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# Patterns of care and dropout rates from outpatient mental healthcare in low-, middle- and high-income countries from the World Health Organization's World Mental Health Survey Initiative

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## Abstract

**Background.** There is a substantial proportion of patients who drop out of treatment before they receive minimally adequate care. They tend to have worse health outcomes than those who complete treatment. Our main goal is to describe the frequency and determinants of dropout from treatment for mental disorders in low-, middle-, and high-income countries. **Methods.** Respondents from 13 low- or middle-income countries ( $N = 60\,224$ ) and 15 in high-income countries ( $N = 77\,303$ ) were screened for mental and substance use disorders. Cross-tabulations were used to examine the distribution of treatment and dropout rates for those who screened positive. The timing of dropout was examined using Kaplan–Meier curves. Predictors of dropout were examined with survival analysis using a logistic link function.

**Results.** Dropout rates are high, both in high-income (30%) and low/middle-income (45%) countries. Dropout mostly occurs during the first two visits. It is higher in general medical rather than in specialist settings (nearly 60% *v.* 20% in lower income settings). It is also higher for mild and moderate than for severe presentations. The lack of financial protection for mental health services is associated with overall increased dropout from care.

**Conclusions.** Extending financial protection and coverage for mental disorders may reduce dropout. Efficiency can be improved by managing the milder clinical presentations at the entry point to the mental health system, providing adequate training, support and specialist supervision for non-specialists, and streamlining referral to psychiatrists for more severe cases.

## Introduction

The treatment gap in mental disorders is well-established. A recent report from the WHO World Mental Health (WMH) Surveys showed that only 13.7% of individuals with a 12-month Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition/Composite International Diagnostic Interview (DSM-IV/CIDI) mental disorder in low/lower-middle income countries, 22.0% in upper-middle income countries, and 36.8% in high-income countries receive any type of professional treatment (Evans-Lacko et al., 2018). Only a minority of the people getting treatment received at least minimally adequate treatment when compared to accepted treatment guidelines. A major reason for this is treatment dropout (Alonso et al., 2018; Degenhardt et al., 2017; Evans-Lacko et al., 2018).

It has long been known that premature interruption of mental health treatment is a common event that has negative consequences both for the patients and the mental health care system (Swift & Greenberg, 2012). Numerous studies have been conducted to understand the causes and consequences of treatment dropout (Cooper & Conklin, 2015; Fassino, Pierò, Tomba, & Abbate-Daga, 2009; Roos & Werbart, 2013). These studies have identified socio-demographic, provider and clinical factors associated with different dropout rates. For example, young age among adults (Wang, 2007; Xiang et al., 2010), lower socio-economic status (income and education) (Centorrino et al., 2002; Warden et al., 2009a), ethnic minority status (Wang, 2007), and lack of health insurance (Edlund et al., 2002) have all been linked to increased probability of treatment dropout. However, other studies have not found a consistent relationship between these or other sociodemographic factors and treatment dropout (Hoyer et al., 2016; Olfson et al., 2009). High variability has also been reported in the frequency of dropout. For example, two meta-analyses including studies of psychotherapeutic treatment for a mental disorder reported mean dropout rates of 19.7% (Swift & Greenberg, 2012) and 47% (Wierzbicki & Pekarik, 1993). Dropout has also been studied for specific disorders, including depression, posttraumatic stress disorders (PTSD), gambling, substance use disorders (SUD), and eating disorders, among others. For example, Roberts, Murphy, Turner, and Sharman (2020) found that for gambling disorder the treatment dropout rate was 51.3% and significantly associated with older age, higher education, higher levels of debt, online gambling, gambling on poker, shorter duration of treatment, higher depression, experience of previous treatment programs and medication, and adverse childhood experiences; Belleau et al. (2017) observed that among individuals with PTSD and SUD, 35 to 62% of individuals drop out of treatment; and Huas et al. (2011) found that for anorexia the dropout rate was above 50%. The inconsistency of findings, variability of methods, and the fact that the vast majority of studies have been carried out only

in high-income countries limit generalizability. Moreover, most studies have focused on the analysis of treatments provided for a single disorder in a single treatment sector, which may overestimate dropout from overall sources of care (Olfson et al., 2009).

The WMH Survey Initiative is the largest effort to date to estimate the burden of mental disorders worldwide, providing population epidemiological data of the prevalence, correlates and treatment for mental disorders in all the continents (Andrade et al., 2014; Kessler et al., 2009). WMH has developed a consistent methodology to estimate the burden of mental and substance use disorders. Every year new countries join the initiative, which means that the same survey protocol is implemented in a new country or region, increasing our sample size and expanding the applicability of our results. In addition to previously reported results (Wells et al., 2013), this study includes data from new surveys conducted in Argentina, Medellín (Colombia), Murcia (Spain), Peru, and Poland. It also includes new variables and stratifies the analyses by early dropout (i.e. dropping out after just 1 or 2 visits) and late dropout (i.e. after the third or subsequent visits). Our objective is to describe the frequency and determinants of dropout in population representative samples from low-, middle-, and high-income countries or regions.

From a health systems perspective, dropout from care represents a relevant outcome: it points to an inefficiency that frustrates the successful efforts of the person and the system to produce a clinical encounter. Indeed, several steps need to take place before such an encounter is possible: the person (or their significant others) needs to acknowledge a problem, reach out to a health care provider, and overcome any barriers to accessibility (such as wait times, out of pocket costs, paperwork, etc). So, understanding the dropout phenomenon and its determinants better is of the utmost importance. As will be described in more detail in the following section, we have developed a distinction between 'early' and 'late' dropout, depending on whether it occurs during the first two encounters or after the third. This distinction seeks to capture an important clinical consideration: whether the initial contact was somehow frustrated or dissatisfactory for the patient, or whether the initial contact was potentially established, treatment initiated, and then interrupted.

## Methods and procedures

### Sample

Thirteen WMH surveys were carried out in countries classified by the World Bank as low- or middle-income countries at the time of data collection (combined  $N = 60\,224$ ; weighted mean response rate 81.1%) and 15 in countries classified as high-income (combined  $N = 77\,303$ ; weighted response rate 63.5%) (Table 1). Eighteen of the 28 surveys (6 in low/middle-income

