



King's Research Portal

DOI:

[10.1192/bjp.bp.116.186213](https://doi.org/10.1192/bjp.bp.116.186213)

Document Version

Peer reviewed version

[Link to publication record in King's Research Portal](#)

Citation for published version (APA):

Salisbury, T. T., Killaspy, H., & King, M. (2017). Relationship between national mental health expenditure and quality of care in longer-term psychiatric and social care facilities in Europe: Cross-sectional study. *British Journal of Psychiatry*, 211(1), 45-49. <https://doi.org/10.1192/bjp.bp.116.186213>

Citing this paper

Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

General rights

Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the Research Portal

Take down policy

If you believe that this document breaches copyright please contact librarypure@kcl.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.

The relationship between national mental health expenditure and quality of care in longer term psychiatric and social care facilities in Europe: Cross-sectional study

Tatiana Taylor Salisbury, Helen Killaspy, Michael King

Abstract

Background It is not known whether increased mental health expenditure is associated with better outcomes.

Aims To estimate the association between national mental health expenditure and 1) quality of longer term mental health care 2) service users' ratings of that care in eight European countries.

Method National mental health expenditure, (percent of health budget spent on mental health) was calculated from international sources. Multilevel models were developed to assess associations with quality of care and service user experiences of care using ratings of 171 facility managers and 1,429 service users.

Results Significant positive associations were found between mental health spend and 1) six of seven quality of care domains; and 2) service user autonomy and experiences of care.

Conclusions Greater national mental health expenditure was associated with higher quality of care and better service user experience.

Declaration of interest None.

Introduction

In its report entitled *Mental Health: New Understanding, New Hope* (1), the World Health Organization (WHO) highlights the need to prioritise mental health and the need to increase expenditure on promotion, prevention and treatment. More recently, mental health has been included in the Sustainable Development Goals as one of the key health priorities (2). Previous research examining the mental health facility expenditure and the quality of care they provide suggest a positive association (3). However, it is unclear whether or not greater mental health expenditure at the national level trickles down to better outcomes.

The development of the Quality Indicator for Rehabilitative Care (QuIRC), the first internationally standardised tool to assess the quality of care provided in longer term mental health facilities (4), has made it possible to estimate the relationship between national mental health expenditure and quality of care for individuals with longer term, severe and complex mental health problems. Although a relatively small group, these individuals absorb a high proportion of national mental health budgets due to their need for high levels of support and are, therefore, an ideal population on which to examine this relationship (5). Using data collected during the development of the QuIRC, we investigated the association between national mental health expenditure and: 1) the quality of care provided in longer term psychiatric and social care facilities; 2) service user ratings of the care received, the therapeutic milieu of the facility and their individual autonomy.

Method

Participants and procedures

Hospital and community-based residential facilities for people with longer term mental health problems were purposively sampled in ten European countries as part of the DEMoBinc project. Facilities providing care exclusively to a specific sub-group of service users (e.g. older people, individuals with learning disabilities, forensic patients) were excluded. Facility managers and a random sample of five to 13 service users in each facility participated in face-to-face interviews with a DEMoBinc researcher after providing informed consent to take part in the study. Service users were excluded only if they were not available at the time the researcher was recruiting participants, lacked mental capacity to provide informed consent or were unable to complete the interview. A detailed description of the sampling process is provided by Killaspy and colleagues (4). The DEMoBinc project was approved by the relevant ethics committee in each country.

Measures

Facility manager ratings of quality of care

The QuIRC was developed through A) the synthesis of a systematic review of the evidence for high quality care (6), results from Delphi exercises with service users, carers, advocates, and mental health professionals on what helps assist recovery (7) and national care standards from each of the ten participating countries; and B) piloting among 213 longer term psychiatric and social care facilities across ten European countries (Bulgaria, Czech Republic, Germany, Greece, Italy, the Netherlands, Poland, Portugal, Spain and, the UK) which took place in 2009 (8). The QuIRC was validated using service user ratings of care to ensure manager's responses accurately reflected the care provided within the facility.

The instrument is completed by the facility manager and includes 145 items, 86 of which yield percentage scores for the quality of care provided in seven domains: Living Environment; Therapeutic Environment; Treatments and Interventions; Self-management and Autonomy; Social Interface; Human Rights; and Recovery-based Practice (see Table DS1). Higher scores indicate better quality care. The instrument was found to have high internal consistency (Cronbach's $\alpha = 0.89$) and good inter-rater reliability (average ICC = 0.95; 8).

