HHS Public Access

Author manuscript

Acta Psychiatr Scand. Author manuscript; available in PMC 2017 November 01.

Published in final edited form as:

Acta Psychiatr Scand. 2017 July ; 136(1): 74–84. doi:10.1111/acps.12749.

The association between psychotic experiences and disability: results from the WHO World Mental Health Surveys

Fernando Navarro-Mateu[1], **Jordi Alonso**[2], **Carmen C. W. Lim**[3], **Sukanta Saha**[4], **Sergio Aguilar-Gaxiola**[5], **Ali Al-Hamzawi**[6], **Laura H. Andrade**[7], **Evelyn J. Bromet**[8], **Ronny Bruffaerts**[9], **Somnath Chatterji**[10], **Louisa Degenhardt**[11], **Giovanni de Girolamo**[12], **Peter de Jonge**[13], **John Fayyad**[14], **Silvia Florescu**[15], **Oye Gureje**[16], **Josep M. Haro**[17], **Chiyi Hu**[18], **Elie G. Karam**[19], **Viviane Kovess-Masfety**[20], **Sing Lee**[21], **Maria E. Medina-Mora**[22], **Akin Ojagbemi**[23], **Beth-Ellen Pennell**[24], **Jose Posada-Villa**[25], **Kate M. Scott**[26], **Juan Carlos Stagnaro**[27], **Kenneth S. Kendler**[28], **Ronald C. Kessler**[29], and **John J. McGrath**[30] **on behalf of the WHO World Mental Health Survey Collaborators**

[1]UDIF-SM, Subdirección General de Planificación, Innovación y Cronicidad, Servicio Murciano de Salud. IMIB-Arrixaca. CIBERESP-Murcia, Murcia, Spain [2]Health Services Research Unit, IMIM-Hospital del Mar Medical Research Institute, Barcelona, Spain; Pompeu Fabra University (UPF), Barcelona, Spain; and CIBER en Epidemiología y Salud Pública (CIBERESP), Barcelona, Spain [3]Queensland Brain Institute, The University of Queensland, St. Lucia, Queensland, Australia [4]Queensland Centre for Mental Health Research, and Queensland Brain Institute, University of Queensland, St. Lucia, Queensland, Australia [5]Center for Reducing Health Disparities, UC Davis Health System, Sacramento, California, USA [6]College of Medicine, Al-Qadisiya University, Diwaniya governorate, Iraq [7]Section of Psychiatric Epidemiology - LIM 23, Institute of Psychiatry, University of São Paulo Medical School, São Paulo, Brazil [8]Department of Psychiatry, Stony Brook University School of Medicine, Stony Brook, New York, USA [9]Universitair Psychiatrisch Centrum - Katholieke Universiteit Leuven (UPC-KUL), Campus Gasthuisberg, Leuven, Belgium [10]Department of Information, Evidence and Research, World Health Organization, Geneva, Switzerland [11]National Drug and Alcohol Research Centre, University of New South Wales, Sydney, NSW 2052, Australia [12]Unit of Epidemiological and Evaluation Psychiatry, Istituti di

Corresponding author: Professor John McGrath, Queensland Brain Institute, The University of Queensland, St Lucia, Queensland 4076, Australia. j.mcgrath@uq.edu.au, Phone: +61 7 3271 8694, Fax: +61 7 3271 8698.

Footnote to acknowledge WMH collaborators

The WHO World Mental Health Survey collaborators are Sergio Aguilar-Gaxiola, MD, PhD, Ali Al-Hamzawi, MD, Mohammed Salih Al-Kaisy, MD, Jordi Alonso, MD, PhD, Laura Helena Andrade, MD, PhD, Corina Benjet, PhD, Guilherme Borges, ScD, Evelyn J. Bromet, PhD, Ronny Bruffaerts, PhD, Brendan Bunting, PhD, Jose Miguel Caldas de Almeida, MD, PhD, Graca Cardoso, MD, PhD, Somnath Chatterji, MD, Alfredo H. Cia, MD, Louisa Degenhardt, PhD, Koen Demyttenaere, MD, PhD, John Fayyad, MD, Silvia Florescu, MD, PhD, Giovanni de Girolamo, MD, Oye Gureje, MD, DSc, FRCPsych, Josep Maria Haro, MD, PhD, Yanling He, MD, Hristo Hinkov, MD, PhD, Chi-yi Hu, MD, PhD, Yueqin Huang, MD, MPH, PhD, Peter de Jonge, PhD, Aimee Nasser Karam, PhD, Elie G. Karam, MD, Norito Kawakami, MD, DMSc, Ronald C. Kessler, PhD, Andrzej Kiejna, MD, PhD, Viviane Kovess-Masfety, MD, PhD, Sing Lee, MB, BS, Jean-Pierre Lepine, MD, Daphna Levinson, PhD, John McGrath, MD, PhD, Maria Elena Medina-Mora, PhD, Jacek Moskalewicz, PhD, Fernando Navarro-Mateu, MD, PhD, Beth-Ellen Pennell, MA, Marina Piazza, MPH, ScD, Jose Posada-Villa, MD, Kate M. Scott, PhD, Tim Slade, PhD, Juan Carlos Stagnaro, MD, PhD, Dan J. Stein, FRCPC, PhD, Margreet ten Have, PhD, Yolanda Torres, MPH, Dra. HC, Maria Carmen Viana, MD, PhD, Harvey Whiteford, MBBS, PhD, David R. Williams, MPH, PhD, Bogdan Wojtyniak, ScD.

Competing interests: In the past 3 years, Dr. Kessler received support for his epidemiological studies from Sanofi Aventis, was a consultant for Johnson & Johnson Wellness and Prevention, and served on an advisory board for the Johnson & Johnson Services Inc. Lake Nona Life Project. Kessler is a co-owner of DataStat, Inc., a market research firm that carries out healthcare research.

