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

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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% vs 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.

Keywords: Dropout; mental health; survival analysis; WMH surveys

4

Introduction

24   The treatment gap in mental disorders is well-established. A recent report from the

25   WHO World Mental Health (WMH) Surveys showed that only 13.7% of individuals with a

26   12-month Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition/Composite

27   International Diagnostic Interview (DSM-IV/CIDI) mental disorder in low/lower-middle

28   income countries, 22.0% in upper-middle income countries, and 36.8% in high income

29   countries receive any type of professional treatment (Evans-Lacko et al., 2018). Only a

30   minority of the people getting treatment received at least minimally adequate treatment when

31   compared to accepted treatment guidelines. A major reason for this is treatment dropout

32   (Degenhardt et al., 2017; Alonso et al., 2018; Evans-Lacko et al., 2018).

33   It has long been known that premature interruption of mental health treatment is a

34   common event that has negative consequences both for the patients and the mental health

35   care system (Swift & Greenberg, 2012). Numerous studies have been conducted to

36   understand the causes and consequences of treatment dropout (Fassino, Pierò, Tomba, &

37   Abbate-Daga, 2009; Roos & Werbart, 2013; Cooper & Conklin, 2015). These studies have

38   identified socio-demographic, provider and clinical factors associated with different dropout

39   rates. For example, young age among adults (Wang, 2007; Xiang et al., 2010), lower socio-

40   economic status (income and education) (Centorrino et al., 2002; Warden et al., 2009a),

41   ethnic minority status (Wang, 2007), and lack of health insurance (Edlund et al., 2002) have

42   all been linked to increased probability of treatment dropout. However, other studies have not

43   found a consistent relationship between these or other sociodemographic factors and

44   treatment dropout (Olfson et al., 2009; Hoyer et al., 2016). High variability has also been

45   reported in the frequency of dropout. For example, two meta-analyses including studies of

46   psychotherapeutic treatment for a mental disorder reported mean dropout rates of 19.7%

47   (Swift & Greenberg, 2012) and 47% (Wierzbicki & Pekarik, 1993). Dropout has also been

48 studied for specific disorders, including depression, posttraumatic stress (PTSD), gambling,

49 substance use disorders (SUD), and eating disorders, among others. For example, Roberts

50 Murphy, Turner and Sharman (2020) found that for gambling disorder the treatment dropout

51 rate was 51.3% and significantly associated with older age, higher education, higher levels of

52 debt, online gambling, gambling on poker, shorter duration of treatment, higher depression,

53 experience of previous treatment programs and medication, and adverse childhood

54 experiences; Belleau et al. (2017) observed that among individuals with PTSD and SUD, 35

55 to 62% of individuals drop out of treatment; and Huas et al. (2011) found that for anorexia

56 the dropout rate was above 50%. The inconsistency of findings, variability of methods, and

57 the fact that the vast majority of studies have been carried out only in high-income countries

58 limit generalizability. Moreover, most studies have focused on the analysis of treatments

59 provided for a single disorder in a single treatment sector, which may overestimate dropout

60 from overall sources of care (Olfson et al., 2009).

61   The WMH Survey Initiativeis the largest effort to date to estimate the burden of

62 mental disorders worldwide, providing population epidemiological data of the prevalence,

63 correlates and treatment for mental disorders in all the continents (Kessler et al., 2009;

64 Andrade et al., 2014). The WMHSI has developed a consistent methodology to estimate the

65 burden of mental and substance use disorders. Every year new countries join the initiative,

66 which means that the same survey protocol is implemented in a new country or region,

67 increasing our sample size and expanding the applicability of our results. In addition to

68 previously reported results (Wells et al., 2013), this study includes data from new surveys

69 conducted in Argentina, Medellin (Colombia), Murcia (Spain), Peru, and Poland. It also

70 includes new variables and stratifies the analyses by early dropout (i.e. dropping out after just

71 1 or 2 visits) and late dropout (i.e. after the third or subsequent visits). Our objective is to

72   describe the frequency and determinants of dropout in population representative samples

73   from low, middle- and high-income countries or regions.

74   From a health systems perspective, dropout from care represents a relevant outcome:

75   it points to an inefficiency that frustrates the successful efforts of the person and the system to

76   produce a clinical encounter. Indeed, several steps need to take place before such an

77   encounter is possible: the person (or their significant others) needs to acknowledge a

78   problem, reach out to a health care provider, and overcome any barriers to accessibility (such

79   as wait times, out of pocket costs, paperwork, etc). So, understanding the dropout

80   phenomenon and its determinants better is of the utmost importance. As will be described in

81   more detail in the following section, we have developed a distinction between "early" and

82   "late" dropout, depending on whether it occurs during the first two encounters or after the

83   third. This distinction seeks to capture an important clinical consideration: whether the initial

84   contact was somehow frustrated or dissatisfactory for the patient, or whether the initial

85   contact was potentially established, treatment initiated, and then interrupted.

86

87   **Methods and Procedures**

88   **Sample**

89   Thirteen WMH surveys were carried out in countries classified by the World Bank as

90   low- or middle-income countries at the time of data collection (combined N = 60,224;

91   weighted mean response rate 81.1%) and 15 in countries classified as high-income (combined

92   N = 77,303; weighted response rate 63.5%) (Table 1). Eighteen of the 28 surveys (6 in

93   low/middle-income countries and 12 in high-income countries) were of nationally

94   representative multistage clustered area probability household samples. Of the surveys that

95   were not nationally representative, two included all parts of the country with the exception of

96 deeply rural areas, one included only selected regions of the country, and the remaining seven

97 included only one or more urbanized areas.

98   **(Table 1 about here)**

99 The interviews were carried out face-to-face by lay interviewers monitored closely by

100 supervisors who were trained by the WMH professional survey administration staff from the

101 Survey Research Center (SRC) at the University of Michigan's Institute for Social Research.

102 Training and field quality control procedures are discussed in more detail elsewhere (Pennell

103 et al., 2008). The interviews in most surveys were in two parts. All respondents were

104 administered the Part I interview, which contained assessments of core psychiatric disorders.

105 A subsample of Part I respondents, which included 100% of those with a Part I psychiatric

106 disorder and a probability sample of other Part I respondents, were then administered Part II.

107 This two-part subsampling was done to reduce survey burden among respondents who did

108 not have a disorder. All surveys used a Part I weight to adjust for differences in within-

109 household probability of selection and to post-stratify for discrepancies between the sample

110 and population on known demographic and geographic variables. A Part II weight was then

111 used to adjust for the under-sampling of Part I respondents who did not have any Part I

112 disorder. These weighting procedures are discussed in more detail elsewhere (Heeringa et al.,

113 2008).

114 **Measures**

115   **Translation and administration procedures:** The WMH interview schedule was

116 originally developed in English. Translation, back-translation, and harmonization of the

117 interview in local languages for use in the WMH surveys were carried out in each country

118 using WHO guidelines and monitored by a centralized back-translation monitoring

119 committee (Pennell et al., 2008). A mix of paper and pencil and computer administration

120 procedures was used, with low/middle income countries more likely than high income

121 countries to use paper and pencil administration. Informed consent was obtained in all

122 countries before beginning interviews. Local Institutional Review Boards approved and

123 monitored the procedures used to protect human subjects.

