S. Saldivia Bórquez[1]
F. Torres González[2]
J. M. Cabasés Hita[3]
and PSICOST Group

Estimation of mental health care cost units for patients with schizophrenia

[1] Psychiatry and Mental Health Department
University of Concepción
Chile
[2] Legal Medicine, Psychiatry and Toxicology Department
University of Granada
[3] Economics Department
Public University of Navarra
PSICOST Group

Introduction. The disease-cost study, based on the study of cohorts of patients through their visits to the mental health system, requires knowledge on the cost of each health care unit. However, lack of standardized procedures limits the external validity of the results obtained. When methodological information regarding the procedures applied is available, it makes it possible to compare the internal validity and to understand the suppositions on which the cost estimations have been made.

Method. Cost-units for the health care received by a cohort of patients diagnosed of schizophrenia were estimated. The study was performed by a community-based team and at several hospital premises belonging to the Andalusia Health Service. A sensitivity analysis was conducted whenever necessary.

Results. Both in inpatients and outpatients care, personnel represents the biggest cost, this proportion being higher within the outpatient care. Among the professional categories the care given by the psychiatrists is the most expensive. Time load is similar for the different categories except for the psychiatrist.

Conclusions. Cost unit estimates are lower than that which has been published internationally and within Spain. However, the findings must be carefully considered due to the influence that the different methodological options may have.

Key words:
Health care. Costs. Shizophrenia.

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Estimación de unidades de costes de atención sanitaria a pacientes con esquizofrenia

Introducción. Llevar a cabo estudios de coste de la enfermedad siguiendo cohortes de pacientes en su recorrido por los dispositivos de atención requiere contar con información lo más precisa posible acerca de los costes unitarios de las diferentes intervenciones. Sin embargo, la carencia de procedimientos estandarizados limita la validez externa de los resultados obtenidos. Disponer de información metodológica acerca de los procedimientos seguidos permite contrastar la validez interna y conocer los supuestos bajo los cuales operan las estimaciones realizadas.

Método. Se estimaron unidades de coste de la atención sanitaria que reciben los pacientes con diagnóstico de esquizofrenia atendidos por un equipo de salud Mental de la Comunidad Autónoma de Andalucía. Se optó por datos de fuentes primarias, trabajando por separado la atención ambulatoria y la hospitalaria. Se llevó a cabo un análisis de sensibilidad con algunas variables sometidas a incertidumbre.

Resultados. Tanto en los cuidados ambulatorios como hospitalarios el mayor peso de los costes recae en el capítulo de personal, siendo esta proporción más alta en los cuidados ambulatorios. Por categoría laboral, el mayor coste recae en la atención de los psiquiatras. Las cargas horarias, con excepción de psiquiatría, son similares entre los diferentes profesionales.

Conclusiones. La magnitud de los costes estimados está por debajo de lo reportado por estudios internacionales y aún españoles. Sin embargo, los hallazgos deben ser cuidadosamente analizados dado la influencia que pueden tener las opciones metodológicas realizadas.

Palabras clave:
Unidades de atención sanitaria. Costes. Esquizofrenia.

INTRODUCTION

The need to hold back health costs has motivated the search for more cost-effective interventions in psychiatry and mental health, which is also reflected in the growing increase of these types of studies in the international literature of the last 20 years.

Correspondence:
Sandra Saldivia
Departamento de Psiquiatria y Salud Mental
Universidad de Concepción
Casilla 160-C
Concepción (Chile)
E-mail: ssaldivi@udec.cl

The methodological approach in this area may include two types of approaches: conducting macroeconomic studies of global cost estimations of the disease (up down), or following cohorts of patients in their visits to mental health care sites (bottom up). This requires a defined population, target disorder and registry of all the associated costs[1]. In the latter case, it is relevant to have the most exact information possible on the unit costs of the different health interventions[2-7]. However, information is not always available on the methodological aspects and results obtained in this area[2,8,9]. This also manifests the characteristics of psychiatry and mental health care, while definitions that may be clearly established in other medical specialities lack consensus here.

Generally, health care service costs are determined by identifying all the resources used and their respective costs; the total sum of these is divided by a measurement of appropriate «work load» to determine the cost per unit of service or client. However, the results may differ, depending on the types of items included and the work load unit used[10].

