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COST OF ILLNESS OF SCHIZOPHRENIA

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# ABSTRACT

Economic evaluation provides a methodology that allows policy makers, managers and clinicians to make choices between differing treatments, settings and illnesses in order to facilitate the judicious use of scarce resources. There are several methods of economic evaluation, cost of illness being one of them. Schizophrenia imposes huge economic impact on individuals, families, and communities. This paper attempts to review the issues related to carrying out cost of illness studies, the findings of cost of illness studies done for schizophrenia from various countries and various sociodemographic and illness factors which influence cost of illness of schizophrenia.

**Key words:** Schizophrenia, Cost of illness (COI), direct cost, indirect cost

# INTRODUCTION

An estimated 20 million people worldwide suffer from schizophrenia 1. The Global Burden of Disease Re- port 2 quotes a point prevalence of 0.4% for schizophre- nia. Schizophrenia is a severe disorder that typically be- gins in late adolescence or early adulthood. It is charac- terized by fundamental distortions in thinking and per- ception and by inappropriate emotions. It follows a vari- able course, with complete symptomatic and social re- covery in one third of cases. In the rest it generally fol- lows a chronic or recurrent course with residual symp- toms and incomplete social recovery. The residual symp- toms include lack of interest and initiative in daily activi- ties and work, social incompetence and inability to take interest in pleasurable activities. These cause continued disability and poor quality of life. These symptoms can also place considerable burden on families 3 .

Economic evaluation is concerned with the best use of limited resources and occurs in a deci-

sion-specific context of identifying the most efficient way of meeting a stated objective. Its main function is to allow policy makers, managers and clinicians to make choices for achieving objectives by assessing the costs and benefits of each chosen method. Health–care budgets are limited. However, there is no limit to expenditure if all existing demands are to be met. Finite resources, and the discrepancy be- tween the demand and the available supply, suggest that a formula be evolved for allocating resources among the various competing sectors. The choice has to be made between differing treatments, treatment set- tings, and illnesses to allow judicious use of scarce re- sources 4.

The economic impact of schizophrenia is wide ranging, long lasting and huge. Schizophrenia imposes a range of costs on individuals, families, and communi- ties. Part of this economic burden is obvious and mea- surable, while other parts are almost impossible to mea-

sure. Among the measurable components of the eco-

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nomic burden are health and social service needs, lost employment and reduced productivity, impact on fami- lies and caregivers, levels of crime and public safety, and the negative impact of premature mortality. The part that cannot be measured in monetary terms is called intan- gible costs and includes effects on the patients in the form of stigma, stress and treatment side effects, and on the caregivers in the form of stress, psychiatric morbid- ity and stigma 3. Therefore, measuring the economic burden imposed by schizophrenia on the family and so- ciety has been an important endeavor. Several studies have tried to document the cost of schizophrenia in terms of treatment expenses, family spending, loss of man- power etc.

# METHODOLOGICAL ISSUES IN COST OF ILLNESS STUDIES

*Costs of illness (COI)* studies describe the eco- nomic burden of disease on society. Cost of illness stud- ies also allow for comparison between different illnesses. COI studies emphasize the issue of cost containment as well as the benefits of total elimination of the disease. COI studies can draw attention to disorders with an overall high burden; disorders with poor investment in services and other resources used in their treatments; the pos- sible impact of preventive measures on primary, second- ary and tertiary prevention; comparison with other disor- ders in a common currency. An important limitation to COI studies in estimating the economic burden is that costs of health service intervention reflect the existing pattern of service delivery 4.

The COI methodology is based on the human capi- tal approach, which assumes an individual’s value to the society in his or her production potential. This method- ology distinguishes between direct costs, which are re- sources used for treatment of the illness, and indirect costs which estimate the lost or reduced productivity of the individual as a consequence of the illness. The COI approach doesn’t explicitly refer to treatment interven- tions. Nevertheless, it is useful in identifying the burden of the disease on society in economic terms, in identify- ing possible areas for future intervention, and in prioritiz- ing health-care expenditure. In this way, the COI approach forms the basic building block for more sophisticated and advanced methods of economic evaluation such as the cost-benefit or cost-utility analysis 5 .