Ricovero e Cura a Carattere Scientifico (IRCCS)-St. John of God Clinical Research Centre, Via Pilastroni 4, Brescia, Italy [13]Developmental Psychology, Department of Psychology, Rijksuniversiteit Groningen, Groningen, NL; Interdisciplinary Center Psychopathology and Emotion Regulation, Department of Psychiatry, University Medical [14]Institute for Development, Research, Advocacy & Applied Care (IDRAAC), Beirut, Lebanon [15]National School of Public Health, Management and Professional Development, Bucharest, Romania [16]Department of Psychiatry, University College Hospital, Ibadan, Nigeria [17]Parc Sanitari Sant Joan de Déu, CIBERSAM, Universitat de Barcelona, Barcelona, Spain [18]Shenzhen Institute of Mental Health & Shenzhen Kangning Hospital, Shenzhen, China [19]Department of Psychiatry and Clinical Psychology, Faculty of Medicine, Balamand University, Beirut, Lebanon; Department of Psychiatry and Clinical Psychology, St George Hospital University Medical Center, Beirut, Lebanon; Institute for Development Research Advocacy and Applied Care (IDRAAC), Beirut, Lebanon [20]Ecole des Hautes Etudes en Santé Publique (EHESP), EA 4057 Paris Descartes University,Paris, France [21]Department of Psychiatry, Chinese University of Hong Kong, Tai Po, Hong Kong [22]National Institute of Psychiatry Ramón de la Fuente, Mexico City, Mexico [23]College of Medicine, University of Ibadan; University College Hospital, Ibadan, Nigeria [24]Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, Michigan, USA [25]Colegio Mayor de Cundinamarca University, Faculty of Social Sciences, Bogota, Colombia [26]Department of Psychological Medicine, University of Otago, Dunedin, Otago, New Zealand [27]Departamento de Psiquiatría y Salud Mental, Facultad de Medicina, Universidad de Buenos Aires, Argentina [28]Department of Psychiatry Virginia Commonwealth University, USA [29]Department of Health Care Policy, Harvard Medical School, Boston, Massachusetts, USA [30]Queensland Centre for Mental Health Research, and Queensland Brain Institute, University of Queensland, St. Lucia, Queensland, Australia; and National Centre for Register-based Research, Aarhus BSS, Aarhus University, Aarhus, Denmark

Abstract

Objective—While psychotic experiences (PEs) are known to be associated with a range of mental and general medical disorders, little is known about the association between PEs and measures of disability. We aimed to investigate this question using the World Mental Health surveys.

Method—Lifetime occurrences of 6 types of PEs were assessed along with 21 mental disorders and 14 general medical conditions. Disability was assessed with a modified version of the WHO Disability Assessment Schedule. Descriptive statistics and logistic regression models were used to investigate the association between PEs and high disability scores (top quartile) with various adjustments.

Results—Respondents with PEs were more likely to have top quartile scores on global disability than respondents without PEs (19.1% vs. 7.5%; $\chi^2 = 190.1$, $p<.001$) as well as greater likelihood of cognitive, social, and role impairment. Relationships persisted in each adjusted model. A significant dose-response relationship was also found for the PE type measures with most of these outcomes.

Conclusions—Psychotic experiences are associated with disability measures with a dose response relationship. These results are consistent with the view that PEs are associated with disability regardless of the presence of comorbid mental or general medical disorders.

Keywords

Psychotic experiences; disability; World Mental Health Survey; WHODAS

Introduction

Approximately one in twenty people in the general community report psychotic experiences (PEs; which include hallucinations and delusions) at some stage in their life (1, 2). Recent population-based studies have found that PEs are associated with a range of mental (3, 4) and general medical disorders (5, 6). Studies have also shown that those with lifetime PEs tend to have poorer functional outcomes, such as poorer neuropsychological functioning (7) and greater general psychological distress (8 , 9). Based on this evidence, it is generally believed that PEs may offer a severity marker in the context of other mental disorders. Thus, those with comorbid PEs and mental disorders would have greater impairment, which would be reflected in greater levels of disability in domains such as cognition (i.e. concentration, memory, thinking clearly), social interactions and the ability to work and/or perform normal activities. It is also feasible that those with PEs in the absence of mental disorders may have impairments across a range of domains. The World Health Organisation Disability Assessment Schedule (WHODAS) has been proposed as the gold standard for assessing disability in different domains of mental and general medical disorders (10–14). Apart from overall WHODAS disability scores (henceforth called global disability), there are several nested domains that may be particularly affected by mental disorders (compared to general medical disorders). For example, PEs would be more likely to disrupt domains such as cognition, social relationships and role functioning, more so than domains such as mobility or basic self-care.

There is some evidence that PEs are associated with impaired functional outcomes in the young. In a sample of adolescents, Kelleher et al. (15) found that those with PEs had poorer functional outcomes compared to those without PEs. Functional deficits in those with PEs have also been described among help-seeking adolescents (16) and young adults (9). A large cross-national study also reported a relationship between the PEs and general health status derived from 16 health-related domains (17). There is robust evidence that individuals with psychotic disorders experience disability across a range of domains (13, 14, 18, 19), with recent evidence from a meta-analyses indicating that those at high risk of psychosis also suffer from disability (20, 21). Based on these findings, and if psychosis can be considered to occur on a continuum (22), it is reasonable to hypothesize that individuals with PEs but without a psychotic disorder per se are also more likely to have disability (compared to those without PEs). As PEs are known to be highly comorbid with mental and general medical disorders (3, 5), it is expected that the association between PEs and disability will be influenced by the presence of such disorders (i.e. strong association between PEs and disability in the presence of comorbidity). Thus, multivariable models are required to disentangle the associations of PEs, and mental and general medical comorbidities with

disability. We also investigated whether among respondents with one or more PEs, there was a dose-response relationship between the number of PE types and disability outcomes. These research questions were examined using data from the WHO World Mental Health (WMH) surveys, one of the largest datasets obtained from multiple countries with diverse cultural backgrounds.

Aims of the study

To examine the relationship between PEs and disability, based on the WHO World Mental Health (WMH) surveys, one of the largest datasets obtained from multiple countries with diverse cultural backgrounds.

Method

Sample

The WMH surveys are a coordinated set of community surveys administered to probability samples of the non-institutionalized population in countries throughout the world (www.hcp.med.harvard.edu/WMH) (23). We examined the 19 WMH surveys that included both the CIDI Psychosis Module and the WHO Disability Schedule (WHODAS) described below. The 19 countries are distributed across North and South America (Argentina, Brazil-Sao Paulo,, Colombia, Mexico, Peru, and USA); Africa (Nigeria); the Middle East (Iraq, Lebanon); Asia (Shenzhen in the People's Republic of China); the South Pacific (New Zealand), and Europe (Belgium, France, Germany, Italy, the Netherlands, Portugal, Romania, Spain). Most of the WMH surveys were based on multi-stage, clustered area probability household sampling designs except Belgium, Germany and Italy which used municipal resident registries to select respondents (Supplementary table S1). The weighted average response rate across all 19 countries was 72.3%.

In keeping with previous studies of PEs (2, 3, 24–26), we made the *a priori* decision to exclude individuals who had PEs but who also screened positive for possible schizophrenia/psychosis, and manic-depression/mania (i.e. respondents: (a) who reported *(1) schizophrenia/ psychosis* or *(2) manic-depression/mania* in response to the question "*What did the doctor say was causing (this/these) experiences?"*; and (b) who ever took any antipsychotic medications for these symptoms). This resulted in the exclusion of 91 respondents (0.4% of all respondents), leaving 33,370 respondents for this study.

Procedures

All surveys were conducted in the homes of respondents by trained lay interviewers. Informed consent was obtained before beginning the interview in all countries. Procedures for obtaining informed consent and data protection (ethical approvals) were reviewed and approved by the institutional review boards of the collaborating organisations in each country (27). Standardised interviewer training and quality control procedures were used consistently in the surveys. Full details of these procedures are described elsewhere (28, 29).