In this way, methodological questions such as the study perspective, definition of the cost of opportunity of resources, guidelines for their allocation and measurement of the load units may affect the magnitude and ratio between treatment costs in comparative analysis of mental health interventions[4] and introduce a bias in the cost-effectiveness results, which cannot be detected due to absence of information[4].

The estimation of the work load can consider direct, face to face care by the different team components, proportion of cost that forms a part of the direct care cost and that may mean lower proportion of total time available[11], and also that which the professionals dedicate to other tasks, among these, those which substitute clinical activities not conducted for reasons outside of the professionals controls (not coming to the appointment, change of time, etc.) and that is treated as an administration cost.

Calculating the direct cost per patient for a defined time period, and assigning the fixed and variable direct and indirect costs to each one of them may be a costly process and require time[11]. However, minor changes will make it possible to approach simple calculation processes that are possible to conduct in a specific setting. They may also be implemented for services foreseen by public mental health sites and be useful to compare information on the magnitude of the financing that these same sites receive[2].

However, a large percentage of studies published in this area make scarce reference to the procedure followed in the unit cost estimation. In some cases, they mention the types of cost included in the calculation[3,5,6,12], in others, the source from where they were obtained is hardly mentioned[13-15].

In this way, lack of standardized procedures incorporates an arbitrary action element in the construction of these cost units[4] that is reflected in the limited external validity of the results. However, the availability of information, that has a direct relationship with the degree of development and organization of the services and with how they are financed, is crucial as it increases the possibilities of obtaining estimations that are more or less close to reality. In the same way, the possibility of having methodological information on the procedures followed make it possible to compare the internal validity and know the suppositions under which these estimations operate. This is not unimportant since, under such premises, comparative studies can be planned between groups cared for within the same service network and/or longitudinal studies can be done that orient on the time changes in the cost variables.

In this context, the object of this study is to estimate the unit costs of health care received by patients with schizophrenia diagnosis who are seen by a mental health team in the regional Community of Andalusia, Spain.

METHODS

In the development framework of the PSICOST-2* project, unit costs were estimated for schizophrenia patient care. This procedure made it necessary to gather information related with the costs and determine the denominator to be used for each calculation. The data were gathered for the Granada province during the year 1999.

Based on the lack of previous information, different degree of data aggregation and different criteria of recording the financial information in each institution, it was decided to look for data as close as possible to the primary sources. Out-patient and hospital care were studied separately according to the nature of the information to be obtained and its availability.

An attempt was made to obtain cost units for individual care in mental health out-patient clinics differentiated by professional category (psychiatrist, psychologist, nursing, social worker and clinical assistant), for stay in acute units of a general hospital ((USM-HG) and in long stay units (LSU), and the daily cost for attendance to day centers. In every case, the reliability of the results was subjected to both sensitivity analysis and expert's opinion, seeking to guarantee their internal consistency.

Out-patient cares

Cost estimation for out-patient cares in mental health was performed in relationship to the direct and indirect costs generated by an area mental health team (AMHT). These total costs were subdivided into 5 groups (table 1): direct costs of

* Analysis of schizophrenia according to the model of care prevalence. FIS 95/1961 PSICOST-2.

Table 1 Classification of total costs for an area mental health team

Typo of cost	Cost included
Direct	Yearly remunerations by professional category
Maintenance	Yearly cost of maintenance of AMHT, prorated based on the surface (in m^2) occupied by the professional, considering individual and shared spaces
Amortization	Yearly cost for amortization of building and furniture, proportional to the space occupied by the AMHT and distributed equally by professional category
Indirect	Yearly cost of organizational structure used by the AMHT, only those costs related with mental health (area coordination, secretary, AMHT coordination), prorated according to work category, are considered
Others	Yearly cost of administrative and clinical assistant personnel that support the AMHT management, distributed equally by professional category

medical personnel, maintenance of facilities, amortizations (facilities and furniture), indirect costs (organizational structure) and others (non-medical support personnel).

Once the annual costs are obtained, a second procedure makes it necessary to identify the denominator by which these results will be divided in order to obtain the cost/hour unit for each professional category. Given that the available information varies between the medical and non-medical personnel, it was decided to estimate a different denominator for each work category.

