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EVALUATION OF ECONOMIC EFFECTS OF POPULATION AGEING – METHODOLOGY OF ESTIMATING INDIRECT COSTS

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ABSTRACT

Process of demographic ageing, especially in recent decades, is steadily growing in dynamics and importance due to increasing health-related needs and expectations with regard to a guarantee of social services. Elaboration of the most effective model of care, tailored to Polish conditions, requires an estimation of actual costs of this care, including indirect costs which are greatly related to informal care. The fact that the costs of informal care are omitted, results from a determined approach to analyses. It is discussed only from a perspective of budget for health and does not cover societal aspects. In such situation, however, the costs borne by a receiver of services are neglected. As a consequence, the costs of informal care are underestimated or often excluded from calculations, even if they include indirect costs. Comprehensive methodological approach for estimating the costs of informal care seems to be important for a properly conducted economic evaluation in health care sector.

Keywords*: indirect costs, population ageing, evaluation methods, informal care*

INTRODUCTION

According to the data of the Central Statistical Office (CSO), derived from the Polish Census as of 31st March 2011, a total of 6,730,000 persons at post-productive age (60/65 years and over) lived in Poland, i.e. 17% of Polish population (1,2). Process of demographic ageing, especially in recent decades, is steadily growing in dynamics and importance due to increasing health-related needs and expectations with regard to a guarantee of social services (3,4). Increasing demand is accompanied by a raised awareness of investment in health at each stage (5). Based on demographic projections, it is assumed that population ageing scale would be increasing. Up to 2050, there would be an increase in the number of elder persons with a decrease of the number of Polish population. Percentage of persons at post-productive age would range from 14.7% in 2013 to 32.7% in 2050. Such increase would result from a reduced fertility rate and prolonged life expectancy (6). Increasing demand for long-term care calls for reforms in health care system (7). Elaboration of the most effective model of care, tailored to Polish conditions, requires an estimation of actual costs of this care, including indirect costs.

COST OF LONG-TERM CARE

Geriatric conditions incur direct costs which are associated with long-term care, drugs administered in chronic diseases and expensive long-term services with an example being hospitalization. In Poland, the highest unit costs of both hospital and outpatient care were triggered by persons over the age of 70 years (8). Having considered the fact that economic effects of long-term care are evaluated with reference to patients at post-productive age, the aspects of lost productivity are often excluded while estimating the total costs of care.

Problem of care over the elderly has an impact on productivity. It generates indirect costs due to a commitment of persons in informal caregiving. In the majority of cases, these persons are relatives: children, spouses, grandchildren, who entirely or partially dedicate their time to the elder person (9,10). Such aspect of long-term caregiving is not recognized sufficiently enough. It should be taken into account in health care planning,

especially due to ethical and moral issues and legal obligations of all parties. Informal caregiving is not cost-free as it generates societal costs. Carers of the elderly often have to resign from the work or their free time as to take care of their elder relatives. Constant caregiving is associated with physical and psychological burden, especially if a carer is not prepared enough and supported. Consequently, it may pose a risk of burnout and pathological interpersonal relationship (11). Excessive burden for carers may have an effect on their effectiveness in fulfilling the obligations at work. Therefore, not only the impact of caregiving on productivity loss due to resignation from a job should be considered but also its reduction resulting from exhaustion (free time is not devoted to the rest).

According to the WHO definition, 'long-term care' is defined as 'activities undertaken by informal (family, friends and neighbours) and formal carers, including professionals and auxiliaries (health, social, and other workers) with the goal to ensure that an individual who needs assistance with the activities of daily living can maintain the best possible quality of life, adequate to personal preferences and needs, with the greatest possible degree of independence, personal fulfilment and human dignity' (12). Approximately 80% of environmental care recipients and 90% of inhabitants of social care centres are persons over the age of 65 years. Thus, long-term care is often considered to be a synonym of care over the elderly (13). Demand for the services for the elderly is increasing from year to year. Simultaneously, experience of other European countries suggests that an increase in the number of nursing homes is not the only solution to this problem. One of the arguments which questions the relevance of such solution are high costs of running of nursing homes and its relatively small effectiveness (4,14). Informal care may yet become an alternative solution. It should not be considered, however, as a cost-free service, resulting from ethical, moral and legal obligations of relatives. Thus, there is a necessity of proper estimation of actual informal care costs, including indirect costs as to ensure that decisions made are rational and socially approved.