All WMH interviews had two parts. Part I, administered to all respondents, assessed core mental disorders. Part 2, which included demographic characteristics, disability, additional

mental disorders, and PEs, and general medical disorders, was administered to respondents who met lifetime criteria for a Part I disorder and a random proportion of the rest. Part 2 individuals were weighted by the inverse of their probability of selection to restore representativeness. Additional weights were used to adjust for differential probabilities of selection within households, nonresponse, and to match the samples to population socio-demographic distributions.

Data collection and data items

The instrument used in the WMH surveys was the WHO Composite International Diagnostic Interview (CIDI) (29), a validated, fully-structured diagnostic interview (http://www.hcp.med.harvard.edu/wmhcidi/instruments_download.php) designed to assess the prevalence and correlates of a wide range of mental disorders according to the definitions and criteria of both the DSM-IV and ICD-10 diagnostic systems. WHO translation, back-translation, and harmonisation protocols were used to adapt the CIDI for use in each participating country.

Psychotic experiences (PEs)—The CIDI Psychosis Module included questions about 6 PE types – 2 related to hallucinatory experiences (visual hallucinations, auditory hallucinations) and 4 related to delusional experiences (thought insertion/withdrawal, mind control/passivity, ideas of reference, plot to harm/follow) (Supplementary table S2a, S2b). Respondents were asked if they ever experienced each PE (e.g., "*Have you ever seen something that wasn't there that other people could not see?"; "Have you ever heard any voices that other people said did not exist?*" etc.). Only PEs occurring when the person was '*not dreaming, not half-asleep, or not under the influence of alcohol or drugs*' were included. Respondents who reported PEs were then asked about frequency/occurrences of the PEs in their lifetime. In this paper, we present two key PE-related metrics: (a) number of PE types (henceforth referred to as *PE type metric);* and (b) frequency of occurrence of PE episodes. We derived frequency per year by dividing the number of PE episodes by the time since onset of the PEs (age at interview minus age of onset, henceforth referred to as *annualized frequency metric* (24).

Disability—Disability was assessed using a modified version of the WHO Disability Assessment Schedule II (WHODAS-II) for use in the WMH surveys (30, 31). The WMH-WHODAS II asked about disability in the 30 days prior to the interview across five domains (Supplementary table S2c): (1) Understanding and communicating *(Cognitive),* e.g., difficulties with concentration, memory, understanding or ability to think clearly; (2) Getting around *(Mobility),* e.g., difficulties with standing for long periods, moving around or getting out of their home; (3) Self-care *(Self-care),* e.g., difficulties with washing, getting dressed and feeding; (4) Getting along with others *(Social interaction),* e.g., difficulties with maintaining a normal social life or participating in social activities; and (5) Role impairment *(Role functioning),* e.g., inability to carry out normal activities, cutting back on the amount or quality of usual activities, extreme effort needed to perform at one's usual level. *Global* WHODAS disability is the mean of these five domains. Further details of the scale are presented elsewhere (31).

Mental disorders—The WMH CIDI assessed lifetime history of 21 mental disorders, including *mood disorders* (major depressive episode, bipolar disorders); *anxiety disorders* (panic disorder, generalized anxiety disorder (GAD), specific phobia, social phobia, agoraphobia without panic, post-traumatic stress disorder (PTSD), separation anxiety disorder (SAD) further divided into childhood SAD and adult separation anxiety disorder); *behaviour disorders* (intermittent explosive disorder, attention deficit disorder, oppositional defiant disorder, conduct disorder); *eating disorders* (anorexia nervosa, bulimia nervosa, and binge eating disorder); and *substance use disorders* (alcohol abuse, alcohol dependence, drug abuse, and drug dependence). Clinical reappraisal studies indicate that lifetime diagnoses based on the CIDI have good concordance with diagnoses based on blinded clinical interviews (32).

General medical conditions—General medical conditions were assessed with a standard checklist based on the US National Health Interview Survey (33). Fourteen conditions were assessed in this study. Specifically, respondents were asked whether they had a lifetime history of arthritis, stroke, back or neck pain, other chronic pain, chronic headaches, and seasonal allergies, and whether they were ever told by a doctor or other health professional that they had cancer, heart disease, high blood pressure, diabetes, epilepsy, peptic ulcer, asthma, or chronic lung disease. Prior research has demonstrated good concordance between self-report illness and medical records (34).

Statistical Analysis

The scores computed for each disability domain ranged from 0 to 100 (higher scores indicated greater disability). Because the distributions were skewed toward the very low end of the scale, each score was dichotomized into present (upper quartile of the distribution) and absent (bottom three quartiles). A series of multivariable logistic regression models was used to investigate the relationship between the PEs and disability. Analyses adjusted for country as well as: (a) socio-demographic characteristics (gender, age at interview, education, employment history, marital status, household income and nativity (Model 1); b) socio-demographic characteristics and lifetime mental disorders (Model 2); c) socio-demographic characteristics and lifetime general medical conditions (Model 3), and (d) all of the above (Model 4).

Next, we examined whether extent of comorbidity influenced the association between PE and disability. We thus constructed logistic models and stratified by four levels of mental comorbidity (0, 1, 2–3, and 4 or more), and three levels of general medical comorbidity (0, 1–2, and 3 or more) in predicting the disability outcomes (i.e. within the subgroup with a certain number of comorbidity disorders, is the presence of PEs associated with greater disability). These analyses adjusted for country, socio-demographic characteristics, and other mental or general medical disorders respectively (see details in the tables' footnotes). Interaction models were constructed and Wald χ^2 from these models were used to examine for significant differences in the estimates within the varying levels of mental/general medical comorbidity.

Finally, to explore the impact of number of PEs, we restricted the analyses to those with PEs, and repeated the logistic regression models (adjusted models) using *PE type* (2 or more PE types versus 1 PE type) and *PE annualized frequency metric* (median split) as predictors of disability. While the disability measures were based on the last 30 days, it is possible that some respondents may have had PE onset during the period covered by the disability assessment; we therefore undertook sensitivity analyses by repeating the main analyses in the subgroup with PE onset prior to the last 12 months.

As the WMH data are both clustered and weighted, the design-based Taylor series linearization implemented in SUDAAN software was used to estimate standard errors and evaluate the statistical significance of coefficients. All significance tests were evaluated using .05-level two-sided tests.

Results

The lifetime prevalence of PEs was 5.7% (S.E. = 0.2). Among those with PEs, 27.8% (S.E. = 1.4) reported more than 1 PE type (Supplementary table S3). The socio-demographic characteristics of respondents with (n = 2,488) and without PEs (n = 30,882) are presented in Supplementary table S4. One or more general medical conditions was reported by 77.5% (S.E. = 1.4) of respondents with PEs (77.5%, S.E. = 1.4), while the comparable proportion in those without PEs was 59.0% (S.E. = 0.4). Similarly, mental disorders were reported by 58.0% (S.E. = 1.8) of respondents with PEs, while the comparable proportion in those without PEs was 28.2% (S.E. = 0.4).

