Int J Public Health (2012) 57:421–430
DOI 10.1007/s00038-011-0317-x

ORIGINAL ARTICLE

Measuring population mental health and social well-being

Eric Van Lente · Margaret M. Barry · Michal Molcho · Karen Morgan · Dorothy Watson · Janas Harrington · Hannah McGee

Received: 15 December 2010 / Revised: 16 October 2011 / Accepted: 17 October 2011 / Published online: 3 November 2011

Abstract
Objectives This paper examines the relationships between indicators of positive and negative dimensions of mental health, social well-being and physical health.
Methods The paper reports on data collected in the third National Survey of Lifestyle, Attitudes and Nutrition (SLÁN 2007), a cross-sectional survey conducted with a representative sample of 10,364 Irish adults. The survey included measures of positive mental health and non-specific psychological distress from the SF-36 questionnaire, together with measures of social well-being, subjective health, and selected health behaviours.
Results Positive mental health is predicted by lower levels of loneliness and higher levels of social support. Better self-rated health, positive health behaviours and lower GP consultation rates are associated with higher levels of positive mental health. Lower levels of social well-being, were found to be the strongest predictors of negative mental health.
Conclusions Social well-being and health behaviours correlate with both positive and negative mental health. These findings highlight the need to endorse comprehensive approaches to population mental health promotion. The inclusion of both positive and negative mental health indicators in future population health surveys is supported by the findings.

Keywords Population mental health · Social well-being

E. Van Lente · M. M. Barry (✉) · M. Molcho
Health Promotion Research Centre, National University of Ireland, 16 Distillery Road, Galway, Ireland
e-mail: margaret.barry@nuigalway.ie

K. Morgan · H. McGee
Royal College of Surgeons in Ireland, Dublin, Ireland

D. Watson
Economic and Social Research and Trinity College, Dublin, Ireland

J. Harrington
University College Cork, Cork, Ireland

Introduction

There is increasing recognition internationally of the need to address mental health as an integral part of improving population health and well-being (WHO 2002, 2005). Despite this, relatively few population health surveys include indicators of mental health as part of their suite of measures. From a population perspective, mental health problems have a high prevalence and impose a significant burden in terms of social and economic costs (WHO 2003; Williams et al. 2005; Friedli and Parsonage 2007). In addressing the burden of mental disorder, it is recognised that treatment approaches alone are not sufficient and that a more comprehensive population-level approach is required, which includes promotion, prevention, specialist treatment and rehabilitation (WHO 2002, 2003). The World Health Organization's Mental Health Declaration and Action Plan (WHO 2005) for Europe, the European Commission's Green Paper on 'Towards a strategy on mental health for the European Union' (European Commission 2005) and the UK Foresight project (Foresight Mental Capital and Wellbeing Project 2008) have all highlighted that the social and economic prosperity of Europe will depend on improving population mental health and well-being. Accurate information on population mental health status and its determinants is critical to informing mental health improvement policy and planning at a population level.

Despite the clear need for population level data, to date there is paucity of information on the relationship between different aspects of mental health, social well-being and physical health. Existing information on population mental health and its determinants is derived mainly from community epidemiological studies of psychiatric morbidity, which tend not to include the positive dimensions of mental health and social well-being (Keyes 2005). Studies by Keyes (2002, 2005) and Huppert and Whittington (2003) present empirical support for the independence of positive and negative mental health and report that mental health and mental disorders are not opposite ends of a single continuum but rather constitute distinct, though correlated, axes. Thus the absence of mental disorder does not equal the presence of mental health and individuals without a mental disorder may experience varying degrees of positive mental health and well-being. This, combined with the growing evidence on the relationship between physical and mental health (Prince et al. 2007), underscores the need for national health surveys to include both positive and negative mental, social well-being and physical health indicators in order to obtain a more comprehensive picture of the different dimensions of population health.

This paper reports on the 2007 Survey of Lifestyle, Attitudes and Nutrition (SLÁN 2007), a national adult population survey in Ireland (Morgan et al. 2008; Barry et al. 2009), which includes a number of dimensions of mental health, both positive and negative mental health, and social well-being as part of the core suite of health survey measures. To ensure comparability, the recommended mental health indicators for Europe, developed by the STAKES Mindful Project (Lavikainen et al. 2006), were employed. The survey design builds on earlier surveys in Europe and other westernised countries by including the following components: health (e.g. European Opinion Research Group 2003), social well-being (e.g. Dalgard et al. 2006), non-specific psychological distress and positive mental health (e.g. European Opinion Research Group 2003; Lehtinen et al. 2005; Dear et al. 2002) and health behaviours. The inclusion of these components in one comprehensive health survey permits the exploration of the relationships between the mental, physical and social dimensions of health and well-being in a community sample. This paper examines the levels of positive and negative mental health in the survey sample and explores the relationship of the positive and negative dimensions of mental health to socio-demographic factors, indicators of social well-being and physical health.