Service user ratings of care

Service users completed standardised assessments of quality of life (Manchester Short Assessment of Quality of Life; 9), autonomy (Resident Choice Scale; 10), experiences of care (Your Treatment and Care; 11), and the therapeutic milieu of the facility (Good Milieu Index; 12; see Table DS1) in 2009. For all measures, higher scores indicate a more positive experience of care or outcome. Demographic information, including age, gender, diagnosis, and date of admission, was sought from the service user and corroborated using case notes.

Mental health expenditure

National mental health expenditure was estimated as the percentage of the health budget spent on mental health in each country and was used in all analyses. No single source reported expenditure data for all included countries, therefore, estimates were collected from the WHO *Mental Health Atlas 2005* (reporting data from 2004; 13) and data from the Mental Health Economics European Network (MHEEN; 14) which were based on best available information such as government reports and journal articles. The data include all direct health costs associated with mental health problems such as service utilisation and medication. As Spanish data were reported by region, the average percentage of the health budget spent on

mental health across all regions was used as the national statistic. Expenditure information was not available for Greece, therefore, its data were excluded from analyses in this study.

Confounding variables

Potential confounding variables at both facility and country levels were included a priori, based on the findings of studies previously conducted among this service user group and longer term mental health treatment settings (6), professional opinion and availability of data. Data on facility type (hospital or community), full-time equivalent (FTE) staff to service user ratio (below or above sample mean), and presence of a maximum length of stay within the facility (yes or no) were collected during the development of the QuIRC. All three variables indicate the goals and expectations of mental health care. Country level variables were limited to publicly available data. Data on stigma perceived by service users with schizophrenia in each country were obtained from Thornicroft and colleagues' paper on the development of the Discrimination and Stigma Scale (DISC; 15). Data were reported for all included countries except the Czech Republic and consequently, Czech data were excluded from the analyses. The year mental health policies were introduced in each country was obtained from *WHO Mental Health Atlas 2005* country reports to calculate the number of years to 2011 since their introduction.

Data analysis

Multilevel modelling was used to analyse the data to allow for effects of data clustering at the service user, facility, and country levels. For each dependent variable (QuIRC domain ratings and service user rated outcomes), four models incorporating confounding variables at the relevant service user, facility, and country levels were developed to examine its association

with national mental health expenditure (the independent variable). A model of best fit was selected for each dependent variable using the corrected Akaike Information Criterion (AICc; 16) The AIC value represents the difference between the approximated true model and the model which has been developed. The greater the difference between these models, the worse the fit. The AICc was developed to account for small sample sizes. An AICc value was calculated for each of the four models. The model with the lowest value was deemed the best fitting model for the dependent variable. All models were checked to ensure assumptions of normality and homoscedasticity were not violated. Data were analysed using STATA release 12.

The association between quality of care and mental health expenditure

Four, two-level models were developed to examine the association between quality of care and mental health expenditure which considered confounding variables at the country and facility levels (see Figure DS1). In Model A, each QuIRC domain was modelled separately as a dependent, facility level (level 1) variable. National mental health expenditure was entered as an independent, country level (level 2) variable. In Model B, the independent variables facility type and FTE staff to service user ratio were added to Model A as facility level fixed effects. In Model C, the degree of national stigma and the number of years since the introduction of mental health policies were added as country level fixed effects, independent variables to Model A. In Model D, all facility and country independent variables were added to Model A as fixed effects. Variables were added as fixed effects due to the small number of countries (highest level groups) included in the models and the non-random selection of countries and facilities.

The association between service user ratings of care and mental health expenditure

The association between service user ratings of care was examined in four, three-level models which considered potential confounding variables at the country and facility levels (see Figure DS2). In Model E, each service user rating was modelled separately as a dependent variable at the service user level (level 1). Mental health expenditure was entered into the same model as the independent variable with fixed effect at the country level (level 3). In Model F, the independent variables facility type and staff-to-service user ratio were added as facility level (level 2) fixed effects. In Model G, the degree of national stigma and the number of years since the introduction of mental health policies were added to Model E as level 3 independent, fixed effect variables. In Model H, both facility and country independent variables were added to Model E as fixed effects.

