


Research Article

Costs associated with Female Urinary Incontinence: an integrative review of the literature

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Abstract

In women, the anatomical peculiarities of the pelvic floor and the risk factors for its dysfunction predispose women to suffer from Urinary Incontinence (UI), a condition that, although it does not pose a vital risk, negatively affects their quality of life and represents a high risk of the economic cost, still invisible.

Objective: To describe the scientific evidence available regarding studies of costs associated with UI in women.

Methods: Integrative review of the literature using the PubMed, Embase, ScienceDirect and Scopus databases as data sources, on studies of direct and indirect costs of UI in women, published between 2009 and 2022. Using the search terms in Spanish and/or English: “Cost of illness”, “direct cost”, “indirect cost”, “urinary incontinence” and “woman”. The monetary values were adjusted from the date of the study to December 31, 2021 and local currencies were converted to USD.

Results: Of the 302 articles reviewed, 14 met the criteria for analysis. Some studies considered the estimate of the total economic burden including direct and indirect costs. The annual direct cost per capita ranges from US\$ 153.71 to US\$ 32,709 depending on the country, medication use and age, the indirect cost corresponds to an average 160 hours per year for presenteeism. Conclusion: In high-income countries, the economic burden for urinary incontinence is notorious, in Latin American and Caribbean countries there are no economic evaluations regarding it, to improve the benefits for women's health, it is advisable to update.

Keywords: Cost of Illness; Direct Cost; Indirect Cost; Urinary Incontinence; Woman

Abbreviations: UI: Urinary incontinence; OAB: Overactive bladder; DC: Direct Cost; IC: Indirect Cost; Qol: Quality of life

U.S: United States; LAC: Latin America and the Caribbean; PC : Per capita

Introduction

To achieve necessary conditions in health and well-being in the population, it is necessary to implement public policies that address the determinants of health, ensuring universal access and coverage. [1] For this, it is indispensable in health management and resource allocation, health economics, which provides information for the orientation of decision-making in pathologies of high prevalence, mortality or social loss. [2]

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Urinary incontinence (UI), although it has no lethality, due to the anatomical particularities of the pelvic floor and the risk factors for its dysfunction, make it one of the most frequent pathologies in women, with an international prevalence of 29% to 75% depending on age [3,4]. UI also generates a significant deterioration in quality of life (QoL), having an impact on emotional well-being, a higher rate of severe depression and anxiety, alternating relationship activities with others, loss of self-esteem, social isolation and a series of associated comorbidities [5,6,7].

Given the multidimensional effect of the clinical situation, it also implies an economic impact for both the individual and society. However, there are very few data available that make this economic burden visible, mostly consider the direct cost (DC) for the treatment of UI and to a lesser extent include comfort and care to cope with it, estimating that in developed countries it is at least 2% of the health budget [8]. In a smaller number of studies, the implications for loss of productivity or indirect cost (IC) are considered difficult to determine due to the variables to be considered [8].

Milson & Coyne (2014), in a systematic review on global prevalence and economic costs, reports that in multinational studies the annual estimates of disease cost for UI were €2.9 billion for DC in five European countries in 2000 and €7 billion for the sum of DC and IC for Canada and five European countries in 2005, and mentions that the cost of the disease to the U.S. in 2007 was \$66 billion USD [9].

To carry out an economic impact assessment of diseases, the method used is the "Cost of illness", whose objective is to identify and measure the costs of a particular disease, including as far as possible, DC, IC and intangible costs; expressed in monetary terms from a societal perspective [10,11]. The Cost of illness scope can range from the incidence or prevalence of the disease to its effect on longevity, morbidity, decline in QoL, and financial aspects, including DC and IC arising from comorbidity, complications, disability, or premature death [12].

In the field of health economics, the concepts of cost and expense are different from those used in financial accounting. Costs are not only measured by income, but also by benefits, well-being and QoL. On the other hand, expenditure is a category in which the health institution incurs, considering human and material resources, these being increased by the epidemiological and demographic changes of the population, technology, the price of medicines, training and research needs, as well as the administrative management of the unit [13].

The objective of this study is to contribute with evidence regarding the costs associated with UI in women under 64 years of age, making visible the economic burden and establishing one to carry out local economic evaluations.

Material and Methods

An integrative review was selected as a search method because this approach allows to examine the emerging evidence when it is not yet clear what other more specific questions can be raised and addressed through a more precise systematic review, thus summarising the existing theoretical or empirical literature that allows an integral understanding of a particular phenomenon [14,15], which in this study provides a preliminary evaluation of the available literature on costs associated with urinary incontinence in women.