Methods

Study design

Data collected in the third National Survey of Lifestyle, Attitudes and Nutrition (SLÁN) study conducted in 2007 in Ireland (Morgan et al. 2008; Harrington et al. 2010) are presented. This study collected detailed information on health-related behaviours and lifestyle from a nationally representative sample of 10,364 respondents (62% response rate) through face-to-face interviews. Study protocols were given ethical approval by the Research Ethics Committee of the Royal College of Surgeons in Ireland (RCSI).

Sample

The population for the survey was defined as adults aged 18 years and over living in private households in Ireland. The sample was obtained from a GeoDirectory list of all residential addresses in the Republic of Ireland, in a multi-stage probability sample, where each dwelling has a known probability of selection. The sample was weighted to closely approximate the Census 2006 figures for gender, age, marital status, education, occupation, region, household size and ethnicity (Morgan et al. 2008).

Measures

SLÁN 2007 respondents were measured on the following socio-demographic variables: gender, age, highest level of education attained, marital and employment status, residential location (urban vs. rural), annual household income [calculated as quintiles based on survey respondent's income and number and age-group of people living in the household, using the national equivalence scale (Callan et al. 1996)], and social class. The social class schema used here is based on the European Socio-economic Classification (ESeC) (Harrison and Rose 2006). This assigns individuals and households to social class groups based on primarily occupational position. This classification follows the model recommended by the ESeC User Guide (Harrison and Rose 2006), with the exception of class 7 that has been combined with ESeC classes 8 and 9 to form a single class (SC 4).

As recommended by the European Commission-funded project *Establishment of a Set of Mental Health Indicators for the European Union (1999–2001)*, a suite of measures assessing the positive aspects of mental health, non-specific psychological distress and social well-being were employed. Some of these recommended measures, marked with an '(S)' are described below. Respondents were also asked a number of other questions relating to social well-being, self-rated health, health behaviours, and quality of life.

Mental health and social well-being measures

Positive mental health (S) Positive mental health is measured using the Energy and Vitality Index (EVI) from

the RAND SF-36 questionnaire (Kovess and Beaudet 2001; Lavikainen et al. 2006). Respondents were asked to respond to four questions about affective aspects of their well-being during the past 4 weeks on a six-category scale, going from 'All of the time' to 'None of the time' (Lavikainen et al. 2006). Their responses are presented as a sum score ranging from 0 to 100. In the current survey, the Cronbach's alpha reliability for the EVI is 0.78. No formal cut-off is established to distinguish those with high levels of positive mental health or 'flourishing' from those with lower levels. For the purposes of this study, following Nieboer et al. (2005) and Braunholtz and Scotland Social Research (2007), a cut-off point was generated to identify a 'high energy and vitality group' (High EVI), based on EVI scores that were equal to or over one standard deviation above the mean (i.e. 87 in the current sample) indicating optimal levels of mental health or 'flourishing'.

Negative mental health (S) Negative mental health is measured in the current study using the five item Mental Health Index-5 (MHI-5) (also called 'non-specific psychological distress') from the RAND SF-36 questionnaire (Ware et al. 1993), that measures the occurrence and extent of psychological distress (usually of anxiety and depression related distress states) during the past 4 weeks (Lavikainen et al. 2006). Responses are presented as a sum score ranging from 0 to 100, with low scores indicating greater psychological distress. A respondent is considered to have a 'probable mental health problem' (PMHP) if they report a score equal to or below a recommend cut-off point of 56 (Lavikainen et al. 2006). In the current survey, the Cronbach's alpha reliability for the MHI-5 is 0.78.

Social support (S) Three questions comprising the 14-point Oslo Social Support Scale (Brevik and Dalgard 1996) were included, as follows: (i) 'number of close friends'; (ii) 'people are showing a friendly interest'; and (iii) 'ease of getting practical help from neighbours'. Scale scores were split into three categories—poor social support (3–8), moderate social support (9–11) and strong social support (12–14). Using the current data, the Cronbach's alpha reliability for the social support scale is 0.53.