Results

Managers of 171 longer term psychiatric and social care facilities and 1,429 users of these services from across eight countries involved in developing the QuIRC were interviewed (see Figure DS1). The majority of facilities were located in the community (67.2%) and had a mean of 26 (SD = 21) beds. One hundred and thirty-three (77.8%) facilities had no stated maximum length of stay. The mean length of stay was 4.5 years. The average service user was male (63.4%) and 45 years of age. Schizophrenia/other psychosis was the most common diagnosis (71.6%). National variations in mean QuIRC domain scores and service user ratings of care are presented in Table 1.

<<Insert Table 1 here>>

Increased national mental health expenditure was found to be significantly associated with all QuIRC domain scores except Social Interface (see Table 2). Positive significant associations were also found between expenditure and service user ratings of autonomy, quality of life and experiences of care. Mental health expenditure and service user rated therapeutic milieu were not significantly correlated.

<<Insert Table 2 here>>

In models of best fit, Increased national mental health expenditure was associated with higher QuIRC domain scores for Living Environment (Model D, coef = 1.85, t = 3.26, $p \leq 0.001$; see Table 3 and DS2-8), Therapeutic Environment (Model B; coef = 1.46, t = 3.16, $p \leq 0.01$), Treatments and Interventions (Model B; coef = 1.12, t = 3.51, $p \leq 0.001$), Self-management and Autonomy (Model D; coef = 3.17, t = 6.18, $p \leq 0.001$), Human Rights (Model A, coef = 2.85, t = 3.38, $p \leq 0.001$), and Recovery-based Practice (Model B, coef = 2.40, t = 7.44, $p \leq 0.001$). A 1% increase in the percentage of the health budget spent on mental health was associated with an increase in domain scores ranging from 1.12-3.17%. However, no statistically significant association was found between expenditure and the Social Interface domain.

<<Insert Table 3 here>>

Among service user ratings of care, national mental health expenditure was positively associated with autonomy (Model H, coef = 2.27, t = 2.48, $p = 0.01$; see Table 4 and DS9-12) and experiences of care (Model E; coef = 0.29, t = 2.62, $p = 0.01$). However, expenditure was not found to be statistically significantly associated with quality of life or therapeutic milieu. All models of best fit met the assumptions of normality. All models except autonomy were

found to have uniform variance of error terms (i.e. homoscedasticity). In order to reduce bias in standard errors, and, as a result, the validity of the models' confidence intervals, three service-user-level outliers were removed.

<<Insert Table 4 here>>

Discussion

Expenditure on mental health services, although varied, is largely limited throughout Europe. Previous research found better service user outcomes were associated with greater residential facility expenditure in England, Germany and Italy (17). However, evidence of the impact of mental health expenditure at the national level did not exist. This study aimed to address this gap in knowledge. We investigated the relationship between expenditure and quality of care in a large sample of service users who are the most severely affected and resource dependent seen by mental health services. We found greater national expenditure on mental health services was associated with better quality care, greater service user autonomy, and more positive service user experiences of care.

Mental health expenditure was not found to be significantly associated with social interface. The Social Interface domain of the QuIRC includes questions related to service user participation in activities within the facility and the wider community, staff encouragement and support of service users to engage in activities and the strength of social networks. Facility type was found to have the greatest influence on this domain with service users in hospital settings having higher levels of interaction. This finding seems counter intuitive given one of the arguments for deinstitutionalisation was increased social integration. However, questions associated with the social interface domain may be more accurately

answered by managers of hospital-based facilities who may be better able to monitor service user activities and relationships outside the facility due to the heightened restrictions often placed on service users as compared to those in community settings.

Expenditure was not significantly associated with service user ratings of quality of life or therapeutic milieu. Our inability to find an association between expenditure and service user ratings of quality of life corroborate those of the European Psychiatric Services – Inputs Linked to Outcome Domains and Needs (EPSILON) study which found no association between the cost of psychiatric care and service user life satisfaction in five European countries (18). Community-based facilities were significantly associated with higher ratings of therapeutic milieu. Therefore, the amount of money available for care may be less important to this variable than the place where the service user is located.

