investigated widely in Western populations, with an average of 20% of participants dropping out of psychological interventions, although rates vary enormously (0% to 74%) (Swift & Greenberg, 2012). Reasons for dropout are manifold and can be divided into patient, treatment, therapist, or study design-related variables (Semmlinger & Ehring, 2022). In Western populations, dropout from cognitive-behavioral therapy (CBT) based interventions have been shown to depend on the patient's diagnosis, medium and setting of treatment delivery, and the number of sessions (Fernandez, Salem, Swift, & Ramtahal, 2015). Dropout rates from psychotherapy studies have been estimated to be at around 20% (Cooper & Conklin, 2015).

Dropout negatively affects patients, healthcare providers, and the health system (Semmlinger & Ehring, 2022). In patients, chronification or exacerbation of symptoms and decreased trust in healthcare systems may occur (Barrett et al., 2008). Additionally, treatment withdrawal can strain health system resources (Barrett et al., 2008; Swift, Greenberg, Whipple, & Kominiak, 2012), an issue especially relevant in the resource-limited context of healthcare provision for RAS (Jefee-Bahloul et al., 2016; Priebe et al., 2016).

Generally, current studies investigate dropout in psychological interventions for RAS as a secondary outcome in treatment efficacy studies (Semmlinger & Ehring, 2022). However, assessed dropout rates in RAS vary enormously between studies (Hinton et al., 2005; Renner, Baenninger-Huber, & Peltzer, 2011). Several factors have been considered to influence treatment adherence. Specifically, post-migration stressors such as language barriers or cultural differences in beliefs about mental health and psychological treatment can impede staying in treatment (Jefee-Bahloul et al., 2016; Priebe et al., 2016; Semmlinger & Ehring, 2022; Slobodin & de Jong, 2015). Against this background, the present study aimed to investigate dropout predictors in the MEHIRA study.

Methods

The Mehira trial was a multicenter, clinician-blinded, randomized controlled trial conducted between 05/2018 and 03/2020 involving seven German university hospitals, including Berlin, Aachen, Marburg, Mannheim, Munich, Tübingen, and Ulm. The aim was to evaluate the effectiveness and cost-effectiveness of a culturally sensitive SCCM compared to the German routine mental health-care system (Treatment-As-Usual, TAU) in a population of RAS (Böge et al., 2020b). The study period was three months, with follow-up assessments at 24 and 48 weeks. Inclusion criteria were male and female RAS between 14–65 years of age, Arabic/Farsi native-speakers and/or fluent in English/German, with at least mild depressive symptoms and relevant psychological distress assessed by the Refugee Health Screener-15 (RHS-15) (Hollifield et al., 2013), the Patient Health Questionnaire-9 (PHQ-9) (Kroenke, Spitzer, & Williams, 2001) and the PHQ-A for adolescents (Johnson, Harris, Spitzer, & Williams, 2002). Exclusion criteria were absent informed consent, diagnosis of a psychotic disorder assessed by the Mini-International Neuropsychiatric Interview (MINI) (Sheehan et al., 1998), degenerative disorder, and current risk of suicidality, assessed by item 10 of the Montgomery-Asberg-Depression-Rating Scale (MADRS) (Montgomery & Asberg, 1979). Ethics approval was obtained from institutional ethics boards at each site. A detailed description

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of the study protocol and interventions can be found in Böge et al. 2020a, 2020b (Böge et al. 2020b), while the primary study results demonstrate the clinical and cost-effectiveness published in Böge et al. 2022 (Böge et al. 2022). The MEHIRA trial was preregistered (clinicaltrials.gov; NCT03109028).

Interventions

Participants in the SCCM arm were allocated to intervention levels according to the PHQ-9 score at baseline. With a PHQ-9 score of ⩾9, participants were included in the 'watchful waiting' condition where no intervention was administered (Level 1). With a PHQ-9 score of 10–14, participants were included in the non-expert invention condition (Level 2). Here, participants either received a smartphone app with psychoeducational content and CBT interventions (BALSAM app) (Böge et al., 2020b) or in-person peer-to-peer group intervention (Böge et al., 2022). With a PHQ-9 score of 15–19, participants were included in Level 3 to participate in the Empowerment CBT-based group therapy (Wiechers et al., 2023) aiming at supporting participants in coping with depressive symptoms and stressors such as homesickness (Höhne et al., 2024; Strupf et al., 2023a, 2023b; Wiechers et al., 2023). With a PHQ-9 score of 20–27, participants received an in-person expert intervention (Level 4) with pharmacological treatment and/or psychotherapy by a licensed psychotherapist/psychiatrist (Böge et al., 2020b).