Regarding those professionals whose function is highly clinical (psychiatrists and psychologists), where there is information recorded on the daily health care load for the year 1999, it was decided to use this as an estimation base of the yearly hours of clinical intervention. In the case of the psychiatrists, where more than one professional carries out the function, the information gathers the average estimations. For the remaining professions, where the registry of patient care is deficient or does not exist, and where the functions assigned are distributed between face to face care with the patients and activities that indirectly affect the users, it was decided to use an hourly care load estimation that eliminates those dedicated to activities outside of the clinical care from the yearly hours available. These may either be due to work rights (vacations, days for special needs, training, etc.) or due to activities performed within the mental health team oriented to administrative questions, such as coordination meetings. This decision required a previous sensitivity analysis which, compared with the experts' opinion, validated such decision.

Hospital cares

Estimation of cost units for hospital dependent services was based on the information provided by a general hospital of the North Granada Health Care Area. The information comes from the use of the COANH program of analytic accounting for the Andalusia Health Service (AHS) sites.

The available information contemplates the total added costs for all the mental health units dependent on the mentioned hospital complex, classified according to that specified in table 2.

The COANH system identifies three clinical activities that may be carried out in such a hospital complex: out-patient visit, emergencies and stays, and calculates the cost in the clinical service. The organization of the mental health care in the AHS centralizes the out-patient visit in the AMHT, so that it was not estimated in this case. The unit cost of psychiatric emergency care was calculated using Health Care Weighted Units (HCWUs), which make it possible to indirectly estimate the average cost of each one of the activities. However, in the case of the stays, the system does not discriminate between the different types of institutions dependent on the hospital complex, and it was only possible to access their average cost.

Considering the above, and based on the available information, the cost units corresponding to this type of system were estimated, given the differences existing between them. These correspond to day of stay in an acute unit of general hospital (USM-HG), in a long stay unit (LSU) and in a day center. To estimate this differentiated cost, the total costs of psychiatric stay, which were prorated accounting to the personnel assigned to each unit and divided by the

Table 2 Classification of hospital costs

Type of cost	Costs included
Personnel	Semi-permanent: salaried and duties (in person and being on call)
	Variable: substitutions
Consumption	Replaceable
	Drugs
Indirect	Central services
	Basic services

Source: COANH-SAS.

number of stays in each system for the year 1999, were considered.

RESULTS

Out-patient cares

The percentage distribution of the different types of cost has greater weight than the direct costs, which represent 80 % of the total costs. Of the remaining categories, only that of Others, that also has a strong weight of remunerations, reached a significant percentage that ranges, according to the work category, from 12 % to 20 %, in an inversely proportional relationship to direct costs (table 3).

When the monetary values are considered, the annual total cost of AMHT, estimated for 1999, reached 278,046 € (46,155,561 pts.). If the data are analyzed by work category, the greatest weights are on psychiatry, derived from both a slightly higher cost and a greater number of professionals hired (table 3).

The hour loads are similar, except for psychiatry, a difference that must be analyzed considering the different methods used to obtain the information and the allotment of differentiated functions for the psychiatrists, which include duties in a USM-HG and, in some cases, care hours outside of the AMHT to populations not attributed to it. With the estimations posed, unit/hour costs for each professional category were obtained (table 4).

Hospital cares

In the distribution of the total costs, the greatest proportion corresponds to personnel, that is, 52.6 %. The remaining 47.4 % include consumption and indirect costs. Based on such information, costs per day of stay in the different systems, including drugs, were estimated. Table 5 summarizes the final results, also incorporating the estimated costs of psychiatric emergency care.

DISCUSSION

Magnitude of the resulting cost units

Although it is true that in health cost studies, it is difficult to compare the findings due to the existing methodological differences, it seems clear that that found in Granada tends to be lower than other European and even Spanish studies. Fattore et al.[2] found out-patient care values in Italy for 1995 in psychiatry, psychology and nursing that were higher than those reported here. The same occurs with those used by Salvador-Carulla et al.[15] to estimate the results of the follow-up at three years of two patient samples with schizophrenia diagnosis.

In the case of hospital cares, the cost per patient and day, both in acute and long stay (LSU) units is below that described in European and USA studies[9,16,17]. However, the differences found are minor and maintain a certain relationship with that indicated in the literature, in the sense that the cost/day of an admission in the acute unit of a general hospital is approximately twice the cost of one day of admission in a long stay unit[16]. In this case, the daily cost for this last system corresponds to 51.9 % of the cost per day of admission in the former while care in a day center represents 21 % of the same reference cost.

