Table 1 Prevalence of childhood adversities in World Mental Health (WMH) surveys carried out in high-, high-middle-, and low/lower-middle-income countries

	High-income countries (n = 20 652)		High-middle-income countries (n = 15 240)		Low-/lower-middle-income countries (n = 16 053)		Total (n = 51 945)	
	%	(s.e.)	%	(s.e.)	%	(s.e.)	%	(s.e.)
I. Interpersonal loss								
Parental death	11.0	(0.3)	11.9	(0.4)	14.8	(0.4)	12.5	(0.2)
Parental divorce	10.1	(0.3)	5.2	(0.3)	3.5	(0.2)	6.6	(0.2)
Other parental loss	4.0	(0.2)	4.0	(0.2)	7.4	(0.3)	5.1	(0.1)
II. Parental maladjustment								
Parental mental illness	5.3	(0.2)	6.7	(0.3)	6.7	(0.3)	6.2	(0.2)
Parental substance disorder	4.5	(0.2)	5.0	(0.3)	2.5	(0.2)	4.0	(0.1)
Parental criminal behaviour	3.4	(0.1)	3.1	(0.2)	2.2	(0.2)	2.9	(0.1)
Family violence	7.8	(0.3)	7.1	(0.3)	4.2	(0.2)	6.5	(0.1)
III. Maltreatment								
Physical abuse	5.3	(0.2)	10.8	(0.4)	9	(0.3)	8.0	(0.2)
Sexual abuse	2.4	(0.1)	0.6	(0.1)	1.5	(0.1)	1.6	(0.1)
Neglect	4.4	(0.2)	5.2	(0.2)	3.6	(0.2)	4.4	(0.1)
IV. Other childhood adversities								
Physical illness	3.9	(0.2)	2.4	(0.2)	2.6	(0.2)	3.1	(0.1)
Economic adversity	5.2	(0.2)	2.9	(0.2)	1.4	(0.2)	3.4	(0.1)
V. Total number of childhood adversities[a]								
Any	38.4	(0.5)	38.9	(0.6)	39.1	(0.6)	38.8	(0.4)
One/any	59.3	(0.7)	59.6	(0.8)	66.2	(0.9)	61.5	(0.5)
Two/any	22.5	(0.6)	24.6	(0.8)	21.8	(0.7)	22.9	(0.4)
Three/any	9.0	(0.4)	9.0	(0.5)	7.5	(0.5)	8.5	(0.3)
Four/any	5.0	(0.4)	4.1	(0.3)	3.1	(0.3)	4.1	(0.2)
Five or more/any	4.2	(0.2)	2.7	(0.3)	1.4	(0.2)	2.9	(0.2)

a. Prevalence estimates in the last five rows represent the proportions of all respondents with any childhood adversity who have exactly one, two, three, four, five or more. These five proportions sum to 100% in each column.

for childhood adversities associated with maladaptive family functioning and 1.1–1.5 for other childhood adversities. (Detailed results of this and other models described below are available from the authors on request.) Odds ratios were smaller in multivariate models that included all childhood adversities as predictors (1.1–1.6 childhood adversities associated with maladaptive family functioning; 1.1–1.3 for other childhood adversities). The 12 degree of freedom χ^2-test for the joint effects of all childhood adversities was significant ($\chi^2_{12} = 1536.6$, $P<0.001$). A multivariate model that considered only number rather than type of childhood adversities showed generally increasing odds ratios from 1.5 for exactly one to 3.5–3.2 for six and for seven or more childhood adversities (compared with no childhood adversities). The χ^2-test for the joint effects of number-of-childhood adversities was statistically significant ($\chi^2_7 = 1345.8$, $P<0.001$). A model that considered both types and numbers of childhood adversities had a better AIC, with both types ($\chi^2_{12} = 695.7$, $P<0.001$) and number ($\chi^2_6 = 200.4$, $P<0.001$) significant. More complex inherently non-linear models did not improve AIC further. However, fit was improved by distinguishing between number of childhood adversities associated with maladaptive family functioning and number of other childhood adversities.

Results of this final model are strikingly consistent across country groups (Table 2). Odds ratios of childhood adversities associated with maladaptive family functioning are consistently positive and significant (1.3–2.4). Odds ratios of other childhood adversities are generally smaller (0.9–1.5) and less consistently significant. Odds ratios of number of childhood adversities associated with maladaptive family functioning are consistently negative, mostly significant, and inversely related to number of such adversities (0.4–0.9 for two to three, 0.2–0.5 for four to five and 0.0–0.3 for six to seven adversities). This negative pattern means that the increasing odds of disorder onset with increasing number of childhood adversities associated with maladaptive family functioning occurs at a significantly decreasing rate as the number of these adversities increases. The odds ratio associated with number of other childhood adversities is less consistent in sign and significance.

Differential associations of childhood adversities with class of disorder and life-course stage

Disaggregation showed that childhood adversities significantly predict first onset of all classes of disorder in all groups of countries. Childhood adversities associated with maladaptive family functioning had consistently higher odds ratios (inter-quartile range, IQR = 1.4–2.0) than other childhood adversities (IQR = 1.1–1.3) across classes and groups. Odds ratios associated with the number of maladaptive family functioning childhood adversities were consistently and significantly negative across classes and groups (0.3–1.0 for two to three, 0.1–0.6 for four to five, 0.0–0.4 for six to seven adversities). Odds ratios associated with number of other childhood adversities were less consistent in sign and significance.

Similar results were found for models estimated by life-course stage. As coefficients were quite comparable across the different groups of countries (detailed results are available from the authors on request), we focus on results pooled across all countries (Table 3). Type of childhood adversity had significant and almost entirely positive odds ratios at each life-course stage, including childhood (ages 4–12), adolescence (ages 13–19), young adulthood (ages 20–29) and later adulthood (ages 30+) ($\chi^2_{12} = 197.8$–407.5, $P<0.001$). Odds ratios associated with childhood adversities associated with maladaptive family functioning were generally higher than those associated with other childhood adversities (IQRs of 1.5–1.9 and 1.1–1.3 respectively) and relatively consistent across life-course stage. Odds ratios associated with number of

Table 2 Multivariate associations (odds ratios) between childhood adversities and the subsequent first onset of DSM-IV/CIDI disorders based on the final multivariate model[a]

	High-income countries ($n=20\,652$)			High-middle-income countries ($n=15\,240$)			Low-/lower-middle-income countries ($n=16\,053$)			Total ($n=51\,945$)		
	OR	(95% CI)	χ^2	OR	(95% CI)	χ^2	OR	(95% CI)	χ^2	OR	(95% CI)	χ^2
I. Maladaptive family functioning[b]			289.2*			152.6*			244.2*			585.8*
Parental mental illness	1.9*	(1.7–2.1)		1.9*	(1.7–2.1)		2.4*	(2.2–2.7)		2.0*	(1.9–2.2)	
Parental substance misuse	1.8*	(1.6–2.0)		1.4*	(1.2–1.6)		1.6*	(1.3–1.9)		1.6*	(1.5–1.7)	
Parental criminality	1.6*	(1.4–1.8)		1.6*	(1.3–1.8)		1.7*	(1.4–2.1)		1.6*	(1.4–1.7)	
Family violence	1.7*	(1.5–1.9)		1.6*	(1.4–1.8)		1.6*	(1.3–1.9)		1.6*	(1.5–1.8)	
Physical abuse	1.9*	(1.7–2.1)		1.6*	(1.4–1.9)		2.0*	(1.7–2.3)		1.8*	(1.7–2.0)	
Sexual abuse	1.9*	(1.7–2.2)		1.7*	(1.4–2.1)		1.5*	(1.2–1.9)		1.8*	(1.6–2.0)	
Neglect	1.6*	(1.4–1.8)		1.3*	(1.1–1.5)		1.7*	(1.4–2.0)		1.5*	(1.4–1.6)	
II. Other childhood adversities[c]			365.5*			35.8 *			32.8*			104.7*
Parental death	1.1	(1.0–1.2)		1.1*	(1.0–1.3)		1.0	(0.9–1.2)		1.1*	(1.0–1.2)	
Parental divorce	1.1	(1.0–1.2)		1.3*	(1.1–1.4)		1.2*	(1.1–1.4)		1.1*	(1.0–1.2)	
Other parental loss	1.4*	(1.3–1.5)		1.3*	(1.1–1.6)		1.3*	(1.1–1.5)		1.4*	(1.2–1.5)	
Serious physical illness	1.4*	(1.2–1.5)		1.5*	(1.3–1.9)		1.4*	(1.2–1.7)		1.4*	(1.3–1.5)	
Family economic adversity	1.2*	(1.1–1.4)		1.2	(0.9–1.5)		0.9	(0.7–1.2)		1.2*	(1.0–1.3)	
III. Number of maladaptive family functioning childhood adversities[d]			124.9*			42.1*			115.0*			193.9*
Zero to one	–			–			–			–		
Two	0.6*	(0.6–0.8)		0.9	(0.8–1.0)		0.7*	(0.6–0.9)		0.7*	(0.7–0.8)	
Three	0.4*	(0.4–0.6)		0.7*	(0.5–0.9)		0.4*	(0.3–0.6)		0.5*	(0.4–0.6)	
Four	0.3*	(0.2–0.4)		0.5*	(0.3–0.7)		0.3*	(0.2–0.4)		0.3*	(0.3–0.4)	
Five	0.2*	(0.1–0.3)		0.3*	(0.2–0.5)		0.2*	(0.1–0.3)		0.2*	(0.2–0.3)	
Six	0.1*	(0.1–0.2)		0.2*	(0.1–0.4)		0.2*	(0.1–0.4)		0.1*	(0.1–0.2)	
Seven	0.0*	(0.0–0.1)		0.2*	(0.0–0.8)		0.0*	(0.0–0.1)		0.0*	(0.0–0.1)	
IV. Number of other childhood adversities[e]			14.7*			2.0			0.3			14.3*
Zero to one	–			–			–			–		
Two	0.8*	(0.7–0.9)		0.9	(0.7–1.1)		1.0	(0.8–1.2)		0.8*	(0.8–0.9)	
Three	0.7*	(0.6–0.9)		1.0	(0.6–1.8)		1.0	(0.5–1.8)		0.8*	(0.6–0.9)	
Four+	0.8	(0.6–1.2)		0.9	(0.6–1.3)		1.1	(0.4–3.5)		0.8	(0.6–1.1)	