Predictors

Predictors Were chosen from the pool of measurement instruments employed in the MEHIRA study (Böge et al., 2020b), which covers a vast range of general psychopathological and psychological aspects, as well as aspects particularly relevant to the RAS population. Within this pool, predictors were pre-selected for statistical analysis with the aim of retaining a broad set of parameters that are nevertheless relevant for the question at hand. Sociodemographic variables (e.g. gender, age, occupation; see Semmlinger et al., 2021), psychopathological variables (e.g. baseline symptom severity; see for instance Buhmann, Mortensen, Nordentoft, Ryberg, & Ekstrøm, 2015; Sonne, Mortensen, Silove, Palic, & Carlsson, 2021), flight-related variables (e.g. housing conditions; see Byrow et al., 2020), psychological resources (e.g. resilience, self-efficacy, self-worth; see for instance Ahnis et al., 2012; Davis, Hooke, & Page, 2006), and social variables and interpersonal traits (e.g. antisocial behavior; see for instance Bennemann, Schwartz, Giesemann, & Lutz, 2022; Raghavan, Rasmussen, Rosenfeld, & Keller, 2013; Sonne et al. 2021) have all been shown to be relevant to treatment outcomes and drop-out in refugees. Any variable belonging to these categories was included in the analysis. All pre-selected variables are listed in Table 1; variable coding is outlined in the Appendix.

Sample selection

This dropout analysis included participants aged ⩾18 years assigned to the intervention group (SCCM), excluding 31 participants younger than 18 years from the initial SCCM arm of the MEHIRA study. 26 participants were excluded due to participation in an intervention they had yet to be assigned to at screening. Additionally, only participants with <30% of predictors missing were included (in line with recent studies excluding participants with missings within the range of 25%; see for instance Betz, Rosen, Salokangas, & Kambeitz, 2022; Schilz et al., 2023), excluding another 18 participants. Overall, the analysis included 219 participants. Dropout was defined as attending <50% of the intervention sessions (Böge et al., 2022) Fig. 1.

Statistical analysis

Statistical analyses were calculated with R (Version 4.3.1, 2023) to characterize dropout through descriptive logistic regression models (Shmueli, 2010). Multiple imputations accounted for missing data points using the multiple imputations by chained equations (MICE) packages (van Buuren & Groothuis-Oudshoorn, 2011). Predictors were imputed to create $m = 10$ complete datasets to strike a balance between accounting for variance and improving feasibility in performing model diagnoses separately for each imputed dataset. Imputation of given predictors was done by utilizing all other n-1 predictors. Numeric data was imputed by predictive mean matching (PMM), binary categorical data by logistic regression, polytomous regression imputation was used for unordered, categorical data with more than two levels, and a proportional odds model for ordered categorical data with more than two levels. Finally, density plots were used to examine the imputation results. Line plots were used to examine convergence.

To determine a subset of relevant variables for our final regression model, predictors were determined by backward elimination (Heinze, Wallisch, & Dunkler, 2018). Here, predictors are iteratively removed from a given model and compared to the previous model iteration regarding an information criterion until an optimal solution is reached. Specifically, the Akaike information criterion (AIC) was used to penalize model fit for model complexity (Akaike, 1973). Backward elimination was preferred to other methods such as Least Absolute Shrinkage and Selection Operator (LASSO) since it provides clearly interpretable regression coefficients, making it suitable to our descriptive analysis; compared to forward selection, it starts with an unbiased global model (Heinze et al., 2018). Moreover, the AIC corresponds to a significance threshold of $\alpha = 0.157$ (Heinze et al., 2018), striking a balance between removing redundant variables and including relevant predictors and covariates in the final model. Twenty nine variables were used as predictors for backward elimination with AIC (see Appendix), which was implemented using the step function in R (R Core Team, 2023).

