ORIGINAL ARTICLE

Friction cost approach methodology in pharmacoeconomic analyses

Metodika prístupu frikčných nákladov vo farmakoekonomických analýzach

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Summary

The use of a societal perspective in pharmacoeconomic analyses is a widely discussed topic. One of the fundamental problems of using the social perspective is the inconsistency of indirect costs calculation. We searched published articles on the use and differences of Human capital approach (HCA) and Friction cost approach (FCA) methods using the Web of Science database using keywords. We analyzed the information obtained from relevant publications. We obtained an overview of recommendations for the use of a social perspective in the world. We summarized and highlighted the necessary information about the differences between the FCA and HCA procedures. We have identified the key variables used in the FCA method when evaluating productivity cost, and we have proposed a procedure for obtaining them. We recommend creating a uniform methodology that could increase the comparison of individual analyses from different countries and contribute to data transferability.

Key words: human capital • friction period • productivity loss • societal perspective • indirect costs

Súhrn

Využitie spoločenskej perspektívy vo farmako-ekonomických analýzach je široko diskutovanou témou. Jedným zo základných problémov využívania spoločenskej perspektívy je nejednotnosť výpočtu nepriamych nákladov. V analýzach sa najčastejšie využívajú dva prístupy na hodnotenie nepriamych nákladov: Human capital approach (HCA) a Friction cost approach (FCA). Zatiaľ čo HCA má pomerne jasnú a jednoduchú metodiku, FCA takúto zjednotenú široko uznávanú metodiku nemá. Vyhľadávali sme publikované články o používaní a rozdielnosti postupov HCA a FCA pomocou databázy Web of Science pomocou kľúčových slov. Analyzovali sme získané informácie z relevantných publikácii. Získali sme prehľad odporúčaní pre využívanie spoločenskej perspektívy vo svete. Zhrnuli a zdôraznili sme základné informácie o rozdielnosti medzi postupmi FCA a HCA. Identifikovali sme kľúčové premenné, ktoré by mali vystupovať v metóde FCA pri ohodnocovaní productivity cost, a navrhli sme postup ich získania. Odporúčame vytvorenie jednotnej metodiky, ktorá by mohla zvýšiť porovnávanie jednotlivých analýz z rôznych štátov a prispieť k prenositeľnosti dát.

Kľúčové slová: ľudský kapitál • frikčná perióda • strata produktivity • spoločenská perspektíva • nepriame náklady

Introduction

The value of the medicinal product is essential for society. The total value of a medicinal product is more than just the direct cost of surgical procedures. The inclusion of broader aspects such as clinical, economic and humanistic values have to be considered, too[1)]. It is reasonable for companies to include indirect costs, such as productivity loss, in their analyses. There needs to be accurate guidance for the calculation of indirect costs that would enable an inter-country comparison of results. These would be regarded as generalizable only if they could be transferred to another environment without any additional modifications[2)].

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Pharmacoeconomics employs several types of analyses, depending on the objective chosen and the perspective of the evaluation. The most commonly used types of analyses are cost-effectiveness, cost-utility and budget impact, all relating to the purpose behind carrying out pharmacoeconomic evaluations. Because pharmacoeconomic evaluations are used primarily to determine the efficiency and cost of new medical procedures, the most frequently applied perspective is from health care payers (health insurance companies, governments and patients). However, a broad societal perspective is under discussion in several countries for a more accurate assessment of the cost-effectiveness of new procedures. The problem with taking such an approach is that once selected, the societal perspective is applied limitedly. According to the Panel on Cost-Effectiveness in Health and Medicine established by the US Public Health Service, a true societal perspective is defined when three key conditions are met[3]:

1. Inclusion of productivity gains and losses (i.e. indirect or time costs).
2. The costs of medicines and other inputs are measured by opportunity costs.
3. To estimate utilities from medical conditions societal choices are used.

Questionnaires, so-called Patient-Reported Outcomes (PRO), are used to determine the utilities. When such results are used in analyses, the third condition can be considered to be met. The first two points were discussed in the report by the ISPOR Drug Cost Task Force in the second part of a series of good research practices covering the societal perspective[3].

The calculation and inclusion of indirect, i.e. productivity costs, are the most controversial point of all analyses based on the societal perspective. These indirect costs are defined as "costs associated with production loss and replacement costs due to illness, disability and death of productive persons, both paid and unpaid" [4].

During a patient's illness, different situations can occur. Koopmanschap and van Rutten outline four possible situations when somebody is ill for a short time[5]:

1. Neither costs nor production would be affected (e.g. if the patient can make up the time lost after their return to work or if there are corporate internal reserves).
2. Production will be maintained, while costs will increase (due to overtime, use of corporate reserves and/or outsourcing external agency workers).
3. Production will fall but costs will remain the same (in which case the output losses are the relevant productivity costs).
4. Production declines while costs rise due to the difference between the productivity of new permanent or temporary employees and the level of productivity achieved by the absent staff member.