**Table 1.** WMH sample characteristics by World Bank income categories<sup>a</sup>

Country by income category	Survey <sup>b</sup>	Sample characteristics <sup>c</sup>	Field dates	Age range	Sample size			Response rate <sup>e</sup>
					Part I	Part II	Part II and age ≤44 <sup>d</sup>	
I. Low- and middle-income countries								
Brazil – São Paulo	São Paulo Megacity	São Paulo metropolitan area.	2005–8	18–93	5037	2942	–	81.3
Bulgaria	NSHS	Nationally representative.	2002–6	18–98	5318	2233	741	72.0
Colombia	NSMH	All urban areas of the country (~73% of the total national population).	2003	18–65	4426	2381	1731	87.7
Colombia - Medellín <sup>f</sup>	MMHHS	Medellin metropolitan area.	2011–12	19–65	3261	1673	–	97.2
Iraq	IMHS	Nationally representative.	2006–7	18–96	4332	4332	–	95.2
Lebanon	LEBANON	Nationally representative.	2002–3	18–94	2857	1031	595	70.0
Mexico	M-NCS	All urban areas of the country (~75% of the total national population).	2001–2	18–65	5782	2362	1736	76.6
Nigeria	NSMHW	21 of the 36 states in the country, representing 57% of the national population. The surveys were conducted in Yoruba, Igbo, Hausa and Efik languages.	2002–4	18–100	6752	2143	1203	79.3
Peru	EMSMP	Five urban areas of the country (~38% of the total national population).	2004–5	18–65	3930	1801	1287	90.2
PRC <sup>g</sup> – Shenzhen <sup>h</sup>	Shenzhen	Shenzhen metropolitan area. Included temporary residents as well as household residents.	2005–7	18–88	7132	2475	–	80.0
Romania	RMHS	Nationally representative.	2005–6	18–96	2357	2357	–	70.9
South Africa <sup>h</sup>	SASH	Nationally representative.	2002–4	18–92	4315	4315	–	87.1
Ukraine	CMDPSD	Nationally representative.	2002	18–91	4725	1720	541	78.3
Total					(60 224)	(31 765)	(7834)	81.1
II. High-income countries								
Argentina	AMHES	Eight largest urban areas of the country (~50% of the total national population).	2015	18–98	3927	2116	–	77.3
Belgium	ESEMeD	Nationally representative. The sample was selected from a national register of Belgium residents.	2001–2	18–95	2419	1043	486	50.6
France	ESEMeD	Nationally representative. The sample was selected from a national list of households with listed telephone numbers.	2001–2	18–97	2894	1436	727	45.9
Germany	ESEMeD	Nationally representative.	2002–3	19–95	3555	1323	621	57.8
Israel	NHS	Nationally representative.	2003–4	21–98	4859	4859	–	72.6
Italy	ESEMeD	Nationally representative. The sample was selected from municipality resident registries.	2001–2	18–100	4712	1779	853	71.3
Japan	WMHJ 2002–2006	Eleven metropolitan areas.	2002–6	20–98	4129	1682	–	55.1
Netherlands	ESEMeD	Nationally representative. The sample was selected from municipal postal registries.	2002–3	18–95	2372	1094	516	56.4
New Zealand <sup>h</sup>	NZMHS	Nationally representative.	2004–5	18–98	12 790	7312	–	73.3
N. Ireland	NISHS	Nationally representative.	2005–8	18–97	4340	1986	–	68.4
Poland	EZOP	Nationally representative.	2010–11	18–65	10 081	4000	2276	50.4
Portugal	NMHS	Nationally representative.	2008–9	18–81	3849	2060	1070	57.3
Spain	ESEMeD	Nationally representative.	2001–2	18–98	5473	2121	960	78.6
Spain – Murcia	PEGASUS – Murcia	Murcia region. Regionally representative.	2010–12	18–96	2621	1459	–	67.4

(Continued)

Table 1. (Continued.)

Country by income category	Survey <sup>b</sup>	Sample characteristics <sup>c</sup>	Field dates	Age range	Sample size			Response rate <sup>e</sup>
					Part I	Part II	Part II and age ≤44 <sup>d</sup>	
United States	NCS-R	Nationally representative.	2001–3	18–99	9282	5692	3197	70.9
Total					(77 303)	(39 962)	(10 706)	63.5
III. Total					(137 527)	(71 727)	(18 540)	70.2

<sup>a</sup>The World Bank (2012) Data. Accessed May 12, 2012 at: <http://data.worldbank.org/country>. Some of the WMH countries have moved into new income categories since the surveys were conducted. The income groupings above reflect the status of each country at the time of data collection. The current income category of each country is available at the preceding URL.

<sup>b</sup>NSMH (The Colombian National Study of Mental Health); IMHS (Iraq Mental Health Survey); NSMHW (The Nigerian Survey of Mental Health and Wellbeing); EMSMP (La Encuesta Mundial de Salud Mental en el Perú); CMDPSD (Comorbid Mental Disorders during Periods of Social Disruption); NSHS (Bulgaria National Survey of Health and Stress); MMHHS (Medellin Mental Health Household Study); LEBANON (Lebanese Evaluation of the Burden of Ailments and Needs of the Nation); M-NCS (The Mexico National Comorbidity Survey); RMHS (Romania Mental Health Survey); SASH (South Africa Health Survey); AMHES (Argentina Mental Health Epidemiologic Survey); ESEMed (The European Study Of The Epidemiology Of Mental Disorders); NHS (Israel National Health Survey); WMHJ2002-2006 (World Mental Health Japan Survey); NZMHS (New Zealand Mental Health Survey); NISHS (Northern Ireland Study of Health and Stress); EZOP (Epidemiology of Mental Disorders and Access to Care Survey); NMHS (Portugal National Mental Health Survey); PEGASUS-Murcia (Psychiatric Enquiry to General Population in Southeast Spain-Murcia); NCS-R (The US National Comorbidity Survey Replication).

<sup>c</sup>Most WMH surveys are based on stratified multistage clustered area probability household samples in which samples of areas equivalent to counties or municipalities in the US were selected in the first stage followed by one or more subsequent stages of geographic sampling (e.g. towns within counties, blocks within towns, households within blocks) to arrive at a sample of households, in each of which a listing of household members was created and one or two people were selected from this listing to be interviewed. No substitution was allowed when the originally sampled household resident could not be interviewed. These household samples were selected from Census area data in all countries other than France (where telephone directories were used to select households) and the Netherlands (where postal registries were used to select households). Several WMH surveys (Belgium, Germany, Italy, Poland, Spain-Murcia) used municipal, country resident or universal health-care registries to select respondents without listing households. The Japanese sample is the only totally un-clustered sample, with households randomly selected in each of the 11 metropolitan areas and one random respondent selected in each sample household. Eighteen of the 28 surveys are based on nationally representative household samples.

<sup>d</sup>Argentina, Brazil, Colombia-Medellin, Iraq, Israel, Japan, New Zealand, Northern Ireland, PRC – Shenzhen, Romania, South Africa and Spain-Murcia did not have an age restricted Part 2 sample. All other countries, with the exception of Nigeria and Ukraine (which were age restricted to ≤39) were age restricted to ≤44.

<sup>e</sup>The response rate is calculated as the ratio of the number of households in which an interview was completed to the number of households originally sampled, excluding from the denominator households known not to be eligible either because of being vacant at the time of initial contact or because the residents were unable to speak the designated languages of the survey. The weighted average response rate is 70.2%.

<sup>f</sup>Colombia moved from the 'lower and lower-middle income' to the 'upper-middle income' category between 2003 (when the Colombian National Study of Mental Health was conducted) and 2010 (when the Medellin Mental Health Household Study was conducted), hence Colombia's appearance in both income categories. For more information, please see footnote a.

<sup>g</sup>People's Republic of China.

<sup>h</sup>For the purposes of cross-national comparisons we limit the sample to those 18+.

countries and 12 in high-income countries) were of nationally representative multistage clustered area probability household samples. Of the surveys that were not nationally representative, two included all parts of the country with the exception of deeply rural areas, one included only selected regions of the country, and the remaining seven included only one or more urbanized areas.