Disability

Table 1 shows that apart from the self-care domain, the proportion of respondents with disability (top quartile of the scale) was higher in those with one or more PEs than among those without PEs. For example, 19.1% (S.E. =1.1) of the respondents with a PE had global disability compared to 7.5% (S.E. =0.2) without PEs ($\chi^2_1 = 190.1$, $p<.001$). Similarly, those with two or more PE items were more likely to have a disability ($\chi^2_1 = 17.8$, $p<.001$).

Association between any PEs with disability

Table 2 summarizes the associations between PEs and presence of disability. In Model 1, which adjusted for country and socio-demographic characteristics, PEs were significantly associated with an increased odds of each disability domain except self-care. Respondents with PEs had about three times the odds of global disability compared to respondents with no PEs (OR=2.9, 95% CI =2.5–3.4). Within the five WHODAS domains, the odds ratios ranged from 1.7 to 3.9, with the highest OR associated with social interaction (OR=3.9, 95% CI =2.9–5.3).

The general pattern shown in Model 1 persisted in Models 2 and 3, which adjusted for mental health and general medical conditions separately, and in Model 4, which included all covariates in Models 1–3. Thus, Model 4 indicated that after full adjustment, a significant association was found between PEs and global disability (OR = 1.7, 95% CI = 1.4–2.1). The associations remained significant for three disability domains, namely cognitive (OR = 1.8,

95% CI = 1.4–2.3), social interaction (OR = 1.9, 95% CI = 1.4–2.7) and role functioning (OR = 1.7, 95% CI = 1.3–2.0).

Table 3 presents the association between PEs and disability at different levels of mental comorbidity (0, 1, 2–3, 4+ mental disorders) (Models 5–8). The general pattern of the associations between PEs and disability remained significant and constant in each of the models. There were no significant group differences between the four levels of comorbidity estimates and any domains of disability (χ^2_3 range between 1.6 and 7.2; all *p*-values were non-significant).

Similarly, in Table 4, when we examined the associations for individuals with different numbers of general medical conditions (0, 1–2 and 3+), the previously mentioned significant associations between any PEs and disability persisted regardless of the number of comorbid general medical disorders. We did not find any group differences, similar to the finding for mental disorders in Table 3, indicating that the associations of PEs and disability were constant across number of general medical comorbidities.

In summary, we found that any PEs were associated with increased odds of disability, and that the significant associations between PEs and different domains of disability were constant across different levels of mental or general medical comorbidities.

Association between any PE type and frequency metrics with disability

Table 5 summarizes the associations between type and annualized frequency metrics of PEs and disability using similar adjustments from Model 4 in Table 2. For type metric, there was a dose-response relationship between number of PEs and global disability (OR = 1.5, 95% CI = 1.1–2.1) as well as for three of the five domains (cognitive: OR = 1.7, 95% CI = 1.1–2.6; social interaction: OR = 1.7, 95% CI = 1.0–2.8; role functioning: OR =1.6, 95% CI = 1.1–2.4). For the annualized frequency metric, those with more frequent PEs (compared to those with less frequent PEs) had a greater odds of disability only in the social interaction domain (OR = 1.7, 95% CI = 1.0–2.9).

Finally, when we repeated the main analyses (as shown in Table 2) in the subgroup with PE onset prior to the 12 months preceding the interview, the significant associations between PEs and different domains of disability (Table 2) were confirmed (Supplementary table S5). The general pattern of the dose response relationships between PEs and disability also persisted (data not shown).

Discussion

Based on a cross-national analysis of 19 countries, we found that compared to individuals without PEs, those with PEs were significantly more likely to report one or more disabilities as measured by the modified WHODAS scale. The associations persisted after adjustment for mental and general medical comorbidities. Among those with PEs, greater number of PEs was significantly associated with global disability (and three of the five specific disability domains), after adjusting for mental and general medical disorder comorbidities.

As hypothesized, respondents reporting PEs were more likely to report disability on three of the five specific domains (cognitive, social interaction and role functioning) though not in domains related to self-care and mobility. Furthermore, the general pattern of findings persisted after we adjusted for a comprehensive number of mental health disorders (21 DSM-IV mental disorders, including almost all anxiety disorders, mood and impulse control disorders, and substance-use disorders) and 14 chronic general medical conditions (including many chronic or relapsing diseases). These results indicate that PEs are associated with greater disability regardless of any co-morbid general medical or mental disorders. Social interaction, cognitive and role functioning were the most prominent disability domains associated with PEs. Interestingly, when we repeated the main analysis in order to exclude those with recent onset of PEs, the general pattern of findings persisted. The dose response relationship between PE type and disability also persisted. Overall, these findings lend weight to the hypothesis that the presence of PEs contribute to disability, regardless of the presence of comorbid mental and/or general medical disorders.

Reassuringly, we found no association between PEs and impairment in self-care and mobility. It is possible that those with distressing PEs, such as hallucinations, may subsequently have impaired concentration, just as it is possible that those with persecutory delusions may be less able to initiate and sustain social relationships. We hope to explore these hypotheses in future studies (i.e. specificity of PE subtype and disability domains).

The findings contribute to a growing body of literature suggesting that PEs, regardless of the presence or absence of mental disorders, are linked to functional impairment (15). However, alternative hypotheses cannot be excluded. For example, birth cohort studies have found that PEs were more common in children with (a) lower intelligence (35), (b) cognitive deficits such as slower processing speed (36), or (c) neurodevelopmental disorders including dyslexia, dyspraxia and related problems (37). Thus, both PEs and disability may be downstream consequences of neurodevelopmental disorders (38), rather than causally related. Regardless of the causal pathways, our findings indicate that those with PEs are more disabled. Apart from disability, it is important to recall that those with PEs are more likely to report higher levels of general psychological distress (8) and have an increased risk of self-harm (39). Until we have a clearer understanding of the causal pathways linking PEs and disability, it would be premature to suggest that our findings have immediate clinical implications.

This study has several strengths: it is based on a large sample size from a range of countries, a uniform methodology was used for population sampling and data collection, and innovative PE-related metrics were used. Nevertheless, several study limitations deserve consideration. In keeping with other population-based surveys, evaluations relied on lay interviewers to administer the questionnaire, the CIDI 3.0, and there was no access to clinical validations of the presence of mental and general medical disorders. We excluded those with PEs who screened positive for possible psychotic disorders (based on self-reported schizophrenia and bipolar diagnoses and use of antipsychotic medications). However, we did not have access to valid measures of clinical psychotic disorders in our sample, and thus it is possible that a small proportion of respondents with a clinical diagnosis involving psychosis were included in the analyses. While we were able to assess

the WHODAS for the previous 30 days, we do not have information on disability across the lifespan. Thus, it is feasible that some respondents who reported high recent disability scores may have had this level of disability prior to the onset of PEs. Birth cohort studies will be better able to address this particular issue.