Methodological aspects

The composition of the numerator of the results presented include most of the cost sources. Those that are not considered, such as administration costs of the health care district, represent such a small proportion regarding the total that their presence or absence does not significantly affect the final results. Thus, the differences in regards to

Table 3 Percentage and monetary distribution of total cost and by work category for an AMHT (values 1999)

Type of cost	AMHT	Psychiatrist**	Psychologist	Nursing	Social worker
Direct	220,997 € (79.7)	129,492 € (81.5)	41,501 € (80.9)	25,783 € (75.1)	24,221 € (73.8)
Maintenance	8,417 € (3.0)	4,715 € (3.0)	1,572 € (3.1)	1,065 € (3.1)	1,065 € (3.3)
Amortization	1,014 € (0.4)	507 € (0.3)	169 € (0.3)	169 € (0.5)	169 € (0.5)
Indirect	7,759 € (2.8)	4,631 € (2.9)	1,544 € (3.0)	792 € (2.3)	792 € (2.4)
Others*	39,213 € (14.1)	19,606 € (12.3)	6,536 € (12.7)	6,536 € (19.0)	6,536 € (19.9)
Total	277,401 € (100)	158,951 € (100)	51,321 € (100)	34,346 € (100)	32,783 € (100)

Source: Administration Healt Care District Loja. Santa Fe; COANH-SAS. * Imputation of cost of clinical assistant and administrative personnel; ** it considers three psychiatrists.

Table 4 Estimation of hourly load and unit costs of clinical care, by work category in an AMHT (1999)

Professional category	Yearly hours of clinical care	Clinical care/hour cost
Psychiatrist	1,043	50.8 € (8,452 pts.)
Psychologist	1,337	38.4 € (6,387 pts.)
Nursing	1,362	25.2 € (4,197 pts.)
Social worker	1,351	24.3 € (4,039 pts.)
Clinical assistant	1,379	15.6 € (2,601 pts.)

Source: Administration Health Care Disctrict Loja. Santa Fe. Clinical activities registry AMHT Loja.

other studies can be attributed either to the definition of the work load or to methodological aspects that are difficult to identify as this information is not easily available in the literature[4]. This underlines the arbitrariness of the options in a research area that still lacks sufficient consensus and whose discussion is the aim of this article.

What is relevant in all the estimations is the weight that the cost of personnel has in them[2,17]. In this case, it increases to 80 % for out-patient cares and exceeds 50 % in the hospital ones. Such relationship is logical if it is considered that the psychiatric cares given in services located in general hospitals tend to use a great amount of personnel, while the costs in replaceable material are less compared with other clinical services.

In relationship with the work load, a central problem arises from the precariousness of the information registry. A sensitivity analysis was conducted using different criteria, from the most administrative, that generalize those resulting from the recording of the activities performed in a fixed number of yearly hours for clinical care, without considering the real practice. However, none is adequate for all the cases or, as some authors state, the work load itself is different for all the professional groups[3,17]. That is why it was decided to use differentiated estimations according to the work category, giving priority to the information closest to the primary sources available, an option that minimizes the information gaps, and when this occurs, the options that support the data quality become transparent.

However, there are aspects related with the administration itself that affect the information quality. One of them is related to the diversity of administrative dependence among the professionals that make up an area mental health team, who depend either on a Health Care District or a general hospital, according to whether they are physicians or not. In this context, the fragmentation in the organic dependence is also expressed in the lack of continuity in the clinical management, follow-up and assessment of the activities performed.

This difference contrasts with the data from other sections of the health care setting, from complementary tests and drugs, and even from private care, where less methodological accuracy is needed to reach results whether because they are already defined by a managing organism or auditor or the possibilities of approaching the real cost are so limited that the care price is generally a frequently used indicator, as occurs in private care.

The weight that the methodological option to follow had on the results obtained was observed in all the search, compiling, processing and data analysis process. However, the mean costs of the specific care programs, as those of case management, varied considerably, reflecting the differences in the number of cases assigned and in the personnel hired in the program[10].

The subject is not less if it is considered that the potential errors inherent to the methodological selection may produce wide variations and influence the findings regarding the care patterns. This will lead to greater repercussions when dealing with cost-effectiveness studies[4].

Table 5 Estimation of unit costs for mental health activities in a general hospital (values 1999)

Activity	Cost unit
Visit to psychiatist in emergency service	58.2 € (9,690 pts.)
Day of stay in mental health unit of general hospital*	315.7 € (52,524 pts.)
Day of stay in long stay unit*	164 € (27,282 pts.)
Day of care in day center*	67.4 € (11,209 pts.)