# COMPONENTS OF COST PACKAGES

The various components of cost estimation are di- rect costs, indirect costs, hidden costs and non-mea- sured costs or intangible costs. **Direct costs** are the ac- tual monetary expenditure related to treating an illness or disorder, i.e. it includes costs associated with hospi- talization, outpatient services, nursing care, drugs, ser- vices of a range of professionals, residential care, day care, domiciliary care and rehabilitation etc 4,6. It includes provider’s cost which is the cost borne by the hospital for providing medical facilities 4. **Indirect costs** concern the monetary value of lost output due to reduced or lost productivity of patients and caregivers, caused by illness, disability or injury of patients 7, family costs in looking after a sick relative, and cost of various allowances4. Some authors also include costs associated with public awareness campaigns, crime control and health insur- ance, and losses due to premature death8. **Intangible costs** cannot be expressed in monetary terms, and in- clude effects on the patient in the form of stigma, stress, and treatment side effects; and on the caregiver in terms

of stress, stigma and psychiatric morbidity 4. Usually the costs of interest vary depending on the economic perspective of the investigator. If a study is conducted from the perspective of a health care system it will be concerned with direct costs only. But if a study is con- ducted from the point of burden on society as a whole (macroeconomic perspective), data would be collected on both direct and indirect costs. Finally, if a study con- ducted with the individual as a focus (a microeconomic perspective), it will include direct, indirect, and intangible costs9.

# TYPES OF COST OF ILLNESS STUDIES

Several different methodologies have been used to compute costs as a part of the COI studies. These can be based on either prevalence or incidence rates, and employs either a top-down or bottom-up approach.

The underlying rationale of the prevalence-based method is that costs are assigned to the year in which they are borne. This type of costing identifies the major contributors to current expenditure. Expected future earn- ings lost as a result of premature death are assigned to the year of death. If cost control is the aim of the exer- cise, this approach allows identification of possible tar- gets for economizing. It can be of great help when soci- etal burden of two diseases are compared. The incidence approach is based on the principle that the flow of costs associated with disease should be assigned to the year in which that flow begins. All future direct and indirect costs are estimated and discounted so that they can be measured in monetary terms of the year in which the illness first occurs. It is assumed that once the illness has occurred the society at one level or another is com- mitted to meet the streams of cost that will be associ- ated with the illness. This approach is useful because it can provide prediction about the likely long-term impact of programs that reduce incidence, make treatment less costly or improve outcome. An incidence- based COI study is helpful when one has to decide between alter- native methods of interventions, because an intervention will affect all future treatment costs and productivity losses10. One or the other method is chosen for different reasons. When information is required about the eco- nomic burden of disease on the society as a whole, or to compare the economic burden of one disease with an- other, a prevalence-based COI approach is more help- ful11. Study designs employed in the COI method could either be based on diagnostic category data from gen- eral population surveys, or on cost projections from pre- vious studies, or on responses from individual subjects12.

**Methods used in estimating direct Costs:** Most of the COI studies use either of two computational methods to determine the direct costs of disease: a “top-down” ap-

proach or a “bottom-up” approach. The ‘top down’ method uses data on total health expenditures and the disease-specific rates of health-care utilization to arrive at disease-specific cost estimates. In contrast, the ‘bot- tom-up’ approach is based on individual units of service performed. It measures the average costs of such ser- vices, and applies this data to the total number of health- care encounters related to the disease.

**Methods used in estimating indirect Cost:** Three al- ternative approaches have been advocated for the esti- mation of indirect cost, those are: a human capital ap- proach, willingness-to-pay or contingent valuation ap- proach and a friction cost approach. The human capital approach views the individuals as producing a stream of output that is valued at market rates, and the value of life is the discounted future earnings. The willingness to pay approach values life according to what individuals are willing to pay for a change that reduces the probability of illness or death. This is more difficult to measure, for it takes into account perception of pain and suffering as- sociated with a condition 13. Friction costs represent the costs associated with the replacement of a sick worker. The concept behind the use of friction costs is that pro- duction losses due to illness may not be as great as ex- pected, because existing labor pools and workplace structures can absorb some of this lost productivity. Fric- tion costs include costs associated with the amount of time needed to replace a sick worker, training costs for new or temporary employees, and costs associated with any decrease in productivity during temporary work absence of the sick employee, or from the substitu- tion of the workforce needed to replace the sick em- ployee 14 .

**Methodological Issues in relation to cost instrument:** A cost instrument should capture the information that would enable comprehensive costs to be calculated. It is realized, that there are limits as to how comprehen- sive a cost evaluation should be. Collecting data on ev- ery possible cost may sacrifice the accuracy of measure- ment. It may sometimes be preferable to ensure that the major costs are measured with utmost accuracy with perhaps less emphasis being placed upon minor ser- vices. The time-scale during which costs are measured is crucial. It is important to choose a length of time that would be a representative example of the user’s service receipt. A three to six month period is usually accept- able 15. Several strategies can improve the reliability of the costing data. Four basic rules for cost analysis have been suggested. Cost should be measured comprehen- sively and they should clearly reflect the perspective from which the analysis is undertaken. Secondly, cost differ- ences between patients should be closely examined for a potential explanation of the variation. Thirdly, cost com-

parisons should ideally be based on comparable samples. Lastly, wherever possible cost information and outcome data should be combined 4.