124 **Diagnostic assessment:** DSM-IV disorders were assessed with Version 3.0 of the

125 WHO Composite International Diagnostic Interview (CIDI; Kessler & Üstün, 2004), a fully-

126 structured diagnostic interview designed to be administered by trained lay interviewers.

127 Disorders were assessed using the definitions of the American Psychiatric Association DSM-

128 IV (APA, 1994). The disorders assessed included mood disorders (major depressive disorder,

129 dysthymic disorder, bipolar disorder), anxiety disorders (panic disorder, generalized anxiety

130 disorder, agoraphobia without panic disorder, social phobia, specific phobia, separation

131 anxiety disorder, post-traumatic stress disorder), externalizing disorders (attention-

132 deficit/hyperactivity disorder, conduct disorder, intermittent explosive disorder, oppositional-

133 defiant disorder), and substance disorders (alcohol and illicit drug abuse with or without

134 dependence). DSM-IV organic exclusion rules were used to make diagnoses. Methodological

135 evidence collected in clinical reappraisal studies shows that diagnoses based on CIDI 3.0

136 have generally good concordance with diagnoses based on blinded clinical reappraisal

137 interviews (Kessler et al., 2005; Haro et al., 2006). This study only included respondents with

138 a diagnosed disorder.

139 **Disorder severity:** Twelve-month DSM-IV/CIDI disorders were classified as severe,

140 moderate or mild. Respondents were classified as having a severe 12-month disorder if they

141 met criteria for bipolar I disorder, substance dependence with a physiological dependence

142 syndrome, had a suicide attempt in the past 12 months in conjunction with any 12-month

143 disorder, or if they had at least one 12-month disorder associated with self-reported severe

144 role impairment as assessed with the Sheehan Disability Scale (SDS; Sheehan, Harnett-

145 Sheehan, & Raj, 1996). Respondents not classified as having a severe disorder were classified

146   as moderate if interference was rated as at least moderate in any SDS domain or if the

147   respondent had substance dependence without a physiological dependence syndrome. The

148   remaining respondents with any 12-month disorder were categorized as mild.

149   **Treatment:** All Part II respondents were asked whether they ever received treatment

150   for "problems with your emotions or nerves or your use of alcohol or drugs." Both outpatient

151   and inpatient treatment are included in the results, as the surveys do not distinguish between

152   treatment settings for each episode of care. Separate assessments were made for different

153   types of professionals, support groups, self-help groups, mental health crisis hotlines, and

154   complementary-alternative medicine (CAM) therapies.

155   Reports of 12-month treatment were classified into three mutually exclusive

156   categories: treatment by a psychiatrist whether or not treatment was also received from some

157   other healthcare professional; treatment by other mental health professional in the absence of

158   psychiatric treatment; and treatment in the general medical sector only. This classification

159   focuses on the level of specialization of the care required by the patient, which is tied to

160   increased costs and complexity of the care delivered. Hence, disorder severity indicates the

161   need, while the type of services used (as defined above) provides an initial breakdown of the

162   system's resources. Of note, we are not comparing between different providers (in fact, those

163   receiving care from a psychiatrist may also receive care from a psychologist and a general

164   physician), but between levels in a stepped care model that meets increased need with

165   increasingly resource-intensive services.

166   **Treatment dropout:** Respondents who received treatment in each healthcare

167   treatment sector in the past 12 months were asked whether treatment had stopped or was

168   ongoing. Respondents that reported they stopped treatment in the healthcare sector were

169   asked whether they "quit before the [provider(s) in that sector] wanted [them] to stop".

170   Respondents who reported quitting before the provider(s) wanted them to stop were classified

171   as having dropped out from that treatment sector. For purposes of these analyses overall

172   dropout denotes dropping out of all studied healthcare sectors. Further, we distinguished

173   whether dropout occurs during the first two encounters (i.e., early), or after the third (i.e.,

174   late). This distinction is consistent with an important clinical consideration: it may take more

175   than one encounter for the patient to sufficiently engage with a provider in order to move to

176   the next stage of care. And, we posit that three or more encounters may indicate that the

177   treatment stage was achieved. We acknowledge that this threshold is to some extent arbitrary,

178   so our findings with this respect should be interpreted with caution.

179   **Predictors:** All respondents were asked about health insurance. Responses were

180   classified into the categories state-funded or subsidized, insurance through an employer or

181   national social security, direct private/optional insurance, any other health insurance, and

182   none. Socio-demographic predictors included gender, age (18-29, 30-44, 45-59, 60+),

183   education and family income (each coded low, low-average, high-average, high), and marital

184   status (married/cohabiting, previously married, never married). Given the wide cross-national

185   variation in education, the four categories of educational attainment were coded to be

186   appropriate for the specific country. In high-income countries, the high education category

187   corresponds to a college degree, high-average to some post-secondary education without a

188   college degree, low-average to secondary school graduation, and low to less than secondary

189   education. These thresholds divide the populations of high-income countries into four groups

190   of roughly equal size. The thresholds in other countries were selected to do the same. For

191   family income, we classified high income as greater than three times the within-country

192   median per capita family income (i.e. income divided by number of family members), high-

193   average income as between one and three times than median, low-average as 50–100% of

194   that median, and low income as less than 50% median per capita family income.

195   **Analysis methods**

196   All analyses were carried out using SAS Version 9.4 (SAS Institute Inc., 2002).

197   Cross-tabulations were used to examine the distribution of treatment and dropout rates across

198   sectors. The timing of dropout was examined using Kaplan-Meier curves. Predictors of

199   dropout were examined with survival analysis using a logistic link function. Survival

200   coefficients and these coefficients +/- two standard errors were exponentiated and reported as

201   odds-ratios (ORs) with 95% confidence intervals (CIs). Separate models were examined for

202   early and later dropout. Standard errors of estimates were obtained using the SUDAAN

203   (SUDAAN 8.0, 2002) software system to adjust for the geographic clustering and weighting

204   of the WMH data. Multivariate significance tests were made using Wald $\chi 2$ tests based on

205   coefficient variance–covariance matrices adjusted for design effects using the Taylor series

206   method. Statistical significance was evaluated using two-sided design-based tests (α=.05).

Results

208   The distribution of treatment across providers was similar in high-income and

209   low/middle-income countries, with 30.8-32.9% of patients, respectively, treated by a

210   psychiatrist, 22.2-19.4% by other mental health professions but not psychiatrists, and the

211   remaining 47.0-47.7% treated exclusively in the general medical sector (Table 2). Mean

212   (interquartile range) number of visits (across all sectors) in high- and low/middle-income

213   countries was consistently highest among patients seen by psychiatrists (18.4 [3-21], 13.6 [2-

214   12]), intermediate among patients seen by other mental health professionals (13.5 [2-15], 6.2

215   [1-6]), and lowest among patients seen exclusively in the general medical sector (3.0 [1-2],

216   2.9 [1-3]).