The interviews were carried out face-to-face by lay interviewers monitored closely by supervisors who were trained by the WMH professional survey administration staff from the Survey Research Center (SRC) at the University of Michigan's Institute for Social Research. Training and field quality control procedures are discussed in more detail elsewhere (Pennell et al., 2008). The interviews in most surveys were in two parts. All respondents were administered the Part I interview, which contained assessments of core psychiatric disorders. A subsample of Part I respondents, which included 100% of those with a Part I psychiatric disorder and a probability sample of other Part I respondents, was then administered Part II. This two-part subsampling was done to reduce survey burden among respondents who did not have a disorder. All surveys used a Part I weight to adjust for differences in within-household probability of selection and to post-stratify for discrepancies between the sample and population on known demographic and geographic variables. A Part II weight was then used to adjust for the under-sampling of Part I respondents who did not have any Part I disorder. These weighting procedures are discussed in more detail elsewhere (Heeringa et al., 2008).

## Measures

### Translation and administration procedures

The WMH interview schedule was originally developed in English. Translation, back-translation, and harmonization of the interview in local languages for use in the WMH surveys were carried out in each country using WHO guidelines and monitored by a centralized back-translation monitoring committee (Pennell et al., 2008). A mix of paper and pencil and computer administration procedures was used, with low/middle-income countries more likely than high-income countries to use paper and pencil administration. Informed consent was obtained in all countries before beginning interviews. Local Institutional Review Boards approved and monitored the procedures used to protect human subjects.

### Diagnostic assessment

DSM-IV disorders were assessed with Version 3.0 of the WHO Composite International Diagnostic Interview (CIDI; Kessler & Üstün, 2004), a fully-structured diagnostic interview designed to be administered by trained lay interviewers.

Disorders were assessed using the definitions of the American Psychiatric Association DSM-IV (APA, 1994). The disorders assessed included mood disorders (major depressive disorder, dysthymic disorder, bipolar disorder), anxiety disorders (panic disorder, generalized anxiety disorder, agoraphobia without panic disorder, social phobia, specific phobia, separation anxiety disorder, PTSD), externalizing disorders (attention-deficit/hyperactivity disorder, conduct disorder, intermittent explosive

disorder, oppositional-defiant disorder), and substance disorders (alcohol and illicit drug abuse with or without dependence). DSM-IV organic exclusion rules were used to make diagnoses. Methodological evidence collected in clinical reappraisal studies shows that diagnoses based on CIDI 3.0 have generally good concordance with diagnoses based on blinded clinical reappraisal interviews (Haro *et al.*, 2006; Kessler *et al.*, 2005). This study only included respondents with a diagnosed disorder.

#### *Disorder severity*

Twelve-month DSM-IV/CIDI disorders were classified as severe, moderate or mild. Respondents were classified as having a severe 12-month disorder if they met criteria for bipolar I disorder, substance dependence with a physiological dependence syndrome, had a suicide attempt in the past 12 months in conjunction with any 12-month disorder, or if they had at least one 12-month disorder associated with self-reported severe role impairment as assessed with the Sheehan Disability Scale (SDS; Sheehan, Harnett-Sheehan, & Raj, 1996). Respondents not classified as having a severe disorder were classified as moderate if interference was rated as at least moderate in any SDS domain or if the respondent had substance dependence without a physiological dependence syndrome. The remaining respondents with any 12-month disorder were categorized as mild.

#### *Treatment*

All Part II respondents were asked whether they ever received treatment for ‘problems with your emotions or nerves or your use of alcohol or drugs.’ Both outpatient and inpatient treatment are included in the results, as the surveys do not distinguish between treatment settings for each episode of care. Separate assessments were made for different types of professionals, support groups, self-help groups, mental health crisis hotlines, and complementary-alternative medicine (CAM) therapies.

Reports of 12-month treatment were classified into three mutually exclusive categories: treatment by a psychiatrist whether or not treatment was also received from some other healthcare professional; treatment by other mental health professional in the absence of psychiatric treatment; and treatment in the general medical sector only. This classification focuses on the level of specialization of the care required by the patient, which is tied to increased costs and complexity of the care delivered. Hence, disorder severity indicates the need, while the type of services used (as defined above) provides an initial breakdown of the system’s resources. Of note, we are not comparing between different providers (in fact, those receiving care from a psychiatrist may also receive care from a psychologist and a general physician), but between levels in a stepped care model that meets increased need with increasingly resource-intensive services.

#### *Treatment dropout*

Respondents who received treatment in each healthcare treatment sector in the past 12 months were asked whether treatment had stopped or was ongoing. Respondents that reported they stopped treatment in the healthcare sector were asked whether they ‘quit before the [provider(s) in that sector] wanted [them] to stop.’ Respondents who reported quitting before the provider(s) wanted them to stop were classified as having dropped out from that treatment sector. For purposes of these analyses overall dropout denotes dropping out of all studied healthcare sectors. Further, we distinguished whether dropout occurs during the first two encounters (i.e. early), or after the third (i.e. late). This distinction

is consistent with an important clinical consideration: it may take more than one encounter for the patient to sufficiently engage with a provider in order to move to the next stage of care. And, we posit that three or more encounters may indicate that the treatment stage was achieved. We acknowledge that this threshold is to some extent arbitrary, so our findings with this respect should be interpreted with caution.

#### *Predictors*

All respondents were asked about health insurance. Responses were classified into the categories state-funded or subsidized, insurance through an employer or national social security, direct private/optional insurance, any other health insurance, and none. Socio-demographic predictors included gender, age (18–29, 30–44, 45–59, 60+), education and family income (each coded low, low-average, high-average, high), and marital status (married/cohabiting, previously married, never married). Given the wide cross-national variation in education, the four categories of educational attainment were coded to be appropriate for the specific country. In high-income countries, the high education category corresponds to a college degree, high-average to some post-secondary education without a college degree, low-average to secondary school graduation, and low to less than secondary education. These thresholds divide the populations of high-income countries into four groups of roughly equal size. The thresholds in other countries were selected to do the same. For family income, we classified high income as greater than three times the within-country median per capita family income (i.e. income divided by number of family members), high-average income as between one and three times than median, low-average as 50–100% of that median, and low income as less than 50% median per capita family income.

#### *Analysis methods*

All analyses were carried out using SAS Version 9.4 (SAS Institute Inc., 2002). Cross-tabulations were used to examine the distribution of treatment and dropout rates across sectors. The timing of dropout was examined using Kaplan–Meier curves. Predictors of dropout were examined with survival analysis using a logistic link function. Survival coefficients and these coefficients  $\pm$  two standard errors were exponentiated and reported as odds-ratios (ORs) with 95% confidence intervals (CIs). Separate models were examined for early and later dropout. Standard errors of estimates were obtained using the SUDAAN (Research Triangle Institute, 2002) software system to adjust for the geographic clustering and weighting of the WMH data. Multivariate significance tests were made using Wald  $\chi^2$  tests based on coefficient variance–covariance matrices adjusted for design effects using the Taylor series method. Statistical significance was evaluated using two-sided design-based tests ( $\alpha = .05$ ).