Loneliness To capture the experience of loneliness in the Irish population, a single question was included, asking respondents to answer 'Yes' or 'No' to the question '*Haveyou often felt lonely in the last 4 weeks?*' (Morgan et al. 2008).

Community involvement Respondents were asked a series of questions about their involvement in community activities, such as joining in the activities of sports clubs or evening classes. Modified versions of questions used in the fourth sweep of the West of Scotland Twenty-07 Study (Macintyre et al. 1989) and the Lifeways Study (see www.ucd.ie/phps/research/lifeways.htm) were employed. In this study, community involvement is used as a dichotomous scale ('involved in one or more community activities' vs. 'involved in none').

Indicators of physical health

In order to explore the relationship between mental and physical health, data on subjective health and a number of selected health behaviours were also examined.

Self-rated health Respondents were asked to rate their health on a standard widely used single question with response categories—'excellent'; 'very good'; 'good'; 'fair'; and 'poor'.

Health behaviour variables Data on smoking were extracted from the main survey and responses were grouped into the following categories: current smoker, former smoker and never smoked. Alcohol intake was assessed using the AUDIT-C alcohol screen (Achtmeyer 2003). Scores range from 0 to 12 on this scale with a score of five or more (called 'positive') indicating increased risk for hazardous drinking or active alcohol abuse (using UK norms). The International Physical Activity Questionnaire (IPAQ) Short Form (Hagströmer et al. 2007) was used to assess levels of physical activity. Categorical scoring was used as follows: low (little or no physical activity); moderate (five or more days of moderate intensity activity and/or walking of at least 30 min per day); high (vigorous-intensity activity on at least 3 days and accumulating at least 1,500 MET minutes/week).

Doctor consultations and recent activity limitation Respondents were also asked a number of questions about doctor consultations and recent activity limitation in the last 30 days based on two questions from the European Health Interview Survey (European Commission 2006) and the Behavioral Risk Factor Surveillance System (Hennessy et al. 1994).

Analyses

Weighted data were used for all analyses. Descriptive analyses were used to describe the sample. All descriptive analyses were conducted using SPSS V. 15.0. Logistic regressions were used to determine the predictors of both positive and negative mental health. These analyses were conducted in STATA V.11 and included adjustments to the standard errors for sample clustering and weighting.

Results

Socio-demographic correlates of mental health status

The mental health status of the survey respondents broken down by socio-demographic variables is presented in Table 1. Most adults reported relatively high levels of energy and vitality in the past 4 weeks, with an overall mean score of 68 (SD = 19). Some 15% of respondents reported High EVI scores, i.e. scores that are equal to or over one standard deviation above the mean (≥87) indicating optimal levels of mental health or 'flourishing'. Men were more likely than women to have high scores on the EVI and respondents in the youngest age group (age 18–29) were more likely to have high scores than older adults. Those in employment and those with higher levels

Table 1 Mental health status by socio-demographic variables in the general population in Ireland (SLÁN 2007)

	SF-36 energy and vitality index (EVI)		SF-36 psychological distress (MHI-5)	
	Mean	SD	Mean	SD
Overall mean	68.1	19.1	81.7	15.6
Social-demographic variables	High EVI %	Un-weighted count	PMHP %	Un-weighted count
Gender				
Male	17.2	4,369	6.3	4,369
Female	11.9	5,995	7.5	5,995
Age				
18–29	16.9	1,907	6.7	1,907
30–44	13.5	3,310	8.0	3,310
45–64	14.1	3,178	7.2	3,178
65+	13.3	1,969	4.3	1,969
Education				
Primary	13.2	1,841	10.3	1,841
Second level	14.8	4,670	7.3	4,670
Third level	14.9	3,853	4.6	3,853
Location				
Rural	16.5	4,340	4.6	4,340
Urban	13.0	5,866	8.4	5,866
Marital status				
Married/cohabiting	13.9	5,849	5.6	5,849
Single	15.9	2,958	8.3	2,958
Divorced/separated	14.1	629	11.5	629
Widowed	12.2	902	6.5	902
Econ. status				
Not at work	12.5	4,320	9.0	4,320
Working	15.7	5,862	5.5	5,862
Social class				
Professional/managerial	14.0	3,582	4.5	3,582
Intermediate	15.0	1,475	5.2	1,475
Self-employed	15.8	1,546	4.2	1,546
Lower technical/service and routine	14.5	2,898	10.2	2,898
Equivalised				
Lowest	12.4	1,721	11.1	1,721
Income				
Second quintile	12.9	1,903	8.2	1,903
Quintile				
Third quintile	14.8	1,854	6.9	1,854
Fourth quintile	16.4	1,852	5.4	1,852
Top quintile	15.4	1,835	3.4	1,835

of education and higher incomes were more likely to have High EVI scores, but the differences by social class were not as marked. The differences by marital status—with single adults most likely and widowed adults least likely to have reported High EVI scores—are probably mainly due to age differences. Those living in urban areas were less likely to have High EVI scores than those living in rural areas.