(Table 2 and Figure 1 about here)

218   The treatment dropout rate was lowest in both high- and low/middle-income countries

219   among patients treated by a psychiatrist (17.2-18.5%), intermediate among those treated by

220   other mental health professions (19.9-44.2%), and highest among those treated exclusively in

221 the general medical sector (43.2-57.2%) (Table 2). However, these were all lower-bound

222 estimates because the number of patients still in treatment at the time of interview was

223 consistently higher than the number who reported successfully completing treatment, raising

224 the likelihood that some of these patients dropped out of treatment subsequent to the time of

225 interview. An estimate of these cumulative dropout rates was obtained by generating Kaplan-

226 Meier curves based on retrospective data of conditional probabilities of dropout as a function

227 of number of visits (Figure 1). Projected cumulative dropout was estimated to be close to

228 30% overall after 13 visits (the largest number for visits over which stable estimates of

229 cumulative dropout could be projected) in high-income countries and approximately 45% in

230 low/middle-income countries. Projected dropout rates varied from values close to 15% for

231 specialty treatment to nearly 50% for general medical treatment in high-income countries and

232 from 25% for psychiatry treatment to 50% for other mental health specialty treatment and

233 60% for general medical treatment in low/middle-income countries. The majority of

234 projected dropouts in each curve occurred within two visits. This was especially pronounced

235 among patients seen exclusively in the general medical sector, where well over 90% of all

236 projected dropout occurred after one or two visits.

237 **(Table 3 about here)**

238 **Predictors of treatment dropout**

239 **Severity and disorder type:** Models were estimated separately for dropout after "1 or

240 2" and "3 or more". The severity of the clinical presentation for respondents with any

241 disorder was a significant predictor in a number of models (Table 3). For both low- and high-

242 income countries, dropout was significantly elevated among patients with mild (OR = 1.8)

243 and moderate (OR = 1.5) disorders after 1-2 visits. In high-income countries, these increased

244 odds were driven by early dropout from psychiatric treatment. The associations of severity

245 and dropout in low/middle-income countries were diverse and more nuanced. In addition to

246   the increased early dropout of people with less severe presentations (also driven by increased

247   dropout from treatment with psychiatrists; OR = 2.2 for mild and 4.7 for moderate), we found

248   a significant association of severity with dropout after 3 or more visits. The direction of these

249   associations was contingent on the type of treatment provided: people with milder clinical

250   presentations had elevated odds of dropout from treatment with a psychiatrist after 3 or more

251   visits (OR = 2.2 for mild and OR=1.9 for moderate), whereas people with severe

252   presentations that were not seeing a psychiatrist had decreased dropout after 3 or more visits

253   (OR = 0.5-0.4 for moderate in "other mental health service" and "general medical"

254   respectively). No consistent associations were found involving disorder type (see Appendix

255   Table 1), and the small numbers of respondents with some specific disorders and disorder

256   combinations precluded us from estimating more complex models combining disorder type,

257   number, and severity.

258   **(Table 4 about here)**

259   **Insurance:** Patients with no coverage (either in the form of insurance or public

260   mental health services) in high-income countries were significantly more likely to drop out

261   from psychiatric care after 3+ visits than patients who did have insurance (Table 4). This was

262   true regardless of the type of insurance the patient carried (see Appendix Table 2). The same

263   general pattern for dropout from psychiatric treatment was found in low/middle-income

264   countries (i.e., higher dropout after 3+ visits among patients with no insurance with than with

265   insurance), and this association was also significant for those seeking treatment by other

266   mental health providers. Patients with no insurance in low- and middle-income countries are

267   significantly less likely to drop out after 1-2 visits if they sought help only in the general

268   medical sector.

269   **Socio-demographics:** The socio-demographic variables considered here had

270   generally non-significant multivariate associations with treatment dropout in the 16

271 multivariate models estimated across sectors crossed by number of visits separately in

272 low/middle- and high-income countries after controlling for type-severity of disorders and

273 type of insurance. Summary multivariate results are reported in Appendix Table 3. Perhaps

274 the most striking result is that the indicators of socio-economic status (education,

275 employment, family income) are for the most part unrelated to dropout.

Conclusion and Discussion

277 These findings indicate that dropout during treatment for mental disorders is high,

278 reaching nearly 30% in high-income and 45% in low-income countries. Dropout is higher in

279 general medical rather than in specialist settings (nearly 60% vs 20% in lower income

280 settings), and higher for mild and moderate than for severe presentations. We also found that

281 the lack of financial protection for mental health services is associated with overall increased

282 dropout from specialist care, as well as with increased relative dropout rates for people with

283 milder clinical forms from psychiatric care, and for people with more severe presentations

284 from general medical services, especially in low-income settings.

285 The results of this study need to be assessed taking into consideration the following

286 limitations. First, data are based on self-report which is susceptible to recall bias. Second,

287 data do not indicate if visits in the previous 12 months correspond to a single episode of care,

288 or if the treatment from two or more professionals occurred within an interdisciplinary care

289 system. In case of visits being conducted by more than one professional, this would

290 underestimate dropout rate. Third, there is heterogeneity across the countries in disorder

291 prevalence (Demyttenaere et al., 2004), health system service organization and resources

292 (WHO, 2017) that may affect the conclusions based on pooled analyses, which was necessary

293 to avoid sparse data. Analysis by country income level and inclusion of a variable to capture

294 financial protection through insurance or public services, seek to mitigate this limitation.

295 Fourth, community surveys fail to adequately capture low prevalence disorders (such as

296   schizophrenia) due to methodological constraints; most respondents with these disorders

297   though, can be expected to meet criteria for comorbid anxiety, mood, or substance disorders,

298   and would therefore be indirectly captured in our analyses. Fifth, our analysis focuses on

299   dropout from treatments provided within the healthcare system, and does not consider

300   community supports provided through community-based human services, CAM, and support

301   groups. Sixth, we highlight that the number of visits does not imply a consistent interval of

302   time. One advantage of the application of discrete-time survival analysis models is that it

303   does not require an x-axis related to time (which would be continuous) and also allows

304   inconsistent time intervals. Similar approaches in which Kaplan–Meier curves were used to

305   examine drop out by number of visits have been published before in the area (see e.g. Edlund

306   et al., 2002; Olfson et al., 2009; Wells et al., 2013). Seventh, we also acknowledge that we

307   are not able to attribute each episode of care to specific diagnoses. However, mental health

308   providers are expected to treat people as a whole, so it is reasonable to expect that disorders

309   that meet well-established thresholds (such as CIDI diagnosed disorders) would be captured

310   by a clinical assessment performed within the healthcare system. Finally, several country-

311   specific socioeconomic and cultural characteristics may explain variations in help-seeking

312   behaviors: we have shown the impact of financial coverage on dropout rates, but also stigma

313   toward mental illness and other cultural norms may affect people's ability to seek and remain

314   engaged care, and would be important areas of additional research.

315   Despite these limitations, our results have important implications for mental health

316   policy and systems planning. In addition to the findings summarized above, our data indicate

317   that the impact of sociodemographic variables on dropout rates is not significant. This may

318   signal that dropout is not so much a consequence of predisposing population characteristics

319   but of how the healthcare system is resourced and organized, or of how treatment is perceived

320   in terms of effectiveness (Andersen, 1995). This is consistent with a previous report of the

321   WMH Surveys Initiative (Evans-Lacko et al., 2018), and provides targets for improvement

322   that are within the health system itself (as opposed to socially pre-determined individual

323   variables).

