Gradus Vol 3, No 1 (2016) 512-515.
ISSN 2064-8014

ECONOMIC COSTS OF FOODBORNE DISEASES AT SOCIAL LEVEL

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Keywords:
foodborne diseases
true incidents
economic burden
registered cases

Article history:
Received 31 Jan 2016
Revised 28 Febr 2016
Accepted 31 March 2016

Abstract
In order to develop effective policy alternatives, measuring the costs of foodborne has become a priority disease all over the world [1.]. Nowadays a great number of studies have been conducted in the literature to calculate the economic impact of diseases. However, calculating the total burden due to food borne illnesses – as it makes necessary to know the real number and all the type of costs - seems to be a big challenge for the researchers. In addition, these studies use different methods and can vary by perspective which can limit the comparability of the results. The primary aim of our work is to resume the methodologies most commonly used for calculating the social costs of foodborne diseases.

1. Introduction

The global occurrence of food-borne diseases is extremely high. The number of true incidents is significantly larger as compared to statistical data. According to some research, barely 10% of the consumers consult their general practitioner (GP) if the condition has no symptoms [2]. This explains the fact that consumers' health consciousness has a considerable influence on changes in the number of reported cases.

A series of international studies have proved that the quantification of unreported cases is an extremely complex task, the realisation of which requires laboratory tests, research data and survey results from representative samples. Between 1987 and 2000, three British researchers Skirrow [3.], Sethi and Brazier [4.] used similar sources to determine the occurrence of some important food-borne diseases. Despite the differences between their individual methods, their results provided valuable information on the differences between recorded and true incidents.

A comparison of the indicators for food-borne diseases registered in the national database shows marked differences within individual countries. This result was reinforced by Havlaar [5.] and Pires [6.] of Danmarks Tekniske Universitet. They researched the social cost burden of food-borne infections caused by Salmonella, Campylobacter and VTEC. Results by Pires proved that in order to correct the number of statistical incidents two multipliers should be used: 7.1 in the case of Salmonellosis and 12 in infections with Campylobacter. In this respect it is worth noting that at present research is attempting to map not only the number of incidents, but also their outcomes. The reason for this is that each new outcome leads to high medical costs and bears heavy social and economic burden.

In recent years, researchers worldwide have been working to develop a methodology that will allow for the quantification of the differences between national database incidents and true incidents, thus, providing the necessary information to estimate the cost of diseases at a national level. However, these studies use different methods and vary by perspective which can often limit the comparability of the results. Some of the most often used methods in studies are Cost-of-Illness (COI), DALY (Disability Adjusted Life Years), Willingness-to-Pay.

2. Reported and unreported cases, outcomes

To determine the confirmed cases of food-borne diseases, the majority of international research uses data supplied by national health authorities and supervisory bodies. In Hungary adequate background information is available on food-borne diseases as reporting food-related infections and food poisoning has been mandatory since 1952. Therefore, disease trends can be easily tracked. However, it is important to note that similar to other countries, in Hungary, at present, there is no standardized method of calculation that could provide well-grounded estimates on the number of unreported cases. Data reveals that the number of reported, diagnosed cases of food-borne illnesses is more than 10,000, while the number of unreported cases of different severity is well above 10,000 [7.]. In a WHO report, the number of food-borne diseases in developed countries is estimated to be merely 10 to 30%, which is referred to as 'the tip of the iceberg' [8.]

In Hungary, the primary goal of the strategic plan devised by the Health and Food Safety Chain Office for the period between 2014 and 2022 is to decrease the number of food-borne diseases. This can only be achieved if reliable statistical data on the real number of cases is available. The first significant research on discovering the true incidents of gastrointestinal diseases caused by domestic food was undertaken by the National Center for Epidemiology in the spring of 2007 with the participation of 870 respondents and using individual interviews. Due to the small quantity of sampling, this research could not be considered representative, however, it provided valuable information on the differences between reported and unreported cases. On the basis of population sampling, the specialists of the Centre concluded that in Hungary a multiplier between 128 and 200 should be used to correct the reported cases annually [9].

3. Costs and calculation

In recent years, researchers worldwide have been working to develop a methodology that will allow for the calculation of costs resulting from foodborne disease and economic effects in health field. Some of the most often used methods in studies related to burden of diseases:

Cost-of-Illness (COI): this method aims to identify direct, indirect as well as „soft costs" of households and companies. The cost-of-illness analysis is one of the most commonly used method for investigation of economic impact of illnesses. In the public health model for prevention, it often falls within measuring the burden of disease or illness: mortality, morbidity, life expectancy, quality of life, quality-adjusted life expectancy, disability-adjusted life expectancy, healthy-days equivalent, and activities of daily living are all measures of disease burden related to health outcomes [10.].

DALY (Disability Adjusted Life Years): It measures „in quality of life years" the gap between current health status due to disease and an ideal health situation. It is calculated as the sum of the years of life due to premature mortality and the years lost due to disability. The DALYs across the population can be considered as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability [11].

QALY *(Quality Adjusted Life Years)*: "A QALY weights one's remaining lifetime or, alternatively, the period evaluated following an intervention, by the value of health-related utility observed during that time period, where utility is normed to range from death (utility equals zero) to perfect health(utility equals 1)" [12.]. Interventions made for increasing the number of Quality Life Years (QALYs) of an individual is used to justify a given intervention cost.

Willingness-to-Pay, (WTP)**:** it is a measure of human preferences. It represents the sums of the maximum amounts that people would be willing to pay to avoid illnesses and outcomes.
A growing number of studies preference WTP method. At present, two main methods have been widely used in the healt field: the 'contingent valuation method' (CVM) and 'choice experiments'

(CE) – or so called conjoint analysis. “CVM and CE have generally been used to set a monetary value on a package of health and/or non-health benefits in the context of a specific intervention” [13.].

4. Summary

A series of international studies have proved that the number of unreported incidents is still extremely high in comparison with reported cases in data banks. Moreover, the difference between the two categories seemed to be increasing. A key question of surveying unreported diseases is to determine if people caught any food-borne disease, the incidents are reported to GP’s or food safety authorities.

In order calculate the economic effect of food borne disease, it is basically important to map not only the number of incidents, but also their outcomes. The reason for this is that each new outcome leads to high medical costs and bears heavy social and economic burden. The resulting cost of a food-borne incident can be estimated by using the stochastic Markov model, in which case transition probability should be applied to each stage of the disease from its very beginning.

5. Conclusion

The majority of international studies determines the true occurrence of food-borne diseases on the basis of data supplied by national health authorities and supervisory bodies. These data represent valuable sources of information for public health economics, however, in Hungary, similar to other countries, statistical data reveal significant differences compared to the occurrence of true incidents. Domestic surveys also indicate that in case of a food-borne disease with mild symptoms, patients are more reluctant to visit their GP’s than in other countries, which leads to the decrease of unreported cases.

In recent years, researchers worldwide have been working to develop a methodology that will allow for the quantification of the differences between national database incidents and true incidents, thus, providing the necessary information to estimate the cost of diseases at a national level. However, these studies use different methods and vary by perspective which can often limit the comparability of the results.

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