# FINANCIAL BURDEN OF SCHIZOPHRENIA

Various aspects of burden on the family have been studied, including financial burden, social discrimination, restriction of social and leisure activity, effect on health of others etc 15-19**.** Among all these, financial burden was found to be a common area of burden, especially in stud- ies from India 16,18,20. This was truer when the person was an earning member of the household 20. Schizophrenia imposes a high financial burden because of various rea- sons. These include early onset, which may lead to life- long disability; disease chronicity, which may result in long-term morbidity; hospitalization and maintenance drug therapy; and social and economic effects on caregivers, like expenditure incurred due to extra arrange- ments, loans taken or savings spent, putting off any planned activity because of the financial pressure of the patient’s illness etc 21. Financial constraints further lead to poor drug compliance and relapse, which further per- petuates the financial burden.

# RESEARCH ON COST OF ILLNESS IN SCHIZOPHRENIA

Schizophrenia is arguably one of the most costly mental illness in terms of its impact on the economy, on the health system and on patients and their families 22. A number of studies have attempted to calculate the cost of care of schizophrenia in developed countries. The find- ings of these studies show wide variations because of methodological dissimilarities. In contrast, there are only few studies of cost of illness from developing countries where comprehensive costing has been un- dertaken 4 .

*Findings from developed countries*

**Costs as percentages of annual health care budgets:** The cost of illness of schizophrenia has varied from 1.6- 2.5% of the annual health care budgets as shown in table-I. These data were obtained by combining the average cost of treating a person with schizophrenia with estimates of the prevalence of the disease in that country.

**Actual costs:** The total cost of schizophrenia has been studied mainly in the U.S.A. and the U.K., and has varied from 2.35 billion US dollars to 3270 billion U.S. dollars per year for all patients of schizophrenia depending on the type of methodology and year of study as shown in table-I. Most of these studies have been prevalence- based, but have used different methods to estimate the cost, for example, Goeree et. al.,32 used a method called

Table I

Cost of illness studies from different countries

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Authors | Year of esti- mation | Country | Cost as  % of health care budget | Costs per annum for the country in billion US $ | Direct treatment cost in Million US $ | Direct treatment cost per patient in  US $ |
| Evers & Ament, 1995 10 | 1989-90 | Netherlands | 2 |  | 518 | 12,470 |
| Rice & Miller, 1996 23 | 1990 | USA | 2.5 | 32.5 | 17296 | 6,918 |
| Dehert et. al.,1998 24 | 1994 | Belgium | 1.9 |  | 304 | 12050 |
| Davis & Drummond, 1993 25 | 1987 | UK | 1.6 | 3270 | 397 | 1670 # |
| Andrews et. al.,1985 26 | 1975 | Australia |  |  | 8.8 | 11,074 |
| Lund, 1994 27 | 1992 | Denmark |  |  | 562 | 14,312 |
| Rund & Ruud, 1999 28 | 1994 | Norway |  |  | 164 | 39,000 |
| Salize, 200129 | 1994 | Germany | 2 |  |  |  |
| Gunderson & Masher,1975 30 | 1975 | USA |  | 11.6-19 |  |  |
| Knapp ,1997 31 | 1992/93 | UK |  | 2.6 |  |  |
| Goeree et. al., 1999 32 | 1996 | Canada |  | 2.35 |  |  |
| Wiersma et. al., 1995 33 | 1979 | Netherlands |  |  |  | 17,000 |
| Fischer & Barrelet, 1987 34 | 1981 | Switzerland |  |  |  | 12,300 |
| Guest et. al.,1996 35 | 1988-93 | Sweden/UK |  |  |  | 31,076 |
| Davis & Drummond, 1994 36 | 1990 | U.K. |  |  |  | 3,560 |
| Wistedt,1992 37 | 1990 | Sweden |  |  |  | 17,285 |
| Hu et. al.,1996 38 | 1990 | USA |  |  |  | 31,890 |
| Kavanagh et. al.,199511 | 1991-93 | UK |  |  |  | 17,421 |
| Salize & Rossler,1996 39 | 1994 | Germany |  |  |  | 18,377 |
| Guest & Cookson ,1999 40 | 1992-97 | UK |  |  |  | 23,000 # |
| Knapp et. al., 200241 |  | Europe |  |  |  | 5038 # |
| Wu et al, 200542 | 2002 | USA |  | 62.7 | 3030 |  |