In summary, our study found that compared to individuals without PEs, those with PEs were more likely to report disability regardless of presence or number of comorbid general medical and mental disorders. There was a dose response relationship between increased PE types and likelihood of disability. A better understanding of the functional disability of people with PEs across the lifespan may help contextualize the characterization of PEs in the general population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

funding support

The World Health Organization World Mental Health (WMH) Survey Initiative is supported by the National Institute of Mental Health (NIMH; R01 MH070884), the John D. and Catherine T. MacArthur Foundation, the Pfizer Foundation, the US Public Health Service (R13-MH066849, R01-MH069864, and R01 DA016558), the Fogarty International Center (FIRCA R03-TW006481), the Pan American Health Organization, Eli Lilly and Company, Ortho-McNeil Pharmaceutical, GlaxoSmithKline, and Bristol-Myers Squibb. We thank the staff of the WMH Data Collection and Data Analysis Coordination Centres for assistance with instrumentation, fieldwork, and consultation on data analysis. None of the funders had any role in the design, analysis, interpretation of results, or preparation of this paper. The views and opinions expressed in this report are those of the authors and should not be construed to represent the views of the World Health Organization, other sponsoring organizations, agencies, or governments.

The Argentina survey -- Estudio Argentino de Epidemiología en Salud Mental (EASM) -- was supported by a grant from the Argentinian Ministry of Health (Ministerio de Salud de la Nación). The Colombian National Study of Mental Health (NSMH) is supported by the Ministry of Social Protection. The ESEMeD project is funded by the European Commission (Contracts QLG5-1999-01042; SANCO 2004123, and EAHC 20081308), the Piedmont Region (Italy)), Fondo de Investigación Sanitaria, Instituto de Salud Carlos III, Spain (FIS 00/0028), Ministerio de Ciencia y Tecnología, Spain (SAF 2000-158-CE), Departament de Salut, Generalitat de Catalunya, Spain, Instituto de Salud Carlos III (CIBER CB06/02/0046, RETICS RD06/0011 REM-TAP), and other local agencies and by an unrestricted educational grant from GlaxoSmithKline. Implementation of the Iraq Mental Health Survey (IMHS) and data entry were carried out by the staff of the Iraqi MOH and MOP with direct support from the Iraqi IMHS team with funding from both the Japanese and European Funds through United Nations Development Group Iraq Trust Fund (UNDG ITF). The Lebanese Evaluation of the Burden of Ailments and Needs Of the Nation (L.E.B.A.N.O.N.) is supported by the Lebanese Ministry of Public Health, the WHO (Lebanon), National Institute of Health / Fogarty International Center (R03 TW006481-01), anonymous private donations to IDRAAC, Lebanon, and unrestricted grants from, Algorithm, AstraZeneca, Benta, Bella Pharma, Eli Lilly, Glaxo Smith Kline, Lundbeck, Novartis, Servier, Phenicia, UPO. The Mexican National Comorbidity Survey (MNCS) is supported by The National Institute of Psychiatry Ramon de la Fuente (INPRFMDIES 4280) and by the National Council on Science and Technology (CONACyT-G30544- H), with supplemental support from the PanAmerican Health Organization (PAHO). Te Rau Hinengaro: The New Zealand Mental Health Survey (NZMHS) is supported by the New Zealand Ministry of Health, Alcohol Advisory Council, and the Health Research Council. The Nigerian Survey of Mental Health and Wellbeing (NSMHW) is supported by the WHO (Geneva), the WHO (Nigeria), and the Federal Ministry of Health, Abuja, Nigeria. The Peruvian World Mental Health Study was funded by the National Institute of Health of the Ministry of Health of Peru. The Portuguese Mental Health Study was carried out by the Department of Mental Health, Faculty of Medical Sciences, NOVA University of Lisbon, with collaboration of the Portuguese Catholic University, and was funded by Champalimaud Foundation, Gulbenkian Foundation, Foundation for Science and Technology (FCT) and Ministry of Health. The Romania WMH study projects “Policies in Mental Health Area” and “National Study regarding Mental Health and Services Use” were carried out by National School of Public Health & Health Services Management (former National Institute for Research & Development in Health, present National School of Public Health Management & Professional Development,

Bucharest), with technical support of Metro Media Transilvania, the National Institute of Statistics – National Centre for Training in Statistics, SC. Cheyenne Services SRL, Statistics Netherlands and were funded by Ministry of Public Health (former Ministry of Health) with supplemental support of Eli Lilly Romania SRL. The São Paulo Megacity Mental Health Survey is supported by the State of São Paulo Research Foundation (FAPESP) Thematic Project Grant 03/00204-3. The Shenzhen Mental Health Survey is supported by the Shenzhen Bureau of Health and the Shenzhen Bureau of Science, Technology, and Information. The US National Comorbidity Survey Replication (NCS-R) is supported by the National Institute of Mental Health (NIMH; U01-MH60220) with supplemental support from the National Institute of Drug Abuse (NIDA), the Substance Abuse and Mental Health Services Administration (SAMHSA), the Robert Wood Johnson Foundation (RWJF; Grant 044708), and the John W. Alden Trust. John McGrath received John Cade Fellowship APP1056929 from the National Health and Medical Research Council, and Niels Bohr Professorship from the Danish National Research Foundation.