324   Dropout generally occurs during the first two visits of care, most likely before

325   beneficial effects of treatment can be produced and perceived by the individual. This is

326   especially true of general medical services, where 90% of dropouts occur before the third

327   session. This is consistent with previous epidemiological and administrative data studies

328   (Olfson et al., 2009; Pan, Liu, & Yeh, 2013; Wells et al., 2013; Petterson, Miller, Payne-

329   Murphy, & Phillips, 2014), and highlights the need to improve training, supervision, support

330   and to review treatment practices for general health providers if they are to be effective entry

331   points to the mental health system. Indeed, patterns of dropout varied remarkably between

332   professionals and country income level. Mean number of visits was higher and dropout rates

333   lower (more than 10 visits and less than 20% dropout rates) for psychiatrists across country

334   income levels. Figures were similar for the "other health professionals" group in high-income

335   countries. However, the figures were very different (3 to 6 mean number of visits and 43 to

336   57% dropout rates) for the general medical sector across country income levels or for those

337   treated by other mental health professionals in low/middle-income countries. Given that

338   current guidelines call for common mental disorders to be treated in primary care (NICE,

339   2004; Fletcher et al., 2009), our findings indicate that significant efforts remain to be made

340   before the general medical sector can provide adequate mental care: most people actually

341   drop out before reaching the minimum required number of visits by any standard (NICE,

342   2009; APA, 2010; Gautam, Jain, Gautam, Vahia, & Grover, 2017).

343   Our findings also indicate that dropout is significantly associated with severity but not

344   with disorder type. Previous studies have been inconsistent: Simon and Ludman found an

345   association in patients with depression between severity and dropout rates (Simon &

17

346   Ludman, 2010; Pan et al., 2013), while Warden et al. did not (Warden et al., 2009a, 2009b).

347   With respect to specific mental disorders, some studies found variability in dropout rates

348   (Murphy et al., 2015; Oflaz et al., 2015; Fernandez-Arias et al., 2016), while others did not

349   (Gonzalez, Weersing, Warnic, Scahill, & Woolston, 2011). The granularity of our data allows

350   us to go one step further and draw preliminary conclusions that shed light on these

351   inconsistencies. In general, people with milder presentations tend to drop out more and drop

352   out earlier, but this tendency is mostly driven by dropout of treatment with psychiatrists. Data

353   from lower income settings show that, in addition to this increased dropout of people with

354   milder clinical presentations from psychiatric care, there is an increase in dropout of people

355   with more severe presentations from general medical and other mental health services. This

356   finding is relevant for health systems planning because it points to what may be the specific

357   changes required to improve outcomes. Indeed, best practices prescribe the management of

358   common and milder mental disorders through primary care, while reserving the scarce

359   specialist resources for more severe clinical presentations and for supervision of general

360   medical services. Our data indicate that in low- and middle-income settings, there may be

361   inefficiencies and potential quality gaps in how the system is organized: a subgroup of people

362   with milder clinical presentations are receiving care from psychiatrists (and dropping out

363   more than people with severe disorders), while a subgroup of people with more severe

364   clinical forms are not receiving care from psychiatrists (and dropping out more than people

365   with less severe disorders). Hence, a stepped care framework in which milder forms are dealt

366   with directly through general medical services while severe cases are systematically referred

367   to psychiatrists or managed in closer consultations with specialists seems like a promising

368   evidence-based approach.

369   Finally, these results show a significant effect of financial coverage of health services

370   (in the form of insurance or direct public provision) on dropout rates. Insurance was

371 associated with lower dropout rates after the third visit in patients being treated by

372 psychiatrists both in high-income and low/middle-income countries. In low/middle-income

373 countries, insurance was associated with lower dropout rates in treatment with other mental

374 health professionals as well. Previous studies (which were constrained to the mental health

375 sector and/or were not stratified by service provider) have also found an effect of insurance

376 on dropout rates (Warden et al., 2009b; Agarwal, Pan, & Sambamorthi, 2013). Our granular

377 data highlight the impact of financial protection on the continuity of care at different level of

378 specialization both in low- and high-income settings.

379   Collectively these findings have implications for policy and health systems planning.

380 First, dropout from mental health treatment is relevant globally because of its high frequency,

381 its potential to increase health care costs due to inefficiencies, and to worsen health outcomes

382 due to missed opportunities to intervene early (Barnicot, Katsakou, Marougka, & Priebe,

383 2011; Swift & Greenberg, 2012). Second, extending financial protection and coverage for

384 mental disorders may reduce dropout and therefore improve continuity of care and health

385 outcomes, especially for those that need specialist care. Third, dropout seems to affect diverse

386 subgroups differently, and a holistic, stepped-care approach to providing mental health

387 services can be expected to improve efficiency and quality of care by: (a) grounding the entry

388 point to the mental health system in primary care, which should manage milder clinical

389 presentations; (b) providing adequate training, support and specialist supervision for non-

390 specialists; and (c) streamlining referral to psychiatrists for more severe and complex cases.

503   **Conflicts of Interest**

504   In the past 3 years, Dr. Kessler received support for his epidemiological studies from Sanofi

505   Aventis; was a consultant for Johnson & Johnson Wellness and Prevention, Sage

506   Pharmaceuticals, Shire, Takeda; and served on an advisory board for the Johnson & Johnson

507   Services Inc. Lake Nona Life Project. Kessler is a co-owner of DataStat, Inc., a market

508   research firm that carries out healthcare research.

509

510   **Ethical standards**

511   The authors assert that all procedures contributing to this work comply with the ethical

512   standards of the relevant national and institutional committees on human experimentation and

513   with the Helsinki Declaration of 1975, as revised in 2008.

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Table 1. WMH sample characteristics by World Bank income categories[a]