Limitations

Mental health expenditure may not have been reported uniformly across the countries included in this study. Expenditure was defined as the proportion of the health budget spent on mental health. However, these figures do not accurately reflect the level of expenditure on mental health in any country as funds often come from several sources including government organisations (e.g. local authorities, ministries), private insurance and out-of-pocket payments. The types of costs which are included in the health budget also differ by country. For example, some social care costs are included in the mental health budget in the UK, while psychotropic medication is subsidised by the Spanish social security system.

Missing expenditure and stigma data resulted in the exclusion of Greek and Czech data, respectively, from this study. The exclusion of Czech data was made as we felt it important to

explore stigma associated with mental health problems as a potential confounding variable due to its potential to act as a barrier to appropriate mental health funding (19). However, as the exclusion of these data accounts for 20% and 29% of the country and service user sampling frame, respectively, it is important to understand the impact this exclusion has had on the validity of our findings. As a result, we re-ran our models without the stigma variable and an estimate of Greek mental health expenditure of 4.43% of the health budget as reported in the 2011 version of the Mental Health Atlas. Although the models of best fit were different for the majority of outcome variables, there were only minor reductions in expenditure coefficient values and no changes in direction or significance levels. We therefore assume that the exclusion of these data did not have a substantial impact on our findings.

Analyses were constrained to facility and service user variables collected as part of the DEMoBinc project and country variables reported in the literature but reflect characteristics relevant to quality and service user ratings of care. The cross-sectional nature of the data made it impossible to investigate potential causal relationships. However, even given comprehensive longitudinal data on service user outcomes, causation may still be difficult to demonstrate given other uncontrolled influences and the possibility that changes in expenditure may not be large enough to have an impact.

Despite these limitations, we believe the data from those countries included in this study to be representative of Europe in terms of variations in national wealth and systems of mental health care provision. Furthermore, the data are likely to represent the most comprehensive information on quality of longer term mental health care facilities currently available internationally.

WHO forecasts predict the burden associated with mental disorders will rise to the second greatest contributor to the global burden of disease, over the next 20 years (20). This prediction highlights the need to prioritise and improve the provision of mental health care. The results of our study suggest that national mental health expenditure is significantly associated with the quality and service user ratings of mental health care. Improved mental wellbeing not only leads to benefits for service users and their families but has related economic and health benefits for a nation including increased productivity (21, 22) and reduced mental and physical health care costs (23). Future work in this area should attempt to include a wider array of country, facility, and service user variables, as they become available, in order to build more robust models in which the effects of national mental health expenditure might be better understood and service users' outcomes and experiences improved.

Author Affiliations

Tatiana Taylor Salisbury*, PhD

Health Service and Population Research Department, Institute of Psychiatry,
Psychology and Neuroscience, King's College London, De Crespigny Park, London
SE5 8AF. email: tatiana.salisbury@kcl.ac.uk

Department of Population Health, London School of Hygiene and Tropical Medicine,
Keppel Street, London W1C 7HT.

Helen Killaspy, PhD

Division of Psychiatry, UCL, 6th Floor, Maple House, 149 Tottenham Court Road,
London W1T 7NF. email: h.killaspy@ucl.ac.uk

Michael King, PhD

Division of Psychiatry, UCL, 6th Floor, Maple House, 149 Tottenham Court Road,
London W1T 7NF. email: michael.king@ucl.ac.uk

*corresponding author

Authors' Contributions

TTS conceived of the study, participated in its design and item development, performed the statistical analysis and drafted the manuscript. HK and MK participated in the design of the study and item development and helped to draft the manuscript. All authors read and approved the final manuscript.

Conflict of Interest

The authors declare that they have no conflicts of interest.

Role of Funding Source

This work stems from a study funded by the Sixth Framework of the European Commission. The funder had no input in data collection, analysis or manuscript preparation.

Ethics Committee Approval

Ethical approval for the original study (DEMoBinc) was obtained from the relevant ethics committees in each of the ten participating countries (Bulgaria - Ethics Committee, Alexandrovska University Hospital; Czech Republic - General University Hospital, Prague, Ethics Committee; Germany – Ethik Kommission der Medizinischen Fakultät Carl Gustav

Carus an der Technischen Universität Dresden; Greece - University Mental Health Research Institutes Medical; Italy - Comitato Etico Indipendente; the Netherlands - Medical Ethical Committee of the University Medical Centre; Poland - Commission of Bioethics, Wrocław Medical University; Portugal - Ethical Committee of the New University of Lisbon Medical School; Spain - Comisión Etica de la Universidad de Granada; UK - City and East London Multi Region Ethics Committee).