Backward elimination with logistic regression was performed for each of the ten data sets, resulting in an optimal solution for each data set. Variables for the final logistic regression model were determined by the frequency of variable selection across datasets: Variables included in more than half of the ten optimal solutions were chosen for the final regression model in accordance with the majority vote method (Wood, White, & Royston, 2008). The following predictor variables were selected: intervention level, refugee accommodation *v.* other accommodation, MADRS score, difference in social status before and after flight, age, BRS score, have a secure *v.* insecure residence status, WHOQOL-Social scale, SDQ-Peer problem scale, SDQ-Conductance problem scale, and SDQ-Emotional problem scale.

Finally, selected variables were used to calculate logistic regression models separately for every imputed dataset. To combine results, the pool function from the MICE packages was used, which averages the estimates across the models and computes the total variance over the repeated analyses by Rubin's rules (Buuren & Groothuis-Oudshoorn, 2011; Rubin, 1987). Regression diagnostics were run for each imputed data set.

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Table 1. Descriptive statistics with non-imputed variables used in the statistical analysis

Variable	Overall, $N = 219$[a]	Dropout, $N = 90$[a]	No dropout, $N = 129$[a]
Intervention level			
No intervention	26 (12%)	4 (4.4%)	22 (17%)
Non-expert intervention	41 (19%)	12 (13%)	29 (22%)
Group intervention	85 (39%)	52 (58%)	33 (26%)
Individual expert intervention	67 (31%)	22 (24%)	45 (35%)
Gender			
Male	139 (63%)	60 (67%)	79 (61%)
Female	80 (37%)	30 (33%)	50 (39%)
Age	30.65 (10.17)	29.89 (9.39)	31.19 (10.68)
Housing			
Other accommodation	124 (57%)	56 (62%)	68 (53%)
Refugee accommodation	94 (43%)	34 (38%)	60 (47%)
Residence status			
Insecure	24 (11%)	8 (8.9%)	16 (13%)
Secure	194 (89%)	82 (91%)	112 (88%)
Marital status			
Post-relationship[b]	22 (10%)	8 (8.9%)	14 (11%)
Single	102 (47%)	44 (49%)	58 (45%)
Married	95 (43%)	38 (42%)	57 (44%)
MADRS score	22.17 (10.27)	24.04 (10.19)	20.90 (10.18)
HTQ score	2.48 (0.63)	2.50 (0.64)	2.46 (0.62)
BRS score	2.77 (0.78)	2.67 (0.71)	2.84 (0.83)
GSE score	24.31 (7.25)	24.11 (6.76)	24.44 (7.60)
Social status difference	−0.91 (1.30)	−1.24 (1.21)	−0.67 (1.32)
WHOQOL-Social scale	2.88 (0.96)	2.88 (0.99)	2.87 (0.94)
WHOQOL-Physical health scale	3.02 (0.71)	2.99 (0.74)	3.04 (0.69)
WHOQOL-Psychological health scale	2.69 (0.71)	2.64 (0.63)	2.72 (0.76)
SDQ-Emotional problem scale	2.38 (0.49)	2.33 (0.47)	2.42 (0.50)
SDQ-Conductance problem scale	1.61 (0.34)	1.56 (0.31)	1.66 (0.36)
SDQ-Hyperactivity scale	2.04 (0.43)	2.04 (0.43)	2.04 (0.43)
SDQ-Prosocial scale	2.70 (0.35)	2.67 (0.36)	2.71 (0.34)
SDQ-Peer problem scale	1.91 (0.40)	1.97 (0.39)	1.87 (0.39)
Medication[c]	77 (36%)	30 (34%)	47 (37%)
Psychotherapy[c]	38 (18%)	18 (21%)	20 (16%)
Migrant identity			
Not yes[d]	43 (20%)	13 (15%)	30 (24%)
Yes	172 (80%)	75 (85%)	97 (76%)
Last residence country			
Afghanistan	53 (24%)	21 (24%)	32 (25%)
Iran	35 (16%)	14 (16%)	21 (16%)
Syria	56 (26%)	21 (24%)	35 (27%)
Turkey	21 (9.7%)	10 (11%)	11 (8.6%)
Other	52 (24%)	23 (26%)	29 (23%)

(*Continued*)

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Table 1. (*Continued.*)