*Includes cost of medication.

CONCLUSIONS

- The magnitude of the unit costs for schizophrenia patient care in the Health Care Area of Granada, both in out-patient as well as hospital cares, is below that reported by international and even Spanish studies.
- However, the characteristics of each health care system and the accuracy and opportunity that the information is managed with, determine the quality of the cost unit results and thus, the importance of improving and standardizing the methods.
- The option for primary information sources facilitates the reaching of estimations closer to reality, and thus supplies validity of the results.

REFERENCES

1. Salvador-Carulla L, Rodríguez-Blázquez MC, Ángel A, Pérez-Marín J. Aspectos conceptuales en evaluación de costes en salud mental. Psiquiatría 1997;9:3-15.
2. Fattore G, Percudani M, Pugnoli C, Contini A. I costi delle prestazioni in psichiatria: un'analisi condotta in un Centro Psico-Sociale (CSP) pubblico in Lombardia. Epidemiol Psichiatr Soc 1997;6:139-47.
3. Amaddeo F, Beecham J, Bonizzato P, Fenyo A, Knapp M, Tansella M. The use of a case register to evaluate the costs of psychiatric care. Acta Psychiatr Scand 1997;95:189-98.
4. Wolff N, Helminiak T, Kraemer J. Getting the cost right in cost-effectiveness analyses. Am J Psychiatry 1997;154:736-43.
5. Amaddeo F, Beecham J, Bonizzato P, Fenyo A, Tansella M, Knapp M. The costs of community-based psychiatric care for first-ever patients. A case register study. Psychol Med 1998;28:173-83.
6. Mirandola M, Bisoffi G, Bonizzato P, Amaddeo F. Collecting psychiatric resources utilisation data to calculate costs of care: a comparison between a service receipt interview and a case register. Soc Psychiatry Psychiatr Epidemiol 1999;34:541-7.
7. Shah A, Jenkins R. Mental health economic studies from developing countries reviewed in the context of those from developed countries. Acta Psychiatr Scand 2000;101:87-103.
8. Ozámiz JA, Cabasés JM. Economic analysis of different pattern of psychiatric treatment and management of chronic psychotic patients in the Basque Country. En: Schwefel D, Zöllner H, Potthoff P, editores. Costs and effects of managing chronic psychotic patients, 1.ª ed. Berlín: Springer-Verlag, 1988; p. 97-105.
9. Moscarelli M, Capri S, Neri L. Cost evaluation of chronic schizophrenic patients during the first 3 years after the first contact. Schizophr Bull 1991;17:421-6.
10. Rosenheck R, Neale M, Frisman L. Issues in estimating the cost of innovative mental health programs. Psychiatr Q 1995;66:9-31.
11. King M, Llewellyn S. Costing care needs for disabled people. An accounting approach. En: Clark C, Lapsley H, editores. Planning and costing community care, 1st ed. Londres: JKP, 1996; p. 121-37.
12. Wiersma D, Kluiter H, Nienhuis F, Ruphan M, Giel R. Costs and benefits of day treatment with community care for schizophrenic patients. Schizophr Bull 1991;17:411-9.
13. Suleiman T, Ohaeri J, Lawal R, Haruna A, Orija O. Financial cost of treating out-patients with schizophrenia in Nigeria. Br J Psychiatry 1997;171:364-8.
14. Haro JM, Salvador-Carulla L, Cabasés JM, Madoz V, Vásquez-Barquero JL. Utilisation of mental health services and costs of patients with schizophrenia in three areas of Spain. Br J Psychiatry 1998;173:334-40.
15. Salvador-Carulla L, Haro J.M, Cabasés JM, Madoz V, Sacristán JA, Vázquez-Barquero JL. Service utilization and cost of first-onset schizophrenia in two widely differing health service areas in North-East Spain. Acta Psychiatr Scand 1999;100:335-43.
16. Salize HJ, Rössler W. The cost of comprehensive care of people with schizophrenia living in the community. A cost evaluation from German Catchment Area. Br J Psychiatry 1996;169:42-8.
17. Rund BR, Ruud T. Costs of services for schizophrenic patients in Norway. Acta Psychiatr Scand 1999;99:120-5.