Acknowledgements

DEMoBinc was funded by the Sixth Framework of the European Commission. The authors gratefully acknowledge this support. We also acknowledge the role of the Maristán Network (<http://redmaristan.org/>) which facilitated the collaboration of a number of member countries in this study and DEMoBinc partners in collecting facility and service user data.

References

1. World Health Organization. Mental health: New understanding, new hope. Geneva: World Health Organization, 2001.
2. United Nations. Sustainable Development Goals 2015 [cited 2015]. Available from: <https://sustainabledevelopment.un.org/?menu=1300>.
3. Knapp M, Hallam A, Beecham J, Baines B. Private, voluntary or public? Comparative cost-effectiveness in community mental health care. *Policy and politics*. 1999;27(1):25-41.
4. Killaspy H, King M, Wright C, White S, McCrone P, Kallert T, et al. Study protocol for the development of a European measure of best practice for people with long term mental health problems in institutional care (DEMoBinc). *BMC Psychiatry*. 2009;9(1):36.
5. Joint Commissioning Panel for Mental Health. Guidance for Commissioners of Rehabilitation Services for People with Complex Mental Health Needs. London: 2012.
6. Taylor TL, Killaspy H, Wright C, Turton P, White S, Kallert T, et al. A systematic review of the international published literature relating to quality of institutional care for people with longer term mental health problems. *BMC Psychiatry*. 2009;9(1):55.
7. Turton P, Wright C, Killaspy H, King MB, White S, Taylor T, et al. Promoting recovery in long-term mental health institutional care: an international Delphi study of stakeholder views. *Psychiatric Services*. 2009;61:293-9.
8. Killaspy H, White S, Wright C, Taylor TL, Turton P, Kallert T, et al. Quality of longer term mental health facilities in Europe: validation of the quality indicator for rehabilitative care against service users' views. *PLoS One*. 2012;7(6):e38070.

9. Priebe S, Huxley P, Knight S, Evans S. Application and results of the Manchester Short Assessment of Quality of Life (MANSA). *International Journal of Social Psychiatry*. 1999;45(1):7-12.
10. Hatton C, Emerson E, Roberts J, Gergory N, Kessissoglou S, Walsh PN. The Resident Choice Scale: A measure to assess opportunities for self-determination in residential settings. *Journal of Intellectual Disability Research*. 2004;48(2):103-13.
11. Webb Y, Clifford P, Fowler V, Morgan C, Hanson M. Comparing patients' experience of mental health services in England: A five-Trust survey. *International Journal of Health Care Quality Assurance*. 2000;13(6):273-81.
12. Røssberg JI, Friis S. Do the Spontaneity and Anger and Aggression subscales of the Ward Atmosphere Scale form homogeneous dimensions? A cross-sectional study of 54 wards for psychotic patients. *Acta Psychiatrica Scandinavica*. 2003;107(2):118-23.
13. World Health Organization. *Mental Health Atlas 2005*. Geneva: World Health Organization, 2005.
14. Medeiros H, McDaid D, Knapp M, the MHEEN group. *Shifting care from hospital to the community in Europe: Economic challenges and Opportunities*. London: 2008.
15. Thornicroft G, Brohan E, Rose D, Sartorius N, Leese M. Global pattern of experienced and anticipated discrimination against people with schizophrenia: a cross-sectional survey. *The Lancet*. 2009;373(9661):408-15.
16. Akaike H. Factor analysis and AIC. *Psychometrika*. 1987;52(3):317-22.
17. Knapp M, Beecham J, McDaid D, Matosevic T, Smith M. The economic consequences of deinstitutionalisation of mental health services: lessons from a systematic review of European experience. *Health & Social Care in the Community*. 2011;19(2):113-25.
18. Knapp M, Chisholm D, Leese M, Amaddeo F, Tansella M, Schene A, et al. Comparing patterns and costs of schizophrenia care in five European countries: The EPSILON study. *Acta Psychiatrica Scandinavica*. 2002;105(1):42.
19. Sartorius N. Stigma and mental health. *The Lancet*. 2007;370(9590):810-1.
20. World Health Organization. *Global Burden of Disease: 2004 Update*. Geneva: World Health Organization, 2008.
21. Wells KB, Sherbourne C, Schoenbaum M, et al. Impact of disseminating quality improvement programs for depression in managed primary care: A randomized controlled trial. *JAMA*. 2000;283(2):212-20.
22. Rollman BL, Belnap B, Mazumdar S, et al. A randomized trial to improve the quality of treatment for panic and generalized anxiety disorders in primary care. *Archives of General Psychiatry*. 2005;62(12):1332-41.
23. Chiles JA, Lambert MJ, Hatch AL. The Impact of Psychological Interventions on Medical Cost Offset: A Meta-analytic Review. *Clinical Psychology: Science and Practice*. 1999;6(2):204-20.