a. The model is a discrete-time survival model in a logistic regression framework with person-year as the unit of analysis to predict first onset of each of the 20 DSM-IV/CIDI disorders included in the analysis separately in each of three groups of countries. Age at onset was assessed using retrospective reports. Controls were included in the model for respondent age at interview, person-year, country, and type of disorder. The 19 type-of-disorder controls were included because the separate person-year data files for each of the 20 disorders were pooled, thereby forcing the slopes to be constant across disorders within each group of countries. As noted in the text, this assumption was subsequently relaxed and the model was estimated separately for each of four classes of disorders (mood, anxiety, behaviour and substance disorders) and then for each of the 20 separate disorders. Broad consistency of coefficients across these disaggregated models supports the validity of interpreting results pooled across all 20 disorders. The model is significant overall in each of the three groups of countries and overall ($\chi^2_{21}=534.4$–1853.7, $P<0.001$). The sample sizes reported are the numbers of respondents who contributed at least one person-year to the data file in each group of countries. The numbers of person-years in the analysis were 18 800 397 for high-income countries, 12 608 715 for high-middle-income countries, 12 193 251 for low/lower-middle-income countries and 43 602 363 for all countries combined. These person-years represent the combination of 20 separate person-year data files, each with a sample size equal to the combined number of years of life of all respondents up to and including their age at onset of the focal disorder for respondents who experienced the disorder and age at interview for respondents who never experienced the disorder. Because of the sample sizes being enormous, a random 5% of observations with a negative score on the outcome were used in the analysis, each such case being assigned a weight of 20 (i.e. 1/.05) to represent the undersampling.
b. For χ^2 d.f. = 7.
c. For χ^2 d.f. = 5.
d. For χ^2 d.f. = 6.
e. For χ^2 d.f. = 3.
*Significant at the 0.05 level, two-sided test.

maladaptive family functioning childhood adversities were consistently negative, significant ($\chi^2_6=35.3$–119.8, $P<0.001$), inversely related to number of such adversities (0.4–0.8 for two to three, 0.2–0.4 for four to five and 0.0–0.2 for six to seven adversities) and relatively consistent across life-course stage.

Population-attributable risk proportions

Population-attributable risk proportions suggest that eradication of childhood adversities would lead to a 22.9% reduction in mood disorders, 31.0% in anxiety disorders, 41.6% in behaviour disorders, 27.5% in substance disorders and 29.8% of all disorders (Table 4). The higher PARP for behaviour disorders than other disorders exists in all three groups of countries, as is the generally lowest PARP for mood disorders. These differences are partly as a result of PARPs for most disorders being highest in childhood and to a much higher proportion of behaviour disorders than other disorders beginning in childhood.[35,36] When we focus exclusively on childhood-onset cases, PARPs for behaviour disorders (50.3–59.0%) are comparable with those for mood (53.8–64.9%) and substance (51.2–65.0%) disorders. Population-attributable risk proportions for mood and behaviour disorders decrease with age in all groups of countries, whereas PARPS remain rather stable after childhood for substance disorders and show less evidence of variation across the age range for anxiety disorders.

Discussion

Limitations

The results are limited by variation across surveys in language of interview, survey auspice, response rates, field procedures, sample

Table 3 Multivariate associations (odds ratios) between childhood adversities and the subsequent first onset of DSM-IV/CIDI disorders in each of four life-course stages based on the final multivariate model[a]

	Childhood, age 4–12 (n = 51 945)			Adolescence, age 13–19 (n = 51 945)			Young adulthood, age 20–29 (n = 41 426)			Later adulthood, age 30+ (n = 38 692)		
	OR	(95% CI)	χ^2	OR	(95% CI)	χ^2	OR	(95% CI)	χ^2	OR	(95% CI)	χ^2
I. Maladaptive family functioning[b]			314.2*			205.8*			236.9*			163.2*
Parental mental illness	2.4*	(2.1–2.6)		1.9*	(1.7–2.2)		2.1*	(1.8–2.3)		1.9*	(1.7–2.2)	
Parental substance misuse	1.6*	(1.4–1.9)		1.6*	(1.4–1.8)		1.8*	(1.5–2.2)		1.6*	(1.4–1.9)	
Parental criminality	1.5*	(1.3–1.8)		1.5*	(1.3–1.8)		1.7*	(1.4–2.0)		1.4*	(1.1–1.7)	
Family violence	1.7*	(1.5–1.9)		1.5*	(1.3–1.8)		1.7*	(1.5–1.9)		1.7*	(1.4–2.0)	
Physical abuse	2.0*	(1.8–2.2)		2.0*	(1.8–2.2)		1.8*	(1.6–2.1)		1.7*	(1.5–1.9)	
Sexual abuse	2.1*	(1.8–2.5)		1.7*	(1.4–2.0)		1.7*	(1.4–2.1)		1.4*	(1.2–1.7)	
Neglect	1.5*	(1.4–1.8)		1.5*	(1.3–1.7)		1.7*	(1.5–2.0)		1.4*	(1.2–1.6)	
II. Other childhood adversities[c]			63.7*			45.7*			30.1*			22.5*
Parental death	1.1*	(1.0–1.2)		1.2*	(1.1–1.3)		1.0	(0.9–1.1)		1.1*	(1.0–1.3)	
Parental divorce	1.1	(1.0–1.2)		1.2*	(1.0–1.3)		1.1	(1.0–1.3)		1.0	(0.9–1.2)	
Other parental loss	1.3*	(1.2–1.5)		1.3*	(1.2–1.5)		1.5*	(1.3–1.74)		1.3*	(1.2–1.6)	
Serious physical illness	1.5*	(1.4–1.7)		1.4*	(1.2–1.6)		1.4*	(1.1–1.7)		1.2*	(1.0–1.4)	
Family economic adversity	1.3*	(1.1–1.5)		1.0	(0.9–1.2)		1.1	(0.9–1.4)		1.2	(1.0–1.4)	
III. Number of maladaptive family functioning childhood adversities[d]			75.5*			119.8*			71.3*			35.3*
Zero to one	–			–			–			–		
Two	0.8*	(0.7–0.9)		0.8*	(0.6–0.9)		0.7*	(0.6–0.8)		0.7*	(0.6–0.8)	
Three	0.6*	(0.4–0.7)		0.5*	(0.4–0.7)		0.4*	(0.3–0.5)		0.5*	(0.4–0.7)	
Four	0.4*	(0.3–0.5)		0.3*	(0.2–0.5)		0.2*	(0.2–0.4)		0.3*	(0.2–0.5)	
Five	0.3*	(0.2–0.4)		0.2*	(0.1–0.3)		0.2*	(0.1–0.3)		0.3*	(0.2–0.6)	
Six	0.2*	(0.1–0.3)		0.1*	(0.0–0.1)		0.1*	(0.0–0.2)		0.2*	(0.1–0.4)	
Seven	0.1*	(0.0–0.2)		0.0*	(0.0–0.1)		0.0*	(0.0–0.1)		0.1*	(0.0–0.3)	
IV. Number of other childhood adversities[e]			5.7			10.1*			9.7*			3.6
Zero to one	–			–			–			–		
Two	0.8	(0.8–1.0)		0.8*	(0.7–0.9)		0.8*	(0.6–1.0)		0.8	(0.6–1.0)	
Three	0.8	(0.6–1.1)		0.8	(0.5–1.1)		0.6*	(0.4–0.9)		0.8	(0.5–1.3)	
Four+	1.2	(0.6–2.0)		0.5*	(0.2–1.0)		0.3*	(0.1–0.8)		0.6	(0.2–1.6)	

a. The model is a discrete-time survival model in a logistic regression framework with person-year as the unit of analysis to predict first onset of each of the 20 DSM-IV/CIDI disorders included in the analysis pooled across all countries in each of four sets of person-years that define life-course stages. Age at onset was assessed using retrospective reports. Controls were included in the model for respondent age at interview, person-year, country, and type of disorder. The 19 type-of-disorder controls were included because the separate person-year data files for each of the 20 disorders were pooled, thereby forcing the slopes to be constant across disorders within each age range. As noted in the text, this assumption was subsequently relaxed and the model was estimated separately for each of four classes of disorders (mood, anxiety, behaviour and substance disorders) and then for each of the 20 separate disorders. Broad consistency of coefficients across these disaggregated models supports the validity of interpreting results pooled across all 20 disorders. The model is significant in each life-course stage (χ^2_{21} = 328.5–1162.6, P < 0.001). The sample sizes reported are the numbers of respondents who contributed at least one person-year to the data file at each of the life-course stages. The numbers decrease with age as some respondents were younger than 20 and even more younger than 30 at the time of interview. The numbers of person-years in the analysis were 9 817 605 for childhood, 7 617 351 for adolescence, 9 459 051 for young adulthood and 16 708 356 for later adulthood. These person-years represent the combination of 20 separate person-year data files, each with a sample size equal to the combined number of years of life of all respondents in the age ranges of the life-course stages described in the column headings, where the upper end of the records are the age at onset of the focal disorder for respondents who experienced the disorder and age at interview for respondents who never experienced the disorder. Because of the sample sizes being enormous, a random 5% of observations with a negative score on the outcome were used in the analysis, each such case being assigned a weight of 20 (i.e. 1/0.05) to represent the undersampling.
b. For χ^2 d.f. = 7.
c. For χ^2 d.f. = 5.
d. For χ^2 d.f. = 6.
e. For χ^2 d.f. = 3.
*Significant at the 0.05 level, two-sided test.

frames (most notably, underrepresentation of rural areas in low- and middle-income countries) and omission of some childhood adversities in some countries. These inconsistencies could increase variation in estimates. However, we estimated models separately by country using only the childhood adversities assessed in that country and found good consistency of results. (Detailed results are available from the authors on request.)