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

References

1. Linscott RJ, van Os J. An updated and conservative systematic review and meta-analysis of epidemiological evidence on psychotic experiences in children and adults: on the pathway from proneness to persistence to dimensional expression across mental disorders. Psychol Med. 2013; 43:1133–49. [PubMed: 22850401]
2. McGrath JJ, Saha S, Al-Hamzawi A, et al. Psychotic Experiences in the General Population: A Cross-National Analysis Based on 31261 Respondents From 18 Countries. JAMA Psychiatry. 2015; 72:697–705. [PubMed: 26018466]
3. McGrath JJ, Saha S, Al-Hamzawi A, et al. The Bidirectional Associations Between Psychotic Experiences and DSM-IV Mental Disorders. Am J Psychiatry. 2016; 173:997–1006. [PubMed: 26988628]
4. DeVylder JE, Burnette D, Yang LH. Co-occurrence of psychotic experiences and common mental health conditions across four racially and ethnically diverse population samples. Psychol Med. 2014; 44:3503–13. [PubMed: 25065632]
5. Saha S, Scott J, Varghese D, McGrath J. The association between physical health and delusional-like experiences: a general population study. PLoS One. 2011; 6:e18566. [PubMed: 21541344]
6. Moreno C, Nuevo R, Chatterji S, Verdes E, Arango C, Ayuso-Mateos JL. Psychotic symptoms are associated with physical health problems independently of a mental disorder diagnosis: results from the WHO World Health Survey. World Psychiatry. 2013; 12:251–7. [PubMed: 24096791]
7. Mollon J, David AS, Morgan C, et al. Psychotic Experiences and Neuropsychological Functioning in a Population-based Sample. JAMA Psychiatry. 2016; 73:129–38. [PubMed: 26720073]
8. Saha S, Scott JG, Varghese D, McGrath JJ. The association between general psychological distress and delusional-like experiences: a large population-based study. Schizophr Res. 2011; 127:246–51. [PubMed: 21239145]
9. Yung AR, Buckby JA, Cotton SM, et al. Psychotic-like experiences in nonpsychotic help-seekers: associations with distress, depression, and disability. Schizophr Bull. 2006; 32:352–9. [PubMed: 16254060]
10. Olariu E, Forero CG, Alvarez P, Castro-Rodriguez JI, Blasco MJ, Alonso J. Asking patients about their general level of functioning: Is IT worth IT for common mental disorders? Psychiatry Res. 2015; 229:791–800. [PubMed: 26279129]
11. Ustun TB, Chatterji S, Kostanjsek N, et al. Developing the World Health Organization Disability Assessment Schedule 2. 0. Bull World Health Organ. 2010; 88:815–23. [PubMed: 21076562]
12. Buist-Bouwman MA, De Graaf R, Vollebergh WA, Alonso J, Bruffaerts R, Ormel J. Functional disability of mental disorders and comparison with physical disorders: a study among the general population of six European countries. Acta Psychiatr Scand. 2006; 113:492–500. [PubMed: 16677226]
13. Chopra P, Herrman H, Kennedy G. Comparison of disability and quality of life measures in patients with long-term psychotic disorders and patients with multiple sclerosis: an application of the WHO Disability Assessment Schedule II and WHO Quality of Life-BREF. Int J Rehabil Res. 2008; 31:141–9. [PubMed: 18467928]

14. Chopra PK, Couper JW, Herrman H. The assessment of patients with long-term psychotic disorders: application of the WHO Disability Assessment Schedule II. Aust N Z J Psychiatry. 2004; 38:753–9. [PubMed: 15324341]
15. Kelleher I, Wigman JT, Harley M, et al. Psychotic experiences in the population: Association with functioning and mental distress. Schizophr Res. 2015; 165:9–14. [PubMed: 25868930]
16. Brandizzi M, Schultze-Lutter F, Masillo A, et al. Self-reported attenuated psychotic-like experiences in help-seeking adolescents and their association with age, functioning and psychopathology. Schizophr Res. 2014; 160:110–7. [PubMed: 25458860]
17. Nuevo R, Chatterji S, Verdes E, Naidoo N, Arango C, Ayuso-Mateos JL. The continuum of psychotic symptoms in the general population: a cross-national study. Schizophr Bull. 2012; 38:475–85. [PubMed: 20841326]
18. Guilera G, Gomez-Benito J, Pino O, et al. Utility of the World Health Organization Disability Assessment Schedule II in schizophrenia. Schizophr Res. 2012; 138:240–7. [PubMed: 22521724]
19. Jabben N, van Os J, Janssen I, Versmissen D, Krabbendam L. Cognitive alterations in groups at risk for psychosis: neutral markers of genetic risk or indicators of social disability? Acta Psychiatr Scand. 2007; 116:253–62. [PubMed: 17803755]
20. Fusar-Poli P, Rocchetti M, Sardella A, et al. Disorder, not just state of risk: meta-analysis of functioning and quality of life in people at high risk of psychosis. Br J Psychiatry. 2015; 207:198–206. [PubMed: 26329563]
21. Lee TY, Hong SB, Shin NY, Kwon JS. Social cognitive functioning in prodromal psychosis: A meta-analysis. Schizophr Res. 2015; 164:28–34. [PubMed: 25749019]
22. van Os J, Linscott RJ, Myin-Germeys I, Delespaul P, Krabbendam L. A systematic review and meta-analysis of the psychosis continuum: evidence for a psychosis proneness-persistence-impairment model of psychotic disorder. Psychol Med. 2009; 39:179–95. [PubMed: 18606047]
23. Kessler RC, Ustun TB. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). Int J Methods Psychiatr Res. 2004; 13:93–121. [PubMed: 15297906]
24. McGrath JJ, Saha S, Al-Hamzawi AO, et al. Age of Onset and Lifetime Projected Risk of Psychotic Experiences: Cross-National Data From the World Mental Health Survey. Schizophr Bull. 2016; 42:933–41. [PubMed: 27038468]
25. Saha S, Scott JG, Johnston AK, et al. The association between delusional-like experiences and suicidal thoughts and behaviour. Schizophr Res. 2011; 132:197–202. [PubMed: 21813264]
26. Saha S, Scott JG, Varghese D, Degenhardt L, Slade T, McGrath JJ. The association between delusional-like experiences, and tobacco, alcohol or cannabis use: a nationwide population-based survey. BMC Psychiatry. 2011; 11:202–10. [PubMed: 22204498]
27. Kessler, RC., Ustun, TB. The WHO World Mental Health Surveys: Global Perspectives on the Epidemiology of Mental Disorders. New York: Cambridge University Press; 2008.
28. Kessler RC, Haro JM, Heeringa SG, Pennell BE, Ustun TB. The World Health Organization World Mental Health Survey Initiative. Epidemiol Psichiatr Soc. 2006; 15:161–6. [PubMed: 17128617]
29. Kessler, RC., Üstün, TB. The World Health Organization Composite International Diagnostic Interview. In: Kessler, RC., Üstün, TB., editors. The WHO World Mental Health Surveys: Global Perspectives on the Epidemiology of Mental Disorders. New York: Cambridge University Press; 2008. p. 58-90.
30. Alonso J, Vilagut G, Adroher ND, et al. Disability mediates the impact of common conditions on perceived health. PLoS One. 2013; 8:e65858. [PubMed: 23762442]
31. Von Korff M, Crane PK, Alonso J, et al. Modified WHODAS-II provides valid measure of global disability but filter items increased skewness. J Clin Epidemiol. 2008; 61:1132–43. [PubMed: 18619808]
32. Haro JM, Arbabzadeh-Bouchez S, Brugha TS, et al. Concordance of the Composite International Diagnostic Interview Version 3.0 (CIDI 3. 0) with standardized clinical assessments in the WHO World Mental Health surveys. Int J Methods Psychiatr Res. 2006; 15:167–80. [PubMed: 17266013]
33. Edwards WS, Winn DM, Kurlantzick V, et al. Evaluation of National Health Interview survey diagnostic reporting. Vital Health Stat. 1994; 2:1–116.