LONG-TERM CARE IN POLAND AND WORLDWIDE

A risk of disability and potential necessity of counting on long-term refers to all age groups, however, such a risk increases with age. Increasing number and percentage of elder persons in population leads to a rise of demand for long-term and constitutes a challenge in planning of care over the elderly, especially due to a dynamics of ageing in this population (15,16). It is estimated that the percentage of elder persons over the age of 80 years in the population would increase from 4.7% to 11.3% in 2010–2050 in the European countries (17). Similar demographic changes are observed in all European countries. Thus, it is comprehensible that organization of long-term and national management would have to become a political priority as to meet civilization standards and societal expectations (18,19).

Methods of long-term financing differ in particular countries as with regard to the sources of care financing (private or public), liability (local or central), or adopted criteria of defining the differences in the scope of services (health care and long-term care). From the analysis of the OECD transpires that private and public expenditures on long-term care on average accounted for 0.1 up to 3.6% of GDP (Portugal and Sweden, respectively). Results of aforesaid study suggest that financing of long-term care in the OECD countries would double from 2005 to 2050 (17).

In a number of countries, long-term policy is of diverse nature as it is in case of health care and social welfare system organization and its financing. In a part of countries, it is claimed that poor and lonely persons should benefit from public long-term services and that family is first to bear the responsibility for care over such persons (Canada, USA). In several European countries (Germany, Sweden, Netherlands, France), long-term care is guaranteed for everyone who needs it regardless of the financial status. As it can be seen, favoured models of care do not always involve the phenomenon of singlehood and social and cultural changes being introduced into family, but more a social pressure on political decisions (societal services) (20). Beside the differences in the approach to long-term financing, the quantity of resources for this care should depend on demographic ageing index or, being more precise, the value of synthetic indicators (e.g. DALY) (21,22). As it was stated earlier, the differences in expenditures on long-term care in particular countries do not result exclusively from demographic disparities. To a large extent, they are associated with balancing the share of informal care, i.e. formal (economic, organizational and legal) and traditional issues (social and cultural norms). From such perspective, the costs of informal care are frequently omitted or considered to be cost-free services. Thus, if their share is not included, it leads to public savings. Simultaneously, if they are not involved in indirect costs, it may lead to a shift of burden and generating the costs of human capital.

The OECD analyses of long-term expenditures suggest that Poland belongs to the countries with the lowest level of expenses on such care, i.e. 0.4% of GDP. It is only an approximate value which includes exclusively public expenditures on long-term care. It does not involve private expenses of households, and even more indirect costs associated with long-term care.

Such approach in the methodology of cost evaluation ranks Poland very low on the list of expenditures for this care (17).

In Poland, there is no separate and uniform long-care system and its services are distributed by different sectors of social welfare system (23). Within the terms of health care system, services are rendered while social welfare system includes both services and monetary benefits. Despite the costs of system (e.g. sensu stricto related to health care), monetary benefits are rendered with the examples being attendance allowance and benefit, to which persons receiving retirement pension and pension, incapable of working or having a certificate of incapability of self-support are entitled. Persons over the age of 75 years receive allowance or benefit regardless of the degree of incapability (24). Preferences for a family-based model of long-term care in Poland result from a number of reasons, including i.a. cultural factors, but also barriers relating to the access to institutional care and private long-term care. Simultaneously, Poland is experiencing similar changes that are reported in many highly industrialized countries, which affect the potential of informal care due to reduced fertility, longer life expectancy, resignation from multigenerational model of family, employment outside the place of residence, modifications in stereotypes of societal roles and singlehood (16,25).

DIRECTIONS OF LONG-TERM CARE ORGANIZATION AND METHODS OF ASSESSMENT

A challenge for the future years would be the organization of long-term care which would ensure services of high quality with concomitant optimization of the costs. There are diverse organizational forms of care in countries (a number of variables) which to a large extent hinders the comparative analysis of care system effectiveness with regard to the costs borne.

For other purposes, a division of long-term care was introduced by the place in which the care over the disabled person is guaranteed:

- Home-based care – medical and social care is rendered by formal and/or informal carers, mainly in the place of residence of the care receiver;
- Institutional social care – services aimed at supporting a person in daily activities, rendered 24 hours a day outside the place of residence;
- Institutional medical and nursing care – services referring to medical aspects of care, rendered in health care units (26).

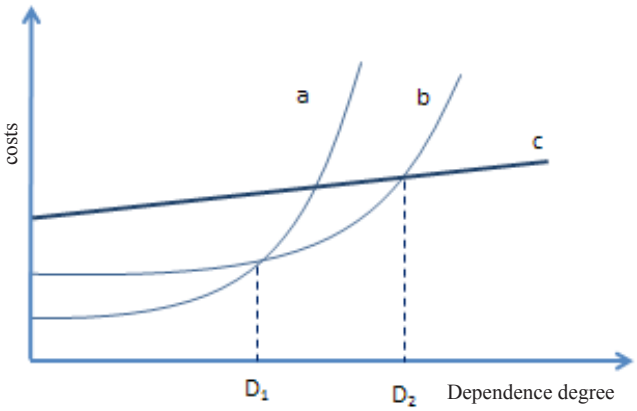

Fig.1. Dependence degree vs. costs of home-based long-term care – 'a', sector of social care – 'b' and health care sector (doctor and nursing care) – 'c' (by Jackson).