If the societal perspective is chosen and productivity is lost, then the loss needs to be included in the analysis. Indirect costs incurred due to productivity loss can be presented separately even in other perspectives, but they are not included in overall outcomes.

Selecting the right approach to measure productivity losses is one of the key points of the societal perspective. Four different procedures for productivity loss quantification are presented in the literature[6]:

1. Human Capital Approach (HCA)
2. Friction Cost Approach (FCA)
3. US (Washington) Panel Approach
4. Willingness to Pay Approach (WPA)

The first two of these procedures are recommended in guidelines produced by expert groups in different countries. While HCA provides a relatively exact methodology for productivity cost determination, FCA has not a uniform methodology. This is probably why most guidelines recommend HCA to calculate productivity cost.

This work aims to compare the HCA and FCA methodologies' availability and consistency and compare the outcomes of indirect cost assessments using the two approaches HCA and FCA. The obtained data are used to design critical parameters for the FCA methodology and the proposed action for obtaining them.

Methods

To obtain data on using the social perspective in the world, we analyzed the data presented on the ISPOR website. At the same time, we used the Web of Science database to search for articles that describe the methodology and differences in outcomes between the procedures for assessing indirect costs using HCA and FCA. The search keywords were Human capital approach and Friction cost approach, HCA vs. FCA, methods, guidelines. After obtaining the necessary information, we analyzed data and identified critical parameters for the FCA methodology.

Results

Based on an overview of guidelines from 42 countries around the world published on the ISPOR website, 32 of them (76.2%) recommend considering the societal perspective either in the primary analysis or as a supplement. Eight countries (19.05%) do not recommend using indirect costs in the analysis. HCA is recommended by 11 (26.19%) out of a total 42 countries, while FCA is recommended by 2 (4.76%), and both methodologies are allowed to be used in 2 countries as well (4.76%). No specific method for calculating productivity loss is defined in 27 countries (64.29%)[7].

Differences between HCA and FCA

The human capital approach in economic evaluations expresses the monetary value of loss of health as the

lost value of economic productivity due to ill health, disability or premature death. To be more exact, HCA uses the present value of expected future returns, adjusted for the probability of survival according to the discounted life table. The idea of a human life valuation by capitalizing the value of future income dates back to the work of Sir William Petty in the late 16th century. On the other hand, economic evaluation of health interventions through HCA only began with Burton Weisbord in the 1960s[8]. Despite widespread use, there are still reservations about HCA. One of the biggest issues with the HCA theory is overestimated costs. In the case of disability and either premature termination of productive age or death, the costs are too high because the theory assumes the absence of unemployment. Compensation mechanisms are not taken into account, either. The advantage remains in the simplicity of calculations and use, as well as the ability to estimate unpaid labour productivity loss[9].

FCA originated in the Netherlands in the early 1990s[10, 11] as a response to the high share of costs of productivity loss in the HCA-derived national budget. This method generally measures lost productivity only during the friction period before labour productivity is fully restored[12]. The friction period covers the time required to search for and train a replacement[9]. The length of the friction period is based on the average duration of job vacancies depending on the unemployment rate and the labour market efficiency in balancing supply and demand[11]. Costs to train and recruit new hires from the pool of unemployed are also included. Moreover, productivity costs are limited to medium-term macroeconomic effects[12]. FCA has been criticized for rejecting key principles of conventional microeconomic theory and for having no foundation in economic theory. Yet there are no uniform guidelines for how to use FCA correctly to determine productivity cost[9]. Therefore, a detailed description of the procedure used to calculate and disclose the data is recommended.

Analyses pointing out the differences in outcomes deploying societal and other perspectives have demonstrated the significance of the societal perspective and including cross-sector costs (productivity, social costs, etc.)[13]. The evidence of the difference between HCA and FCA was provided by Goree et al. in a study in which the productivity loss estimated applying HCA was 69 times higher than with FCA[14]. A comparison of indirect costs of back pain using HCA and FCA was also analyzed in the Netherlands. The outcome revealed the indirect cost quantified by HCA of $ 1,545 million, while the amount estimated by FCA was only $ 842 million[15]. Huscher et al. compared the indirect costs of rheumatoid arthritis. They determined productivity losses to be lower with FCA, although the loss also depended on the disease, its stage and other variables[16]. A comprehensive literature review of differences in FCA-reported productivity cost was published by Kigozi et al. They compared 46 studies, most (28) of which originated in the Netherlands. The review revealed that, despite wider use, there were differences in FCA application. The most frequently encountered issue was a vague description of how the friction period was derived; very often it was taken from the Netherlands (even in studies that were conducted in other countries). Accordingly, no precise information about the elasticity factor was available[17]. Batko et al. identified several studies in their review that used various methods to quantify indirect costs. They likewise emphasized the differences in the application of these methods, referring to a study of the indirect costs of rheumatoid arthritis where HCA-quantified indirect costs amounting to € 8,452 compared to FCA's calculation of € 1,441[18, 19]. The duration of staff absences was the material factor in the difference found in results from using the different methods to quantify indirect costs. This is evident in Raciborski et al., who compared the indirect costs of rheumatoid arthritis. Their results indicate the costs of productivity loss in short-term absences to be the same for both HCA and FCA, while for long-term absences, the costs were several times higher for HCA (PLN 1,554 million) than for FCA (PLN 9 million)[20].