Variable	Overall, $N = 219$[a]	Dropout, $N = 90$[a]	No dropout, $N = 129$[a]
Years of schooling	8.90 (4.13)	9.27 (4.02)	8.65 (4.20)
Occupation			
Unemployed	172 (80%)	76 (85%)	96 (77%)
Employed	42 (20%)	13 (15%)	29 (23%)
Sense of cultural belonging			
Culture of country of origin	111 (53%)	45 (52%)	66 (53%)
Not culture of origin	100 (47%)	42 (48%)	58 (47%)
Sense of disconnect	0.57 (0.22)	0.56 (0.20)	0.57 (0.23)
Flight reason			
One reason	140 (64%)	59 (66%)	81 (63%)
More than one reason	79 (36%)	31 (34%)	48 (37%)
Means of flight			
Alone	93 (43%)	41 (46%)	52 (41%)
Not alone	123 (57%)	48 (54%)	75 (59%)

n, Number; s.d.,Standard deviation; MADRS, Montgomery Asberg Depression Rating Scale; HTQ, Harvard Trauma Questionnaire; BRS, Brief Resilience Scale; GSE, Generalized Self-Efficacy Scale; SDQ, Strengths and Difficulties Questionnaire; WHOQOL, World Health Organisation Quality of Life. Number of observations does not add up to overall sample size for all variables since descriptive statistics are computed for non-imputed data.
[a]*n* (%) for categorical variables; mean (s.d.) for metric variables.
[b]Includes response options 'divorced/separated' and 'widowed'.
[c]Reflects the number and percentage of people answering 'yes' to this question.
[d]Contains the response options 'No', 'Rather not', and 'Undecided'.

Linearity between predictors and outcomes was examined through scatterplots for each predictor and the model's logit values. Variance inflation factors were calculated to rule out multicollinearity. Standardized residuals were visualized to identify potential outliers. However, no data point was excluded based on these analyses.

Furthermore, we computed group differences (dropout *v.* non-dropout) across all variables separately for each intervention level to provide tentative evidence on level-specific characteristics. Here, Pearsons's χ^2 tests or Fisher's exact tests (for small cell sizes) were calculated for categorical and Welch Two Sample *t* tests for metric variables. All comparisons were computed on

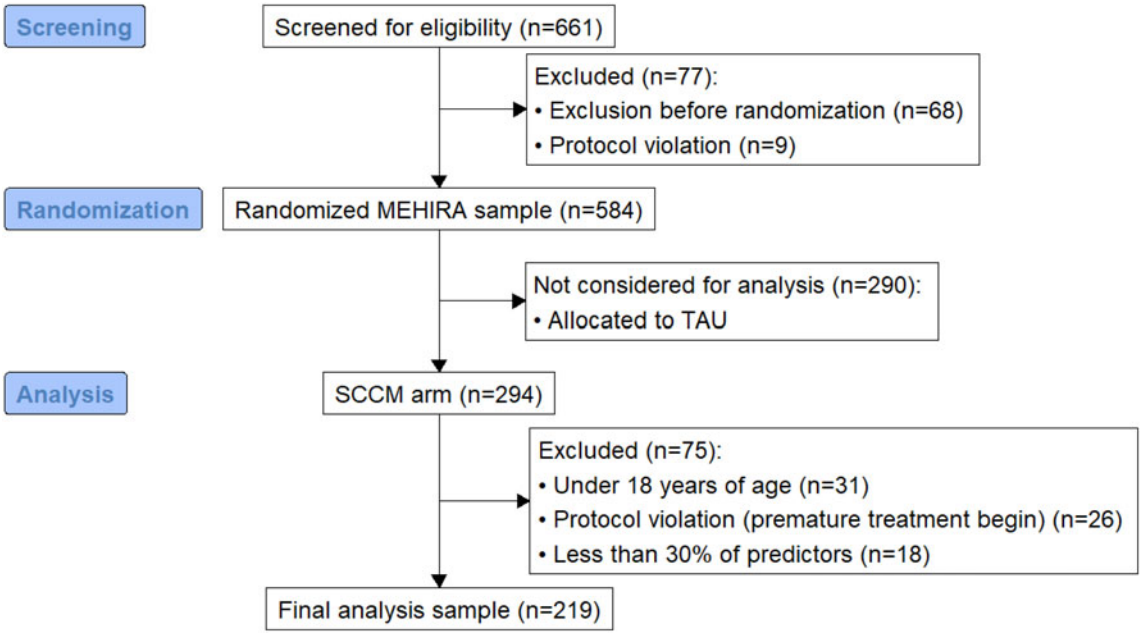

Figure 1. Flow chart of participant recruitment, allocation, and inclusion in present statistical analysis.
MEHIRA, Mental Health in Refugees and Asylum Seekers; SCCM, Stepped and Collaborative Care Model.