34. Baumeister H, Kriston L, Bengel J, Harter M. High agreement of self-report and physician-diagnosed somatic conditions yields limited bias in examining mental-physical comorbidity. J Clin Epidemiol. 2010; 63:558–65. [PubMed: 19959329]

35. Horwood J, Salvi G, Thomas K, et al. IQ and non-clinical psychotic symptoms in 12-year-olds: results from the ALSPAC birth cohort. Br J Psychiatry. 2008; 193:185–91. [PubMed: 18757973]

36. Niarchou M, Zammit S, Walters J, Lewis G, Owen MJ, van den Bree MB. Defective processing speed and nonclinical psychotic experiences in children: longitudinal analyses in a large birth cohort. Am J Psychiatry. 2013; 170:550–7. [PubMed: 23632836]

37. Khandaker GM, Stochl J, Zammit S, Lewis G, Jones PB. A population-based longitudinal study of childhood neurodevelopmental disorders, IQ and subsequent risk of psychotic experiences in adolescence. Psychol Med. 2014; 44:3229–38. [PubMed: 25066026]

38. Calkins ME, Moore TM, Satterthwaite TD, et al. Persistence of psychosis spectrum symptoms in the Philadelphia Neurodevelopmental Cohort: a prospective two-year follow-up. World Psychiatry. 2017; 16:62–76. [PubMed: 28127907]

39. Kelleher I, Corcoran P, Keeley H, et al. Psychotic symptoms and population risk for suicide attempt: a prospective cohort study. JAMA Psychiatry. 2013; 70:940–8. [PubMed: 23863946]

Significant outcomes

- Respondents with psychotic experiences have a significantly increased odds of being in the top quartile scores on disability measures related to cognitive, social, and role impairment (compared to respondents without PEs).
- The risk is above and beyond the risk associated with comorbid general medical and mental disorders.
- There was a dose response relationship between increased PE types and likelihood of disability

Limitations

- We did not have access to valid measures of clinical psychotic disorders in our sample.
- While we were able to assess the WHODAS for the previous 30 days, we do not have information on disability across the lifespan.
- While cross-sectional studies cannot deduce that PEs lead to subsequent disability, some respondents who reported high recent disability scores may have had this level of disability prior to the onset of PEs.

Table 1

Percentage of respondents with scores on or above the 75th percentile in WMH-WHODAS disability domains, by psychotic experiences (PEs) and related metrics

PEs	Global WHODAS[a]		Disability domain[a]									
			Cognitive		Mobility		Self-Care		Social Interaction		Role functioning	
	%[b]	S.E.	%[b]	S.E.	%[b]	S.E.	%[b]	S.E.	%[b]	S.E.	%[b]	S.E.
I. PEs												
No PEs (n = 30882)	**7.5**	0.2	**1.8**	0.1	**2.7**	0.1	**0.7**	0.1	**0.9**	0.1	**6.6**	0.2
Any PEs (n = 2488)	**19.1**	1.1	**6.9**	0.6	**5.0**	0.6	**1.1**	0.3	**3.5**	0.4	**16.3**	1.1
χ^2_1 [p-value]	**190.1***	[<.001]	**208.7***	[<.001]	**21.9***	[<.001]	**2.8**	[0.092]	**101.0***	[<.001]	**138.1***	[<.001]
II. PE type metric (among those with PEs)												
1 PE item (n = 1706)	**16.2**	1.3	**4.9**	0.6	**4.6**	0.9	**0.7**	0.2	**2.5**	0.4	**13.7**	1.2
2 or more PE items (n = 782)	**26.4**	2.5	**12.0**	1.6	**5.9**	1.2	**2.2**	1.0	**6.1**	1.2	**23.1**	2.5
χ^2_1 [p-value]	**17.8***	[<.001]	**31.0***	[<.001]	**0.7**	[0.401]	**10.6***	[0.001]	**15.3***	[<.001]	**17.1***	[<.001]
III. PE annualized frequency metric (among those with PEs)												
<= 0.3 episodes (n = 1259)	**17.8**	1.6	**5.7**	0.8	**5.5**	1.0	**1.1**	0.4	**2.5**	0.4	**15.4**	1.6
> 0.3 episodes (n = 1229)	**20.5**	1.5	**8.2**	1.0	**4.5**	0.7	**1.1**	0.5	**4.7**	0.8	**17.4**	1.5
χ^2_1 [p-value]	**2.1**	[0.147]	**5.5***	[0.020]	**0.7**	[0.418]	**0.0**	[0.972]	**10.1***	[0.002]	**1.1**	[0.287]

[a]Scores were dichotomized and defined as a score on or above the 75th percentile of the distribution of disability. For example, 7.5% in the first cell is the proportion of respondents with score on or above the 75th percentile (high disability) on global WHODAS among those with no psychotic experiences.

[b]Estimates are based on weighted data

Table 2

Associations between psychotic experiences with disability (n = 33,370)

Disability domain[a]	M1: Adj for socio-demographic variables[b]		M2: Adj for socio-demographic variables + comorbid mental disorders[c]		M3: Adj for socio-demographic variables + comorbid general medical disorders[d]		M4: Adj for socio-demographic variables + comorbid mental + general medical disorders[e]	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Global WHODAS	**2.9***	(2.5–3.4)	**2.1***	(1.8–2.5)	**2.1***	(1.8–2.5)	**1.7***	(1.4–2.1)
Cognitive	**3.6***	(2.9–4.5)	**2.2***	(1.7–2.7)	**2.5***	(2.0–3.1)	**1.8***	(1.4–2.3)
Mobility	**1.7***	(1.3–2.3)	**1.5***	(1.1–2.0)	**1.3**	(0.9–1.7)	**1.2**	(0.9–1.6)
Self-Care	**1.8**	(0.9–3.7)	**1.5**	(0.7–2.9)	**1.4**	(0.7–2.9)	**1.2**	(0.6–2.5)
Social interaction	**3.9***	(2.9–5.3)	**2.1***	(1.5–2.9)	**2.8***	(2.0–3.9)	**1.9***	(1.4–2.7)
Role functioning	**2.7***	(2.3–3.3)	**2.0***	(1.7–2.5)	**2.0***	(1.7–2.4)	**1.7***	(1.3–2.0)

OR, Odds ratio; CI, Confidence interval

[a]Outcome: WMH WHODAS domain score on or above the 75th percentile of the distribution.

Each row in the table represents a logistic regression model of any PE (ref: no PE) as predictor of high disability.

[b]**M1:** All models adjusted for country and socio-demographic variables (sex, age, education, employment history, marital status, household income and nativity).

[c]**M2:** All models adjusted for country, socio-demographic variables and 21 DSM-IV mental disorders (listed in supplementary table S4).

[d]**M3:** All models adjusted for country, socio-demographic variables and 14 general medical disorders (listed in supplementary table S4).

[e]**M4:** All models adjusted for country, socio-demographic variables, 21 DSM-IV mental disorders and 14 general medical disorders (listed in supplementary table S4).