Once the methodology for assessing productivity loss is chosen, it becomes necessary to input the financial value of lost time. The "super-gross salary" should be included in analyses (averaging the total of gross salaries plus additional income for purposes of generalization to the largest possible segment of the population). The significance of the super-gross salary lies in systems where both employees and employers contribute to the health and social insurance. Because the super-gross salary includes these contributions when an employee is absent, these contributions are reduced and at the same time healthcare is received and entitlements to sickness benefits and disability payments are claimed deepening society's "loss". Moreover, the employer has to pay part of the employee's salary, even though the employee is not working and until the employee either returns to his/her job or leaves it permanently. Concurrently, tax levies are reduced while the employees are absent and the costs they would ordinarily cover are now borne by the national government. All individual values should be presented clearly with the source of data always indicated.

The main FCA component is the friction period. This period is defined above together with how to estimate it from the average duration of job vacancies. The procedure appears to be correct. It should be kept in mind that the resulting financial loss depends on this period. Naturally, if the employee's absence is shorter than the friction period, the outcome from both HCA and FCA will be the same. However, FCA would provide lower productivity loss values were the employees' absence from their jobs is longer than the friction period. When applying FCA, there should be an awareness that using the same friction period is

not always appropriate. For example, when employees are conventionally treated for a diagnosis, absent for longer than the friction period and subsequently leave their jobs, the friction period would be applied to the calculation. But if a new procedure enters into the treatment that causes employees to be absent from work for less than the friction period, it would be more appropriate to use the average sick leave time for the diagnosis to calculate productivity loss. In this case, using the friction period obtained from the average duration of job vacancies (as defined by the friction period) would overestimate productivity loss, as in HCA. This would significantly distort overall results from the benefits of the new approach.

Another option, with a greater probability of accuracy, is to use questionnaires to measure the absence and presence of employees at work. This procedure provides more exact information, yet it is more time-consuming and would significantly prolong any decision on whether a new procedure should be included in the reimbursement system or not. It does not necessarily mean not obtaining accurate information, but there should be an easier way for the initial determination of productivity loss, such as the friction period estimation above.

Another factor entering into the evaluation of productivity loss is elasticity. The factor of elasticity is the change in working time as opposed to labour productivity and is applied to adjust short-term worker's compensations[11]. Koopmanschap et al. explain it as the costs for an absence from work shorter than the friction period and calculated as the production value during the period of absence reduced by a certain percentage[5]. This problem is described in the paragraph above. Dividing average sick leave time by the total number of working days in a year can resolve the issue of calculating the elasticity factor.

$$elasticity\ factor = 1 - \frac{mean\ period\ of\ sick\ leave}{number\ of\ work\ days\ in\ a\ year}$$

Compensation mechanisms and multiplier effects addressed by Krol et al.[21] can have an impact on the resulting productivity loss. Nonetheless, these factors are very diverse and individual to each employee, so their use in any general analysis is improbable.

It could be more appropriate to apply FCA than HCA because it takes more variables into account than just an average wage and time left until retirement. See above for differences between the two methods. Also, HCA is preferred by pharmaceutical companies because its high indirect costs would lower the cost-effectiveness ratio, bringing some drugs below the cost per QALY new medications are required to meet. Conversely, the FCA method is more appropriate for governments because they would not have to cover some high-cost drugs[22]. Since national budgets are severely limited, it is more appropriate to take all relevant variables into account and carefully consider reimbursements for different medications, which means applying FCA.

Some limitations of using FCA methodology in pharmacoeconomic analyses exist. The use of a societal perspective is not necessary in all cases. Given that many societal decisions are made within the limits of the healthcare budget, the cost savings for other sectors are not significant, so in that situation, we will not need FCA methodology[23]. Even though many countries recommend the payer perspective in the primary case (and as a supplementary is recommended the societal perspective), proper perspective selection depends not only on the assessed intervention but also on budget holders. ISPOR guidelines advise on the choice of appropriate perspective[7].

Conclusion

This presentation of the pitfalls and differences in using HCA and FCA to quantify productivity cost leads us to conclude that FCA is more appropriate. However, to increase consistency and use of this methodology, guidance is needed from expert groups that would issue a single set of guidelines. This would enable funds spent on health care to be used more efficiently and increase the benefits resulting from such investments for society. Simultaneously, the development of such a standardized set of guidelines for FCA could lay the groundwork for a uniform, transnational evaluation of therapeutic procedures across the world.

Conflict of interest: none.

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