Table 1. Included country characteristics

	Country								
	Sample	Portugal	Bulgaria	Poland	Italy	Spain	Netherlands	UK	Germany
Health budget spent on mental health (%)	5.79	2.30	2.50	3.50*	5.00*	5.89*	7.00	10.00	10.14*
Per capita mental health expenditure (Int\$)	117.42	37.21	7.58	22.02 [†]	110.20 [†]	94.65 [†]	182.84	198.90	285.95 [†]
QuIRC domain mean score (SD)									
Living Environment	60.92 (16.04)	59.18 (15.64)	54.10 (18.06)	49.02 (12.87)	64.75 (9.57)	46.48 (16.81)	70.14 (13.95)	67.05 (10.75)	73.81 (7.92)
Therapeutic Environment	52.15 (9.73)	47.82 (10.55)	45.56 (12.17)	47.47 (8.58)	52.60 (6.83)	55.72 (8.04)	51.58 (4.86)	64.52 (6.03)	51.78 (7.22)
Self-management and Autonomy	55.68 (15.80)	49.63 (16.47)	44.95 (19.19)	44.06 (9.61)	53.18 (9.11)	46.86 (10.28)	65.98 (9.83)	68.69 (11.03)	71.85 (8.28)
Social Interface	48.59 (15.28)	51.96 (19.33)	45.76 (17.68)	40.09 (14.04)	49.98 (11.85)	59.55 (16.38)	47.01 (33.38)	53.95 (12.74)	40.32 (11.52)
Treatments and Interventions	51.17 (9.35)	46.49 (10.13)	48.48 (11.37)	46.24 (7.72)	50.55 (6.69)	53.97 (9.55)	52.74 (7.06)	59.50 (8.03)	51.57 (8.46)
Human Rights	57.36 (13.12)	48.70 (11.85)	52.36 (14.39)	52.97 (10.41)	48.11 (9.60)	53.73 (9.10)	70.78 (6.44)	69.7 (9.19)	65.74 (5.71)
Recovery-based Practice	52.29 (12.81)	44.16 (13.41)	45.48 (15.94)	46.08 (10.26)	48.43 (8.12)	55.42 (8.80)	51.71 (8.65)	65.92 (9.67)	62.39 (8.77)
Mean service user rating scores (SD)									
Quality of Life	4.61 (0.89)	4.63 (0.87)	4.19 (0.89)	4.60 (0.85)	4.61 (0.75)	4.63 (0.94)	4.79 (0.89)	4.52 (0.86)	4.88 (0.89)
Autonomy	59.42 (12.21)	52.41 (11.90)	47.93 (9.72)	51.28 (7.46)	65.30 (7.17)	55.59 (10.92)	72.65 (7.45)	67.13 (8.29)	64.54 (7.54)
Experiences of Care	17.47 (4.89)	15.71 (4.79)	16.12 (4.61)	17.18 (5.17)	18.56 (4.53)	16.58 (4.84)	18.96 (4.60)	18.90 (5.36)	18.08 (4.14)
Therapeutic Milieu	17.36 (4.20)	17.39 (4.31)	17.05 (4.04)	18.01 (4.08)	18.01 (4.11)	16.83 (4.36)	17.34 (4.06)	16.91 (4.40)	17.38 (4.13)

Note: Data from "Mental Health Atlas 2005" by World Health Organization, 2005 except where denoted