The integrative review was conducted following the protocol explained by Arksey and O'Malley (2005), updated for Peters et al (2015) and Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) [16,17]. The protocol includes five steps: (a) define research questions; (b) define eligibility criteria; (c) identify relevant studies through a search strategy; (d) data graphics, i.e., extracting, synthesizing and interpreting data; and, (e) summarise and report results [16,17].

The objective of the review was addressed by keeping in mind the following research question: What is the direct and indirect cost of UI in women aged 20 to 64 years? To answer this question, a search was made for international studies, with special interest in Latin American and Caribbean countries (LAC), on economic evaluation of health with an approach to information on direct and/or indirect costs of UI in women.

Relevant definitions associated with the problem

The construction of the main question was done through concepts that define the problem and the components of the costs associated with it.

Urinary Incontinence: The International Continence Society (ICS) defines UI as involuntary loss of urine [3,4].

Overactive Bladder: ICS as "clinical syndrome characterised by the presence of isolated micturition urgency, or in combination with urge urinary incontinence, together with an increase in micturition frequency and nocturia in the absence of another demonstrable disease" [18].

Direct cost (DC): are those that correspond to medical care such as diagnosis, treatment and rehabilitation; non-health costs incurred by the health system, the family and the individual patient such as transportation, household expenses, comfort and informal care of any kind [12]

Indirect Cost (IC): refers to "productivity losses or productivity costs" due to morbidity and mortality, borne by the individual, family, society or employer, forming part of social welfare losses [12,13]

Search strategy

The search strategies were developed based on keywords and terms of **Medical Subject Headings (MeSH)** that are related to: "Cost of illness", "Direct Cost", "Indirect Cost". "Urinary Incontinence" and "Woman. An extensive search was carried out in the electronic databases of: PUBMED, Embase, ScienceDirect, Scielo and Scopus.

Inclusion and exclusion criteria

Original articles were included that comprised direct and/or indirect costs whose results were expressed in monetary units, published in English and Spanish between 2009-2021 and that included women with urinary incontinence between 20 and 64 years old in their sample.

Studies conducted only with elderly people, only in patients with associated neurological pathologies, opinion articles, interviews and proceedings of conferences or congresses, systematic reviews, meta-analyses and these were excluded.

Selection of studies

The review was conducted by two investigators (lead author and co-author) and guided by the PRISMA-ScR statement. All kinds of documents were included. The titles and abstracts of the documents identified through the database were downloaded to an Excel spreadsheet and then both researchers independently reviewed them based on eligibility criteria and their relevance to the research question. Subsequently, for the final selection of the documents, the full texts of the selected articles were downloaded, which were independently reviewed by the researchers according to the eligibility criteria. Disagreements over article selection or function domains were resolved by discussion between the two authors until consensus was reached.

Data Analysis

The analysis of the information was carried out by critically reading the qualitative and quantitative content of the selected articles. The description of the articles was carried out applying thematic categories for the construction of the summary tables, the first being the identification of the methodology, the second the origin of obtaining the direct and indirect costs of each study and the last is the cost referred by each author in local currency and USD (US dollar).

For the critical analysis of the costs considered in each study, the currency was adjusted for inflation from the year the study was published to December 31, 2021 according to the World Bank, described in results. This date is considered cut-off due to the Covid-19 pandemic and its subsequent impact on the world economy. In addition, the local currency of the study was converted to USD (US dollars) of the same date to unify the information.

Results

For the selection of the articles, the references reported in each of the search engines were used according to the inclusion and exclusion criteria established in this study. The search with the keywords resulted in 302 studies published between 2009 and 2015, without presenting national or international updates later.

After reading the abstracts and according to the inclusion criteria, 22 of the articles complied with the request, however, in the critical analysis of the full texts, 8 articles were rejected, leaving 14 for the study. The search flowchart is shown in (Figure 1).

To determine the IC, the authors considered absenteeism (absence from work due to health problems), presenteeism (employees go to work, but dedicate part of the working day to tasks that are not productive or are not related to the company, either for health reasons, lack of motivation, personal problems or mental block) and QoL.

Regarding the DC reported in the studies, it is observed that health costs such as medical visits, supplies and medicines were considered; and as non-sanitary costs comfort, laundry, use of sanitary towels (pads for incontinence).