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non-imputed data. Significant comparisons are reported in 'Results'. The complete secondary analysis can be found in the Appendix. For all analyses, p values below or equal to a false-discovery threshold of 0.05 were considered significant and p values below or equal to a threshold of 0.1 were considered marginally significant.

Results

The Current sample of refugees and asylum seekers was predominantly male, with 37% female participants. The average age was 31. Most participants (89%) reported having a currently secure residence status in Germany. 80% were unemployed. The largest group of migrants indicated Syria (26%) as their last country of residence, followed by Afghanistan (24%) and Iran (16%). These data are similar to results from two recent, large, cross-sectional surveys on the health of non-treatment-seeking refugees in Germany (Grabo & Leavey, 2023; Walther et al., 2020), making our analysis sample representative of RAS in Germany regarding key variables, though Syrian refugees were more represented in these surveys (>50% of overall study sample). The detailed sample characteristics can be found in Table 1.

Of the 219 participants included in this dropout analysis, 26 had been allocated to a watchful waiting approach at Level 1, 41 to app-based or peer-to-peer interventions at Level 2, 85 to group therapy at Level 3, and 67 to individual psychotherapy and/or psychotropic medication at Level 4. In total, 90 of 219 participants fulfilled the dropout criteria, defined as attending 50% or less of the intervention sessions, leading to an overall dropout rate of 41,1%. In Level 1, the dropout rate was 4.4%, defined as patients not attending the post-intervention visit. In Level 2, where participants received non-expert interventions, the dropout rate amounted to 12%. In Level 3, 58% of participants were characterized as dropouts. In level 4, where participants received individual expert interventions, the dropout rate was 24%.

All variables included in the predictor analysis can be found in Table 2. Overall, the logistic regression model was significant ($\chi^2 = 3.43$, $p < 0.001$) and showed a positive correlation with dropout for the following variables: participation in Level 3 ($p = 0.001$; OR = 10.7), satisfaction with personal relationships, sex life, and support from friends (WHOQOL-Social scale; $p = 0.017$; OR = 1.87), difficulties in building and maintaining personal relationships (SDQ-Peer problem scale; $p = 0.005$; OR = 4.27), and depressive symptoms (MADRS score; $p = 0.029$; OR = 1.05). This implies that participants included in Level 3, those with a larger satisfaction with social relationships, those with difficulties in building and maintaining personal relationships, and those with higher depressive symptoms were more likely to drop out of the study.

The following variables showed an inverse significant correlation with dropout: housing in refugee accommodation ($p = 0.040$; OR = 0.45), difference in social status before and after flight ($p = 0.008$; OR = 0.67), SDQ-Conductance problem scale ($p = 0.020$; OR = 0.24), and SDQ-Emotional problem scale ($p = 0.013$; OR = 0.31). This implies that participants living in refugee accommodation, with a larger difference in social status before and after flight, with conduct and emotional problems are less likely to drop out of treatment.

The analysis also showed tentative evidence for a positive association between secure residence status and dropout ($p = 0.065$; OR = 2.90), implying that those with secure residence status were more likely to drop out.

Table 2. Results of logistic regression on treatment dropout *v.* completion

Variable	OR	95% CI[a]	*p* value
Intervention level			
No intervention	–	–	
Non-expert intervention	1.87	[0.46–7.66]	0.4
Group intervention	10.7	[2.76–41.8]	<0.001
Individual expert intervention	3.26	[0.74–14.3]	0.12
Housing			
Other accommodation	–	–	
Refugee accommodation	0.45	[0.21–0.96]	0.040
MADRS score	1.05	[1.01–1.10]	0.029
Social status difference	0.67	[0.50–0.90]	0.008
Age	0.97	[0.94–1.01]	0.13
BRS score	0.65	[0.38–1.13]	0.12
Residence status			
Insecure	–	–	
Secure	2.90	[0.94–9.01]	0.065
WHOQOL-Social scale	1.87	[1.12–3.11]	0.017
SDQ-Peer problem scale	4.27	[1.55–11.7]	0.005
SDQ-Conductance problem scale	0.24	[0.07–0.79]	0.020
SDQ-Emotional problem scale	0.31	[0.12–0.78]	0.013

OR, Odds ratio; CI, Confidence interval; MADRS, Montgomery Asberg Depression Rating Scale; BRS, Brief Resilience Scale; SDQ, Strengths and Difficulties Questionnaire; WHOQOL, World Health Organisation Quality of Life. OR above 1 implies higher probability of dropout with increasing variable value; OR below 1 implies lower probability of dropout with increasing variable value.
[a]Confidence interval for a given variable's odds ratio.