#### *Results*

The distribution of treatment across providers was similar in high-income and low/middle-income countries, with 30.8–32.9% of patients, respectively, treated by a psychiatrist, 22.2–19.4% by other mental health professions but not psychiatrists, and the remaining 47.0–47.7% treated exclusively in the general medical sector (Table 2). Mean (interquartile range) number of visits (across all sectors) in high- and low/middle-income countries was consistently highest among patients seen by psychiatrists [18.4 (3–21), 13.6 (2–12)], intermediate among patients seen by other mental health professionals [13.5 (2–15), 6.2 (1–6)], and

**Table 2.** Number of visits by sector (Part I) and treatment status (Part II) and by treatment among respondents with at least one disorder in the 12 months before interview who received mental health treatment in the past 12 months in the World Mental Health Surveys, by country income group

Part I	High-income countries						Low/middle-income countries					
	<i>n</i> <sup>a</sup>	% <sup>b</sup>	(SE)	Mean number of visits	(SE)	IQR <sup>c</sup>	<i>n</i> <sup>a</sup>	% <sup>b</sup>	(SE)	Mean number of visits	(SE)	IQR <sup>c</sup>
Treatment												
Psychiatrist (whether or not received other service)	1197	30.8	(0.9)	18.4	(1.0)	[3, 21]	395	32.9	(1.5)	13.6	(0.9)	[2, 12]
Not psychiatrist but other mental health (whether or not received general medical)	828	22.2	(0.8)	13.5	(0.5)	[2, 15]	235	19.4	(1.2)	6.2	(0.4)	[1, 6]
General medical (only)	1762	47.0	(1.0)	3.0	(0.1)	[1, 2]	573	47.7	(1.7)	2.9	(0.1)	[1, 3]
Any of the 3 services	3787			10.1	(0.4)	[1, 10]	1203			7.0	(0.4)	[1, 5]

Part II	High-income countries									Low/middle-income countries								
	Treatment drop out			Completed treatment			Still in treatment			Treatment drop out			Completed treatment			Still in treatment		
	<i>n</i> <sup>a</sup>	% <sup>b</sup>	(SE)	<i>n</i> <sup>a</sup>	% <sup>b</sup>	(SE)	<i>n</i> <sup>a</sup>	% <sup>b</sup>	(SE)	<i>n</i> <sup>a</sup>	% <sup>b</sup>	(SE)	<i>n</i> <sup>a</sup>	% <sup>b</sup>	(SE)	<i>n</i> <sup>a</sup>	% <sup>b</sup>	(SE)
Treatment																		
Psychiatrist (whether or not received other service)	174	17.2	1.2	110	9.6	0.8	913	73.2	1.4	84	18.5	1.6	55	16.5	1.8	256	65.0	2.0
Not psychiatrist but other mental health (whether or not received general medical)	150	19.9	1.5	160	19.2	1.2	518	60.9	1.6	106	44.2	3.0	37	16.9	2.5	92	38.9	2.9
General medical (only)	784	43.2	1.2	284	17.4	1.1	694	39.5	1.3	308	57.2	1.9	95	17.6	1.3	170	25.2	1.9
Any of the 3 services	1108			554			2125			498			187			518		

<sup>a</sup>Unweighted number of respondents who received treatment in the sector.<sup>b</sup>Weighted percentage. Percentages are weighted to adjust for differences in selection probabilities, differential non-response, oversampling of Part II cases and residual differences on sociodemographic variables between the sample and the population.<sup>c</sup>IQR: Interquartile range.

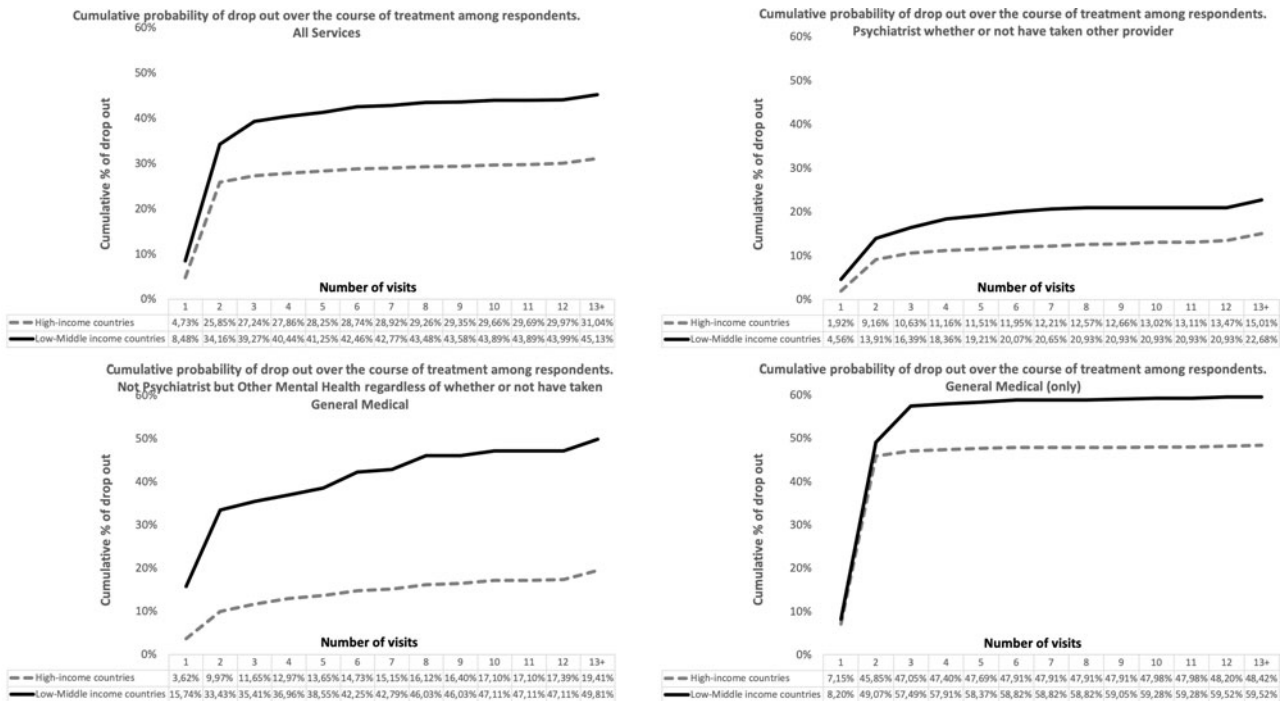


Fig. 1. Probability of drop out over the course of treatment.

lowest among patients seen exclusively in the general medical sector [3.0 (1–2), 2.9 (1–3)].

The treatment dropout rate was lowest in both high- and low/middle-income countries among patients treated by a psychiatrist (17.2–18.5%), intermediate among those treated by other mental health professions (19.9–44.2%), and highest among those treated exclusively in the general medical sector (43.2–57.2%) (Table 2). However, these were all lower-bound estimates because the number of patients still in treatment at the time of interview was consistently higher than the number who reported successfully completing treatment, raising the likelihood that some of these patients dropped out of treatment subsequent to the time of interview. An estimate of these cumulative dropout rates was obtained by generating Kaplan–Meier curves based on retrospective data of conditional probabilities of dropout as a function of number of visits (Fig. 1). Projected cumulative dropout was estimated to be close to 30% overall after 13 visits (the largest number for visits over which stable estimates of cumulative dropout could be projected) in high-income countries and ~45% in low/middle-income countries. Projected dropout rates varied from values close to 15% for specialty treatment to nearly 50% for general medical treatment in high-income countries and from 25% for psychiatry treatment to 50% for other mental health specialty treatment and 60% for general medical treatment in low/middle-income countries. The majority of projected dropouts in each curve occurred within two visits. This was especially pronounced among patients seen exclusively in the general medical sector, where well over 90% of all projected dropout occurred after one or two visits.