Relatively low levels of psychological distress were reported by survey respondents, with an overall mean score of 82 (SD = 16). Some 6.4% of the population were scored as having probable mental health problems (PMHP). Women, those with lower education, those living in urban areas, widowed adults and those not in employment were more likely to report high levels of psychological distress. High levels of psychological distress were also more common among those in the lower technical/service and routine social class and those in the lower income quintiles.

Socio-demographic and social well-being predictors of positive and negative mental health

Table 2 presents the findings from the logistic regression models predicting high levels of positive mental health (i.e. High EVI scores). As noted above, the analysis controls for the impact on standard errors of sample clustering and weighting.

Table 2 Logistic regression models predicting positive mental health (high energy and vitality, ≥87, $p = 15\%$) in the general population in Ireland (SLÁN 2007)

	Odds	*p*	95% Confid. interval	
			Lower	Upper
Gender (ref. = male)				
Female	0.63	0.00	0.54	0.73
Age (ref. = 18–29)				
30–44	0.86	0.25	0.66	1.12
45–64	0.86	0.28	0.65	1.13
65+	0.91	0.62	0.64	1.30
Education (ref. = third level)				
Primary	0.82	0.19	0.61	1.10
Second level	0.91	0.37	0.75	1.11
Location (ref. = rural)				
Urban	0.75	0.01	0.62	0.92
Marital stat. (ref. = married/cohabiting)				
Single	1.12	0.34	0.89	1.41
Divorced/separated	1.42	0.13	0.90	2.25
Widowed	1.11	0.57	0.78	1.58
Econ. status. (ref. = not at work)				
Working	1.11	0.34	0.90	1.37
Social class (ref. = profess./manag.)				
Intermediate non-manual	1.20	0.16	0.93	1.54
Self-employed	1.07	0.55	0.85	1.36
Lower technical/service and routine	1.32	0.01	1.06	1.65
Equivalised income				
Lowest	0.89	0.49	0.64	1.24
Quintile (ref. = top fifth)				
Second quintile	0.87	0.36	0.65	1.17
Third quintile	0.93	0.52	0.73	1.17
Fourth quintile	1.09	0.46	0.86	1.38
Social support (ref. = strong support)				
Poor support	0.50	0.00	0.35	0.71
Moderate support	0.63	0.00	0.51	0.77
Loneliness	0.27	0.00	0.19	0.40
Community involvement (lack of)	0.95	0.63	0.79	1.16
N cases	8,038			
F	7.55 (22,367)			

Analysis conducted in STATA using 'svy:logistic' routine to adjust standard errors for weighting and sample clustering

The strongest predictors of High EVI scores were the social well-being variables of loneliness and social support. Those reporting that they feel lonely and that they experience poor levels of social support were much less likely to report High EVI, over and above the effect of the socio-demographic variables. The only socio-demographic variables significantly associated with High EVI scores, once the social well-being variables are controlled, were gender, urban/rural location and social class. Women and those living in urban areas were less likely to report high levels of energy and vitality. Somewhat paradoxically, those in the lower social classes (lower technical, lower sales and service and routine occupations) were more likely to report high levels of energy and vitality. When income (which is not significant in the model) is dropped, this association with social class is no longer statistically significant. This suggests that those in the lower technical, lower sales and service and routine occupations were more likely to report high energy and vitality than would be expected based on their incomes.