For such division, Jackson conducted an analysis aimed at determining the criteria of optimal care. Having compared the costs in particular sectors, the total cost of care, including indirect costs, was estimated. It was assumed that the quality of care in all sectors is stable and the cost of care increases with a rise of receiver's dependence. Estimation of home-based care costs raises the greatest difficulties as despite the costs of formal home-based care, expenditures on running the household, the costs of informal care should be calculated, without the possibility to calculate its market value (market price). Indirect cost associated with long-term care is mainly related to the loss of human capital of carers (due to professional deactivation, burnout, reduced professional effectiveness). For both institutional social care and medical care, the main component of costs are costs related to running a unit, operational costs (nutrition, cleaning) and nursing costs.

Due to its specialist nature, health care sector generates relatively high costs, regardless of the degree of dependence (disability of a patient). Economic analyses suggest that in case of low degree of dependence, the most cost-effective is home-based care while with a high degree of dependence – specialized, institutional medical care (13). For proper establishing of such relations, it is necessary to correctly estimate the costs, borne in particular age groups and different models of care. As it was stated earlier, a special role in home-based care is played by indirect costs. In countries, where home-based care mainly depends on informal care, underestimation of indirect costs may lead to erroneous conclusions, i.e. 'home-based care is the most cost-effective model'. Thus, funds and resources in system are transferred as to delay the development of 'needless, capital-intensive' institutional care.

Estimation of indirect costs of home-based long-term care would ensure the evaluation of societal costs of care. Such an approach to this problem would allow

for rational (cost-effective) organization of care in ageing population, assuring the balance between formal and informal home-based care and institutional care. It seems to be a false assumption that institutional care is the most expensive model of care while home-based care is of the highest effectiveness. The actual cost is affected by the degree of dependence of a disabled person. Effective management of services and rational allocation of receivers to appropriate sectors of care have an impact on limiting the societal costs.

Having considered different methodologies adopted in worldwide studies analyzing the costs of long-term care and geriatric conditions, there are high disparities in the results achieved. To the largest extent, inclusion of indirect costs and selection of methods used to analyze these costs lead to differences in results obtained. Results of systematic review of studies discussing the costs of care over patients with dementia suggest that the calculation of costs of informal care differed even more than twofold between studies. In the analysis, a total of 28 studies, investigating the costs of disease from various perspectives, using different methods of cost assessment were discussed. In more than 70% of studies analyzed, the cost of informal care was calculated, however, the estimated value of working hour of a carer differed to a large extent. It resulted from serious differences in methodologies adopted, which hindered the comparison of particular results (27). Costs of informal care have a great impact on the final results of study as they frequently account for a high percentage of total costs. In the study conducted by Schwarzkopf et al., the cost of care over the patients with dementia in Germany was estimated, including the costs of informal care. Share of informal care cost accounted for more than 80% of total costs, assessed from a societal perspective. The cost of informal care increased with the rising degree of dependence (28).

METHODOLOGY OF ASSESSMENT OF INDIRECT COSTS OF CARE

A number of care systems shift a great part of long-term care to the area of informal care, which in many situations is an effective form of care continuation. Studies suggest that home-based informal care reduces the costs of specialist care and delays the qualification to long-term care unit (29). Having substituted and supplemented the formal medical care, a person benefiting from informal care may stay longer in home settings, thus, generating savings for long-term care system. On the other hand, provision of such care may be a challenge (burden) for the carers. Studies suggest that persons who care for family member for a long time present depression symptoms. They are likely to consider their health status as poor. In many cases, they have to resign from their careers (30,31,32). All these factors are associated with lost productivity and generate societal costs. Having selected an optimal model of care, it is necessary to indicate the actual costs of particular options for the society with determining the indirect costs which are of importance in informal care. If the value of informal care is considered as a 'cost-free' care in economic analyses, it may lead to negative consequences from a societal perspective. Societal perspective, involving the indirect costs, is taken into consideration in the reimbursement process as it is included in the recommendations of the Agency for Health Technology Assessment and Tariff System. Implementation of societal perspective is restricted in analyses due to i.a. methodological and interpretative ambiguities concerning the estimation of indirect costs (33). Having analyzed the cost of informal care, it is essential to calculate the time dedicated to caregiving, value of this time and its utility. For each of these issues, there is a range of possible methodological approaches. To assess the time spent on informal caregiving, two methods are commonly adopted, i.e. the diary and the recall method (34). First of the aforesaid methods is more precise, but concomitantly more difficult and time-consuming to perform. The diary method requires a study participant to note all activities related to caregiving performed in a day. Such method is also challenging for a researcher due to time-consuming analysis of results. Alternative recall method is less time-consuming, however, it raises doubts with regard to the credibility of results (35). Another obstacle is associated with the qualification of activeness and clarification whether the activities are directly related to caregiving or those defined as typical housework. To eliminate such problem, it is necessary to adequately prepare the questionnaire and categories of activities. Selection of a proper evaluation method of indirect costs of informal care is of importance while analyzing the costs of long-term care.