Another limitation is that the WMH surveys did not assess psychosis, which has been found in other research to be significantly related to childhood adversities.[37–39] Disorder assessment was also limited by focusing exclusively on DSM-IV cases. The DSM categories might not capture the full relevant range of psychopathology in the countries studied. An additional limitation related to measurement is that childhood adversities and disorders were assessed retrospectively. Retrospective recall bias is likely to be conservative, leading to underreporting of both childhood adversities[40] and disorders.[41] Long-term prospective study is needed to resolve this problem using available prospective data-sets.[1,42–44] Some interesting preliminary work of this sort has already begun.[45]

Analyses were limited by not examining patterns separately for men and women or across other important subsamples and by not controlling all unmeasured common causes of childhood adversities and disorders that could induce the associations observed here in the absence of causal effects of childhood adversities. Special caution is needed in interpreting the PARPs because of this limitation, as the actual effects of eradicating childhood adversities could be much lower than those estimated by the PARPs.

Within the context of these limitations, the WMH results are consistent with previous studies in suggesting that substantial proportions of children are exposed to childhood adversities.

Table 4 Population attributable risk proportions (PARPs) of childhood adversities predicting lifetime DSM-IV/CIDI disorders by type of disorder and life-course stage[a]

	Childhood, age 4–12	Adolescence, age 13–19	Early adulthood, age 20–29	Later adulthood, age 30+	Total
I. High-income countries					
Mood disorders	57.1	28.8	19.1	13.6	19.7
Anxiety disorders	34.1	29.7	29.6	22.6	30.0
Behaviour disorders	50.3	36.4	–[b]	–[b]	43.6
Substance disorders	62.4	24.2	25.8	32.4	22.8
All disorders	41.2	30.9	25.3	19.1	28.7
II. High-middle-income countries					
Mood disorders	64.9	32.1	26.9	13.5	23.5
Anxiety disorders	31.5	28.4	41.3	25.6	30.0
Behaviour disorders	59.0	40.9	25.3	–[b]	46.7
Substance disorders	65.0	24.1	29.6	44.2	28.8
All disorders	40.0	30.0	32.1	24.3	30.0
III. Low-/lower-middle-income countries					
Mood disorders	53.8	34.7	30.4	19.6	25.6
Anxiety disorders	31.4	28.1	34.0	40.3	29.2
Behaviour disorders	53.7	42.9	19.8	–[b]	43.7
Substance disorders	51.2	32.9	27.7	27.8	29.2
All disorders	33.3	34.7	30.2	27.8	29.9
IV. Total					
Mood disorders	59.5	32.6	24.2	13.6	22.9
Anxiety disorders	31.1	30.3	36.7	28.3	31.0
Behaviour disorders	49.6	36.2	17.4	–[b]	41.6
Substance disorders	62.3	30.0	28.9	34.2	27.5
All disorders	38.2	32.3	29.0	21.8	29.8

a. The PARPs were calculated using simulation methods to generate individual-level predicted probabilities of the outcome disorders twice from the coefficients in final model, where these coefficients were estimated separately for each cell of the table. The first time the calculations were made using all the coefficients in the model and the second time assuming that the coefficients associated with the childhood adversities were all zero. One minus the ratio of the predicted prevalence estimates in the two specifications was then used to calculate PARP.
b. Too few onsets occurred at this life-course stage to estimate PARP.

Consistency of WMH exposure rates with those reported in previous studies is difficult to assess precisely, as measurement approaches across studies differ and cannot be compared directly.[46] World Mental Health survey respondent reports of parental divorce, the childhood adversity most often found in government statistics, are generally consistent with official estimates.[47] World Mental Health survey respondent reports of other childhood adversities such as physical and sexual abuse[48] and parental violence,[49] however, are lower than in some other surveys. This suggests that WMH estimates might be conservative.

Although early studies on associations between a single childhood adversity and a single mental disorder implied the existence of specificity of effects,[50,51] little evidence of specificity was found in the WMH data. The implication is that causal pathways linking childhood adversities to disorders are quite general. Although several recent comparative studies found more evidence for specificity among children and adolescents,[52–54] those studies focused on prevalent cases, whereas the current analysis focused on first lifetime onsets.

Implications and future research

We showed that childhood adversities often co-occur and that clusters of childhood adversities associated with maladaptive family functioning are linked with the highest risk of mental disorders. We also found generally subadditive effects of multiple childhood adversities associated with maladaptive family functioning. This has important implications for intervention because it means prevention or amelioration of only a single childhood adversity among individuals exposed to many is unlikely to have important effects. Early intervention to reduce exposure to all childhood adversities (e.g. multisystem family therapy, foster care placement) and later intervention to address long-term adult maladaptive psychological and behavioural consequences of having been exposed to childhood adversities would seem to hold the most promise in light of these results.

Intervention, of course, requires detection. Screening of youngsters in routine medical settings would seem the easiest approach to detection of severe childhood adversities (e.g. physical/sexual abuse and neglect). Although children are often reluctant to admit these childhood adversities and health professionals are often reluctant to ask, promising approaches have been developed to increase the success of detection based on health worker questioning.[55] Although it is less clear whether retrospective detection of childhood adversities in adulthood would have value, the WMH data show that history of childhood adversities predicts disorder onset in adulthood. This is much more striking than showing that childhood adversities continue to be associated with adult prevalence,[56,57] and suggests that retrospective detection might help find adults in need of interventions to address the long-term emotional and behavioural consequences of childhood adversities that contribute to their ongoing elevated risk on new onsets.[58]

There is nothing in our retrospective WMH results that addresses the number of hypotheses that could be advanced to explain the patterns documented here.[57,59,60] Our results are nonetheless important, in providing empirical justification for further analyses to explore such hypotheses to identify mediators, modifiers and developmental sequences that might be fruitful targets for preventive interventions.[61] It would also be useful to examine these associations in an epidemiological sample that had a genetically informative design to investigate the extent to which exposure and reactivity to childhood adversities are under genetic control. Consistent with other recent research,[38] it would

also be useful to study genetic influences on inter-generational continuity of childhood adversities exposure. A new WMH initiative is collecting saliva samples from respondents in close to a dozen different WMH surveys in order to allow genetic studies of this sort to be carried out.

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Associations of serious mental illness with earnings: results from the WHO World Mental Health surveys

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Background
Burden-of-illness data, which are often used in setting healthcare policy-spending priorities, are unavailable for mental disorders in most countries.

Aims
To examine one central aspect of illness burden, the association of serious mental illness with earnings, in the World Health Organization (WHO) World Mental Health (WMH) Surveys.

Method
The WMH Surveys were carried out in 10 high-income and 9 low- and middle-income countries. The associations of personal earnings with serious mental illness were estimated.

Results
Respondents with serious mental illness earned on average a third less than median earnings, with no significant between-country differences ($\chi^2(9) = 5.5–8.1$, $P = 0.52–0.79$). These losses are equivalent to 0.3–0.8% of total national earnings. Reduced earnings among those with earnings and the increased probability of not earning are both important components of these associations.

Conclusions
These results add to a growing body of evidence that mental disorders have high societal costs. Decisions about healthcare resource allocation should take these costs into consideration.

Declaration of interest
R.C.K. has been a consultant for GlaxoSmithKline, Kaiser Permanente, Pfizer, Sanofi-Aventis, Shire Pharmaceuticals and Wyeth-Ayerst; has served on advisory boards for Eli Lilly & Company and Wyeth-Ayerst; and has had research support for his epidemiological studies from Bristol-Myers Squibb, Eli Lilly & Company, GlaxoSmithKline, Johnson & Johnson Pharmaceuticals, Ortho-McNeil Pharmaceuticalsc, Pfizer and Sanofi-Aventis.

The fact that mental disorders are associated with high societal burden is now well established both in terms of disability-adjusted life-years[1] and as a fraction of national budgets.[2] A large part of this burden consists of indirect costs such as those associated with reduced rates of labour force participation,[3] unemployment among those in the labour force[4] and underemployment among those who are employed.[5] Mental disorders also have costs for employers, including high rates of sporadic absenteeism[6] and disability-related work leave[7] as well as low levels of on-the-job work performance.[8] The most commonly used approach to study these labour market costs is the human capital approach.[9] This approach is based on the observation that wages and salaries are paid in direct return for productive services, making earnings a good indicator of the human capital accumulated by the individual and making earnings-equivalent time forgone because of an illness a good representation of the indirect costs of that illness to the employer. Although a considerable body of empirical research has used the human capital approach to document adverse societal effects of mental disorders, this research has been carried out largely in a small number of high-income countries.[4,7] Yet epidemiological data show that mental disorders are common throughout the world.[10] The purpose of the current paper is to use the survey data in the World Health Organization (WHO) World Mental Health (WMH) Surveys to make estimates of the human capital costs of mental disorders in a wider range of countries (population samples from 10 high-income and 9 low- and middle-income countries with a total of more than 100 000 respondents). We focus on serious mental illness because previous research has shown that earnings and long-term work incapacity are both much more strongly related to serious mental illness than to less serious forms of mental illness.[5,11]

Method

Sample

Twenty surveys were carried out in 19 countries in the Americas (Brazil, Colombia, Mexico, USA), Europe (Belgium, Bulgaria, France, Germany, Italy, The Netherlands, Spain), the Middle East (Israel, Lebanon), Africa (Nigeria, South Africa), Asia (Japan, People's Republic of China: Beijing, Shanghai, Shenzhen, India: Pondicherry), and New Zealand (online Table DS1). The World Bank[12] classifies Brazil, Bulgaria, Colombia, India, Lebanon, Mexico, Nigeria, the People's Republic of China, and South Africa as low- and middle-income countries, and all the other surveyed countries as high-income countries. All surveys were based on either multistage clustered area probability samples of households, with one or two random respondents selected in each sample household, or multistage clustered area probability samples of individuals listed in a national population register. All interviews were carried out face to face by trained lay interviewers.

Recruitment began with a letter sent to the households of potential respondents describing the purpose of the study and answering commonly asked questions about how their household was selected, the voluntary nature of participation and the confidentiality of responses. Interviewers reviewed these issues with the potential respondents when they visited the households

and obtained informed consent before beginning the interviews. Standard procedures for recording and storing the survey data in de-identified files were used to protect the confidentiality of respondents. A respondent safety plan was developed separately in each country consistent with local norms to address concerns about evidence of respondent danger to self or others. These recruitment, consent and respondent protection procedures were approved by the Human Subjects Committee of the lead organisation that carried out the survey in each country.