Table 3 shows the results of a logistic regression model predicting probable mental health problems (PMHP) as measured on the MHI-5 scale. Again, the strongest predictors were the social well-being measures, especially loneliness. Poor levels of social support and lack of community involvement were also associated with an increased likelihood of PMHP. Older adults (age 65 and over) showed a lower incidence of PMPH. A higher incidence of

Table 3 Logistic regression models predicting negative mental health (MHI-5 $\leq$ 56, $p = 6.4\%$) in the general population in Ireland (SLÁN 2007)

	Odds	*p*	95% Conf. interval	
			Lower	Upper
Gender				
Female	1.13	0.43	0.83	1.54
Age (ref. = 18–29)				
30–44	1.48	0.06	0.98	2.25
45–64	1.14	0.42	0.83	1.58
65+	0.48	0.00	0.29	0.79
Education (ref. = third level)				
Primary	1.48	0.07	0.97	2.25
Second level	1.22	0.21	0.90	1.65
Location (ref. = rural)				
Urban	1.51	0.02	1.06	2.13
Marital stat. (ref. = married/cohabiting)				
Single	1.16	0.45	0.79	1.72
Divorced/separated	0.76	0.21	0.49	1.17
Widowed	0.59	0.08	0.33	1.07
Econ. status				
Working	0.80	0.16	0.59	1.09
Soc. class (ref. = profess./manag.)				
Intermediate	0.81	0.27	0.55	1.18
Self-employed	0.85	0.42	0.56	1.27
Lower technical/service and routine	1.33	0.06	0.99	1.80
Equiv. income quintile (ref. = top fifth)				
Lowest	1.94	0.01	1.21	3.12
Second quintile	1.87	0.02	1.12	3.11
Third quintile	1.76	0.02	1.09	2.83
Fourth quintile	1.46	0.09	0.95	2.24
Social support (ref. = strong support)				
Poor support	2.19	0.00	1.43	3.35
Moderate support	1.29	0.17	0.90	1.85
Loneliness	5.54	0.00	4.04	7.59
Community involvement (lack of)	1.98	0.00	1.49	2.64
N cases	8,008			
F	15.49 (22,367)			

Analysis conducted in STATA using 'svy: logistic' routine to adjust standard errors for weighting and sample clustering

Table 4 Association between indicators of physical health and positive and negative mental health (column percentages, except for 'Average days lost') in the general population in Ireland (SLÁN 2007)

	Energy and vitality		Psychological distress	
	Not high %	High %	Not high %	High %
Self-rated health***				
Excellent	19	40	23	13
Very good	36	36	37	20
Good	31	20	30	32
Fair	11	3	9	20
Poor	3	0	2	15
Smoking				
Current smoker	29	24	27	48
($p = 0.001$ for HIGHEV)				
Former smoker	19	20	20	10
($p < 0.0000$ for PMHP)				
Never smoked	51	57	53	42
Exercise (IPAQ)***				
Low	29	21	27	41
Moderate	47	47	48	45
High	23	31	25	13
Alcohol use				
Not at risk	43	45	44	37
($p = 0.3013$ for HIGHEV)				
Hazardous	31	28	30	32
($p = 0.1211$ for PMHP)				
Probable dependence	26	27	26	31
GP consultation***				
In last 4 weeks	27	15	24	44
1–12 months ago	49	46	49	38
1–2 years ago	13	16	13	9
More than 2 years ago	10	19	12	7
Never	1	3	2	1
Average days lost***	1.70	0.33	1.18	5.84

Pearson chi-square test (controlling for clustering) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Wald test for average days lost in last month, *** $p < 0.001$

high psychological distress was found among those living in urban areas and those with lower incomes. The associations with gender, marital status, economic status (in employment or not) and social class were not significant with other characteristics controlled.

Table 4 shows the association between the two measures of mental well-being and a range of other outcomes of interest to health researchers. Clear associations were found between self-rated health, selected health behaviours and positive mental health (see Table 4). Respondents with higher levels of positive mental health (High EVI) were more likely to report better self-rated health ($p < 0.001$), to be physically active ($p < 0.001$), less likely to smoke ($p = 0.001$) and less likely to consult a GP in the last 12 months and to report less activity limitation (0.33 average days lost in the last 30 days for High EVI group in contrast to 1.7 days for other adults). However, the analysis did not show any clear relationship with reported alcohol consumption patterns. In relation to negative mental health, similar patterns, though in the opposite direction, were found for those in the PMHP group who were experiencing high levels of psychological distress: they were less likely to report excellent or very good health, more likely to be current smokers and to have a low scope on the IPAQ rating of physical exercise, and more likely to have consulted a GP in the last 12 months. The PMHP group had a much higher average number of days lost due to physical or mental health problems in the past month (5.84).