The values extracted from the IC, DC and Total Cost (IC+DC) were adjusted according to inflation from the year of publication to December 31, 2021 and are presented in (table 3), it is also highlighted that the values were converted to their equivalent in USD of the same date. It is worth mentioning that the study by Lee KS & Choo MS was not considered as it did not contain analysis of cost data.

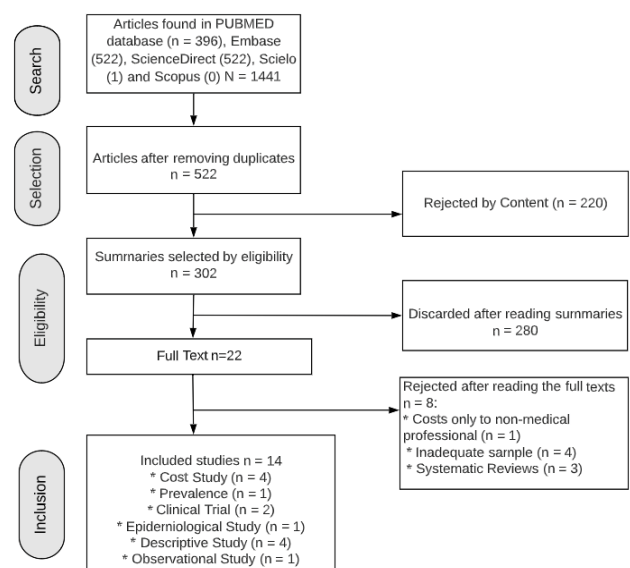


Figure 1: Search Strategy Flowchart

The methodological, objective and sample characteristics of the studies are heterogeneous, however, the methodological approach used was for all quantitative articles (Table N°1)

Table 1: Methodological characteristics of the articles included in the integrative review

Author	Year of publication/ Country	Methods	Design	Sample	Data collection
Cahil B., Donhardt R. [19]	2011 / Australia	Determine the prevalence and costs of UI and fecal.	Epidemiological report.	Men and women >15 years living with UI, fecal or both.	Uninformed
Ganz ML, Smalarz AM [20]	2010 / USA	Calculate from a social perspective, the DC and IC of VH in the US	Prevalence with a social perspective.	Men and Women > 25 years, including institutionalized.	Based on 5-year review of medical literature, clinical guidelines, expert panels, based on annual US per capita and costs in 2007
Onukwugha E., Zuckerman I. [21]	2009 / USA	Calculate total costs specific to OAB	Cost of illness according to population prevalence.	N=12.000 Men and Women > 18 years old, including institutionalized.	EpiLuts survey , the categories were analyzed by dividing on the Likert scale according to urinary loss into two groups according to response: Often/Base group and Sometimes/alternative group.
Subak L, Marinelli A. [22]	2012. / USA	Determine the decrease in costs in the management of UI due to weight loss.	Randomized clinical trial .	N=338 ; women from 43 to 63 years of age with at least 10 weekly episodes of urine loss, and weight of 97 ± 17 kg	Questionnaire applied at the beginning of the study, at 6 and 18 months after randomization.
Sexton Ch, Coyne K. [23]	2009/ USA	Determine the impact of VH on full-time and part-time work.	Descriptive study with cross-sectional cohort.	N= 5696; Men n= 2876 and women n= 2820 employees from 40 to 65 years old	Cross-sectional online survey of participants on the incidence of UI and other lower urinary tract symptoms in a series of questions on work productivity.
Tang D, Colayco D [24]	2014/ USA	To determine the impact of UI on health services, QoL and productivity in patients with OAB.	Retrospective clinical analysis of cross-sectional cohort	N= 1730 patients with overactive bladder with and without UI Of the total 77% were women mean age 60.7 years, and 77.0% of them were women, 84.2% were non-Hispanic white and 71% were incontinent.	Adelphi UI Disease Specific Program , a multinational survey of physician- and patient-reported data conducted between November 2010 and February 2011.
Lee Ks, Choo MS [25]	2015 / Korea	Determine the impact of OAB on QoL, use of services and loss of productivity.	Descriptive cross-sectional cohort study.	N=625 patients recruited from 6 Korean hospitals	A survey was conducted between July and December 2013, classified into 4 groups according to the average number of episodes.
Sung V, Washington B.[26]	2010 / USA	To assess trends in outpatient care costs related to floor disorders female pelvic in the US.	Descriptive study	N=4.01 million visits.	National Survey of Ambulatory Medical Care for estimates national out patient visits in the U.S.
Subak L., Goode P. [27]	2014 / USA	Bursh surgery on out-of-pocket costs.	Cost analysis study.	491 women with an average age of 53 ± 10 years,	Bursh surgery and 24 months after was measured through a survey .
Sung W, You H, [28]	2012 / South Korea	Quantify and describe the economic cost of OAB and UI in Korea	Cost of Illness	Uninformed.	Data was collected from various institutes, including the Health Insurance Review Agency The DC were calculated by identifying data obtained from public and private sources that contain population-based information.