The total sample size was 101 825, with individual country sample sizes ranging from a low of 2372 in The Netherlands to a high of 12 992 in New Zealand. The weighted average response rate across countries was 72.2%. Internal subsampling was used to reduce respondent burden by dividing the interview into two parts. Part I included the core diagnostic assessment of mental disorders. Part II included a detailed risk-factor questionnaire, a series of diagnoses of secondary interest, and a series of questions about the correlates of mental illness. Earnings were assessed in Part II. All respondents completed Part I ($n = 101\,825$), and all respondents who met criteria for any Part I mental disorder plus a probability sample of other Part I respondents were administered Part II ($n = 51\,007$). (All respondents were administered Part II in Israel and South Africa.) The Part I data were weighted to adjust for differential probabilities of selection and for the undersampling of hard-to-reach respondents (a probability subsample of whom received special intensive recruitment efforts). The Part II data were additionally weighted to adjust for the undersampling of Part I respondents without a core disorder (i.e. weighting by the inverse of probability of selection into Part II) to remove any bias in Part II relative to Part I. A final Part II was weight adjusted for discrepancies between the sample distributions and the population census on a wide range of sociodemographic and geographic variables. The analyses reported here were based on the respondents in the weighted Part II sample who were of working age, which we defined for purposes of this analysis as 18–64 years of age ($n = 44\,561$). A more detailed description of WMH sampling that includes an analysis of the effects of weights and weight trimming is presented elsewhere.[13]

Interviewer training and fieldwork quality control

Each WMH interviewer was required to complete a 7-day training course and to pass an examination that included administering a series of practice interviews with scripted responses before beginning production work. During production, supervisors reviewed all interviews for completeness and made follow-up contacts with a random 5–10% of respondents to confirm household addresses, household enumeration, random selection procedures and the length of the interview. Supervisors repeated a random sample of questions during these interview audits in order to make sure interviewers administered the complete interview and that responses were recorded accurately. In addition, aggregate interviewer-level data were monitored on an ongoing basis to look for distinctive interviewer-specific data patterns that might indicate fabrication of data. A more detailed discussion of interviewer training and field quality-control procedures is presented elsewhere.[14]

Measures

Mental illness

All surveys assessed mental illness with the WHO Composite International Diagnostic Interview (CIDI),[15] a fully-structured diagnostic interview that assesses the prevalence of mental disorders according to the definitions and criteria of both the DSM–IV[16] and ICD–10[17] diagnostic systems. The DSM–IV criteria were used in the current report. We focused on prevalence at any time within the 12 months before the interview. The disorders considered include anxiety disorders (generalised anxiety disorder, panic disorder, phobias, post-traumatic stress disorder) and mood disorders (major depressive disorder, dysthymic disorder, bipolar disorder). In making diagnosis, CIDI organic exclusion rules were imposed. Clinical reappraisal studies carried out in conjunction with a number of WMH surveys using the Structured Clinical Interview for DSM–IV[18] as the gold standard documented generally good concordance of masked clinical diagnoses with diagnoses based on the CIDI. Serious mental illness was defined following previous WMH analyses[19] as either meeting criteria for bipolar I disorder or having any other 12-month diagnosis with evidence of serious role impairment. Serious role impairment was defined as either having a score in the severe range on one or more of the Sheehan Disability Scales,[20] which assess disability in work-role performance, household maintenance, social life or intimate relationships or attempting suicide. The CIDI also assessed DSM–IV alcohol and illicit drug use with or without dependence. Both lifetime prevalence of these conditions and prevalence in the 12 months before the interview were used as controls to adjust for comorbidity between mental and substance disorders. Other 12-month disorders that did not meet criteria for serious mental illness were not considered because preliminary analysis found that they are not significantly related to earnings. (Detailed results are available from the authors on request.)

Earnings

All Part II respondents were asked to report their personal earnings in the past 12 months before taxes. Respondents were instructed to count only wages and other stipends from employment, not pensions, investments or other financial assistance or income. As in most community surveys, the item-level non-response rate for this question was non-trivial (with a range of 0.8–18.3% and an interquartile range of 2.2–7.0% across surveys). Mean imputation was used to impute missing values. It is noteworthy that serious mental illness was not significantly related to having a missing value on the earnings variable either in high- or low- and middle-income countries ($\chi^2(1) = 0.1$–3.1, $P = 0.08$–0.71). This means that the decision about how to deal with these missing values (i.e. either by case deletion, imputation or introducing a control variable for having a missing value on this variable into the regression equations) would not meaningfully influence the magnitude of the serious mental illness coefficients in the regression analyses reported below.

Analysis methods

In order to facilitate pooling of results across countries, earnings reports were divided by the median earnings in the country. These transformed scores were then used as outcomes in pooled regression analyses estimated simultaneously across all countries. Prior to carrying out this analysis, earnings distributions were compared for respondents with and without serious mental illness. The earnings distributions among respondents with any earnings were divided for this purpose into four categories by defining low earnings as less than half the within-country median, low–average earnings as up to the median, high–average earnings as up to twice the median, and high earnings as greater than two times the median.

The regression analyses were then carried out using a dummy variable for serious mental illness as the predictor of primary interest. The outcome was the transformed continuous earnings score. Control variables were included for sociodemographics (age, gender), country (19 dummy variables to distinguish respondents across the 20 surveys), substance disorders and interactions between gender and all other predictors. The gender interactions were included because previous research has shown that the predictors of earnings are different for males than females.[5,21]

A major statistical problem in estimating regression equations of this sort is that the earnings distribution is highly skewed, with a meaningful minority of the sample in each country reporting no earnings and a much higher proportion of other respondents having high earnings than would be found in a normal distribution. This makes ordinary least squares regression analysis both biased and inefficient. Economists have developed special statistical procedures to address this problem that involve using either two-part models (i.e. a first logistic regression model to predict having any earnings and a second linear regression model to predict amount of earnings among those with any earnings)[22,23] or special one-part non-linear models.[24,25] We used both approaches in addition to conventional ordinary least squares regression analysis (with linear, square root and logarithmic link functions) and selected the best approach based on standard empirical model comparison procedures.[26] The details of the modelling approaches are discussed elsewhere,[5] but the final best-fitting model was a one-part generalised linear model that assumed a logarithmic link function between predictors and the outcome with prediction error variance proportional to the predicted values.

As the best-fitting model used a non-linear transformation of the outcome in conjunction with an interaction between serious mental illness and gender, model-based simulation was needed to interpret the coefficients. This was done by predicting earnings twice for each respondent from the model coefficients, once using the actual characteristics of the respondent and a second time recoding all respondents with serious mental illness to assume that they did not have serious mental illness. Individual-level differences between these estimates were averaged across all respondents with serious mental illness to estimate the mean individual-level decrease in earnings associated with serious mental illness. Societal-level estimates were then obtained by multiplying this individual-level estimate by the prevalence of serious mental illness. Demographic rate standardisation[27] was then used to decompose the societal-level estimates into components due to the associations of serious mental illness with probability of having any earnings and with the amount earned by those with any earnings. Because the WMH sample design featured weighting and clustering, the standard errors of the model coefficients and the simulated estimates were obtained using the design-based jackknife repeated replications method.[28] In this method, each model and each simulation is replicated many times in pseudo-samples to generate a distribution of each coefficient that is then used to calculate an empirical estimate of the standard error of the coefficient. Multivariate significance was estimated using design-adjusted Wald χ^2-tests.[29] Statistical significance was consistently evaluated using two-sided tests at the 0.05 level of significance.

Results

Sample distributions

Consistent with their population distributions, the age distribution of the sample is different in high-income countries from that in low- and middle-income countries ($\chi^2(3) = 553.1$, $P<0.001$) (Table 1). Larger proportions of respondents are in the age ranges 18–24 (24.5% *v.* 15.6%) and 25–39 (40.8% *v.* 35.0%) in low- and middle-income than high-income countries, whereas larger proportions are in the age ranges 40–54 (34.0% *v.* 24.8%) and 55–64 (15.4% *v.* 10.0%) in high-income than low- and middle-income countries. Females have a somewhat older age distribution than males in low- and middle-income countries ($\chi^2(3) = 9.2$, $P = 0.026$), but there is no gender difference in the age distribution in high-income countries ($\chi^2(3) = 1.3$, $P = 0.74$). Serious mental illness is estimated to be significantly more prevalent in high-income than low- and middle-income countries both in the total sample (4.3% *v.* 3.0%, $t = 6.4$, $P<0.001$) and separately among males (3.5% *v.* 2.2%, $t = 5.1$, $P<0.001$) and females (5.0% *v.* 3.9%, $t = 4.3$, $P<0.001$) (Table 1). Serious mental illness is estimated to be significantly more common among females than males in both high-income and low- and middle-income countries ($t = 6.1$–6.6, $P<0.001$).

Earnings distributions among respondents with and without serious mental illness

The proportion of respondents with non-zero earnings is significantly lower among those with than those without serious mental illness in both high-income (61.9% *v.* 75.6%, $t = 8.6$,

Table 1 Distributions of age, gender and mental illness in high-income and low- and middle-income countries[a]

	% (s.e.)					
	High-income countries			Low- and middle-income countries		
	Total ($n = 23\,457$)	Male ($n = 10\,114$)	Female ($n = 13\,343$)	Total ($n = 21\,104$)	Male ($n = 9040$)	Female ($n = 12\,064$)
Age, years[b]						
18–24	15.6 (0.4)	16.0 (0.5)	15.3 (0.5)	24.5 (0.4)	24.6 (0.7)	24.5 (0.6)
25–39	35.0 (0.5)	34.7 (0.6)	35.2 (0.6)	40.8 (0.5)	41.3 (0.7)	40.2 (0.6)
40–54	34.0 (0.4)	34.0 (0.6)	34.0 (0.6)	24.8 (0.4)	25.1 (0.6)	24.4 (0.5)
55–64	15.4 (0.3)	15.3 (0.5)	15.5 (0.4)	10.0 (0.3)	9.1 (0.4)	10.8 (0.4)
12-month serious mental illness[c]	4.3 (0.1)	3.5 (0.2)	5.0 (0.2)	3.0 (0.1)	2.2 (0.2)	3.9 (0.2)

a. High-income countries: Belgium, France, Germany, Israel, Italy, Japan, The Netherlands, Spain, USA, New Zealand; low- and middle-income countries: South Africa, Brazil, Bulgaria, China, Colombia, Lebanon, Mexico, Nigeria, Pondicherry, Shenzhen.
b. Significance of age differences was evaluated with Wald design-based χ^2-tests. The age distribution is significantly different between high-income and low- and middle-income countries in the total sample ($\chi^2(3) = 553.1$, $P<0.001$) and separately among males ($\chi^2(3) = 272.5$, $P<0.001$) and females ($\chi^2(3) = 298.4$, $P<0.001$). Males and females also have significantly different age distributions in low- and middle-income ($\chi^2(3) = 9.2$, $P = 0.026$) but not high-income ($\chi^2(3) = 1.3$, $P = 0.74$) countries.
c. The estimated prevalence of serious mental illness differs significantly between high-income and low- and middle-income countries in the total sample ($\chi^2(1) = 40.4$, $P<0.001$) and separately among males ($\chi^2(1) = 25.0$, $P<0.001$) and females ($\chi^2(1) = 17.6$, $P<0.001$). Males and females also differ in prevalence of serious mental illness in both high-income ($\chi^2(1) = 34.7$, $P<0.001$) and low- and middle-income ($\chi^2(1) = 39.8$, $P<0.001$) countries.