Despite the time spent on caregiving, another element constitutes a determination of the value of this time.

Proxy good method is the most indirect method of estimating the value of time spent on caregiving. It corrects the time devoted to informal care by market value of services rendered within such care (36,37,38). The value of time is dependent on the type of activities. Namely, housework is evaluated differently from attendance support which is treated as nursing care. A basic disadvantage of this method consists in the fact that informal care is equal to formal care with regard to quality, and that they are ideal substitutes. This method does not take into account the preferences for the type of care from the perspective of both the carer and receiver. Furthermore, it requires a precise determination

of time spent on particular activities. Another variant of cost assessment is the method of alternative costs, where the value of lost benefits for a person providing informal care is determined (36,39). Usually, the value of lost benefits is similar to the value of remuneration of a person, corrected by time spent on caregiving. If a carer does not perform paid work, a substitute value of remuneration is used. Its dimension is dependent on a carer's willingness to provide care for an hour. Another method of establishing the equivalent of work consists in calculating the average remuneration for person of similar demographic profile. A basic feature of this method is attributing different monetary values of the same activities to a carer and his market remuneration, and not to the type of activities. To prepare a reliable assessment of informal care value, using these methods, it is required to have a complete list of tasks, time spent on their execution and calculation of particular tasks. Such method of indirect cost assessment may be employed in the majority of economic analyses due to purely financial nature. Both methods do not consider the differences between the hours of care provided with regard to the moment of caregiving (the first and last hour of care), and disparities in particular tasks. Furthermore, they do not consider the impact of caregiving on a carer, including negative aspects associated with devotion of time and those of positive nature, i.e. satisfaction derived from the care over a relative.

Long-term provision of informal care may have negative effects, not only on health but also, in a broader sense, on well-being. Another element of the assessment of informal care is establishing its impact on the quality of life of a carer. Provision of informal care may lead to physical and psychiatric problems in carers, or even to an increased risk of diseases and premature death (40,41). Assessment of life quality may be used to analyze the impact of caregiving on a carer. The greatest challenge of such analyses results from a difficulty in assessing the relation between caregiving and its impact on the quality of life. It may be hard to decide whether the efforts associated with caregiving affect the quality of life or a carer, presenting some health conditions, is more likely to negatively perceive attendance activities belonging to his obligations. For example, depression symptoms, listed in particular questionnaires, may result from the health status of a relative, being care receiver, and not from caregiving itself. If there is such an impact of disability of a family member on a carer, it should be taken into account in economic analyses, including societal perspective, however, it may not be defined as a negative influence of caregiving on a carer. Literature data suggest a number of generic methods to measure health effects, e.g. EQ5D, SF 36, CDQLP (42,43). Generic health-related instruments allow for a comprehensive assessment of impact of caregiving on carers. There are also specific instruments to measure carer's quality of life such as *CareQol*. They describe seven dimensions of burden resulting from caregiving.: fulfilment, relational dimension, mental health dimension, social dimension, financial dimension, perceived support and physical dimension. It creates a complete picture of effects of these factors on carer's well-being (44). There are also instruments used for carers of persons with specific conditions such as *caregiver Quality of Life Index-Cancer Scale,* assessing the quality of life of carers taking care over patients suffering from cancers (44) or *caregiver-targeted quality-of-life measure* (CGQOL) used to measure the quality of life of carers of patients with dementia (45).

SUMMARY

There are considerable disparities with regard to approach and methodology, which finally affect the results, in the worldwide analyses of costs generated by long-term care and treatment of geriatric conditions. Probably, the issues regarding the inclusion of i.a. indirect costs and selection of methods used to evaluate these costs may have the greatest impact on the differences in results obtained and difficulties in conducting comparative analyses. Simultaneously, demographic situation calls for a reliable evaluation of these costs for cost-effective management of medical and long-term care for the elderly. There is a necessity of elaborating the standards for the assessment of indirect costs in informal care, including its limitations, utility of use under Polish conditions, possibilities of adjusting to currently used instruments and methodological recommendations for measuring the costs and its usefulness in care planning in Poland.

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