Sicras-Mainar A., Ruiz- Torrejo A. [29]	2015 / Spain	To evaluate the impact of the loss of work productivity in patients treated with Fesoterodine, Tolterodine or Solifenacin to treat OAB in Spain.	Retrospective Observational Study	N = 3094; Population >20 years and <65 years in treatment for OAB Average age 54 SD 9.2 Women n=1918 (62%)	Database review using the records of actively working patients (2008-2013).
Kannan H, Radican L. [30]	2009 / USA	To determine the effect of lower urinary tract symptoms, including OAB/UI	Prospective cross-sectional descriptive study.	N=13,957 cases over 18 years of age with lower urinary tract symptoms.	US National Survey of Health and Wellness
Goren A, Zou K [31]	2014 / USA	To assess the impact for the prevention of persistent urgency UI on health care resource utilization, productivity, activity impairment, and associated costs.	Prospective cross-sectional descriptive study.	N=1190 over 18 years of age. with prescription=481: Without prescription=709. Women:N= 884 (n=388 with drug use and n=496 without drug use) Employees:N=432 (n=132 with drugs and n=300 without drugs).	2011 US National Health and Wellness Survey. 3IQ Questions for UI
Brodzsky V., Gulácsi L. [32]	2012/ Hungary	To assess the productivity and costs of women with OAB in Hungary.	Cost of illness with a societal perspective and human capital approach.	N= 66; women with a mean age of 56.9 (SD of 12.4 years)	Cross-sectional survey was performed in 5 urology/gynecology outpatient centres.

Table 2: Characteristics of the data collection of Direct and Indirect Costs

Author	Indirect Cost Considerations	Direct Cost Considerations
Cahil B., Donhardt R. [19]	Measures the loss of work productivity of the patient. Others cost as help and formal caregiver are considered in this study as indirect.	Medical costs for doctor visits, hospitalizations and drugs. No medical, expenditure on urinary incontinence management products and laundry costs.
Ganz ML, Smalarz AM [20]	Were calculated as the difference between the income of the average person without and with OAB	Measures doctor visits, diagnostic laboratory tests, anticholinergic medications, over-the-counter medications, physical therapy, surgical procedures, emergency room visits, UTI treatment, fall/fracture costs, OAB-related depression costs, OAB-related nursing homes, costs for panties, pads, diapers, latex gloves, bedside dressing, and skin protection. Experts were also consulted through the National Survey of Ambulatory Medical Care.
Onukwugha E., Zuckerman I. [21]	It measures the loss of work productivity of the patient by consulting how many times a week their work was interrupted due to loss of urine.	Medical and non-medical cost components. Cost of diagnostics, drug and other medical treatment, routine and care related to OAB and its complications.
Subak L, Marinelli A. [22]	They are not included in the study.	Household spending on sanitary towels, toilet paper, laundry, and drying underwear was measured.
Sexton Ch, Coyne K. [23]	Productivity level	They are not included in the study.
Tang D, Colayco D [24]	Productivity and Work Activity Impairment Questionnaire.	OAB-related surgeries, OAB-related hospitalizations, incontinence pads, anticholinergic use, and doctor visits. Health-related measures were derived from the EurQoL-5D, the Continence QoL Questionnaire and the OAB Questionnaire.