*Significant at the .05 level, 2-sided test.

Table 3

Associations between psychotic experiences with disability by number of comorbid mental disorders (n = 33,370)

Disability domain[a]	M1 from table 2 (Adj for socio-demographic variables)[b]		Among subset of respondents with								Test for the significance of differences across 4 subsamples (M5–M8)	
			M5: No comorbid mental disorder[c]		M6: 1 comorbid mental disorder[d]		M7: 2–3 comorbid mental disorders[e]		M8: 4 or more comorbid mental disorders[e]			
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	X^2_3	[P-value]
Global WHODAS	**2.9** *	(2.5–3.4)	**2.5** *	(1.7–3.6)	**1.5** *	(1.0–2.2)	**2.2** *	(1.7–2.8)	**2.1** *	(1.5–2.9)	**7.2**	[0.065]
Cognitive	**3.6** *	(2.9–4.5)	**2.1**	(1.0–4.3)	**2.3** *	(1.4–3.8)	**2.2** *	(1.6–3.1)	**1.7** *	(1.2–2.5)	**4.0**	[0.266]
Mobility	**1.7** *	(1.3–2.3)	**1.8**	(0.9–3.3)	**0.9**	(0.5–1.6)	**1.4**	(0.9–2.1)	**1.4**	(0.8–2.6)	**3.1**	[0.369]
Self-Care	**1.8**	(0.9–3.7)	**1.3**	(0.3–4.7)	**0.2**	(0.0–1.7)	**3.5** *	(1.5–7.9)	**1.4**	(0.7–3.1)	**3.3**	[0.352]
Social interaction	**3.9** *	(2.9–5.3)	**2.5**	(1.0–6.2)	**1.0**	(0.4–2.6)	**2.2** *	(1.3–3.8)	**2.4** *	(1.5–3.8)	**1.6**	[0.650]
Role functioning	**2.7** *	(2.3–3.3)	**2.4** *	(1.7–3.5)	**1.6** *	(1.1–2.3)	**1.9** *	(1.5–2.5)	**1.9** *	(1.4–2.6)	**6.5**	[0.088]

OR, Odds ratio; CI, Confidence interval

[a] Outcome: WMH WHODAS domain score on or above the 75th percentile of the distribution.

Each row in the table represents a logistic regression model of any PE (ref: no PE) as predictor of high disability.

[b] All models adjusted for country and socio-demographic variables (sex, age, education, employment history, marital status, household income and nativity).

[c] **M5:** All models adjusted for country, socio-demographic variables in those without any comorbid mental disorder.

[d] **M6:** All models adjusted for country, socio-demographic variables and 20 DSM-IV mental disorders in those with one comorbid mental disorder.

[e] **M7–8:** All models adjusted for country, socio-demographic variables and 21 DSM-IV mental disorders in those with 2–3 or 4+ comorbid mental disorders.

* Significant at the .05 level, 2-sided test

Table 4

Associations between psychotic experiences with disability by number of comorbid general medical disorders (n = 33,370)

Disability domain[a]	M1 from table 2 (Adj for socio-demographic variables)[b]		Among subset of respondents with						Test for the significance of differences across 3 subsamples (M9–M11)	
			M9: No comorbid general medical disorders[c]		M10: 1–2 comorbid general medical disorders[d]		M11: 3 or more comorbid general medical disorders[d]			
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	X^2_2	P-value
Global WHODAS	**2.9***	(2.5–3.4)	**4.7***	(2.6–8.4)	**2.0***	(1.5–2.5)	**1.9***	(1.5–2.4)	**3.5**	[0.177]
Cognitive	**3.6***	(2.9–4.5)	**3.4***	(1.6–7.4)	**3.4***	(2.4–4.8)	**2.0***	(1.5–2.7)	**4.4**	[0.108]
Mobility	**1.7***	(1.3–2.3)	**3.0**	(0.9–9.8)	**1.6**	(1.0–2.7)	**1.0**	(0.7–1.5)	**2.0**	[0.361]
Self-Care	**1.8**	(0.9–3.7)	**0.5**	(0.0–10.4)	**2.4**	(0.7–8.7)	**1.1**	(0.5–2.4)	**2.0**	[0.359]
Social interaction	**3.9***	(2.9–5.3)	**10.4***	(4.8–22.3)	**2.5***	(1.5–4.2)	**2.2***	(1.4–3.5)	**5.7**	[0.059]
Role functioning	**2.7***	(2.3–3.3)	**4.3***	(2.4–7.6)	**1.7***	(1.3–2.3)	**1.9***	(1.5–2.5)	**3.0**	[0.223]

OR, Odds ratio; CI, Confidence interval

[a] Outcome: WMH WHODAS domain score on or above the 75th percentile of the distribution.

Each row in the table represents a logistic regression model of any PE (ref: no PE) as predictor of high disability.

[b] All models adjusted for country and socio-demographic variables (sex, age, education, employment history, marital status, household income and nativity).

[c] **M9:** All models adjusted for country and socio-demographic variables in those without any comorbid general medical disorders.

[d] **M10–11:** All models adjusted for country, socio-demographic variables and 14 general medical disorders in those with 1–2, 3 or more comorbid general medical disorders.

* Significant at the .05 level, 2-sided test.

Table 5

Associations between psychotic experiences (2 or more versus 1 PE type, more than 0.3 annualized episodes versus 0.3 or less) with disability in the subgroup of those with psychotic experiences (n = 2,488).

Disability domain[a]	PE type metric[b]		PE annualized frequency metric[c]	
	OR	(95% CI)	OR	(95% CI)
Global WHODAS	**1.5***	(1.1–2.1)	**1.1**	(0.8–1.5)
Cognitive	**1.7***	(1.1–2.6)	**1.0**	(0.7–1.6)
Mobility	**1.2**	(0.6–2.6)	**1.1**	(0.6–1.8)
Self-Care	**1.7**	(0.6–4.5)	**0.5**	(0.1–1.9)
Social interaction	**1.7***	(1.0–2.8)	**1.7***	(1.0–2.9)
Role functioning	**1.6***	(1.1–2.4)	**1.0**	(0.7–1.4)

OR, Odds ratio; CI, Confidence interval

[a] Outcome: WMH WHODAS domain score on or above the 75th percentile of the distribution.

[b] Each row represents a logistic regression model of 2 or more PE items (ref: 1 PE item) as predictor of high disability (ref: non-severe) adjusting for country, socio-demographic variables, 21 DSM-IV mental disorders and 14 general medical disorders.

[c] Each row represents a logistic regression model of 0.4 or more episodes per year (ref: <= 0.3 episodes) as predictor of high disability (ref: non-severe) adjusting for country, socio-demographic variables, 21 DSM-IV mental disorders and 14 general medical disorders.

* Significant at the .05 level, 2-sided test.