**Predictors of treatment dropout**

*Severity and disorder type*

Models were estimated separately for dropout after ‘1 or 2’ and ‘3 or more’. The severity of the clinical presentation for respondents

with any disorder was a significant predictor in a number of models (Table 3). For both low- and high-income countries, dropout was significantly elevated among patients with mild (OR = 1.8) and moderate (OR = 1.5) disorders after 1–2 visits. In high-income countries, these increased odds were driven by early dropout from psychiatric treatment. The associations of severity and dropout in low/middle-income countries were diverse and more nuanced. In addition to the increased early dropout of people with less severe presentations (also driven by increased dropout from treatment with psychiatrists; OR = 2.2 for mild and 4.7 for moderate), we found a significant association of severity with dropout after 3 or more visits. The direction of these associations was contingent on the type of treatment provided: people with milder clinical presentations had elevated odds of dropout from treatment with a psychiatrist after 3 or more visits (OR = 2.2 for mild and OR = 1.9 for moderate), whereas people with severe presentations that were not seeing a psychiatrist had decreased dropout after 3 or more visits (OR = 0.5–0.4 for moderate in ‘other mental health service’ and ‘general medical’ respectively). No consistent associations were found involving disorder type (see online Appendix Table 1), and the small numbers of respondents with some specific disorders and disorder combinations precluded us from estimating more complex models combining disorder type, number, and severity.

*Insurance*

Patients with no coverage (either in the form of insurance or public mental health services) in high-income countries were significantly more likely to drop out from psychiatric care after 3 + visits than patients who did have insurance (Table 4). This was true regardless of the type of insurance the patient carried (see online Appendix Table 2). The same general pattern for dropout from psychiatric treatment was found in low/middle-income countries (i.e. higher dropout after 3 + visits among patients with no

**Table 3.** Bivariate associations of 12-month disorder severity with treatment dropout after 1–2 and 3+ visits among patients with 12-month DSM-IV/ICD10 disorders in the World Mental Health Surveys, by country income group<sup>a</sup>

	1–2 visits				3+ visits								
	Mild		Moderate		Mild		Moderate						
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)					
<b>I. High-income countries</b>													
Psychiatrist (whether or not received other service)	1.8	(0.9–3.4)	2.4*	(1.4–4.2)	0.007	0.007	2.2	(1.0–4.6)	1.2	(0.7–2.0)	0.115	0.115	972
Not psychiatrist but other mental health (whether or not received general medical)	1.0	(0.5–1.9)	0.8	(0.4–1.4)	0.665	0.665	0.9	(0.3–2.3)	1.2	(0.7–1.9)	0.693	0.693	633
General medical (only)	1.4	(1.0–1.8)	1.1	(0.9–1.4)	0.083	0.083	0.9	(0.4–2.1)	0.7	(0.4–1.3)	0.566	0.566	443
Any of the three services	1.8*	(1.4–2.2)	1.5*	(1.2–1.9)	<0.0001	<0.0001	1.6	(0.9–2.8)	1.5*	(1.0–2.1)	0.049	0.049	2048
<b>II. Low/middle-income countries</b>													
Psychiatrist (whether or not received other service)	2.2*	(1.2–4.1)	4.7*	(2.4–8.9)	<0.0001	<0.0001	2.2*	(1.4–3.7)	1.9	(0.5–6.7)	0.005	0.005	269
Not psychiatrist but other mental health (whether or not received general medical)	1.7	(0.8–3.5)	1.8*	(1.0–3.0)	0.111	0.111	0.8	(0.5–1.4)	0.5*	(0.3–0.8)	0.001	0.001	103
General medical (only)	0.9	(0.5–1.5)	0.9	(0.6–1.3)	0.833	0.833	0.8	(0.5–1.2)	0.4*	(0.3–0.6)	<0.0001	<0.0001	174
Any of the three services	1.8*	(1.2–2.5)	1.8*	(1.4–2.4)	0.000	0.000	2.9*	(2.1–4.0)	1.5	(0.9–2.5)	<0.0001	<0.0001	546

\*Significant at the 0.05 level, two-sided test compared to patients with severe disorders.

<sup>a</sup>Each model included dummy variable controls for survey and number of visits. The models for any dropout additionally controlled for treatment sector.

insurance with than with insurance), and this association was also significant for those seeking treatment by other mental health providers. Patients with no insurance in low- and middle-income countries are significantly less likely to drop out after 1–2 visits if they sought help only in the general medical sector.

**Socio-demographics**

The socio-demographic variables considered here had generally non-significant multivariate associations with treatment dropout in the 16 multivariate models estimated across sectors crossed by the number of visits separately in low/middle- and high-income countries after controlling for type-severity of disorders and type of insurance. Summary multivariate results are reported in online Appendix Table 3. Perhaps the most striking result is that the indicators of socio-economic status (education, employment, family income) are for the most part unrelated to dropout.

**Conclusion and discussion**

These findings indicate that dropout during treatment for mental disorders is high, reaching nearly 30% in high-income and 45% in low-income countries. Dropout is higher in general medical rather than in specialist settings (nearly 60% v. 20% in lower income settings), and higher for mild and moderate than for severe presentations. We also found that the lack of financial protection for mental health services is associated with overall increased dropout from specialist care, as well as with increased relative dropout rates for people with milder clinical forms from psychiatric care, and for people with more severe presentations from general medical services, especially in low-income settings.

The results of this study need to be assessed taking into consideration the following limitations. First, data are based on self-report which is susceptible to recall bias. Second, data do not indicate if visits in the previous 12 months correspond to a single episode of care, or if the treatment from two or more professionals occurred within an interdisciplinary care system. In case of visits being conducted by more than one professional, this would underestimate dropout rate. Third, there is heterogeneity across the countries in disorder prevalence (Demyttenaere et al., 2004), health system service organization and resources (WHO, 2017) that may affect the conclusions based on pooled analyses, which was necessary to avoid sparse data. Analysis by country income level and inclusion of a variable to capture financial protection through insurance or public services, seek to mitigate this limitation. Fourth, community surveys fail to adequately capture low prevalence disorders (such as schizophrenia) due to methodological constraints; most respondents with these disorders though, can be expected to meet criteria for comorbid anxiety, mood, or substance disorders, and would therefore be indirectly captured in our analyses. Fifth, our analysis focuses on dropout from treatments provided within the healthcare system, and does not consider community supports provided through community-based human services, CAM, and support groups. Sixth, we highlight that the number of visits does not imply a consistent interval of time. One advantage of the application of discrete-time survival analysis models is that it does not require an x-axis related to time (which would be continuous) and also allows inconsistent time intervals. Similar approaches in which Kaplan–Meier curves were used to examine drop out by number of visits have been published before in the area (see e.g. Edlund et al., 2002; Olfson et al., 2009; Wells et al., 2013). Seventh, we also acknowledge that we are not able to attribute



**Table 4.** Bivariate associations<sup>a</sup> of health insurance with treatment dropout (after 1–2 and 3+ visits) among patients with 12-month DSM-IV/CIDI disorders in the World Mental Health Surveys, by country income group