Discussion

The Present study aimed to characterize dropout *v.* non-dropout participants in the MEHIRA study. The overall study sample consisted of 584 RAS (Böge et al., 2022), constituting one of the largest samples investigating mental health and psychotherapy in this population (Acarturk et al., 2022; Cuijpers et al., 2022; Purgato et al., 2021).

The initial study design assumed a dropout rate of 50% (Böge et al., 2020b). Overall, measured dropout was lower at 41.7%, albeit still high, compared to around 20% in Western populations (Edlund et al., 2002; Swift & Greenberg, 2012) and to previously observed dropout rates of 19% in a meta-analysis of dropout from psychological interventions in RAS (Semmlinger & Ehring, 2022). This may be partially due to the complexity of delivering therapy through a novel SCCM, while individual intervention arms in SCCM take longer to fill. Thus, recruitment phases are prolonged (Böge et al., 2022), which may lead to higher attrition. Participants in Level 3 were significantly more likely to drop out. This may be partially due to the longer waiting time until the completion of recruitment for an intervention, due to the closed group format. Therefore, open group formats might be more suitable for this population in upcoming trials, and more extensive research is needed in this mobile population. Despite these organizational issues, we cannot rule out that other aspects of intervention 3 – such as a reluctance to open up in a group

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setting – are responsible for the high drop-out. Notably, though, other studies in RAS have not shown group therapy to influence dropout (Semmlinger & Ehring, 2022), however, future research should examine this topic.

Moreover, specific post-migration stressors have been discussed to increase dropout (Sandhu et al., 2013; Semmlinger & Ehring, 2022; Slobodin & de Jong, 2015). The present study partially confirms these hypotheses. Overall, social relationships seem to influence attrition. Patients with high satisfaction with personal relationships, sex life, and support from friends, measured by the WHOQOL-Social scale, were more likely to drop out. Conversely, difficulties in building and maintaining personal relationships assessed by the SDQ-Peer problem scale were also associated with higher dropout. The WHOQOL Social Scale measures satisfaction with personal relationships, social support, and sexual activity (Development of the World Health Organization WHOQOL-BREF quality of life assessment, 1998) whereas the SDQ-Peer problem scale assesses the ability to build and maintain relationships with peers (Brann, Lethbridge, & Mildred, 2018; Goodman, 1997). These results may indicate that higher satisfaction with personal relationships lowers the need for mental health care, while experiencing difficulties with peers may impair adherence to a predefined treatment scheme involving, among others, peer-to-peer, and group interventions. Put differently, both social resources and difficulties seem to influence dropout in the MEHIRA trial. Conversely, higher scores on the SDQ-Conduct problems scale assessing (Brann et al., 2018; Goodman, 1997) are associated with lower dropout. Additionally, a person with social issues who tends to be solitary and with few friends may receive less external encouragement to continue treatment. Therefore, the type of interpersonal issue may matter when explaining dropout. The negative association between the SDQ-Emotional problem scale and dropout may indicate that participants with issues such as somatic symptoms, worries, and low confidence are more likely to see a need for treatment. Furthermore, social status loss predicted dropout. The loss of financial resources and recognition might be a challenge that needs to be addressed within the study interventions, leading to increased dropout. Interestingly, previous studies have argued that losing the social environment due to flight may increase dropout (Sandhu et al., 2013; Semmlinger & Ehring, 2022). While the present study provides evidence for the importance of social relationships and behavioral aspects for attrition, this relation seems to be more complex than previously hypothesized. Issues regarding social status loss, and relationships with peers, friends, and family, seem to have a multifaceted influence on treatment-seeking behavior, going beyond the hypothesis that more social stressors lead to a higher dropout rate. This should be considered in the design of future studies and psychotherapeutic interventions that could specifically address the topic of shaping relationships with peers and fostering social support.