Discussion

The findings on positive mental health compare favourably with those reported from other European countries (European Opinion Research Group 2003). The overall mean score of 68 reported in the present study is somewhat greater than the score of 65 reported in an earlier Irish postal survey by Blake et al. (2000) and also greater than a

mean of 61 reported for 15 European countries based on the Eurobarometer 58.2 survey (European Opinion Research Group 2003). It should be noted that the current survey was undertaken during the economic boom in Ireland. It is, therefore, open to question whether such high levels of positive mental health would be obtained if repeated in the current recessionary economic climate. In addition, in view of the methodological differences in sampling and survey administration across studies, caution is advised in making strong inferences about differences in the mean levels reported. However, in keeping with previous findings (Keyes 2002; Lehtinen et al. 2005), there was evidence of a strong association between high levels of positive mental health, gender, and social and economic factors. Being male, younger, having higher income, higher levels of education and being in paid employment were all found to be strongly predictive of high levels of positive mental health at the bivariate level. Lower levels of loneliness and higher levels of social support also emerged as being strongly associated with positive mental health, when the analysis controlled for other factors.

With regard to the prevalence of probable mental health problems in the population, the figure of 6.4% compares favourably with a value of 10.5% reported in the British Household Panel Survey (Taylor et al. 2005), and the average of 23% reported from a Eurobarometer survey of 15 European countries (European Opinion Research Group 2003). Ireland was reported as having 16% of respondents with probable mental health problems in that 2003 Eurobarometer survey. The difference in sampling methods used between SLÁN 2007 and Eurobarometer may account for the difference in results. The socio-demographic associations with psychological distress (MHI-5) at the bivariate level are similar to those seen in earlier studies, e.g. Jenkinson et al. (1993); with men reporting lower levels of psychological distress, as did those in the oldest age group (65+ years). On the other hand, those in lower income quintiles had higher levels of psychological distress.

In keeping with previous findings from the international literature (Prince et al. 2007; Melzer et al. 2004; Kessler 2007), indicators of social and economic well-being such as loneliness, low levels of social support, lack of community involvement, and lower income levels were all associated with negative mental health in the SLÁN 2007 survey. While it is not possible to determine the direction of causality in a cross-sectional survey, there is increasing recognition that mental health is both a cause and a consequence of social and economic inequities, i.e. mental health problems both reflect deprivation and contribute to it (Melzer et al. 2004; Friedli 2009). The WHO Commission on the Social Determinants of Health (WHO 2008) calls for action on 'the causes of the causes' of poor health in society. The impact of the experience of inequity and its consequence on people's mental health is under-researched and the extent to which poor mental health contributes to social and health inequities needs to be better understood and further researched.

While gender played an important role in influencing positive mental health status—even with other characteristics controlled—in the logistic regression model on negative mental health, the effect of gender was not significant when included with other socio-demographic variables, measures of social support, loneliness and community involvement. This finding suggests that perhaps gender in itself is not a risk factor for negative mental health but is associated with other determinants of mental health. Most martial status variables became non-significant when social well-being variables were added, suggesting that social well-being variables—especially loneliness—may explain some of the effects of marital status on mental health variables. Loneliness was by far the strongest predictor of experiencing probable mental health problems.

There were fewer socio-demographic predictors of positive mental health than negative mental health in the model. The clearest difference between predictors of positive and negative mental health emerged in relation to the influence of income levels. The logistic regression models showed a clear association between income and reported negative mental health (PMHP) but no such relationship was evident in relation to income and positive mental health (High EVI). This seems to support other findings (WHO 2005; Huppert and Whittington 2003; Prince et al. 2007) in suggesting that positive mental health and negative mental health are two discrete dimensions of mental health rather than two ends of one continuum.

The findings clearly suggest that positive social well-being contributes to positive mental health, although it is difficult to determine the direction of this effect. Better self-rated health, more positive health behaviours, lower reported levels of GP and recent activity limitation were also found to be associated with higher levels of positive mental health. Findings from other studies confirm that adults with higher levels of positive mental health are more likely to have better functioning and fewer limitations of daily living in comparison to those who are moderately mentally healthy, i.e. reporting no detectable mental health problems (Prince et al. 2007). Therefore, there is added value in determining the levels of positive mental health over and above what may be gleaned from measures of negative mental health alone (i.e. presence or absence of probable mental health problems).

The limitations of this study, in terms of the difficulty in determining the direction of effect from the cross-sectional design, need to be borne in mind when interpreting the relationships between the measures of mental health, social well-being and health behaviours included in the survey.

The measures used are tailored for rapid data capture with some inevitable compromise of detail and comprehensiveness. For example, while the EVI scale is a robust and relatively short measure of positive mental health recommended for use in population surveys, it may not be regarded as a comprehensive measure of positive mental health. The same limitation applies in relation to the brief measures of social well-being that were included in the survey. Further examination of the determinants of positive mental health and of social well-being using a more comprehensive suite of measures is warranted.