	No insurance		$\chi^2$ ( <i>p</i> value)	Sample size
	OR	(95% CI)		
<b>I. High-income countries</b>				
After 1–2 visits				
Psychiatrist (whether or not received other service)	1.7	(0.7–4.4)	0.230	225
Not psychiatrist but other mental health (whether or not received general medical)	1.6	(0.5–4.6)	0.395	195
General medical (only)	1.1	(0.7–1.9)	0.677	1319
Any of the three services	1.4	(0.9–2.1)	0.131	1739
After 3+ visits				
Psychiatrist (whether or not received other service)	6.0*	(2.3–15.3)	0.000	972
Not psychiatrist but other mental health (whether or not received general medical)	0.4	(0.1–2.1)	0.271	633
General medical (only)	1.1	(0.2–6.4)	0.901	443
Any of the three services	2.0	(0.8–4.6)	0.122	2048
<b>II. Low/middle-income countries</b>				
After 1–2 visits				
Psychiatrist (whether or not received other service)	1.2	(0.7–2.2)	0.518	126
Not psychiatrist but other mental health (whether or not received general medical)	0.8	(0.4–1.4)	0.418	132
General medical (only)	0.4*	(0.2–0.6)	<0.0001	399
Any of the three services	0.7	(0.5–1.2)	0.218	657
After 3+ visits				
Psychiatrist (whether or not received other service)	7.5*	(4.0–14.1)	<0.0001	269
Not psychiatrist but other mental health (whether or not received general medical)	11.9*	(7.4–18.9)	<0.0001	103
General medical (only)	1.1	(0.5–2.3)	0.854	174
Any of the three services	2.9*	(1.8–4.8)	<0.0001	546

\*Significant at the 0.05 level, two-sided test compared to patients with any insurance.

<sup>a</sup>Each model included dummy variable controls for survey and number of visits. The models for any dropout additionally controlled for treatment sector.

each episode of care to specific diagnoses. However, mental health providers are expected to treat people as a whole, so it is reasonable to expect that disorders that meet well-established thresholds (such as CIDI diagnosed disorders) would be captured by a clinical assessment performed within the healthcare system. Finally, several country-specific socioeconomic and cultural characteristics may explain variations in help-seeking behaviors: we have shown the impact of financial coverage on dropout rates, but also stigma toward mental illness and other cultural norms may affect people's ability to seek and remain engaged with care, and would be important areas of additional research.

Despite these limitations, our results have important implications for mental health policy and systems planning. In addition to the findings summarized above, our data indicate that the impact of sociodemographic variables on dropout rates is not significant. This may signal that dropout is not so much a consequence of predisposing population characteristics but of how the healthcare system is resourced and organized, or of how treatment is perceived in terms of effectiveness (Andersen, 1995). This is consistent with a previous report of the WMH Survey Initiative (Evans-Lacko *et al.*, 2018), and provides targets for improvement that are within the health system itself (as opposed to socially predetermined individual variables).

Dropout generally occurs during the first two visits of care, most likely before beneficial effects of treatment can be produced and perceived by the individual. This is especially true of general medical services, where 90% of dropouts occur before the third session. This is consistent with previous epidemiological and administrative data studies (Olfson *et al.*, 2009; Pan, Liu, & Yeh, 2013; Petterson, Miller, Payne-Murphy, & Phillips, 2014; Wells *et al.*, 2013), and highlights the need to improve training, supervision, support and to review treatment practices for general health providers if they are to be effective entry points to the mental health system. Indeed, patterns of dropout varied remarkably between professionals and country income level. Mean number of visits was higher and dropout rates lower (more than 10 visits and less than 20% dropout rates) for psychiatrists across country income levels. Figures were similar for the 'other health professionals' group in high-income countries. However, the figures were very different (3 to 6 mean number of visits and 43% to 57% dropout rates) for the general medical sector across country income levels or for those treated by other mental health professionals in low/middle-income countries. Given that current guidelines call for common mental disorders to be treated in primary care (Fletcher *et al.*, 2009; NICE, 2004), our findings indicate that significant efforts remain to be made before the

general medical sector can provide adequate mental care: most people actually drop out before reaching the minimum required number of visits by any standard (APA, 2010; Gautam, Jain, Gautam, Vahia, & Grover, 2017; NICE, 2009).

Our findings also indicate that dropout is significantly associated with severity but not with disorder type. Previous studies have been inconsistent: Simon and Ludman found an association in patients with depression between severity and dropout rates (Pan et al., 2013; Simon & Ludman, 2010), while Warden et al., did not (Warden et al., 2009a, b). With respect to specific mental disorders, some studies found variability in dropout rates (Fernandez-Arias et al., 2016; Murphy et al., 2015; Oflaz et al., 2015), while others did not (Gonzalez, Weersing, Warnick, Scahill, & Woolston, 2011). The granularity of our data allows us to go one step further and draw preliminary conclusions that shed light on these inconsistencies. In general, people with milder presentations tend to drop out more and drop out earlier, but this tendency is mostly driven by dropout of treatment with psychiatrists. Data from lower income settings show that, in addition to this increased dropout of people with milder clinical presentations from psychiatric care, there is an increase in dropout of people with more severe presentations from general medical and other mental health services. This finding is relevant for health systems planning because it points to what may be the specific changes required to improve outcomes. Indeed, best practices prescribe the management of common and milder mental disorders through primary care, while reserving the scarce specialist resources for more severe clinical presentations and for supervision of general medical services. Our data indicate that in low- and middle-income settings, there may be inefficiencies and potential quality gaps in how the system is organized: a subgroup of people with milder clinical presentations are receiving care from psychiatrists (and dropping out more than people with severe disorders), while a subgroup of people with more severe clinical forms are not receiving care from psychiatrists (and dropping out more than people with less severe disorders). Hence, a stepped care framework in which milder forms are dealt with directly through general medical services while severe cases are systematically referred to psychiatrists or managed in closer consultations with specialists seems like a promising evidence-based approach.

Finally, these results show a significant effect of financial coverage of health services (in the form of insurance or direct public provision) on dropout rates. Insurance was associated with lower dropout rates after the third visit in patients being treated by psychiatrists both in high-income and low/middle-income countries. In low/middle-income countries, insurance was associated with lower dropout rates in treatment with other mental health professionals as well. Previous studies (which were constrained to the mental health sector and/or were not stratified by service provider) have also found an effect of insurance on dropout rates (Agarwal, Pan, & Sambamoorthi, 2013; Warden et al., 2009b). Our granular data highlight the impact of financial protection on the continuity of care at different levels of specialization both in low- and high-income settings.

Collectively these findings have implications for policy and health systems planning. First, dropout from mental health treatment is relevant globally because of its high frequency, its potential to increase health care costs due to inefficiencies, and to worsen health outcomes due to missed opportunities to intervene early (Barnicot, Katsakou, Marougka, & Priebe, 2011; Swift & Greenberg, 2012). Second, extending financial protection and

coverage for mental disorders may reduce dropout and therefore improve continuity of care and health outcomes, especially for those that need specialist care. Third, dropout seems to affect diverse subgroups differently, and a holistic, stepped-care approach to providing mental health services can be expected to improve efficiency and quality of care by: (a) grounding the entry point to the mental health system in primary care, which should manage milder clinical presentations; (b) providing adequate training, support and specialist supervision for non-specialists; and (c) streamlining referral to psychiatrists for more severe and complex cases.

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A complete list of all within-country and cross-national WMH publications can be found at <http://www.hcp.med.harvard.edu/wmh/>.