Country by income category	Survey[b]	Sample characteristics[c]	Field dates	Age range	Sample size Part I	Part II	Part II and age ≤ 44[d]	Response rate[e]
I. Low and middle income countries								
Brazil - São Paulo	São Paulo Megacity	São Paulo metropolitan area.	2005-8	18-93	5,037	2,942	--	81.3
Bulgaria	NSHS	Nationally representative.	2002-6	18-98	5,318	2,233	741	72.0
Colombia	NSMH	All urban areas of the country (approximately 73% of the total national population).	2003	18-65	4,426	2,381	1,731	87.7
Colombia - Medellin[h]	MMHHS	Medellin metropolitan area	2011-12	19-65	3,261	1,673		97.2
Iraq	IMHS	Nationally representative.	2006-7	18-96	4,332	4,332	--	95.2
Lebanon	LEBANON	Nationally representative.	2002-3	18-94	2,857	1,031	595	70.0
Mexico	M-NCS	All urban areas of the country (approximately 75% of the total national population).	2001-2	18-65	5,782	2,362	1,736	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	6,752	2,143	1,203	79.3
Peru	EMSMP	Five urban areas of the country (approximately 38% of the total national population).	2004-5	18-65	3,930	1,801	1,287	90.2
PRC[f] - Shenzhen[g]	Shenzhen	Shenzhen metropolitan area. Included temporary residents as well as household residents.	2005-7	18-88	7,132	2,475	--	80.0
Romania	RMHS	Nationally representative.	2005-6	18-96	2,357	2,357	--	70.9
South Africa[g]	SASH	Nationally representative.	2002-4	18-92	4,315	4,315	--	87.1
Ukraine	CMDPSD	Nationally representative.	2002	18-91	4,725	1,720	541	78.3
TOTAL					(60,224)	(31,765)	(7,834)	81.1
II. High-income countries								
Argentina	AMHES	Eight largest urban areas of the country (approximately 50% of the total national population)	2015	18-98	3,927	2,116	--	77.3
Belgium	ESEMeD	Nationally representative. The sample was selected from a national register of Belgium residents.	2001-2	18-95	2,419	1,043	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	2,894	1,436	727	45.9
Germany	ESEMeD	Nationally representative.	2002-3	19-95	3,555	1,323	621	57.8
Israel	NHS	Nationally representative.	2003-4	21-98	4,859	4,859	--	72.6
Italy	ESEMeD	Nationally representative. The sample was selected from municipality resident registries.	2001-2	18-100	4,712	1,779	853	71.3
Japan	WMHJ 2002-2006	Eleven metropolitan areas.	2002-6	20-98	4,129	1,682	--	55.1
Netherlands	ESEMeD	Nationally representative. The sample was selected from municipal postal registries.	2002-3	18-95	2,372	1,094	516	56.4
New Zealand[g]	NZMHS	Nationally representative.	2004-5	18-98	12,790	7,312	--	73.3
N. Ireland	NISHS	Nationally representative.	2005-8	18-97	4,340	1,986	--	68.4

Table 1 continued. WMH sample characteristics by World Bank income categories[a]

Country by income category	Survey[b]	Sample characteristics[c]	Field dates	Age range	Sample size Part I	Part II	Part II and age ≤ 44[d]	Response rate[e]
Poland	EZOP	Nationally representative	2010-11	18-65	10,081	4,000	2,276	50.4
Portugal	NMHS	Nationally representative.	2008-9	18-81	3,849	2,060	1,070	57.3
Spain	ESEMeD	Nationally representative.	2001-2	18-98	5,473	2,121	960	78.6
Spain - Murcia	PEGASUS- Murcia	Murcia region. Regionally representative.	2010-12	18-96	2,621	1,459	--	67.4
United States	NCS-R	Nationally representative.	2001-3	18-99	9,282	5,692	3,197	70.9
TOTAL					(77,303)	(39,962)	(10,706)	63.5
III. TOTAL					(137,527)	(71,727)	(18,540)	70.2

[a]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.

[b]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 Peru); CMDPSD (Comorbid Mental Disorders during Periods of Social Disruption); NSHS (Bulgaria National Survey of Health and Stress); MMHHS (Medellín 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).

[c]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. 18 of the 28 surveys are based on nationally representative household samples.

[d]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.

[e]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%.

[f] People's Republic of China

[g] For the purposes of cross-national comparisons we limit the sample to those 18+.

[h]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*.

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 the World Mental Health Surveys, by country income group

Part I

	High-income countries			Mean number of visits	(SE)	IQR[c]	Low-middle income countries			Mean number of visits	(SE)	IQR[c]
	n[a]	%[b]	(SE)				n[a]	%[b]	(SE)			
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		
	n[a]	%[b]	(SE)	n[a]	%[b]	(SE)	n[a]	%[b]	(SE)	n[a]	%[b]	(SE)	n[a]	%[b]	(SE)	n[a]	%[b]	(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**		

[a]Unweighted number of respondents who received treatment in the sector.
[b]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.
[c]IQR: Interquartile range...

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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/CIDI disorders in the World Mental Health Surveys, by country income group[1]

| | 1-2 visits | | | | | | 3+ visits - OR (95% CI) | | | | | |
| | Mild | | Moderate | | | | Mild | | Moderate | | | |
I. High income countries	OR	95% CI	OR	95% CI	χ^2_2 (p-value)	Sample size	OR	95% CI	OR	95% CI	χ^2_2 (p-value)	Sample size
Psychiatrist (whether or not received other service)	1.8	(0.9-3.4)	2.4*	(1.4-4.2)	0.007	225	2.2	(1.0-4.6)	1.2	(0.7-2.0)	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	195	0.9	(0.3-2.3)	1.2	(0.7-1.9)	0.693	633
General medical (only)	1.4	(1.0-1.8)	1.1	(0.9-1.4)	0.083	1319	0.9	(0.4-2.1)	0.7	(0.4-1.3)	0.566	443
Any of the three services	1.8*	(1.4- 2.2)	1.5*	(1.2-1.9)	<.0001	1739	1.6	(0.9-2.8)	1.5*	(1.0-2.1)	0.049	2048
II. Low-Middle income countries												
Psychiatrist (whether or not received other service)	2.2*	(1.2-4.1)	4.7*	(2.4-8.9)	<.0001	126	2.2*	(1.4-3.7)	1.9	(0.5-6.7)	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	132	0.8	(0.5-1.4)	0.5*	(0.3-0.8)	0.001	103
General medical (only)	0.9	(0.5-1.5)	0.9	(0.6-1.3)	0.833	399	0.8	(0.5-1.2)	0.4*	(0.3-0.6)	<.0001	174
Any of the three services	1.8*	(1.2-2.5)	1.8*	(1.4-2.4)	0.000	657	2.9*	(2.1-4.0)	1.5	(0.9-2.5)	<.0001	546

*Significant at the .05 level, two-sided test compared to patients with severe disorders
[1]Each model included dummy variable controls for survey and number of visits. The models for any dropout additionally controlled for treatment sector.

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

	No insurance			
	OR	95% CI	χ^2_1 (p-value)	Sample size
I. High income countries				
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
II. Low-Middle income countries				
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)	<.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)	<.0001	269
Not psychiatrist but other mental health (whether or not received general medical)	11.9*	(7.4-18.9)	<.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)	<.0001	546