Consistent with the international literature, indicators of social and economic well-being were associated with mental health status in this study, highlighting the need for comprehensive intersectoral policy approaches in improving mental health at a population level. The study findings support the call for models of population mental health promotion that will intervene at the level of strengthening individuals' social participation, strengthening communities, improving access to community services and removing the structural barriers to mental health through initiatives to reduce economic and social inequities (Foresight Mental Capital and Wellbeing Project 2008; Friedli 2009; Barry and Friedli 2008). Results from the present study also support the view that positive mental health is more than the absence of negative mental health and is associated with indicators of higher levels of social well-being, positive health behaviours, and improved health functioning.

Acknowledgments We would like to thank the SLÁN 2007 Consortium members for their contribution to this research. Consortium members: Professor Ivan Perry, University College Cork UCC), Dr. Emer Shelley, Royal College of Surgeons in Ireland (RCSI), Professor Ronán Conroy (RCSI), Professor Ruairí Brugha (RCSI), Professor Richard Layte, Economic and Social Research Institute (ESRI), Ms Nuala Tully (RCSI), Ms Jennifer Lutomski (UCC) and Mr Mark Ward (RCSI). This study was funded by the Department of 508Health and Children, Dublin

References

Achtmeyer C (2003) Frequently asked questions about audit-C for clinicians 9/5/03. www.oqp.med.va.gov/general/uploads/FAQ%20AUDIT-C%20for%20clinicians.doc. Accessed May 2011

Barry MM, Friedli L (2008) The influence of social, demographic and physical factors on positive mental health in children, adults and older people. In: Foresight Mental Capital and Wellbeing Project. State-of-Science Review: SR-B3. Government Office of Science and Innovation, London, UK

Barry MM, van Lente E, Molcho M, Morgan K, McGee H, Conroy R, Watson D, Shelley E, Perry I, SLÁN 2007 (2009) Mental Health and Social Well-being Report. Department of Health and Children, Dublin

Blake C, Codd MB, O'Meara YM (2000) The short form 36 (SF-36) health survey: normative data for the Irish population. Ir J Med Sci 169(3):195–200

Braunholtz S, Scotland Social Research (2007) Well? What Do You Think? (2006): The Third National Scottish Survey of Public Attitudes to Mental Health, Mental Wellbeing and Mental Health Problems. Scottish Government Social Research, Edinburgh

Brevik JI, Dalgard OS (1996) The Health Profile Inventory. University of Oslo, Oslo

Callan T, Nolan B, Whelan BJ, Whelan CT, Williams J (1996) Poverty in the 90 s: evidence from the 1994 Living in Ireland survey. Oak Tree Press, Dublin

Dalgard OS, Dowrick C, Lehtinen V, Vazquez-Barquero JL, Casey P, Wilkinson G, Ayuso-Mateos JL, Page H, Dunn G (2006) Negative life events, social support and gender difference in depression: a multinational community survey with data from the ODIN study. Soc Psychiatry Psychiatr Epidemiol 41(6):444–451

Dear K, Henderson S, Korten A (2002) Well-being in Australia—findings from the National Survey of Mental Health and Well-being. Soc Psychiatry Psychiatr Epidemiol 37(11):503–509

European Commission (2005) Improving the mental health of the population: Towards a strategy on mental health for the European Union. Green Paper. Health and Consumer Protection Directorate, European Commission, Brussels

European Commission (2006) Eurostat, The core group on health interview survey (HIS): European health interview survey (Ehis) questionnaire. http://ec.europa.eu/health/ph_information/implement/wp/systems/docs/ev_20070315_ehis_en.pdf. Accessed May 2011

European Opinion Research Group (2003) The mental health status of the European population. http://ec.europa.eu/health/ph_determinants/life_style/mental_eurobaro.pdf. Accessed May 2011

Foresight Mental Capital and Wellbeing Project (2008) Final Project Report. The Government Office for Science, London

Friedli L (2009) Mental health, resilience and inequalities. WHO Regional Office for Europe, Copenhagen

Friedli L, Parsonage M (2007) Building an economic case for mental health promotion: part I. J Public Ment Health 6(3):14

Hagströmer M, Oja P, Sjöström M (2007) The international physical activity questionnaire (IPAQ): a study of concurrent and construct validity. Public Health Nutr 9(6):755–762