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**Ethical standards.** The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

## References

- Agarwal, P., Pan, X., & Sambamoorthi, U. (2013). Depression treatment patterns among individuals with osteoarthritis: A cross sectional study. *BMC Psychiatry*, *13*, 121. doi: 10.1186/1471-244X-13-121.
- Alonso, J., Liu, Z., Evans-Lacko, S., Sadikova, E., Sampson, N., Chatterji, S., ... Thornicroft, G. (2018). Treatment gap for anxiety disorders is global: Results of the World Mental Health Surveys in 21 countries. *Depression and Anxiety*, *35*(3), 195–208. doi: 10.1002/da.22711.
- American Psychiatric Association (APA) (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Arlington: American Psychiatric Publishing, Inc.
- American Psychiatric Association (APA) (2010). *Practice guidelines for the treatment of patients with major depressive disorder*. Washington, DC: American Psychiatric Association (APA). ([https://psychiatryonline.org/pb/assets/raw/sitewide/practice\\_guidelines/guidelines/mdd.pdf](https://psychiatryonline.org/pb/assets/raw/sitewide/practice_guidelines/guidelines/mdd.pdf)). Accessed 28 September 2019.
- Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior*, *36*(1), 1–10. doi: 10.2307/2137284.
- Andrade, L. H., Alonso, J., Mneimneh, Z., Wells, J. E., Al-Hamzawi, A., Borges, G., ... Kessler, R. C. (2014). Barriers to mental health treatment: Results from the WHO World Mental Health surveys. *Psychological Medicine*, *44* (6), 1303–1317. doi: 10.1017/S0033291713001943.
- Barnicot, K., Katsakou, C., Marougka, S., & Priebe, S. (2011). Treatment completion in psychotherapy for borderline personality disorder – a systematic review and meta-analysis. *Acta Psychiatrica Scandinavica*, *123*(5), 327–338. doi: 10.1111/j.1600-0447.2010.01652.x.
- Belleau, E. L., Chin, E. G., Wanklyn, S. G., Zambrano-Vazquez, L., Schumacher, J. A., & Coffey, S. F. (2017). Pre-treatment predictors of drop-out from prolonged exposure therapy in patients with chronic post-traumatic stress disorder and comorbid substance use disorders. *Behaviour Research and Therapy*, *91*, 43–50. doi: 10.1016/j.brat.2017.01.011.
- Centorrino, F., Hernán, M. A., Drago-Ferrante, G., Rendall, M., Apicella, A., Långar, G., & Baldessarini, R. J. (2002). Factors associated with noncompliance with psychiatric outpatient visits. *Psychiatric Services*, *52*(3), 378–380. doi: 10.1176/appi.ps.52.3.378.