*Significant at the .05 level, two-sided test compared to patients with any insurance
[1]Each model included dummy variable controls for survey and number of visits. The models for any dropout additionally controlled for treatment sector.
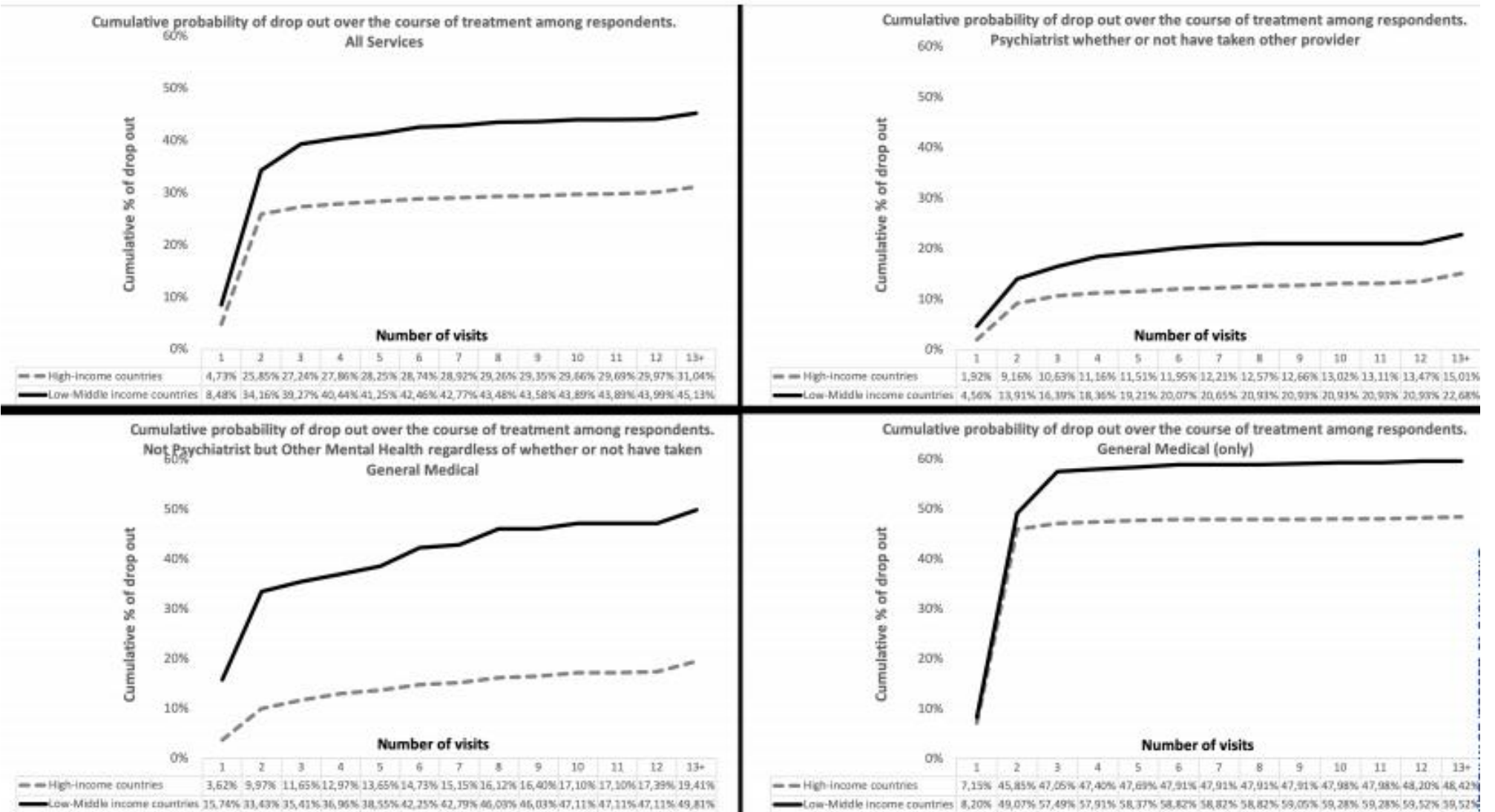
Figure 1.

Cumulative probability of drop out over the course of treatment among respondents. All Services

Number of visits	1	2	3	4	5	6	7	8	9	10	11	12	13+
High-income countries	4,73%	25,85%	27,24%	27,86%	28,25%	28,74%	28,92%	29,26%	29,35%	29,66%	29,69%	29,97%	31,04%
Low-Middle income countries	8,48%	34,16%	39,27%	40,44%	41,25%	42,46%	42,77%	43,48%	43,58%	43,89%	43,89%	43,99%	45,13%

Cumulative probability of drop out over the course of treatment among respondents. Psychiatrist whether or not have taken other provider

Number of visits	1	2	3	4	5	6	7	8	9	10	11	12	13+
High-income countries	1,92%	9,16%	10,63%	11,16%	11,51%	11,95%	12,21%	12,57%	12,66%	13,02%	13,11%	13,47%	15,01%
Low-Middle income countries	4,56%	13,91%	16,39%	18,36%	19,21%	20,07%	20,65%	20,93%	20,93%	20,93%	20,93%	20,93%	22,68%

Cumulative probability of drop out over the course of treatment among respondents. Not Psychiatrist but Other Mental Health regardless of whether or not have taken General Medical

Number of visits	1	2	3	4	5	6	7	8	9	10	11	12	13+
High-income countries	3,62%	9,97%	11,65%	12,97%	13,65%	14,73%	15,15%	16,12%	16,40%	17,10%	17,10%	17,39%	19,41%
Low-Middle income countries	15,74%	33,43%	35,41%	36,96%	38,55%	42,25%	42,79%	46,03%	46,03%	47,11%	47,11%	47,11%	49,81%

Cumulative probability of drop out over the course of treatment among respondents. General Medical (only)

Number of visits	1	2	3	4	5	6	7	8	9	10	11	12	13+
High-income countries	7,15%	45,85%	47,06%	47,40%	47,69%	47,91%	47,91%	47,91%	47,91%	47,98%	47,98%	48,20%	48,42%
Low-Middle income countries	8,20%	49,07%	57,49%	57,91%	58,37%	58,82%	58,82%	58,82%	59,05%	59,28%	59,28%	59,52%	59,52%

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Appendix table 1. Bivariate analyses[a] of the association of mental disorder diagnosis with treatment drop out within each country income group among World Mental Health Survey respondents with at least one disorder in the 12 months before interview and received mental health treatment. Results for any of the three services[b], stratified by number of visit