Additionally, significantly lower dropout rates occurred among those living in refugee accommodation. This might be due to a higher need for therapy for those living in more dire conditions, as refugee housing tends to lack privacy, residents are burdened with higher noise levels, and usually have an uncertain residence status (Babka von Gostomski et al., 2016). This aligns with previous research suggesting an association between quality of living conditions and negative mental health outcomes (Schilz et al., 2023). Previous studies, however, have also hypothesized that difficult living conditions may hinder treatment-seeking (Slobodin & de Jong, 2015). Furthermore, the analysis showed tentative evidence for a positive association between residence status and dropout, meaning those with secure residence status were more likely to stop treatment. These results point towards the resilience of these subjects in the face of difficult living conditions. Lastly, patients with higher depressive symptoms were more likely to drop out. This may indicate high symptom burden prevents patients from finishing treatment and is in line with several findings from RCT conducted with Western populations (Barrett et al., 2008; Zimmermann, Rubel, Page, & Lutz, 2017).

The study has several limitations. Most importantly, it was only sufficiently powered to provide tentative evidence for within-treatment-level dropout characteristics (see Appendix). An in-depth analysis is necessary to understand the challenges of the individual interventions, especially Level 3, and adapt them appropriately. Additional, sufficiently powered studies investigating post-migration stressors, social factors, and organizational issues are needed. Moreover, while questionnaires in this study had been previously validated (Böge et al., 2020b) and were translated according to WHO guidelines to Arabic and/or Farsi for this study, a minor number of instruments had not been validated in these languages (e.g. SDQ), particularly for refugees, and must therefore be interpreted with caution. Additionally, it needs to be noted that participants under the age of 18 and with psychotic disorders were excluded from the analysis, limiting the generalizability of the results. It is also important to consider here that the present population consists of refugees who were initially willing to participate in a trial; thus, drop-out rates for refugees in routine treatment may be even higher and should, therefore, be investigated in future studies. Further limitations pertain to the definition and assessment of drop-out. For one, assessing the time point of dropout would help to understand whether treatment was discontinued right after starting treatment or only after multiple weeks. Secondly, the original study's definition of drop-out (i.e. attending half of the intervention sessions) is a pragmatic solution within the resource-intense context of a randomized controlled trial with different treatment modalities comprising the SCCM all requiring different definitions of drop-out. However, future studies should explore more fine-grained measures of drop-out, such as user engagement and their associations with drop-out predictors in refugees. Regarding methodology, the exploratory nature of the analysis is another limitation of this study. While this approach seems appropriate given the relative dearth of data on drop-out in RAS, future studies should probe the robustness of the significant predictors mentioned here using confirmatory analysis techniques. At the same time, variables that only approached statistical significance but displayed meaningful effect sizes - such as the WHOQOL-Physical health scale - may warrant future investigation despite their lack of statistical significance. Furthermore, preexisting stigma may negatively influence treatment adherence (Barrett et al., 2008) and should be accounted for by assessing the participants' expectations and individual attitudes. Finally, although Patient and Public Involvement (PPI) approaches were included in the study (Böge et al., 2022), such involvement was limited due to financial and time constraints. PPI approaches have been shown to lower dropout rates by including individuals with lived experience more extensively in the study and intervention design (Dziobek & Lipinski, 2021). Sufficient funding and time to increase PPI approaches may improve adherence.

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Conclusion

The Assessment of dropout predictors should inform mental health professionals in designing interventions and treatment planning. This is especially relevant in contexts with high disease burden and limited resources. Stepped Care and Collaborative Models are complex in design and implementation to ensure cost-effective measures tailored to specific patient needs. Overall, the outcomes of this study suggest that social relationships, social status, living conditions, and intervention design are multifaceted in influencing dropout in RAS. One way that these findings may impact mental health service provision to refugees is by influencing content discussed in psychotherapeutic interventions. Specifically, there may be a need for an increased focus on social issues, which previous studies have also been found to be relevant for refugee mental health (Böge et al., 2020a). For instance, the present findings might engender an increased discussion of social status loss in psychotherapy with refugees; consequently, a larger number of refugees may feel their mental health concerns addressed and become less likely to drop out of treatment. Future research on attrition on the intervention level is needed in this population, specifically group interventions, to improve intervention design in this mobile population faced with particular stressors.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/S0033291724003179.