**# in pounds**

Table II

Percentage of Direct and Indirect Cost

|  |  |  |  |
| --- | --- | --- | --- |
| Study | Type of Study | Direct Cost | Indirect Cost |
| Tarricone et. al., 2000 5 | Prevalence | 30% | 70% |
| Guest et. al., 1996 35 | Incidence | 51% | 49% |
| Kissling et. al., 1999 43 | Prevalence | 13% | 87% |
| Goeree et. al., 1999 32 | Prevalence | 48% | 52% |
| Davis & Drummond, 1994 36 | Incidence | 19% | 81% |
| Rund, 199544 | Prevalence | 51.5% | 48.5 |
| Rice & Miller,1996 23 | Prevalence | 53.2% | 46.8% |
| Davis & Drummond, 1993 25 | Prevalence | 18% | 82% |
| Gunderson & Mosher,1975 30 | Prevalence | 15-30% | 70-85% |
| Guest & Cookson ,1999 40 | Incidence | 49% | 51 % |
| Wu et al, 2005 42 | Incidence | 48.5 % | 51.5 % |

the “friction cost approach” to assess the indirect costs, but did not take into account earning-loss due to unem- ployment of caregiver. Similarly, they estimated the di- rect cost borne by the health agencies, but did not con- sider the financial cost to the families. The wide varia- tions in actual costs are probably a result of these meth- odological variations.

**Direct treatment costs:** Many studies have evaluated direct treatment costs of schizophrenia. Most of these studies have focused mainly on the cost borne by the health-care system. This has varied from 8.8 million US dollars to 17,296 million US dollars per year as shown in table-I. Direct treatment cost per patient has varied from 3560 U.S. dollars to 39,000 US dollars per patient per year as shown in table-I. Inpatient care has been found to be largest cost driver for direct costs, suggest- ing that relapse prevention is the key to reduce health care costs.

**Direct and indirect costs:** Studies comparing direct and indirect costs have come up with mixed results. There is a wide variation in percentage attributed to each, depend- ing on the type of study. Direct costs have ranged from 13%-53% of the total cost, and indirect costs from 47%-87% as shown in table-II. On the whole, however, different authors have claimed that either the proportion of direct costs and indirect costs are nearly equal 1, 23, or that indirect costs are three to four times higher 26, 30,36.

**Drug cost:** Studies have constantly shown that drug costs forms a minor bulk of the total cost, varying from 2%-5.6% of the total cost 35, 45; and 3%-5% of the direct

cost 25.

What becomes evident from the above review is that although various attempts have been made to calculate the cost of schizophrenia, all the expendi- tures due to the illness has not been taken into consi- deration in most of the studies. Further, there is a wide variation in the percentage of direct and indirect costs, mainly due to the method used to calculate indi- rect costs.

**Comparison with other illness:** The cost of illness of schizophrenia has been compared with both physical and psychiatric illness, and the consistent finding is that the cost of care of schizophrenia is much more than other illnesses. Andrews et. al.,26 showed that cost of illness of schizophrenia was six times higher than that of myocar- dial infarction. Rice & Miller23 reported that schizophre- nia accounted for 22% of the total cost of all mental ill- nesses, compared to affective disorder which accounts for 20.55%, anxiety disorder which accounts for 31.5%, and other mental disorders which account for 26% of the total costs. The financial burden due to schizophre-

nia was disproportionately large when the prevalence of various disorders was considered 23. Burns & Raftery 46 showed that care of patients with schizophrenia was twice as expensive as care of patients with other psychiatric disorders. Grassi et. al.,47 found that overall direct cost of schizophrenia was more than the neurotic disorders, but they did not find any significant differences in costs of inpatient services and drugs administration between the groups.

# FINDINGS FROM DEVELOPING COUNTRIES

There are only few studies from developing coun- tries which have calculated the cost of psychiatric ill- nesses. There is only one published cost-benefit analy- sis study of mental illness from Guinea-Bissau. This study was based on national model of delivering mental health services through a service framework 13. The few pub- lished cost- effectiveness studies that exist are those of family therapy of schizophrenia in China48, simulated modeling of treatments of both schizophrenia and manic depressive illness49, home care compared to hospital- ization in rural China21, screening and psychiatric case finding in primary care from Brazil50 and India50,51 home visiting after discharge from a psychiatric hospital in South Africa17, and cost of integration of mental health care into primary care in India and Pakistan 52.