Table 2 Earnings distributions[a] for respondents with and without serious mental illness in high-income and low- and middle-income countries[b]

	High-income countries			Low- and middle-income countries		
	Total (n = 23 457)	Male (n = 10 114)	Female (n = 13 343)	Total (n = 21 104)	Male (n = 9040)	Female (n = 12 064)
Any earnings, % (s.e.)						
Total sample	75.0 (0.4)	82.6 (0.6)	67.7 (0.6)	62.8 (0.5)	72.9 (0.7)	53.3 (0.6)
Serious mental illness	61.9* (1.6)	70.6* (2.6)	56.2* (2.0)	51.6 (1.9)	62.9*,† (3.6)	45.6*,† (2.4)
Others	75.6* (0.4)	83.1* (2.6)	68.3* (0.6)	63.1 (0.5)	73.1*,† (0.7)	53.6*,† (0.6)
Low earnings among the employed, % (s.e.)						
Total sample	24.3 (0.5)	16.8 (0.6)	33.2 (0.8)	25.7 (0.6)	23.0 (0.8)	29.0 (0.9)
Serious mental illness	40.4* (1.8)	34.6* (3.0)	45.2* (2.2)	23.9 (2.5)	22.2 (3.9)	25.1 (3.0)
Others	23.8* (0.5)	16.3* (0.6)	32.7* (0.8)	25.7 (0.6)	23.0 (0.8)	29.2 (0.9)
Low-average earnings among the employed, % (s.e.)						
Total sample	20.6 (0.5)	16.0 (0.6)	26.0 (0.7)	33.0 (0.7)	30.1 (0.8)	36.8 (1.0)
Serious mental illness	25.1* (1.6)	21.0* (2.5)	28.4 (2.1)	45.6* (3.0)	39.1*,† (4.1)	50.4*,† (3.9)
Others	20.5* (0.5)	15.9* (0.6)	25.9 (0.7)	32.7* (0.7)	29.9*,† (0.8)	36.3*,† (1.0)
High-average earnings among the employed, % (s.e.)						
Total sample	28.2 (0.5)	29.2 (0.7)	27.1 (0.7)	15.7 (0.5)	16.2 (0.6)	15.0 (0.7)
Serious mental illness	21.9* (1.7)	25.7 (2.8)	18.8* (1.8)	11.6* (1.6)	13.8 (3.1)	10.0*,† (2.2)
Others	28.5* (0.5)	29.3 (0.7)	27.4* (0.7)	15.8* (0.5)	16.3 (0.7)	15.2*,† (0.7)
High earnings among the employed, % (s.e.)						
Total sample	26.8 (0.5)	37.9 (0.8)	13.8 (0.5)	25.6 (0.6)	30.7 (0.8)	19.1 (0.7)
Serious mental illness	12.7* (1.2)	18.8* (2.2)	7.6* (1.2)	18.9* (1.7)	24.9*,† (2.7)	14.5* (2.2)
Others	27.3* (0.5)	38.5* (0.8)	14.1* (0.5)	25.8* (0.6)	30.8*,† (0.8)	19.3* (0.8)
$\chi^2(3)$	141.2†	76.0†	47.9†	28.8†	6.2	16.9†

a. Low earnings were defined as less than half the within-country median among those with any earnings, low–average earnings as up to the median, high–average earnings as up to twice the median, and high earnings as greater than twice the median.
b. High-income countries: Belgium, France, Germany, Israel, Italy, Japan, The Netherlands, New Zealand, Spain, USA; low- and middle-income countries: Brazil, Bulgaria, Colombia, India, Lebanon, Mexico, Nigeria, People's Republic of China, South Africa.
*Significant difference between respondents with serious mental illness and other respondents at the 0.05 level, two-sided test.
†Significant difference at the 0.05 level between the earnings distributions of respondents with and without serious mental illness among those with non-zero earnings.

$P<0.001$) and low- and middle-income (51.6% *v.* 63.1%, $t=5.9$, $P<0.001$) countries (Table 2). Similar differences are found when we look separately at males ($t=4.8$–2.8, $P\leqslant 0.001$–0.005) and females ($t=5.9$–3.2, $P\leqslant 0.001$). These overall differences are because of the proportions of respondents with low and low–average earnings being significantly higher among those with than those without serious mental illness in both high-income (40.4% *v.* 23.8%, $t=9.0$, $P<0.001$ low earnings; 25.1% *v.* 20.5%, $t=2.8$, $P=0.005$ low–average earnings) and low- and middle-income (low–average only; 45.6% *v.* 32.7%, $t=4.4$, $P<0.001$) countries and the proportions of respondents with high–average and high incomes being significantly higher among those without than those with serious mental illness in both high-income (28.5% *v.* 21.9%, $t=3.7$, $P<0.001$ high–average earnings; 27.3% *v.* 12.7%, $t=11.2$, $P<0.001$ high earnings) and low- and middle-income (15.8% *v.* 11.6%, $t=2.5$, $P=0.013$ high–average earnings; 25.8% *v.* 18.9%, $t=3.8$, $P<0.001$ high earnings) countries. Similar patterns are found when we look separately at men and women.

Individual-level regression models of the association between serious mental illness and earnings

The model-based simulations estimate that serious mental illness is associated with a reduction in earnings equal to 32% of the median within-country earnings in high-income countries and 33% of median within-country earnings in low- and middle-income countries (Table 3). The association is considerably larger among men than women in high-income countries (53% *v.* 19%, $t=4.8$, $P<0.001$) but more comparable for men and women in low- and middle-income countries (29% *v.* 35%, $t=0.2$, $P=0.85$). Decomposition shows that 39% of the total association between serious mental illness and earnings in high-income countries and 27% in low- and middle-income countries is as a result of the reduced probability of having any earnings among people with serious mental illness. This component is smaller for men than women in high-income countries (31% *v.* 55%, $t=2.4$, $P=0.020$) but larger for men than women in low- and middle-income countries (50% *v.* 18%, $t=0.5$, $P=0.60$). A larger component of the total association, 49% of the total in high-income countries and 66% in low- and middle-income countries, is as a result of the lower mean level of earnings among people with than without serious mental illness who have any earnings. This component is larger for men than women in high-income countries (56% *v.* 36%, $t=2.1$, $P=0.030$) but larger for women than men in low- and middle-income countries (75% *v.* 45%, $t=0.5$, $P=0.61$).

Country-specific, individual-level and societal-level projections

It is instructive to compare results across countries and to put the individual-level estimates into perspective by considering them in their natural metrics projected to the societal level. This was done by estimating the coefficients in the best-fitting model separately in each of the 20 surveys, expressing the estimates in terms of mean rather than median earnings, multiplying these estimates by the prevalence of serious mental illness, and then multiplying this product by the population size of the country in the age range of the sample to obtain societal-level estimates (Table 4). Serious mental illness is associated with a reduction in earnings in all 19 countries, with a statistically significant weighted average value of 19.4% of mean earnings in high-income countries and 10.9% of mean earnings in low- and middle-income countries. Between-country differences in these individual-level estimates are not significant either in high-income ($\chi^2(9)=8.1$, $P=0.52$) or low- and middle-income ($\chi^2(9)=5.5$, $P=0.79$) countries. At

Table 3 The simulated associations of serious mental illness with reduced earnings at the individual level among men and women separately in high-income and low- and middle-income countries[a]

	Estimate (s.e.)					
	High-income countries			Low- and middle-income countries		
	Total	Male	Female	Total	Male	Female
Overall association						
Association between serious mental illness and earnings in the total sample[b]	0.32* (0.03)	0.53* (0.07)	0.19* (0.02)	0.33* (0.14)	0.29 (0.23)	0.35 (0.18)
Component effects						
Effect of serious mental illness on probability of non-zero earnings[c]	0.14* (0.02)	0.16* (0.02)	0.14* (0.02)	0.05 (0.03)	0.07 (0.05)	0.05 (0.04)
Estimated effect of serious mental illness on earnings given non-zero earnings[b]	0.26* (0.04)	0.42* (0.08)	0.12* (0.03)	0.42 (0.28)	0.21 (0.30)	0.57 (0.44)
Decomposition of overall effect[d]						
Due to difference in probability of non-zero earnings	0.39* (0.05)	0.31* (0.06)	0.55* (0.08)	0.27 (0.19)	0.50 (0.58)	0.18 (0.18)
Due to difference in earnings given non-zero earnings	0.49* (0.05)	0.56* (0.07)	0.36* (0.07)	0.66* (0.20)	0.45 (0.53)	0.75* (0.23)
Due to the interaction between the two components	0.12* (0.01)	0.13* (0.02)	0.09* (0.02)	0.07* (0.03)	0.05 (0.06)	0.08 (0.06)

a. High-income countries: Belgium, Germany, Israel, Italy, Japan, The Netherlands, Spain, USA, New Zealand; low- and middle-income countries: Brazil, Bulgaria, Colombia, India, Lebanon, Mexico, Nigeria, People's Republic of China, South Africa.
b. The estimates reported in these rows summarise the results of individual-level simulations based on the coefficients in the best-fitting multiple regression model. (The coefficients from these models are not reported here, but are available from the authors.) That model was a generalised linear model that assumed a logarithmic link function between predictors and the outcome with prediction error variance proportional to the predicted values. A discussion of generalised linear model estimation is presented elsewhere.[5] The simulation used the model coefficients to predict individual-level earnings twice for each respondent, once using the actual characteristics of the respondent and a second time based on the counterfactual assumption that none of the respondents had serious mental illness. Individual-level differences between these earnings estimates were averaged across all respondents with serious mental illness to estimate the expected mean individual-level decrease in earnings associated with serious mental illness in Part I of the current table. Standard errors were obtained by replicating the entire analysis in pseudo-samples using the method of jackknife repeated replication and using the distribution of estimates to generate an empirical estimate of the standard error.[28]
c. The estimates reported in this row summarise the results of logistic regression analysis to predict any earnings *v.* no earnings.
d. Demographic rate standardisation[27] was then used to decompose the societal-level estimates into components due to the associations of serious mental illness with probability of having any earnings and with the amount earned by those with any earnings. A description of this method is presented elsewhere.[5]
* Significant at the 0.05 level, two-sided test.