Harrington J, Perry IJ, Lutomski J, Fitzgerald AP, Sheily F, McGee H, Barry MM, Van Lente E, Morgan K, Shelley E (2010) Living longer and feeling better: healthy lifestyle, self-rated health, obesity and depression in Ireland. Eur J Public Health 20(1):91–95

Harrison E, Rose D (2006) The European socio-economic classification (ESeC) user guide. Institute for Social and Economic Research http://www.iser.essex.ac.uk/files/esec/guide/docs/UserGuide.pdf. Accessed May 2011

Hennessy C, Moriarty D, Zack M, Scherr P, Brackbill R (1994) Measuring health-related quality of life for public health surveillance. Public Health Rep 109(5):665–672

Huppert FA, Whittington JE (2003) Evidence for the independence of positive and negative well-being: implications for quality of life assessment. Br J Health Psychol 2003(8):107–122

Jenkinson C, Coulter A, Wright L (1993) Short form-36 (Sf-36) health survey questionnaire—normative data for adults of working age. BMJ 306(6890):1437–1440

Kessler RC (2007) The global burden of anxiety and mood disorders: putting the European study of the epidemiology of mental disorders (ESEMeD) findings into perspective. J Clin Psychiatry 68(Suppl 2):10–19

Keyes CLM (2002) The mental health continuum: from languishing to flourishing in life. J Health Soc Behav 43(2):207–222

Keyes CLM (2005) Mental illness and/or mental health? Investigating axioms of the complete state model of health. J Consulr Clin Psychol 73(3):539–548

Kovess V, Beaudet M (2001) Concepts and measurement of positive mental health. Psychiatria Fennica 32(Supp 2):14–34

Lavikainen J, Fryers T, Lehtinen V (2006) Improving mental health information in Europe. Proposal of the MINDFUL project (ed). STAKES, Helsinki

Lehtinen V, Sohlman B, Kovess-Masfety V (2005) Level of positive mental health in the European union: Results from the Eurobarometer 2002 survey. Clin Pract Epidemiol Ment Health 1:9

Macintyre S, Annandale E, Ecob R, Ford G, Hunt K, Jamieson B, MacIver S (1989) The west of Scotland twenty-07 study: health in the community. In: Martin C, McQueen D (eds) Readings for a new public health. Edinburgh University Press, Edinburgh, pp 56–74

Melzer D, Fryers T, Jenkins R (2004) Social inequalities and the distribution of common mental disorders (eds). Maudsley Monograph 44, Psychology Press, Hove and New York

Morgan K, McGee H, Watson D, Perry I, Barry MM, Shelley E, Harrington J, Molcho M, Layte R, Tully N, van Lente E, Ward M, Lutomski J, Conroy R, Brugha R (2008) SLÁN 2007: Survey of Lifestyle, Attitudes and Nutrition in Ireland. Main Report. Department of Health and Children, Dublin (www.slan07.ie)

Nieboer P, Buijs C, Rodenhuis S, Seynaeve C, Beex LVAM, van der Wall E, Richel DJ, Nooij MA, Voest EE, Hupperets P et al (2005) Fatigue and relating factors in high-risk breast cancer patients treated with adjuvant standard or high-dose chemotherapy: a longitudinal study. J Clin Oncol 23(33):8296–8304

Prince M, Patel V, Saxena S, Maj M, Maselko J, Phillips MR, Rahman A (2007) No health without mental health. Lancet 370:859–877

Taylor M, Brice J, Buck N, Prentice-Lane E (2005) British household panel survey user manual volume A: introduction, technical report and appendices. University of Essex, Colchester

Ware JE, Snow KK, Kosinski M, Gandek B (1993) SF-36 health survey: manual and interpretation guide. The Health Institute, New England Medical Center, Boston, MA

Williams SM, Saxena S, McQueen DV (2005) The momentum for mental health promotion. Promot Educ (Suppl 2):6–9

World Health Organization (2002) Prevention and promotion in mental health. Mental Health: Evidence and Research. Department of Mental Health and Substance Dependence. World Health Organization, Geneva

World Health Organization (2003) Investing in mental health. Department of Mental Health and Substance Dependence, Non-communicable Diseases and Mental Health. World Health Organization, Geneva

World Health Organization (2005) Mental health action plan for Europe. Facing the challenges, building solutions. World Health Organization, Geneva

World Health Organization Commission on the Social Determinants of Health (2008) Closing the gap in a generation: health equity through action on the social determinants of health. Final Report of the Commission on the Social Determinants of Health. World Health Organization, Geneva