Studies on cost of illness from developing coun- tries are on social costs of alcoholism in India53, cost of illness studies in Hong Kong, Taiwan and Beijing on sui- cides 54, financial cost of treating out patients with schizo- phrenia in Nigeria7 and cost of care of schizophrenia in India55. Suleiman et. al.,7 estimated the monetary cost of treating a group of Nigerian outpatients with schizophre- nia in comparison with insulin dependent diabetes melli- tus. They studied 50 outpatients with schizophrenia and 40 with diabetes mellitus, attending government hospi- tals. Direct and indirect costs were assessed using a self

–designed questionnaire, at monthly intervals for 6 months. The cost of schizophrenia in 6 months was sig- nificantly less than that of diabetes mellitus. This was largely due to the cost of insulin injections, needles and syringes. The cost of antipsychotics drug accounted for 52.8% of the total cost of schizophrenia, while insulin in- jections accounted for 92.8% of the total cost of diabe- tes mellitus. Patients with schizophrenia and their rela- tives suffered significantly more loss of working days. The authors concluded that these findings were in sharp contrast to Western reports where cost of drugs for schizophrenia accounted for only 2-5% of the total costs. They attributed this to lack of disability benefits and nurs- ing homes; and drastic currency devaluation, since all the drugs used for treating these patients were imported at very high exchange rates.

Cost of illness studies from India includes studies such as social cost of alcoholism by Benegal et. al., 53, cost of drugs used in treatment of schizophrenia by Girish et. al.,56, cost of one outpatient visit to a general hospital clinic by Sarma57 and cost of care of schizophrenia in India 55. Girish et. al., 56 found that antipsychotic drugs are affordable and are comparable to drug treatment costs of other physical illnesses. They found the monthly cost of treatment with chlorpromazine was Rupees (Rs.) 55, an equivalent dose of trifluperazine amounted to Rs. 25/month, risperidone Rs 60 and clozapine Rs. 225 per month. They also noticed that there was a marked price difference across brands. They concluded that although antipsychotic drugs are affordable, the other costs as- sociated with treatment make them more expensive, like coprescribed antiparkinsonian agents, antidepressants, anxiolytics etc. Sarma 57 showed that cost of one outpa- tient visit was Rs. 201 in which management contribu- tion was 68% and patient’s contribution was 32%; it was found that salaries accounted for a maximum propor- tion, i.e. 48% of the total cost, this was followed by loss of earnings which accounted for 17%. Drug accounted for less than 10% of the total cost. Chisholm et. al.,52 screened four rural populations in India and Pakistan for psychiatric morbidity. Individuals with a diagnosable mental disorder were invited to seek treatment, and as- sessed prospectively on symptoms, disability, quality of life and resource use. Seventy two percent of cases in Bangalore and 92% cases in Rawalpindi belonged to broad category of mood disorders. They found that cost of treatment in the Bangalore site at baseline was Rs 700 per month and in the Rawalpindi site the baseline cost was more than Rs 3000 per month. The total cost was equivalent to between 7 and 14 days of agriculture worker’s wages in India, and approximately 20 days in Pakistan. These total costs, decreased appreciably by the follow-up assessment point in 3 of the 4 localities. Grover et al55 assessed the cost of care of outpatients with schizophrenia compared to a group of patients with diabetes mellitus at a general hospital outpatient clinic. Cost of illness in 50 outpatients with schizophrenia was assessed over a 6-month period using a specially de- signed questionnaire, together with structured assess- ments of psychopathology and disability. Similar assess- ments were carried out in 50 outpatients with diabetes mellitus. Total annual costs of care of schizophrenia were Rupees 13,688 and these were not significantly different from the diabetes mellitus group (rupees 14,517). The major proportion of the total costs of schizophrenia was made up of indirect costs (63%), followed by direct costs (32.6%) and provider’s costs (4.4%). Drug costs were high. Total treatment costs in schizophrenia were signifi- cantly higher in those who were unemployed, those who visited the hospital more often, more severely ill and dis- abled.

# FACTORS INFLUENCING COST OF ILLNESS OF SCHIZOPHRENIA

Various factors might influence cost of care of schizophrenia. Important among them are the socio-de- mographic factors, socio-cultural factors, and illness vari- ables 4, 7, 28, 39,56.

**Socio-demographic factors:** Several studies have as- sessed the influence of sociodemographic variables on costs of care in schizophrenia. However, inconsistent results have meant that it is difficult to arrive at any defi- nite conclusions. For example, some authors have found no positive association between any of the demographic parameters and costs of treatment7, 58. Others have re- ported higher costs among men 28, 41, 59 or women 39, fail- ure to complete high school education59, in the young 28, 41, 60-64 as well as old 65. Living alone, being single or un- employed have all been linked to increased total, direct or indirect costs 5, but on the other hand there are stud- ies which have found higher cost for patients who live with others and unemployed 41. Being previously mar- ried was associated with higher indirect costs but hav- ing higher availability of friends was associated with lower total costs 59.

**Socio-cultural factors:** Several sociocultural factors such as religion, lifestyle, attitudes towards mental ill- nesses etc. can influence the cost of care. However, these have not been extensively investigated 4.