	High income countries						Low-Middle income countries					
	1-2 visits n=1739			3+ visits n=2048			1-2 visits n=657			3+ visits n=546		
	OR	(95% CI)	χ^2 (p-value)	OR	(95% CI)	χ^2 (p-value)	OR	(95% CI)	χ^2 (p-value)	OR	(95% CI)	χ^2 (p-value)
Disorder type[c]												
Any anxiety[d]	1.2	(0.9-1.4)	0.195	0.9	(0.6-1.3)	0.672	1.2	(0.9-1.6)	0.252	0.4***	(0.2-0.6)	<.0001
Any mood[e]	0.8*	(0.7-1.0)	0.032	0.6**	(0.4-0.9)	0.009	0.8	(0.6-1.1)	0.145	1.5*	(1.1-2.0)	0.011
Any substance[f]	0.7	(0.5-1.0)	0.077	1.4	(1.0-2.1)	0.063	0.6*	(0.4-1.0)	0.049	2.7***	(1.6-4.5)	0.000
Any impulse[g]	1.0	(0.7-1.5)	0.974	0.7	(0.4-1.2)	0.144	0.7	(0.5-1.1)	0.102	0.9	(0.4-1.8)	0.737
Panic disorder	0.8	(0.7-1.1)	0.184	0.4**	(0.2-0.7)	0.001	0.8	(0.6-1.2)	0.277	0.1***	(0.0-0.3)	0.000
Generalized anxiety disorder	0.9	(0.7-1.1)	0.364	0.8	(0.6-1.2)	0.374	1.0	(0.7-1.3)	0.787	0.2***	(0.1-0.4)	<.0001
Social phobia	0.8	(0.7-1.0)	0.098	0.8	(0.5-1.2)	0.277	1.0	(0.8-1.4)	0.799	0.8	(0.5-1.3)	0.405
Specific phobia	1.3**	(1.1-1.5)	0.003	0.5**	(0.3-0.8)	0.009	1.2	(0.8-1.6)	0.340	0.8	(0.4-1.7)	0.559
Agoraphobia	0.6*	(0.5-0.9)	0.010	0.6*	(0.3-1.0)	0.044	0.7	(0.5-1.1)	0.122	0.5**	(0.3-0.8)	0.002
PTSD	0.7*	(0.6-1.0)	0.040	1.2	(0.8-1.8)	0.353	1.1	(0.7-1.7)	0.823	0.6	(0.3-1.3)	0.192
Separation anxiety	1.3	(0.8-2.0)	0.342	0.3	(0.1-1.1)	0.075	0.8	(0.5-1.4)	0.532	0.5	(0.1-1.7)	0.266
Major depressive episode	0.8*	(0.6-0.9)	0.014	0.7*	(0.5-0.9)	0.021	0.8	(0.6-1.1)	0.142	1.4*	(1.1-1.9)	0.014
Bipolar disorder	0.9	(0.6-1.1)	0.293	0.7	(0.5-1.2)	0.240	0.8	(0.4-1.4)	0.392	1.6	(0.5-5.2)	0.469
Oppositional defiant disorder	0.6	(0.2-1.4)	0.232	1.4	(0.4-5.0)	0.619	0.2	(0.0-1.2)	0.079	1.1	(0.3-4.5)	0.844
Conduct disorder	0.4	(0.1-1.7)	0.201	0.2***	(0.1-0.3)	<.0001	1.7	(0.6-5.2)	0.315	1.6	(0.2-14.3)	0.658
Attention deficit disorder	1.1	(0.6-1.9)	0.724	0.6	(0.2-1.7)	0.340	1.9	(0.8-4.6)	0.127	<0.1***	(<0.1-<0.1)	<.0001
Intermitent explosive disorder	1.2	(0.8-1.8)	0.345	0.7	(0.3-1.4)	0.286	0.6*	(0.4-0.9)	0.018	0.9	(0.4-2.0)	0.771
Alcohol abuse	0.8	(0.5-1.2)	0.218	1.4	(0.8-2.3)	0.196	0.7	(0.4-1.3)	0.263	2.9***	(1.7-5.1)	0.000
Alcohol dependence	0.6	(0.4-1.0)	0.076	1.0	(0.5-1.9)	0.987	0.5	(0.2-1.0)	0.057	1.9	(0.8-4.7)	0.145
Drug abuse	0.8	(0.5-1.4)	0.522	1.8*	(1.1-3.0)	0.020	0.5	(0.2-1.5)	0.188	2.2*	(1.2-4.0)	0.010
Drug dependence	0.6	(0.3-1.4)	0.261	0.9	(0.5-1.4)	0.535	0.8	(0.2-3.1)	0.744	0.4	(0.1-1.1)	0.081

[a]Models are bivariate and based on a discrete time survival framework with a person-visit file. Country is also included in the model (not shown).
[b]It includes dropout from all of up to 3 different providers: Psychiatrist, Other Mental Health professional, General Medical
[c]Reference category is not having the disorder
[d]Any anxiety disorder includes Panic Disorder, Generalized Anxiety Disorder, Social Phobia, Specific Phobia, Agoraphobia, PTSD, Social Anxiety
[e]Any mood disorder includes Major Depressive Episode, Dysthymia and Bipolar Disorder
[f]Any substance disorder includes Alcohol Abuse, Alcohol Dependence, Drug Abuse, Drug Dependence
[g]Any impulse control disorder includes Opositional Defiant Disorder, Conduct disorder, Attention Deficit Disorder, Intermitent Explosive Disorder
* p<0.05
**p<0.01
***p<0.001

Appendix table 2. Bivariate associations of health insurance type with treatment dropout after 1-2 and 3+ visits among patients with 12-month DSM-IV/CIDI disorders in the WMH surveys[1]

	State funded coverage or subsidized insurance			Insurance through employment or national social security			Direct private/optional insurance			Other types of insurance			χ^2_4 (p-value)	Sample size
	OR	(95% CI)	%	OR	(95% CI)	%	OR	(95% CI)	%	OR	(95% CI)	%		
I. High income countries														
After 1-2 visits														
Psychiatrist (whether or not have received other service)	0.6	(0.1-2.8)	14.7	0.6	(0.2-1.4)	44.4	0.3	(0.1-1.1)	12.4	2.2	(0.5-9.8)	2.2	0.195	225
Not psychiatrist but other mental health (whether or not received general medical)	0.4	(0.1-1.3)	7.7	0.8	(0.3-2.4)	34.9	0.4	(0.1-2.0)	13.3	0.5	(0.1-3.7)	1.5	0.374	195
General medical (only)	0.7	(0.4-1.3)	9.9	1.0	(0.6-1.8)	29.6	0.8	(0.4-1.4)	13.0	1.0	(0.3-3.4)	0.9	0.550	1319
Any of the three services	0.6	(0.4-1.1)	10.2	0.8	(0.5-1.2)	32.1	0.6*	(0.4-0.9)	13.0	1.0	(0.4-2.5)	1.2	0.080	1739
After 3+ visits														
Psychiatrist (whether or not have received other service)	0.1*	(0.0-0.6)	13.9	0.2*	(0.1-0.5)	40.4	0.2*	(0.1-0.5)	15.6	0.0*	(0.0-0.0)	1.3	<.0001	972
Not psychiatrist but other mental health (whether or not received general medical)	2.7	(0.4-17.7)	7.9	3.8	(0.6-22.8)	31.6	1.2	(0.2-6.9)	14.2	1.0	(0.1-11.9)	1.9	0.291	633
General medical (only)	0.9	(0.2-3.4)	7.5	0.9	(0.1-8.0)	27.3	0.9	(0.1-9.6)	13.3	--[2]		0.7	--[2]	443
Any of the three services	0.4	(0.1-1.3)	10.6	0.6	(0.3-1.4)	34.9	0.5	(0.2-1.2)	14.7	0.3	(0.0-1.6)	1.4	0.502	2048
II. Low-Middle income countries														
After 1-2 visits														
Psychiatrist (whether or not received other service)	1.1	(0.4-3.4)	18.3	0.9	(0.4-1.7)	27.0	0.5	(0.2-1.7)	9.5	--[2]		0.8	--[2]	126
Not psychiatrist but other mental health (whether or not received general medical)	0.4	(0.1-1.1)	9.1	1.8	(0.9-3.6)	39.4	1.0	(0.4-2.8)	10.6	2.3	(1.0-5.4)	4.6	0.013	132
General medical (only)	4.5*	(2.2-9.0)	16.8	1.8	(1.0-3.4)	14.3	2.9*	(1.3-6.6)	5.5	5.1*	(1.6-16.2)	2.8	0.000	399
Any of the three services	1.5	(0.9-2.7)	15.5	1.3	(0.7-2.1)	21.8	1.1	(0.6-2.0)	7.3	1.9	(0.6-5.5)	2.7	0.558	657
After 3+ visits														
Psychiatrist (whether or not received other service)	0.1*	(0.0-0.3)	27.1	0.1*	(0.0-0.2)	26.0	0.2*	(0.1-0.5)	11.9	0.1	(0.0-1.4)	3.7	<.0001	269
Not psychiatrist but other mental health (whether or not received general medical)	0.0*	(0.0-0.0)	14.6	0.1*	(0.0-0.1)	27.2	0.1*	(0.0-0.1)	14.6	2.1*	(1.3-3.4)	3.9	<.0001	103
General medical (only)	0.9	(0.5-1.5)	14.4	1.2	(0.6-2.4)	13.2	1.5	(0.3-7.1)	5.8	0.2*	(0.1-0.4)	5.2	<.0001	174
Any of the three services	0.3*	(0.2-0.6)	20.7	0.4*	(0.2-0.7)	22.2	0.4*	(0.2-0.8)	10.4	0.1*	(0.1-0.4)	4.2	<.0001	546