* Data from "Shifting care from hospital to the community in Europe: Economic challenges and opportunities", Medeiros, 2008

[†] Note: Statistic calculated using information from WHO and Medeiros (2008)

Table 2. Correlation between mental health expenditure and quality and service user ratings of care

	Pearson Correlation (r)	
	Percentage mental health expenditure	Per capita mental health expenditure
Living Environment	0.38***	0.17*
Therapeutic Environment	0.41***	0.18**
Self-management and Autonomy	0.60***	0.30***
Social Interface	0.00	-0.03
Treatments and Interventions	0.34***	0.13
Human Rights	0.55***	0.30***
Recovery-based Practice	0.56***	0.32***
Autonomy	0.51***	0.55***
Quality of Life	0.12***	0.15***
Experiences of Care	0.18***	0.18***
Therapeutic Milieu	-0.03	-0.02

* $p < 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Table 3. Main effects of mental health expenditure on quality of care

	Living Environment	Therapeutic Environment	Self-management and Autonomy	Social Interface	Treatments and Interventions	Human Rights	Recovery-based Practice
Model	D	B	D	B	B	D	B
Intercept, mean (s.e.)	-2.12 (13.15)	45.11*** (2.94)	-0.74 (11.90)	50.68*** (5.13)	45.64*** (2.00)	36.95 (19.47)	37.70*** (2.02)
Fixed effects parameter estimate (s.e.)							
Percentage mental health expenditure	1.85*** (0.57)	1.46** (0.46)	3.17*** (0.51)	0.09 (0.81)	1.12*** (0.32)	2.85** (0.84)	2.40*** (0.32)
Unit type							
hospital	reference	reference	reference	reference	reference	reference	reference
community	12.79*** (2.12)	-3.67* (1.50)	4.42* (2.16)	-5.89* (2.63)	-2.54 (1.56)	0.59 (1.85)	-0.17 (1.88)
Staff/service user ratio							
< 0.52	reference	reference	reference	reference	reference	reference	reference
≥ 0.52	-1.72 (2.75)	3.06 (1.81)	1.20 (2.66)	3.83 (3.17)	2.42 (1.71)	3.01 (2.38)	2.73 (1.93)
Mental Health legislation ^a	0.16 (0.22)		0.15 (0.19)			-0.30 (0.33)	
Stigma	8.38*** (2.20)		6.50** (1.99)			1.65 (3.27)	
Random parameters variance (s.e.)							
Level 1 (country)	5.68 (9.39)	10.05 (7.85)	3.23 (7.26)	30.55 (23.99)	2.14 (3.44)	28.35 (23.20)	1.71e-13 (2.56e-12)
Level 2 (facility)	148.21 (16.52)	65.43 (7.29)	142.84 (15.90)	199.88 (22.28)	73.86 (8.22)	97.60 (10.87)	113.29 (12.40)

^a Years since introduction of legislation

* $p < 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Table 4. Main effects of mental health expenditure on service user ratings of care

	Autonomy	Quality of Life	Experiences of Care	Therapeutic Milieu
Model	H	E	E	F
Intercept, mean (s.e.)	30.72 (21.03)	4.40*** (0.15)	15.88*** (0.71)	17.42*** (3.52)
Fixed effects parameter estimate (s.e.)				
Percentage mental health expenditure	2.27* (0.92)	0.04 (0.02)	0.29** (0.11)	-0.08 (0.06)
Unit type				
hospital	reference	reference	reference	reference
community	3.01* (1.16)			0.74* (0.32)
Staff/service user ratio				
< 0.52	reference	reference	reference	reference
≥ 0.52	0.71 (1.53)			-0.15 (0.33)
Mental Health legislation ^a	-0.11 (0.36)			
Stigma	3.23 (3.54)			
Random parameters variance (s.e.)				
Level 1 (country)	38.67 (28.60)	0.03 (0.02)	0.54 (0.45)	0.02 (0.10)
Level 2 (facility)	31.24 (4.24)	0.05 (0.02)	2.70 (0.59)	1.28 (0.37)
Level 3 (service user)	51.34 (2.05)	0.71 (0.03)	20.07 (0.80)	16.28 (0.65)

^a Years since introduction of legislation

* $p < 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$