**Illness variables:** Some reports have suggested that a longer duration of illness leads to higher costs 5, 41. Moscarelli et. al.,66 found that the length of time between onset and first contact/admission was a significant determinant of total costs. In contrast, Suleiman et. al.,7 reported no association of duration with treatment costs. Carr et al 59 reported that chronicity of the course was a significant predictor of cost. Studies have shown higher costs for patients with higher number of inpatient episodes in the past41,61-64. However, the most consistent associations across several studies are of severity of illness and levels of disability, with the costs of care. Treatment costs are significantly higher among the severely ill patients, or those with impaired functioning 24, 32, 58, 64, 67, 41.

# CONCLUSION

While economic evaluation was of academic inter- est earlier, it is increasingly becoming more relevant and practical. This is because pharmacoeconomics is likely to become an important basis for health-policy decisions as a number of significant dynamics evolve in the mar- ket place. These include, consumers acting on their grow- ing access to information and becoming more actively

involved in treatment decisions; payers, providers and patients deepening their interaction and overcoming their traditional focus on either cost or benefits alone; and manufacturers being challenged by other health-care constituencies as sponsors of cost-based outcome studies.

# REFERENCES

1. Rupp A, Keith SJ. The cost of schizophrenia. Psychiatr Clin North Am, 1993; 16: 413-418.
2. Vos T, Mathers CD. Burden of mental disorders: Aus- tralia and global burden of disease studies. Bull World Health Organ, 2000; 78:427-438.
3. World Health Organization. The World Health Report: 2001; Mental Health Report: New Understanding, New Hope. WHO, Geneva, 2001, pp 33-34.
4. 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.
5. Tarricone R, Gerzeli S, Montanelli R, Frattura L, Percudani M, Racagni G. Direct and indirect costs of schizophrenia in community psychiatric services in Italy. The GISIES study. Interdisciplinary study Group on the Economic Impact of Schizophrenia. Health Policy, 2000; 51: 1-18.
6. Herman WH, Eastman RC. The effect of treatment on the direct cost of diabetes. Diabetes Care, 1998; 21 (3 Suppl.):C19-C24.
7. Suleiman TG, Ohaeri JU, Lawal RA, Haruna, AY, Orija OB. Financial cost of treating out- patients with schizo- phrenia in Nigeria. Br J Psychiatry, 1997; 171: 364-368.
8. Wilde MI, Whittington R. Paroxetine: A Pharmacoeconomic drug evaluation of its use in de- pression. Pharmaco-economics, 1995; 8: 62-81.
9. Sevy S, Visweswaraiah H, Mentschel C, Leucht S, Schooler NR. Relationship between costs and symp- toms in schizophrenia patients treated with antipsy- chotic medication: a review. J Clin Psychiatry, 2004; 65:756-65.
10. Evers S, Ament A. Cost of schizophrenia in the Neth- erlands. Schizophr Bull, 1995; 21:141-153.
11. Kavanagh S, Opit L, Knapp M, Beecham J. Schizo- phrenia: Shifting the balance of care. Soc Psychiatry Psychiatr Epidemiology, 1995; 30:206-212.
12. Songer TJ. The economics of diabetes care: USA. In: Alberti KGMM, Zimmet P, DeFronzo RA, Editors. In- ternational textbook of diabetes mellitus.2nd edition. John Wiley, Chichester, 1997.
13. De Jonge JVM. A comprehensive public mental health programme in Guinea Bissau: a useful model for Afri-

can, Asian and Latin American countries. Psychol Med, 1996; 26: 97-108.