*Significant at the .05 level, two-sided test compared to patients with no insurance
[1]Each model included dummy variable controls for survey and number of visits. The models for any dropout additionally controlled for treatment sector.
[2]Results not shown because of small cell size. Small cell size determined by calculating the expected number of cases based on the percentage of people with the outcome and the total number of people with the condition. If the expected value was less than five, then the OR is dashed out.

Appendix table 3. Predictors of treatment dropout within each country income group 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

	1-2 visits								3+ visits							
	Any of the three services		Psychiatrist (whether or not received other service)		Not psychiatrist but other mental health (whether or not received general medical)		General medical (only)		Any of the three services		Psychiatrist (whether or not received other service)		Not psychiatrist but other mental health (whether or not received general medical)		General medical (only)	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
I. High income countries *,1																
Gender (male vs. female)	1.0	(0.8-1.2)	0.8	(0.4-1.6)	0.7	(0.4-1.2)	1.2	(0.9-1.5)	1.2	(0.8-1.8)	1.6	(1.0-2.5)	1.5	(0.9-2.6)	0.6	(0.3-1.3)
Age	1.0	(1.0- 1.0)	1.0	(1.0-1.0)	1.0	(1.0-1.0)	1.0*	(1.0-1.0)	1.0*	(1.0-1.0)	1.0*	(0.9-1.0)	1.0	(1.0-1.0)	1.0	(1.0-1.0)
Education	0.9	(0.8-1.0)	0.9	(0.7-1.1)	1.0	(0.8-1.3)	0.9	(0.8-1.1)	0.9	(0.7-1.1)	0.8	(0.6-1.1)	0.7	(0.5-1.0)	1.3	(0.9-1.8)
Employed (yes vs. all others)	1.1	(0.9-1.4)	1.0	(0.6-1.6)	0.8	(0.4-1.4)	1.2	(0.9-1.5)	1.0	(0.6-1.5)	2.1*	(1.2-3.8)	0.6	(0.3-1.2)	1.2	(0.6-2.4)
Family income	1.0	(0.9-1.0)	1.0	(0.8-1.3)	1.1	(0.8-1.5)	1.0	(0.9-1.1)	1.0	(0.8-1.2)	1.0	(0.8-1.2)	0.9	(0.7-1.2)	1.4*	(1.0-1.9)
Marital Status (ref.: married or cohabiting)																
Previously married	1.2	(1.0-1.6)	0.9	(0.6-1.6)	1.0	(0.6-1.7)	1.5*	(1.2-2.0)	0.5*	(0.3-0.8)	0.7	(0.3-1.5)	0.3*	(0.2-0.5)	0.9	(0.4-1.9)
Never married	1.2	(0.9-1.5)	1.9*	(1.0-3.6)	0.8	(0.5-1.4)	1.1	(0.8-1.5)	0.6*	(0.4-1.0)	0.9	(0.4-1.8)	0.4*	(0.2-0.7)	0.6	(0.3-1.3)
χ^2_2 (p-value)	3.3 (0.189)		5.8 (0.056)		0.5 (0.782)		8.6 (0.014)		10.0 (0.007)		0.8 (0.672)		24.7 (<.0001)		1.5 (0.471)	
Global χ^2 (p-value)	8.0 (0.333)		11.4 (0.123)		4.8 (0.683)		21.7 (0.003)		25.8 (0.001)		38.3 (<.0001)		65.7 (<.0001)		13.5 (0.060)	
Sample size	3787		1197		828		1762		2048		972		633		443	
II. Low-Middle income countries																
Gender (female vs. male)	0.8	(0.6-1.1)	0.1*	(0.0-0.4)	0.8	(0.5-1.5)	1.0	(0.6-1.6)	1.4	(0.9-2.3)	0.6	(0.3-1.0)	0.9	(0.6-1.3)	3.7*	(1.8-7.3)
Age	1.0	(1.0-1.0)	1.0	(1.0-1.0)	1.0	(1.0-1.0)	1.0*	(1.0-1.0)	1.0	(1.0-1.0)	1.0	(1.0- 1.0)	0.9*	(0.9-0.9)	1.0	(1.0-1.0)
Education	0.9	(0.8-1.1)	1.2	(0.8-1.9)	0.8	(0.6-1.1)	1.0	(0.8-1.2)	0.8	(0.6-1.1)	0.8	(0.6- 1.2)	0.8	(0.6-1.1)	0.7	(0.5-1.1)
Employed (yes vs. all others)	1.0	(0.7-1.4)	0.8	(0.4-1.7)	0.9	(0.6-1.3)	1.0	(0.6-1.5)	1.0	(0.6-1.7)	1.7	(0.9- 3.3)	1.1	(0.7-1.7)	1.1	(0.8-1.4)
Family income	1.1	(0.9-1.2)	0.8	(0.6-1.0)	1.0	(0.8-1.2)	1.1	(1.0-1.4)	0.9	(0.8-1.1)	1.2	(1.0- 1.6)	1.3	(1.0-1.7)	0.8*	(0.6-1.0)
Marital status (ref.: married or cohabiting)																
Previously married	1.4	(1.0-2.0)	0.8	(0.4-1.6)	1.8	(1.0-3.4)	1.5	(1.0-2.3)	1.2	(0.6-2.4)	0.8	(0.4-1.6)	4.9*	(2.1-11.2)	1.7	(0.8-3.9)
Never married	1.2	(0.8-1.8)	2.6*	(1.2-5.5)	1.2	(0.7-2.3)	1.2	(0.6-2.2)	0.8	(0.4-1.4)	0.5	(0.2-1.3)	0.6*	(0.4-1.0)	1.0	(0.4-2.8)
χ^2_2 (p-value)	3.7 (0.158)		8.1 (0.017)		3.7 (0.158)		3.4 (0.188)		1.1 (0.580)		3.1 (0.215)		20.0 (<.0001)		2.2 (0.388)	
Global χ^2 (p-value)	11.0 (0.140)		22.2 (0.002)		10.1 (0.181)		16.9 (0.018)		6.4 (0.498)		11.8 (0.107)		51.4 (<.0001)		26.9 (0.000)	
Sample size	1203		395		235		573		546		269		103		174	

*Significant at the .05 level, two-sided test compared to patients with the omitted category described in parentheses
[1]Each model included dummy variable controls for survey, number of visits, number-severity of disorders, and type of insurance. The model for any dropout additionally controlled for treatment sector.