- Cooper, A. A., & Conklin, L. R. (2015). Dropout from individual psychotherapy for major depression: A meta-analysis of randomized clinical trials. *Clinical Psychology Review, 40*, 57–65. doi: 10.1016/j.cpr.2015.05.001.
- Degenhardt, L., Glantz, M., Evans-Lacko, S., Sadikova, E., Sampson, N., Thornicroft, G., ... Kessler, R. C. (2017). Estimating treatment coverage for people with substance use disorders: An analysis of data from the World Mental Health Surveys. *World Psychiatry, 16*(3), 299–307. doi: 10.1002/wps.20457.
- Demyttenaere, K., Bruffaerts, R., Posada-Villa, J., Gasquet, I., Kovess, V., Lepine, J. P., ... Chatterji, S. (2004). Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *Journal of the American Medical Association, 291*(21), 2581–2590. doi: 10.1001/jama.291.21.2581.
- Edlund, M. J., Wang, P. S., Berglund, P. A., Katz, S. J., Lin, E., & Kessler, R. C. (2002). Dropping out of mental health treatment: Patterns and predictors among epidemiological survey respondents in the United States and Ontario. *American Journal of Psychiatry, 159*(5), 845–851. doi: 10.1176/appi.ajp.159.5.845.
- Evans-Lacko, S., Aguilar-Gaxiola, S., Al-Hamzawi, A., Alonso, J., Benjet, C., Bruffaerts, R., ... Thornicroft, G. (2018). Socio-economic variations in the mental health treatment gap for people with anxiety, mood, and substance use disorders: Results from the WHO World Mental Health (WMH) surveys. *Psychological Medicine, 48*(9), 1560–1571. doi: 10.1017/S0033291717003336.
- Fassino, S., Pierò, A., Tomba, E., & Abbate-Daga, G. (2009). Factors associated with dropout from treatment for eating disorders: A comprehensive literature review. *BMC Psychiatry, 9*, 67. doi: 10.1186/1471-244X-9-67.
- Fernandez-Arias, I., Garcia-Fernandez, G., Bernaldo-de-Quiros, M., Estupinua Puig, F. J., Labrador Encinas, F. J., & Labrador-Mendez, M. (2016). Premature termination of psychological treatment for anxiety disorders in a clinical setting. *Psicothema, 28*(3), 241–246. doi: 10.7334/psicothema2015.201.
- Fletcher, J., Bower, P. J., Gilbody, S., Lovell, K., Richards, D., & Gask, L. (2009). Collaborative care for depression and anxiety problems in primary care. *Cochrane Database of Systematic Reviews, (2)*, 1–256. doi: 10.1002/14651858.CD006525.
- Gautam, S., Jain, A., Gautam, M., Vahia, V., & Grover, S. (2017). Clinical practice guidelines for the management of depression. *Indian Journal of Psychiatry, 59*(Suppl 1), S34–S50. doi: 10.4103/0019-5545.196973.
- Gonzalez, A., Weersing, V. R., Warnick, E. M., Scahill, L. D., & Woolston, J. L. (2011). Predictors of treatment attrition among an outpatient clinic sample of youths with clinically significant anxiety. *Administration and Policy in Mental Health and Mental Health Services Research, 38*(5), 356–367. doi: 10.1007/s10488-010-0323-y.
- Haro, J. M., Arbabzadeh-Bouchez, S., Brugha, T. S., De Girolamo, G., Guyer, M. E., Jin, R., ... Kessler, R. C. (2006). Concordance of the composite international diagnostic interview version 3.0 (CIDI 3.0) with standardized clinical assessments in the WHO World Mental Health Surveys. *International Journal of Methods in Psychiatric Research, 15*(4), 167–180. doi: 10.1002/mpr.196.
- Heeringa, S. G., Wells, J. E., Hubbard, F., Mneimneh, Z., Chiu, W. T., Sampson, N. A., & Berglund, P. A. (2008). Sample designs and sampling procedures. In R. C. Kessler and T. B. Üstun (Eds), *The WHO World Mental Health Surveys: Global perspectives on the epidemiology of mental disorders* (pp. 18–32). Cambridge: Cambridge University Press.
- Hoyer, J., Wiltink, J., Hiller, W., Miller, R., Salzer, S., Sarnowsky, S., ... Leibing, E. (2016). Baseline patient characteristics predicting outcome and attrition in cognitive therapy for social phobia: Results from a large multicentre trial. *Clinical Psychology and Psychotherapy, 23*(1), 35–46. doi: 10.1002/cpp.1936.
- Huas, C., Godart, N., Foulon, C., Pham-Scottez, A., Divac, S., Fedorowicz, V., ... Rouillon, F. (2011). Predictors of dropout from inpatient treatment for anorexia nervosa: Data from a large French sample. *Psychiatry Research, 185*(3), 421–426. doi: 10.1016/j.psychres.2009.12.004.
- Kessler, R. C., Adler, L., Ames, M., Demler, O., Faraone, S., Hiripi, E., ... Walters, E. E. (2005). The World Health Organization Adult ADHD Self-Report Scale (ASRS): A short screening scale for use in the general population. *Psychological Medicine, 35*(2), 245–256. doi: 10.1017/s0033291704002892.
- Kessler, R. C., Aguilar-Gaxiola, S., Alonso, J., Chatterji, S., Lee, S., Ormel, J., ... Wang, P. S. (2009). The global burden of mental disorders: An update from the WHO World Mental Health (WMH) surveys. *Epidemiologia e Psichiatria Sociale, 18*(1), 23–33. doi: 10.1017/s1121189x00001421.
- Kessler, R. C., & Üstün, T. B. (2004). The World Mental Health (WMH) survey initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *International Journal of Methods in Psychiatric Research, 13*(1), 93–121. doi: 10.1002/mpr.168.
- Murphy, D., Hodgman, G., Carson, C., Spencer-Harper, L., Hinton, M., Wessely, S., & Busuttill, W. (2015). Mental health and functional impairment outcomes following a 6-week intensive treatment programme for UK military veterans with post-traumatic stress disorder (PTSD): A naturalistic study to explore dropout and health outcomes at follow-up. *BMJ Open, 5*, 1–9. doi: 10.1136/bmjopen-2014-007051.
- National Institute for Health and Care Excellence (NICE) (2004). *Depression: The treatment and management of depression in adults*. NICE guidelines [CG23]. London, UK: NICE (<http://www.scamfyc.org/documentos/depre-sion%20NICE.pdf>). Accessed 28 September 2019.
- National Institute for Health and Care Excellence (NICE) (2009). *Depression: The treatment and management of depression in adults*. NICE guidelines [CG90]. London, UK: NICE (<https://www.nice.org.uk/guidance/cg90>). Accessed 28 September 2019.
- Oflaz, S., Guveli, H., Kalelioglu, T., Akyazi, S., Yildizhan, E., Kilic, K. C., ... Oral, E. T. (2015). Illness perception of dropout patients followed up at bipolar outpatient clinic, Turkey. *Asian Journal of Psychiatry, 15*, 68–72. doi: 10.1016/j.ajp.2015.04.006.
- Olfson, M., Mojtabai, R., Sampson, N. A., Hwang, I., Druss, B., Wang, P. S., ... Kessler, R. C. (2009). Dropout from outpatient mental health care in the United States. *Psychiatric Services, 60*(7), 898–907. doi: 10.1176/appi.ps.60.7.898.
- Pan, Y. J., Liu, S. K., & Yeh, L. L. (2013). Factors affecting early attrition and later treatment course of antidepressant treatment of depression in naturalistic settings: An 18-month nationwide population-based study. *Journal of Psychiatric Research, 47*(7), 916–925. doi: 10.1016/j.jpsychires.2013.03.005.
- Pennell, B. E., Mneimneh, Z., Bowers, A., Chardoul, S., Wells, J. E., Viana, M. C., ... Villagut Saiz, G. (2008). Implementation of the World Mental Health Surveys. In R. C. Kessler and T. B. Üstun (Eds), *The WHO World Mental Health Surveys: Global perspectives on the epidemiology of mental disorders*. (pp. 35–57). Cambridge: Cambridge University Press.
- Petterson, S., Miller, B. F., Payne-Murphy, J. C., & Phillips, R. L. (2014). Mental health treatment in the primary care setting: Patterns and pathways. *Families Systems and Health, 32*(2), 157–166. doi: 10.1037/fsh0000036.
- Research Triangle Institute. (2002). *SUDAAN 8.0*. Research Triangle Park, NC: Research Triangle Institute.
- Roberts, A., Murphy, R., Turner, J., & Sharman, S. (2020). Predictors of dropout in disordered gamblers in UK residential treatment. *Journal of Gambling Studies, 36*(1), 373–386. doi: 10.1007/s10899-019-09876-7.
- Roos, J., & Werbart, A. (2013). Therapist and relationship factors influencing dropout from individual psychotherapy: A literature review. *Psychotherapy Research, 23*(4), 394–418. doi: 10.1080/10503307.2013.775528.
- SAS Institute (2002). *SAS 9.4*. Cary, NC: SAS Institute Inc.
- Sheehan, D. V., Harnett-Sheehan, K., & Raj, B. A. (1996). The measurement of disability. *International Clinical Psychopharmacology, 11*(Suppl 3), 89–95. doi: 10.1097/00004850-199606003-00015.
- Simon, G. E., & Ludman, E. J. (2010). Predictors of early dropout from psychotherapy for depression in community practice. *Psychiatric Services, 61*(7), 684–689. doi: 10.1176/ps.2010.61.7.684.
- Swift, J. K., & Greenberg, R. P. (2012). Premature discontinuation in adult psychotherapy: A meta-analysis. *Journal of Consulting and Clinical Psychology, 80*(4), 547–559. doi: 10.1037/a0028226.
- Wang, J. L. (2007). Mental health treatment dropout and its correlates in a general population sample. *Medical Care, 45*(3), 224–229. doi: 10.1097/01.mlr.0000244506.86885.a5.
- Warden, D., Rush, A. J., Carmody, T. J., Kashner, T. M., Biggs, M. M., Crismon, M. L., & Trivedi, M. H. (2009b). Predictors of attrition during one year of

- depression treatment: A roadmap to personalized intervention. *Journal of Psychiatric Practice*, 15(2), 113–124. doi: 10.1097/01.pra.0000348364.88676.83.
- Warden, D., Rush, A. J., Wisniewski, S. R., Lesser, I. M., Thase, M. E., Balasubramani, G. K., ... Trivedi, M. H. (2009a). Income and attrition in the treatment of depression: A STAR\*D report. *Depression and Anxiety*, 26(7), 622–633. doi: 10.1002/da.20541.
- Wells, J. E., Browne, M. O., Aguilar-Gaxiola, S., Al-Hamzawi, A., Alonso, J., Angermeyer, M. C., ... Kessler, R. C. (2013). Drop out from out-patient mental healthcare in the World Health Organization's World Mental Health Survey initiative. *British Journal of Psychiatry*, 202(1), 42–49. doi: 10.1192/bjp.bp.112.113134.
- Wierzbicki, M., & Pekarik, G. (1993). A meta-analysis of psychotherapy drop-out. *Professional Psychology: Research and Practice*, 24(2), 190–195. doi: 10.1037/0735-7028.24.2.190.
- World Health Organization (WHO). (2017). *Project atlas: Resources for mental health*. Geneva: World Health Organization (<https://apps.who.int/iris/bitstream/handle/10665/272735/9789241514019-eng.pdf?ua=1>). Accessed 28 September 2019.
- Xiang, Y.-T., Weng, Y.-Z., Leung, C.-M., Tang, W.-K., Chan, S. S. M., Wang, C.-Y., ... Ungvari, G. S. (2010). Gender differences in sociodemographic and clinical characteristic and the quality of life of Chinese schizophrenia patients. *Australian and New Zealand Journal of Psychiatry*, 44(5), 450–455. doi: 10.3109/00048670903489858.