1. Koopmanshap MA, Rutten FFH, Martin van Ineveled B, Roijen, L. The friction cost method for measuring indirect costs of disease. J Health Econ, 1995; 14: 171-189.
2. Magliano L, Fadden G, Madianos M. Burden on the families of patients with schizophrenia: results of the BIOMED-I study. Social Psychiatry Psychiatr Epidemiol, 1998; 33: 405-412.
3. Ali MR, Bhatti RS. Social support system and family burden due to chronic schizophrenia in rural and ur- ban background. Indian J Psychiatry, 1988; 30: 249-253.
4. Gillis LS, Koch A, Joyi M. The value and cost effec- tiveness of a home visiting programme for psychiat- ric patients. S Afr Med J, 1990;77: 309-310.
5. Pai S, Kapur RL. Evaluation of Home Care treatment for schizophrenic patients. Acta Psychiatr Scand, 1983;67:80-88.
6. Raj L, Kulhara P, Avasthi A. Social burden of positive and negative schizophrenia. Int J Soc Psychiatry, 1991;37:242-250.
7. Gautam S, Nijhawan M. Burden on families of schizo- phrenic and chronic lung disease patients. Indian J Psychiatry, 1984; 26:156-159.
8. Wasylenki DA. The cost of schizophrenia. Can J Psy- chiatry, 1994;39 (Suppl 2): 565-569.
9. Andreasen N. Assessment issues and the cost of schizophrenia. Schizophr Bull, 1991; 17: 408-410.
10. Rice DP, Miller LS. The economic burden of schizophrenia: conceptual and methodological issues and cost estimates. In: Moscarelli, M. Ruff, A. & Sartorius N. Editors. Schizophrenia. Handbook of Mental Health Economics and Health Policy; New York, NY: John Wiley and Sons., 1996; Vol.1: pp 321-334.
11. Dehert M, Thys E, Boydens J, Gilis P, Kestloot K, Verhaegen L, et al. Health-care expenditure on schizo- phrenia patients in Belgium. Schizophr Bull, 1998, 24,519-527.
12. Davies LM, Drummond MF. Assessment of cost and benefits of drug therapy in the United Kingdom. Br J Psychiatry, 1993; 162: 38-42.
13. Andrews G, Hall W, Holdstein G, Lapsley H, Bartels R, Silove D. The economic cost of schizophrenia. Arch Gen Psychiatry, 1985; 42: 537-543.
14. Lund P. A calculation of the costs of schizophrenia in Denmark. Paper presented at the A.R.C.A.P. Third workshop on costs and assessment in psychiatry, Venice, October 28-30. 1994.
15. Rund BR, Ruud T. Cost of services for schizophrenia patients in Norway. Acta Psychiatr Scand, 1999; 99: 120-125.
16. Salize HJ. Cost of Schizophrenia -what we know (not?). Psychiatr Prax, 2001; 28 (1 Suppl): 521–528.
17. Gunderson JG, Mosher LR. The cost of schizophre- nia. Am J Psychiatry, 1975;132: 901-906.
18. Knapp M. Cost of schizophrenia. Br J Psychiatry, 1997; 171: 509-518.
19. Goeree R, O’Brien BJ, Goering RNP, Blackhouse G, Agro K, Rhodes A, et al. The economic burden of schizophrenia in Canada. Can J Psychiatry, 1999; 44: 464-472.
20. Wiersma D, Kluiter H, Nienhuis J, Ruphan M, Giel R. Cost and benefits of hospital and day treatment with community care of affective and schizophrenia disor- der. Br J Psychiatry, 1995; 166 (27 Suppl.):52-59.
21. Fischer W, Barrelet L. Cost of Psychiatric treatment: a comparative approach of three categories of patients. Soz. Preventivmed, 1987; 32:168-175.
22. Guest JF, Hart WM, Cookson RF, Linstrom E. Pharmacoeconomic evaluation of long term treatment with risperidone for patients with chronic schizo- phrenic. Br J Med Econ, 1996; 10: 59-67.
23. Davies LM, Drummond MF. Economics and schizo- phrenia: the real cost. Br J Psychiatry, 1994;165 (Suppl. 25): 18-21.
24. Wistedt B. In: Michels. R. Editors. The cost of schizo- phrenia. London, England: Royal Society of Medi- cine Services, 1992: pp 3-5.
25. Hu TW, Shumway M, Hargreaves WA. Estimating costs of schizophrenia and its treatment. In: Foscaselli M, Rupp A & Sartorius N. Editors. Hand book of Men- tal Health Economics and Health Policy, Chichester, England: John Wiley and Sons. 1996; Vol-I : pp 359-371
26. Salize HS, Rossler W. The cost of comprehensive care of people with schizophrenia living in the com- munity catchment Area. Br J Psychiatry, 1996; 169: 42-48.
27. Guest JF, Cookson RF. Cost of schizophrenia to UK society. Pharmacoeconomics, 1995;15: 597-610.
28. Knapp M, Chisholm D, Leese M, Amaddeo F, Tansella M, Schene A, et al and EPSILON study group. Com- paring patterns of costs of schizophrenia care in five European countries: the EPSILON study, Acta Psychiatr Scand, 2002; 105: 42-54.
29. Wu EQ, Birnbaum HG, Shi L, Ball DE, Kessler RC, Moulis M, et al. The economic burden of schizophre- nia in the United States in 2002. J Clin Psychiatry,2005; 66:1122-9.
30. Kissling W, Hoffler J, Seemann U, Muller P, Ruther E, Trenckmann U, et al. Direct and indirect costs of schizophrenia. Fortschritte der Neurologie und Psychiatrie, 1999;67:29-36.
31. Rund BR. Schizophrenia — how much do we spend on treatment and research? (In French) Tidsskr, Nor Laegeforen, 1995; 115: 2682 –2683.
32. Rouillon F, Toumi M, Dansette GY, Benyaya J, Auquier