the societal level, the estimate averages 0.8% of all national earnings in high-income countries and 0.3% of all national earnings in low- and middle-income countries. Between-country differences are statistically significant in high-income countries ($\chi^2(9) = 30.4$, $P < 0.001$), with much lower estimates in Italy, Japan and Spain (0.0–0.3%) than the other countries (0.7–1.7%). Between-country differences in the societal-level estimates are not statistically significant, in comparison, in low- and middle-income countries ($\chi^2(9) = 4.7$, $P = 0.86$).

Discussion

Main findings

We found that serious mental illness is associated with a reduction in population-level earnings equivalent to 0.8% of all earnings in high-income countries and 0.3% of all earnings in low- and middle-income countries. We are aware of no other comparable studies of the societal costs of mental disorders with which these estimates can be compared with other than US studies that are broadly consistent with the results reported here for the US WMH sample.[30,31] An excellent benchmark for putting these values into perspective is the recent US government stimulus package in the American Recovery and Reinvestment Act (ARRA; www.recovery.gov), an unprecedented series of US government investments in education, energy, healthcare and national infrastructure implemented in an effort to stimulate the flagging US economy. The 0.8% decrement in societal-level earnings associated with serious mental illness in high-income countries is roughly equivalent to the total planned ARRA investment in national infrastructure, whereas the 0.3% decrement in societal-level earnings associated with serious mental illness in low- and middle-income countries is roughly equivalent to the total planned ARRA investment in all of healthcare. These comparisons make it clear that mental disorders are associated with massive losses of productive human capital not only at the individual level (32–33% of median national earnings, 11–19% of mean national earnings) but also at the societal level in the WMH countries.

Implications

This finding of a strong association between mental disorders and low earnings adds to a growing body of evidence that the impaired functioning associated with mental disorders carries an enormous societal burden.[12,14] Comparative cost-of-illness studies suggest that the magnitude of this burden at the individual level is higher than that of many other classes of illness. For example, another recent WMH report showed that mental disorders are associated with higher levels of individual-level disability than any of the wide variety of commonly occurring physical disorders examined in the WMH surveys, including arthritis, asthma, cancer, diabetes and heart disease.[32] This pattern held in both high-income and low- and middle-income countries. Health policy makers need to be made aware of these comparative illness burden data along with information about comparative treatment effectiveness to help guide decisions about resource allocation in disorder-specific screening and treatment programmes.

Controlled intervention trials have shown that employment rates and earnings among the employed can both be increased among people with severe-persistent mental illness, the vast majority of whom have a history of psychosis, using such methods as prevocational training and supported employment.[33,34] It is important to note, though, that only a minority of people with serious mental illness have severe-persistent mental illness.[35] Little is known about the effects of treatment on occupational outcomes among the much larger proportion of people with serious mental illness who do not have severe-persistent mental illness, the majority of whom suffer from chronic anxiety or behaviour disorders or recurrent depression. The fact that low earnings among people who have earnings accounts for a larger component of the total effect of serious mental illness on earning than having no earnings raises the question whether out-patient interventions

Table 4 The simulated association of serious mental illness with reduced earnings at the individual level and societal level in each World Mental Health country

	Serious mental illness		The associations expressed as a proportion of mean national earnings[a]				The associations expressed in local currency[b]			
	Prevalence		Individual-level[c]		Societal-level[d]		Individual-level		Societal-level (in Billions)	
	%	(s.e.)	Estimate	(s.e.)	Estimate	(s.e.)	Estimate	(s.e.)	Estimate	(s.e.)
High-income										
Belgium	4.9	(1.0)	27.3	(17.3)	1.3	(0.8)	211 807	(135 679)	65.8	(42.2)
France	3.8	(0.5)	38.9*	(18.7)	1.5*	(0.7)	42 660*	(20 473)	56.7*	(27.0)
Germany	2.7	(0.5)	36.8	(36.8)	1.0	(1.0)	11 908	(11 886)	16.8	(16.7)
Israel	3.7	(0.3)	23.8*	(10.0)	0.9*	(0.4)	1516*	(622)	0.2*	(0.0)
Italy	1.3	(0.2)	1.5	(7.9)	0.0	(0.1)	409 686	(2 107 357)	194.1	(998.7)
Japan	1.2	(0.4)	19.1	(30.0)	0.2	(0.4)	611 752	(959 881)	5.4	(8.7)
The Netherlands	4.4	(0.7)	16.2*	(6.2)	0.7*	(0.3)	7404*	(2901)	3.5*	(1.4)
New Zealand	4.9	(0.3)	25.3	(15.5)	1.3	(0.8)	10 031	(6275)	1.2	(1.3)
Spain	1.9	(0.3)	18.0	(15.2)	0.3	(0.3)	353 356	(294 691)	177.2	(147.6)
United States	6.5	(0.4)	25.5*	(6.5)	1.7*	(0.4)	8519*	(2100)	99.5*	(24.6)
Low- and middle-income										
Brazil	9.3	(0.7)	1.5	(2.5)	0.1	(0.2)	17	(30)	0.0	(0.0)
Bulgaria	1.5	(0.3)	26.6	(18.7)	0.4	(0.3)	638	(441)	0.0	(0.0)
Colombia	4.1	(0.4)	20.1	(13.0)	0.8	(0.5)	1 051 625	(675 762)	1042.9	(670.3)
India (Pondicherry)	1.0	(0.2)	39.4	(125.9)	0.4	(1.3)	17 478	(55 715)	0.1*	(0.0)
Lebanon	4.1	(0.7)	2.1	(1.1)	0.1*	(0.0)	141*	(70)	0.0	(0.0)
Mexico	2.3	(0.2)	5.9	(4.6)	0.1	(0.1)	2022	(1622)	2.4	(1.5)
Nigeria	0.5	(0.2)	34.5	(56.5)	0.2	(0.3)	23 599	(38 745)	7.5	(12.4)
People's Republic of China (Beijing, Shanghai)	0.6	(0.2)	28.9	(57.4)	0.2	(0.3)	413	(826)	0.0	(0.0)
Shenzhen	0.9	(0.3)	3.6	(10.9)	0.0	(0.1)	1141	(3413)	0.0	(0.0)
South Africa	3.3	(0.3)	18.8	(22.3)	0.6	(0.7)	4798	(5585)	3.9	(4.8)
Pooled										
High-income	4.3	(0.1)	19.4*	(1.8)	0.8*	(0.1)				
Low- and middle-income	3.1	(0.1)	10.9*	(4.6)	0.3*	(0.1)				

a. Results are expressed here in terms of mean earnings, whereas they were expressed in terms of median earnings in Table 3. The median was used in estimating the models in Table 3 because this transformation was considered the one that makes most sense as the basis for constraining model coefficients to be constant across countries. The mean is used here, in comparison, because it is the natural metric for interpreting the substantive meaning of results. To clarify the interpretation: if 4.3% of respondents in high-income countries have serious mental illness and serious mental illness is associated with a 19.4% reduction in earnings, then this level of loss in this segment of the population represents $0.194 \times 0.043 = 0.8\%$ of all national earnings.
b. The local currencies are francs in Belgium, francs in France, marks in Germany, shekels in Israel, lira in Italy, yen in Japan, guilders in The Netherlands, dollars in New Zealand, pesetas in Spain, dollars in the USA, reals in Brazil, lev in Bulgaria, pesos in Colombia, rupees in India, pounds in Lebanon, pesos in Mexico, naira in Nigeria, yuan in People's Republic of China, and rand in South Africa.
c. Estimates do not differ significantly across either high-income countries ($\chi^2(9) = 8.1$, $P = 0.52$) or low- and middle-income countries ($\chi^2(9) = 5.5$, $P = 0.79$) based on design-based Wald χ^2-tests.
d. Estimates differ significantly across high-income countries ($\chi^2(9) = 30.4$, $P < 0.001$) but not low- and middle-income countries ($\chi^2(9) = 4.7$, $P = 0.86$) based on design-based Wald χ^2-tests.
*Significant at the 0.05 level, two-sided test.

for employed people with a serious mental illness, but one that is a non-severe-persistent mental illness, might be a useful remedy. A handful of controlled studies have documented that such interventions can reduce job loss and sickness absence,[36,37] but we are aware of no controlled intervention studies that have documented an effect on earnings among the employed. Long-term follow-up would likely be required to document such an effect. A useful preliminary step might be to examine naturalistic longitudinal data to increase our understanding of the occupational career dynamics associated with serious mental illness that is non-severe-persistent mental illness in nature and the extent to which the high unemployment rate of people with serious mental illness is as a result of a high long-term unemployment rate versus a high short-term circulating unemployment rate. Intervention implications differ depending on the mix of these two kinds of unemployment, which cannot be distinguished with the data examined here.

