Best in Category Prize – Research Methods / Techniques

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DIRECT COSTS OF FEMALE URINARY INCONTINENCE IN ITALY: AN EVENT-TREE BASED MODEL

Hypothesis / aims of study

The research aims at developing an original model for the identification, measurement and analysis, in a societal perspective, of the costs that arise from the complex Diagnosis and Treatment Paths (DTPs) of female UI, making distinction between the costs that are borne by the national healthcare system (NHS) and private expenditures. The need for a model derives from three main motivations: i) UI is a very diverse disease: its various types largely differ for their aetiology and subsequent treatments; ii) in many countries (Italy included), it is not possible to obtain complete and detailed information on actual costs, given the absence of precise treatment protocols, a significant diversity among the different regions of the country and the lack of specifically designed cost accounting systems; iii) through a model, it is possible to assess also the costs privately borne by individuals (and their families, employers, etc.).

Study design, materials and methods

The research has been carried on by an interdisciplinary team, with specialists in the study and treatment of UI and – with a particular focus on the identification, measurement and assessment of the economic dimensions of the DTPs - experts in business economics and accounting. The application of the model has been limited to 18-85 years old women, not living in residential care homes and not affected by disabling or extremely severe diseases. The model is based on a two-dimensional classification of UI (i.e. by type and by age: four main types, anatomic SUI and ISD SUI, UUI and - as a combination of the other types - MUI, and four significant ages, 30, 45, 60 and 75 yrs), defining modules that have been studied and analysed through the Event tree analysis (ETA) method. The event trees start with the first visit with the GP and, after a sequence of events linked by conditional probabilities, lead to a list of possible outcomes, characterised by different probabilities and costs. The combination of events and probabilities of each module depends mainly on the capability of the healthcare system to effectively attract patients and address them towards proper treatments (supply side) and on the awareness and determination of incontinent women, together with their overall trust in the healthcare system (demand side). The direct costs of DTPs have been classified into six broad categories: GP visits, specialist visits, surgical treatments, pharmacological therapy, physical therapy, absorbent and skin protection products. For the definition of the structure of the trees, the probabilities of the events, the identification and estimates of the cost components and their attribution to either NHS or private expenditure, the study has formulated hypotheses in coherence with the existing research (on Italy and other comparable contexts). When it was not possible to rely unambiguously on adequate publications and secondary data, the overall plausibility of the hypotheses has been validated with a wider panel of selected experts.

Results

The table below shows the event tree for the most common type of UI for a woman aged 60.

Outcomes that are labelled “A.x” (e.g. A.1) correspond to a recovery, while those labelled “B.x” may correspond to a partial recovery (e.g. B.3) or to no improvement (e.g. B.7, B.8, B.9). In the “DTPs costs” column, the costs of absorbent products are not included, in order to highlight just the costs of diagnosis and therapy attempts.

Table 1. Example of event-tree: Diagnosis and Treatment Path (DTP) of a 60 years old woman affected by anatomic SUI in Italy (amounts expressed in EUR)

Events			Event-tree levels								Outcomes		DTPs costs	
Id	Level	Description	1	2	3	4	5	6	7	8	id	P %	€	% NHS
1	1	General Practitioner	100%											
2	2	Specialist		60%										
3	3	Prescription of a therapy - adherence			50%									
4	4	TOT sling procedure				20%								
5	5	Recovery					85%				A.1	**5,10%**	**3.377**	**95%**
6	5	Ineffective, second TOT sling procedure					5%							
7	6	Recovery						70%			A.2	0,21%	6.573	96%
8	6	Ineffective - absorbent products						30%			B.1	0,09%	6.573	96%
9	5	Ineffective - absorbent products					10%				B.2	0,60%	3.377	95%
10	4	Physical therapy				80%								
11	5	Effective					65%							
12	6	Recovery						10%			A.3	**1,56%**	**860**	**53%**
13	6	Significant recovery						90%			B.3	**14,04%**	**860**	**53%**
14	5	Ineffective					35%							
15	6	TOT sling procedure						50%						
16	7	Recovery							85%		A.4	**3,57%**	**4.057**	**87%**
17	7	Ineffective, second TOT sling procedure							5%					
18	8	Recovery								70%	A.5	0,15%	7.253	91%
19	8	Ineffective - absorbent products								30%	B.4	0,06%	7.253	91%
20	7	Ineffective - absorbent products							10%		B.5	0,42%	4.057	87%
21	6	Prescription of absorbent products						50%			B.6	**4,20%**	**860**	**53%**
22	3	Prescription of a therapy - NON-adherence			30%						B.7	**18,00%**	**320**	**59%**
23	3	The specialist prescribes absorbent products			20%						B.8	**12,00%**	**320**	**59%**
24	2	Prescription of absorbent products (by the GP)		40%							B.9	**40,00%**	**40**	**100%**
		Probability weighted average cost											*672*	*78%*

Interpretation of results

The event tree of each module offers a quick overview of the main possible outcomes of the DTP and provides measures of how an outcome probability may be affected if the probability of a certain event along the path would change. In other words, the observation of the event-tree may suggest which actions could be taken by decision makers to favour more desirable outcomes. For example, Table 1 shows that in Italy, a sixty years old woman affected by anatomic SUI currently has a 70% probability to quit the DTP without even starting any therapy (outcomes B.7+B.8+B.9). The event tree indicates that this is mainly due to what happens after the GP visit, suggesting the opportunity of initiatives that could increase the number of women that visit a specialist instead of accepting their condition (for example, specific awareness raising projects or the introduction of limitations to the possibility of GPs to prescribe absorbent products). Another possible use of the probabilities of each possible outcome, e.g. in combination with data on incidence, is to predict the demand of specific treatments, allowing the NHS (or private investors) to better focus their investments.

Focusing on costs:

- the event trees of all the modules showed a very wide range for the cost estimates of the possible outcomes (e.g., in Table 1, DTPs costs range from € 40 – outcome B.9 - to € 7.253 – A.5-B.4). As an important contribution for the studies on cost-of-illness, the event tree analysis allows the calculation of the "probabilities weighted average cost" of each module, providing measures that could be useful to assess the total costs for a certain population. The use of different averages could take to unfounded estimates;
- comparisons between the costs of different DTP outcomes cannot be performed without extending the cost observation to the subsequent years and without taking into account also the costs of absorbent products, the indirect costs and, when possible, also the intangible costs.

In the case described in Table 1, we have demonstrated that it takes less than two years for the total direct and indirect costs of outcome B.9 to exceed the DTP expense of the outcome A.1. In other, words, the shifting towards a DTP with an apparent higher expenditure, eventually leads to a saving, without even taking into account the positive effects of the recovery on intangible costs and quality of life.

Concluding message

Event-tree based models may be a powerful tool for a better understanding of the key drivers of UI direct costs and, consequently, of the aspects that should be primarily addressed by public policies makers, scientific community, specialists, GPs and their representative associations. Also, the method of event-tree analysis favours the interdisciplinary dialogue that is fundamental for well-grounded and in-depth cost-of-illness studies.

Disclosures

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