P. Some aspects of cost of schizophrenia in France. Pharmacoeconomics, 1997; 11: 578 –594.

1. Burns T, Raftery J. Cost of schizophrenia in a ran- domized trial of home based treatment. Schizophr Bull, 1991; 17: 407- 410.
2. Grassi A, Bruni R, Pileggi F, Chiappelli M, Boldrini M, Franceschi E, et al. Analysis of comparative evalua- tion of the cost of supports and treatment of schizo- phrenia, affective psychosis. Epidemiol Psichiatr Soc, 2001; 10:115–124.
3. Xiong W, Phillips MR, Wang R, Dai Q , Klienaman J, Klienaman A. Family based intervention for schizo- phrenic patients in China: a randomized control trial. Br J Psychiatry, 1994; 165:239-247.
4. Cowley P, Wyatt JR. Schizophrenia and manic depressive illness. In: Jamison DT, Berman JE, Measham AR, Alleyne G, Claeson M, Evans DB, Jha P. Disease Control Priorities in Developing countries. Oxford: Oxford University Press. 1993, 661-670.
5. Sen B, Wilkinson G, Mari JJ. Psychiatric morbidity in primary health care. A two stage screening procedure in developing countries: choice of instruments and cost effectiveness. Br J Psychiatry, 1987; 151: 33-38.
6. Issac MK, Kapur RL. A cost-effective analysis of three different methods of psychiatric case finding in the general population. Br J Psychiatry, 1980;137: 540-546.
7. Chisholm D, Sekar K, Kumar KK, Saeed K, James S, Mubbashar M, et al. Integration of mental health care into primary care. Demonstration cost-outcome study in India and Pakistan. Br J Psychiatry, 2000,176, 581-588.
8. Benegal V, Velayudhan A, Kumar CP, Jain S, Janakiramaiah N. The social cost of alcoholism in India. Fourth workshop on cost and assessments in psychiatry, Venice, March 14th- 16th, 1997.
9. Yip PSF. Suicides in Hong Kong, Taiwan and Beijing. Br J Psychiatry, 1996; 169:495-502.
10. Grover S, Avasthi A, Chakrabarti S, Bhansali A, Kulhara P. Cost of care of schizophrenia: a study of Indian out-patient attenders. Acta Psychiatr Scand, 2005; 112: 54-63.
11. Girish K, Pratima M, Issac MK. Drug treatment in schizophrenia: issues of comparability and costs. In- dian J Psychiatry,1991; 41:100-103.
12. Sarma PG. General hospital psychiatry: cost of one visit. Indian J Psychiatry, 2000;42: 258-261.
13. Haro JM, Salvador–Carulla L, Madoz V, Vazquez- Barquero and the PSICOST group. Utilization of men- tal health services and costs of patients with schizo- phrenia in three areas of Spain. Br J Psychiatry, 1998; 173:334-340.
14. Carr VJ, Lewin TJ, Neil AL, Halpin SA, Holmes S. Premorbid, psychosocial and clinical predictors of the costs of schizophrenia and other psychoses. Br J Psychiatry, 2004; 184:517-25.
15. Rice DP, Kelman S, Miller LS. The economic burden of mental illness. Hosp Community Psychiatry, 1992; 43:1227-1232.
16. Bonizzato P, Bisoffi G, Amaddeo F, Chisholm D, Tansella M. Community based mental health care: to what extent are service costs associated with clinical, social and service history variables? Psychol Med, 2000; 30: 1205-1215.
17. Byford S, Barber JA, Fiander M, Marshall S, Green J. Factors that influence the costs of caring for patients with severe psychotic illness. Br J Psychia- try,2001;178: 441-447.
18. Lewis M, McCrone P, Frangou S. Service use and costs of treating schizophrenia with atypical antipsychotics. J Clin Psychiatry, 2001; 62: 749-756.
19. Kilian R, Roick C, Matschinger H, Bernert S, Mory C, Angermeyer MC. The analysis of the cost structures of the treatment of the schizophrenia by means of stan- dardized assessment instruments. Psychiatr Prax, 2001; 28 (2 Suppl), 5102 –5108.
20. Cuffel BJ, Jeste DV, Halpain M, Pratt C, Tarke H, Patterson T. Treatment costs and use of community mental health services for schizophrenia by age co- horts. Am J Psychiatry, 1996; 153:870-876.
21. Moscarelli M, Capri S, Nesi L. Cost evaluation of chronic schizophrenic patients during the first 3 yrs after the first contact. Schizophr Bull,1991;17:421-426.
22. Moscarelli M. Health and economic evaluation in schizophrenia: implications for health policies. Acta Psychiatr Scand,1994;382:84-88.