Limitations

This study has a number of limitations in measurement, including that mental disorders were assessed with fully structured lay interviews rather than clinical interviews, that earnings were assessed with self-report rather than administrative records, that missing income reports were based on mean imputations, and that results were pooled across samples that varied in inclusion criteria and response rates. Bias could be introduced by any of these measurement characteristics. A limitation of a more conceptual sort is that the productive labour of women in domestic activities was not assigned a monetary value even though it clearly has value. In a related way, the productive labour of individuals who receive compensation for their labour in the form of goods or services (e.g. food and housing) rather than money, such as subsistence farmers, is underestimated in our analysis because we did not measure labour directly but rather inferred the existence of labour from earning. This limitation could be of special importance in low- and middle-income countries, as a larger proportion of workers are in the informal sector than in high-income countries.[38] This limitation might explain the fact that estimates of gender differences are less pronounced in low- and middle-income than high-income countries.

Limitations also existed in the analysis approach, most notably that a dynamic association was estimated with cross-sectional data. The most significant implication of this fact was that we were unable to adjust for the effect of low earnings on risk of mental disorder. There is good reason to believe that such a reciprocal

effect exists.[39] Because of this limitation, although we can state that serious mental illness is associated with low earnings we cannot say that this association is the result of serious mental illness causing low earnings. Virtually all cost-of-illness studies[9] have this same limitation. There is no definitive way to correct estimates for this limitation with non-experimental data. Controlling for mediating variables, such as education and marital status, which might themselves be reciprocally related to mental disorders, is not a corrective, as this can lead to overcorrection. Longitudinal analysis can sometimes help. For example, a 5-year longitudinal follow-up of 5000 initially employed respondents aged 18–30 in the Cardia study in four US cities found that high baseline depression symptom scores significantly predicted subsequent unemployment and decreases in income even after controlling for baseline education, marital status and history of prior unemployment.[40] Even here, though, high baseline depression symptom scores could have been influenced by knowledge of job insecurity that turned out to predict subsequent job loss.

Sophisticated statistical models can sometimes be used to reduce the range of uncertainty about reciprocal influences if information is available on third variables that influence one but not the other variable in a reciprocal pair[41] or if other assumptions can reasonably be made to justify the assumption of implicit conditional randomisation,[42] but such models are highly sensitive to misspecification. As a result, experimental interventions are ultimately the only reliable way to resolve the uncertainty about the causal effects of mental disorders on earnings. Controlled studies of these sorts, when combined with information about the prevalence and course of illness from epidemiological studies, provide the greatest hope of obtaining more definitive data about the effects of serious mental illness on earnings and other aspects of productive role functioning.

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特集—自殺—精神科医として何ができるか—

リストカッターの自殺

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抄録：2000年にカリスマ的リストカッターである「南条あや」の遺稿集『卒業式まで死にません』が刊行されて以降，精神科臨床の現場でリストカットを繰り返す自傷患者と遭遇することが急激に増えた。このような自傷患者のなかには，処方薬の過量服薬を繰り返す者も少なくなく，救急医療の現場では過量服薬患者が問題となっている。リストカットなどの自傷行為は，その行為だけを見れば自殺企図と峻別されるが，長期的には重要な自殺のリスク要因であり，援助の対象とすべき問題である。しかし，わが国の精神科医療者のなかでは，リストカットや過量服薬を繰り返す患者に対する否定的な感情を持ち，近年の自殺対策のなかでかかりつけ医から精神科医への紹介促進の動きとは裏腹に，いまもって援助に忌避的な者も少なくない。本稿では，リストカッターにおける自殺のリスク要因について論じるとともに，彼らをめぐる今日の精神科医療の問題点を指摘した。

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Key words：*self-injury, wrist-cutting, suicide, risk factor*

Ⅰ．リストカッター「南条あや」の死

2000年頃から，精神科外来ではリストカットを繰り返す女性患者が急激に増加した。筆者は，そうした患者たちから何度となく，「先生は，南条あやの『卒業式まで死にません』[15]を読みましたか？」と質問されたものである。当時，自傷患者のあいだで南条あやはカリスマ的存在となっていて，数多くの追随者・模倣者を生み出していた。

南条あや（本名：鈴木純）は，両親の離婚や学校での苛酷ないじめといった状況のなかで，中学1年頃よりリストカットを繰り返すようになった。もっとも，彼女の問題はリストカットだけではなかったように思われる。遺稿集[15]を読むと，彼女は時々，ヨーグルトやゼリーしか口にしないという極端なダイエットも繰り返しており，摂食障害への罹患も疑われる。

ともあれ，数年間に及ぶ自傷行為の果てに，彼女は高校3年時には精神科での入院治療も受けた。そのようななかで自らの精神科医療利用体験を綴った日記がネット上に公開されると，彼女はたちまち「メンヘル系ライター」として注目を集めるようになった。『卒業式まで死にません』は，それらの日記をまとめた遺稿集にあたる。

彼女は，1999年3月30日—高校の卒業式の20日後—に死亡した。その日の午後，彼女は一人でカラオケボックスに入店し，大量の向精神薬を服用

Suicide of self-injurers.

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して昏睡状態に陥り，そのまま帰らぬ人となったという。享年18歳であった。ただし，彼女が服用した向精神薬の量は致死量に満たず，かねてより頻回のリストカットや献血（これも「瀉血」という一種の自傷か）による慢性貧血の状態にあり，また，死後の解剖において心臓弁膜に異常が見出されたことから，死因は「推定自殺」と曖昧に濁されている。

南条あやという存在は，彼女の信奉者だけでなく，精神科医療関係者にも無視できない影響を与えたように思う。彼女の日記には，処方薬の飲み心地をソムリエのように批評したり，気軽に過量服薬したりするありさまが描かれているが，初めてそれを読んだとき，筆者は，現代精神科医療の暗部を拡大鏡で見せつけられた気がして慄然としたのを覚えている。当時すでにわが国では，精神科クリニックの急増に伴って過量服薬によって救急搬送される患者の増加が問題となり始めていた。「うつ病はこころの風邪，早めに精神科へ」などといった口当たりのよい啓発の副作用かもしれない。その結果，彼女の死と前後して，巷には「リストカット患者はお断り」という理由から患者を断る精神科クリニックが増え始めた。無理もない話である。処方薬を乱用し，インターネット上でリストカットした血まみれの腕の写真や主治医の発言を公開する患者など，確かに煩わしいことこの上ない。それでいて，まともに治療をしようと思えば長い診察時間が必要となり，現行の診療報酬制度下ではあまりにも効率が悪すぎる。

とはいえ，現実に南条あやが死亡している以上，リストカッターたちが死なないという保証などどこにもない。いいかえれば，「リストカットじゃ死なない」といえたとしても，「リストカットする奴は死なない」とはいえない。その意味では，自殺予防の観点では，「リストカッターお断り」として援助の埒外に弾き出して済まされる問題ではないのである。

本稿では，こうした「リストカッター」たちの自殺について考えてみたい。

Ⅱ．なぜ彼らはリストカットを繰り返すのか？

1．自傷と自殺の違い

まずはここから始めよう。自殺とは，致死的な目的から，致死性の予測をもって，現実に致死性の高い損傷を自らの身体に加えることを指すが，一方，自傷とは，自殺以外の目的から，非致死性の予測をもって，故意に非致死的な損傷を自らの身体に加える行為とされている[21]。ここでいう「自殺以外の目的」とは，たとえば，周囲に対する何らかの意思伝達の意図であったり，解離症状を軽減するためであったりするが，なかでも最も多い自傷の理由が，怒りや緊張などの不快感情への対処である[13]。つまり，自傷とは，誰の助けも借りずに苦痛を緩和する孤独な対処方法であり，意図の点で自殺とは峻別されるべき行動である。

Walsh と Rosen[21]は，Shneidman[19]の自殺に関するメタ心理学的知見を踏まえて，自殺と自傷の差異を明らかにしている（表1）。Shneidman によれば，自殺とは，耐えがたく，逃れられない，果てしなく続く精神的苦痛のなかで，唯一自分に残された「脱出口」であるという。すなわち，自殺を考える者は，もはや自力ではどうにも状況を変えることができないという絶望感と無力感のなかで，「楽になるには，一切の意識活動を終焉させるしかない」と確信する心理的視野狭窄の状態に陥り，自らを傷つけるわけである。

一方，自傷とは，苦痛を一時的に緩和する試みである。すなわち，自傷者の苦痛は間歇的・断続的な性質のものであり，そのような不快な意識状態を短期間だけ変化させ，混乱した意識状態を再統合するために自らを傷つける。もちろん，本来であれば，間歇的な苦痛の原因（たとえば，虐待やいじめ）を取り除くことこそが根本的かつ建設的な解決策であるのはいうまでもないが，虐待やいじめの加害者が到底かなわないほど強大な相手であったり，加害者に制止を要請してかえって深刻な事態に陥った経験を持つ者もいよう。そのような場合，次善の策としてとられるのが，苦痛を体験する自らの意識状態を変容させることで困難な状況に適応する，という方法である。

表1　メタ心理学的視点に基づく自傷と自殺の違い（文献21より引用）

特徴	自殺	自傷
苦痛	耐えられない，逃れられない，果てしなく続く痛み	間歇的・断続的な苦痛
目的	唯一の最終的な解決策	一時的な解決策
目標	意識の終焉	意識の変化
感情	絶望感　無力感	疎外感

その生理学的メカニズムには不明な点が多いが，自傷者の場合，自傷がもたらす「身体の痛み」には「心の痛み」を一時的に抑えるという不思議な鎮痛効果があることが知られている[18]。事実，習慣性自傷者では，自傷直後には脳内モルヒネ様物質エンケファリンの血中濃度が上昇しているという報告[19]があり，このことが，自傷の「心の痛み」に対する鎮痛効果と関係している可能性がある。したがって，自傷とは，「心の痛み」を一時的に鎮めるために，自傷という方法で自らに「身体の痛み」を与える方法なのである。あるいは，こういいかえてもよい。自傷とは，「死にたいくらいつらい状況」を「生き延びるために」行われる行動なのである，と。

自傷者の多くは，こうした，自傷がもたらす鎮痛効果を偶然に，あるいは，自殺企図の失敗や他の自傷者の模倣を通じて発見し，以後その行動をまるでお守りのように携えて生きることとなる。ある17歳の女性患者は，かつて筆者に次のように語った。