Data availability statement. The trial data can be requested deidentified and anonymized by researchers for future usage in independent scientific research projects. These requests should be addressed to the corresponding author to negotiate a data-sharing agreement with the Charité-Universitätsmedizin Berlin.

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Tobias Banaschewski reports a relationship with Lundbeck LLC that includes: consulting or advisory. Tobias Banaschewski reports a relationship with Medice that includes: consulting or advisory and speaking and lecture fees. Tobias Banaschewski reports a relationship with Neurim Pharmaceuticals Ltd that includes: consulting or advisory. Tobias Banaschewski reports a relationship with Oberberg GmbH that includes: consulting or advisory. Tobias Banaschewski reports a relationship with Takeda that includes: consulting or advisory and speaking and lecture fees. Tobias Banaschewski reports a relationship with InfectoPharm Medicines and Advice GmbH that includes: consulting or advisory. Tobias Banaschewski reports a relationship with Eli Lilly and Company that includes: speaking and lecture fees. Alkomiet Hasan reports a relationship with AbbVie Ltd. that includes: speaking and lecture fees. Alkomiet Hasan reports a relationship with Advanz that includes: speaking and lecture fees. Alkomiet Hasan reports a relationship with Janssen-Cilag that includes: board membership and speaking and lecture fees. Alkomiet Hasan reports a relationship with Lundbeck LLC that includes: board membership and speaking and lecture fees. Alkomiet Hasan reports a relationship with Recordati that includes: board membership and speaking and lecture fees. Alkomiet Hasan reports a relationship with Rovi that includes: board membership and speaking and lecture fees. Alkomiet Hasan reports a relationship with Otsuka Pharmaceutical Co Ltd that includes: board membership and speaking and lecture fees. Paul Plener reports a relationship with Shire that includes: speaking and lecture fees. Paul Plener reports a relationship with InfectoPharm Medicines and Advice GmbH that includes: speaking and lecture fees. Frank Padberg reports a relationship with Brainsway Inc that includes: board membership and non-financial support. Frank Padberg reports a relationship with Mag&More GmbH that includes: non-financial support and speaking and lecture fees. Frank Padberg reports a relationship with neuroCare Group GmbH that includes: speaking and lecture fees. Frank Padberg reports a relationship with neuroConn GmbH that includes: non-financial support. Malek Bajbouj reports a relationship with Bayer AG that includes: board membership. Malek Bajbouj reports a relationship with GH Research that includes: board membership. Alkomiet Hasan is editor of the German (DGPPN) schizophrenia treatment guidelines and first author of the WFSBP schizophrenia treatment guideline. Paul Plener was involved in clinical trials of Lundbeck and Servier. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Competing interests. Dr Banaschewski served in an advisory or consultancy role for Lundbeck, Medice, Neurim Pharmaceuticals, Oberberg GmbH, Takeda, and Infectopharm. He received conference support or speaker's fees from Lilly, Medice, and Takeda. He received royalties from Hogrefe, Kohlhammer, CIP Medien, Oxford University Press; the present work is unrelated to these relationships. Alkomiet Hasan is editor of the German (DGPPN) schizophrenia treatment guidelines, first author of the WFSBP schizophrenia treatment guidelines; on advisory boards of and speaker fees from AbbVie (speaker fees only), Advanz (speaker fees only), Janssen-Cilag, Lundbeck, Recordati, Rovi, and Otsuka. Paul Plener was involved in clinical trials of Lundbeck and Servier. He received a speaker's honorarium from Shire and Infectopharm. Frank Padberg is a member of the European Scientific Advisory Board of Brainsway Inc., Jerusalem, Israel, and has received speaker's honoraria from Mag&More GmbH and the neuroCare Group. His lab has received support with equipment from neuroConn GmbH, Ilmenau, Germany, and Mag&More GmbH and Brainsway Inc., Jerusalem, Israel. Malek Bajbouj is member of advisory boards for Bayer and GH Research. The other authors declare no competing interests.

Ethical standards. All procedures were performed in compliance with relevant laws and institutional guidelines. Ethics approval was obtained from institutional ethics boards at each site. As part of the MEHIRA study, this study was conducted in accordance with the latest version of the Declaration of Helsinki and has been approved by the Ethical Committee of Charité-Universitätsmedizin Berlin (EA2/070/17).

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