「父はいわゆる仕事人間でほとんど家におらず，母は新興宗教に熱中していた。だから，学校でのいじめのことも話せなかった。それで，小学校5年のときに『もう死のう』と思って初めてリストカットをした。もちろん，死にはしなかったけど，気持ちがすごく楽になった。誰も私を助けてくれないけど，『これ』さえあれば生きていけると思った」

2. 自傷アディクションという死への迂回路化

自傷がもたらす「心の痛み」に対する鎮痛効果は，きわめて速やかに発現する。苛酷な状況を根本的・建設的な方法で変化させるよりも，圧倒的に簡単で迅速な困難の解決をはかることができるので，またたく間に手放せない行動となってしまう。

しかしその一方で，自傷には反復される過程で耐性を生じやすいという欠点もある。繰り返すほどに主観的な疼痛閾値は上昇し，当初と同じ切り方では「心の痛み」を鎮めるのに不足するようになり，また，鎮痛効果の持続時間が短くなってしまうのである。そのため，何回も自分を傷つけたり，より深く切ったりしなければ，かつてと同じ効果が得られなくなってしまうのである。ときには，手首や腕だけで足りなくなり，他の身体部位を切ったり，あるいは，切るだけではなく，頭を壁に打ちつけたり，火のついたタバコを皮膚に押しつけたりする者もいる。

さらに困ったことに，自傷を繰り返すうちに以前よりもストレスに対して脆弱になってしまうという変化も見られる。以前だったら気にもとめなかったささいな出来事にも「身体の痛み」が必要となるわけである。このため，最終的には，いくら切っても「心の痛み」を埋め合わせるのに追いつかない状態―「切ってもつらいが，切らなきゃなおつらい」という状態―に陥ってしまうのである。これは自傷のアディクション化である。

Favazza[5]は，この自傷のアディクション状態のことを「反復性自傷症候群 Repetitive Self-mutilation syndrome」と呼んでいる。自傷によって自分をコントロールしているつもりが，いつしか自分が自傷にコントロールされてしまう事態である。Favazzaによれば，この段階に到達した自傷者は，もはや禁止や叱責によってはその行動をコントロールできない状態にあり，その行動自体を治療の対象とする必要があるという。反復性自傷に至った者の生き方は，次第に自暴自棄的ともいいうる独特なすさみ方を呈する。たとえば，自虐的に自らを「リストカッター」などと呼ぶなど，否定的自己同一性を確立する。あるいは，自傷した際に出た血液で絵を描いたり，自傷創の写真をインターネット上に掲載したりするなど，一見グロテスクとも思える行動をとることも少なくない。こうした行動は，援助者側の陰性感情を刺

激し，彼らの苦痛を過小視させてしまう。

一般に反復性自傷者は，「生き延びるために」自傷を繰り返しながら日々をすごすうちに，皮肉にも以前よりも自殺念慮を強めている傾向がある。実際，彼らはしばしば，「消えてしまいたい」「いなくなりたい」といった消極的な自殺念慮ともとれる言葉を口にする。もっと直截に「死にたい」という言葉を漏らすことも稀ではない。そしてあるとき，ふだん自傷に用いているのとは別の方法で自殺企図に及ぶことがある。

要するに，苛酷な現在を生き延びるためのこのアディクション行動は，死への迂回路でもあるのである。現在の死を回避するのに役立つかもしれないが，未解決の問題はそのまま残り，緩徐に未来の死をたぐり寄せている可能性がある。

Ⅲ．自殺リスクの高いリストカッターの特徴

1．自傷患者の3年間の追跡調査から

すでに述べたように，自傷と自殺とは峻別されるべきであるが，Owensら[16]のメタ分析は，十代における1回以上の自傷経験は10年後における自殺既遂による死亡のリスクを数百倍に高めることを明らかにしている。このことは，自傷が自殺のリスク要因であることを意味している。もちろん，現実にはすべてのリストカッターが自殺企図に及んだり，自殺既遂に至ったりするわけではない。

筆者ら[10]は，自傷患者の自殺リスクを明らかにするために，精神科通院中の女性自傷患者81名を3年間追跡したことがある。その結果，3年間追跡し得た67名のうち，50名（74.6%）が何らかの自己破壊的行動を行っており，15名（22.4%）が致死性の高い自己破壊的行動（医療機関で治療が行われなければ明らかに死亡していたと考えられる身体損傷を伴うもの）に及んでいたことが明らかにされた（表2）。

続いて，3年間以内に致死性の高い自己破壊的行動が見られた群と見られなかった群とのあいだで，追跡調査開始時点に収集した情報に関して比較を行った（表3）。情報として採用した変数は，年齢や生活状況，外傷体験，自傷行為の様態（開始年齢や継続年数，頻度や嗜癖性の自覚など），随伴する精神医学的問題（過量服薬の既往，生活機能，衝動性，摂食障害傾向，衝動性，アルコール乱用）といったものである。その結果，致死性の高い自己破壊的行動が見られた群では，強姦被害の体験，ならびに市販薬の過量服薬体験が有意に高率であり，また，アルコール依存のスクリーニング尺度である日本語版AUDIT（Alcohol Use Disorder Identification Test）[8]得点，および，神経性大食症のスクリーニング尺度である日本語版BITE（Bulmic Investigatory Test of Edinburgh）[14]得点も有意に高かった。要するに，リストカッターの自殺リスクは，①強姦被害の経験，②市販薬を過量服薬した経験，③アルコール問題，④摂食障害的傾向という4つの要因に関連し，意外なことに，自傷頻度や身体損傷の程度といった自傷自体の重症度とは関連していなかったのである。

さらに筆者らは，交絡因子の影響を除去して，致死性の高い自己破壊的行動と特に密接に関連する要因を明らかにするために，上述した単変量比較で有意差の見られた項目を独立変数として多変量比較を行った。すると，致死性の高い自己破壊的行動と有意に関係する変数として，BITE得点（オッズ比，1.066；95%信頼区間，1.002-1.141）だけが抽出された。これは，BITE得点が1点上昇するに伴って，致死的な自己破壊的行動をするリスクが1.066倍高まることを意味している。

2．自己破壊的行動スペクトラム

自身が行った調査の結果，さらには内外の先行研究で明らかにされた知見をもとに，最近，筆者は図1のような自己破壊的行動スペクトラム[11]を考えるようになった。縦軸に行為にあたっての致死的な意図の強さをとり，横軸に客観的な行為がもたらす身体損傷の致死性をとる。すると，一方の極に，明確な致死的な意図から，縊首や飛び降り，飛び込みなどといった致死性の高い方法による「自殺企図」を想定すると，もう一方の反対の極には，摂食障害やアルコール・薬物乱用が布置されることとなる。

摂食障害やアルコール・薬物乱用は，「死にた

表2　自己破壊的行動の手段・方法（文献10より引用）

自己破壊的行動の内容（重複回答あり）	3年間の経過が判明した対象者 N=67 何らかの自己破壊的行動あり 74.6%（50名）	
	致死性の高い行動	致死性の低い行動
	22.4%	68.7%
自己切傷・刺傷・熱傷	7.5%	58.2%
過量服薬	19.4%	35.8%
服毒	0.0%	4.5%
縊首	1.5%	6.0%
高所からの飛び降り	7.5%	0.0%
車・電車などへの飛び込み	0.0%	0.0%
溺水	1.5%	0.0%
その他	0.0%	0.0%

い」あるいは「自分を傷つけたい」という意図からではなく，「痩せたい」「ハイになりたい」という意図から行われる。また，1回の拒食や過食・嘔吐，あるいは精神作用物質の摂取で健康が損なわれるわけではないが，かつてMenninger[12]によって「慢性自殺」と名づけられたように，長期間繰り返されることで健康被害が顕在化する。さらに，すでに述べたように，自傷患者に摂食障害やアルコール・薬物乱用が併存すれば，致死性の高い自己破壊的行動のリスクが高まる。なお，HarrisとBarraclough[6]のメタ分析によれば，患者の自殺死亡率が最も高い精神障害の診断は摂食障害である。また，海外にはアルコール・薬物乱用が自殺のリスク要因であることを示す研究が多数存在する[1,3]。以上を踏まえれば，摂食障害やアルコール・薬物乱用は「無意識的な自傷」と名づけることには異論はあるまい。

「無意識的な自傷」の1つ上の段階には，「意識的な自傷」がある。これにはリストカットが含まれる。これはMenningerのいう「局所性自殺」である。つまり，「死にたいくらいつらい状況を生き延びるために」身体の一部を犠牲にする行為であり，致死的な意図はない。しかし，「自分を傷つけている」という意図は意識されている。なお，自傷者のなかにはアルコール・薬物乱用や摂食障害傾向を呈する者が少なくないことから，「意識的な自傷」と「無意識的な自傷」は近縁的な関係があるといえる。

「意識的自傷」の1つ上の段階には，過量服薬などの「自殺の意図が曖昧な過量服薬」がある。PattisonとKahan[17]は，非致死性の予測がつきにくく，身体損傷の状況を視覚的に確認できないという理由から，過量服薬を自傷概念から除外している。たしかに過量服薬した患者は，意識回復後に「とにかく眠りたかった」「嫌なことを忘れたかった」などと，一見，自殺とは異なる意図を述べる一方で，「ずっと目が覚めなければよかった」などと，死を願うかのような言葉をもらすことも珍しくない。その意味では，過量服薬は自傷と自殺の中間，あるいは双方にまたがる地点に位置づけられるべきである。

筆者らの調査[9]では，過量服薬はリストカット歴の長い自傷者に多いということが明らかにされている。最初の過量服薬は，通常，反復性自傷の段階に到達して「鎮痛効果」が得られなくなった自傷者が，自殺行動として行うことが多いが，そこで自殺既遂に至らなかったものの，過量服薬が持つ，あたかもパソコンを強制終了させる瞬間のような「不快気分に対する強力なリセット効果」を発見し，苛酷な状況を「生き延びるために」これを繰り返すようになる場合がある。しかし筆者の臨床経験では，最終的に致死的な行動によって既遂に至った者のなかには，自殺既遂に至る前に何回も過量服薬を繰り返した果てに縊首や飛び降