Lee Ks, Choo MS [25]	Productivity loss was assessed using the Work Productivity and Activity Impairment Questionnaire (WPAI).	Information was also collected on the frequency of visits to hospitals and clinics, and the use of incontinence pads. QoL was measured using the incontinence-specific instrument (I-QOL), the QoL in Overactive Bladder Symptoms Questionnaire (OAB-Q), and the EQ-5D questionnaire.
Subak L., Goode P. [26]	They are not included in the study.	Social costs on resources used to manage the UI (supplies, laundry, dry cleaning).
Sung V, Washington B. [27]	They are not included in the study.	Visits related to pelvic floor dysfunction were based on the ICD-9 codes. Visits were assigned an Assessment and Management code, costs were estimated using the national average of Medicare allowances for medical services.
Sung W, You H, [28]	To estimate the IC (loss of productivity), the human capital approach was applied.	The resource utilization of each patient by effort UI and OAB, such as subsequent medical visits, treatment fees, drug costs, and transportation costs.
Sicras-Mainar A., Ruiz-Torrejo A. [29]	Number of days absent due to VH (and/or UI). The main outcome measures were comorbidity, medication ownership rate (MPR), treatment persistence, and number of days absent and associated costs. Leave or lost productivity was quantified according to the average interprofessional work cost.	They are not included in the study.
Kannan H, Radican L. [30]	Lost work productivity metrics included absenteeism and/or presenteeism	Outcomes assessed included health resource use: emergency room visit, number of emergency room visits, hospitalization, number of days, visit to any medical provider, and number of visits to all medical providers. QoL was measured using the Medical Outcomes Study Short-Form Health Survey (SF-8), a multipurpose measure of health status.
Goren A, Zou K [31]	Labor data sources for 2010, measuring absenteeism and labor presenteeism.	2008 Medical Expenditure Source
Brodzky V., Gulácsi L.. [32]	Medication, health, and informal care utilization were examined for the past 12 months. Work Productivity and the WPAI Questionnaire were used to assess productivity.	Medical and non-medical expenses.

Discussion

Urinary Incontinence is a clinical situation that generates a significant cost both for the population that is affected, as well as for health systems and society [33]. In addition, the well-known repercussions on women's QoL in the mental and physical areas [5] in turn cause a decrease in work productivity and daily household chores, a situation that would be compensated in the case of users who receive adequate and timely treatment [26,31].

Sexton & Coyne in their study of the level of productivity in people with UI, report that in women with minimal symptoms of UI decreases to 72% the chances of working full time, in the case of those with OAB to 75% and 67% if they had both. In addition, 36% of women reported having to always be worried about frequently interrupting meetings due to this situation[23].

The Kannan & Radican (2009) study in the US demonstrated, when followed for 7 days in workers with

lower urinary tract symptoms, an absenteeism rate of 4.01%, a 9.08% of presenteeism and an 8.03% loss of labour productivity combined by both due to this situation, that is, an equivalent of 3.2 hours within a 40-hour workweek which leads to a loss Total 160 hours or 4 weeks of annual productivity [30].

On the other hand, Brodzky & Gulácsi (2012) mention in their study that applying the questionnaire for the deterioration of activity and labour productivity (WPAI) in active workers resulted in absenteeism of 0.4%, presenteeism of 44.6% and impaired activity of 48.2%, the latter was 50.7% for non-workers.[32].

Goren & Zou (2014) report that annual costs in US per person using drug for UI compared to those who do not use it was US\$ 32,709 against US\$ 25,759 for direct costs, due to the greater number of medical visits for the former, and US\$ 10,525 versus US\$ 11,547 respectively for indirect costs, data obtained by the National Health Survey of 2011 in the US applied to 75,000 people [31].

Sung & Washington (2010) only calculated for their DC study, they report an average annual cost only for women aged 21-44 years of US\$ 54.45 million [27], an age group in which this condition is even more invisible.

In addition, two studies project the costs obtained, reported values that were adjusted for the corresponding inflation of the study year towards December 31, 2021, where Ganz & Smalarz (2010) report a total annual national cost of US\$ 82.24 billion, and based on an economic model of prevalence NOBLE (National Overactive Bladder Evaluation) projected for the past 2020 an increase of 25% since 2007 in the annual cost per UI for the US, which would be equivalent to US\$ 106.92 billion adjusted [20]. On the other hand, Cahil & Donhardt (2010) mention a total annual financing per capita cost for UI of US\$ 8766, projecting that by 2030, Australia would have a national cost of US\$ 59.9 billion[19].

Therefore, within the strengths of the study, despite the scarce number of existing articles on direct and indirect costs of the UI, the selected ones give us evidence that demonstrates the invisible economic impact on women living with UI, allowing to lay the foundations for a reflection on the economic burden that involves silent pathology, but of high prevalence. The relevance of this study for public health is to make visible the costs associated with neglected UI in women, especially in young adults, due among other things, to the fact that most of the studies focus on older adults.

Another data that could be extracted from the articles was the prevalence of UI reported in the study of Cahil & Donhardt for Australia, where they consider in 2010 an N = 4.2 million people with UI over 20 years (21% of the population) and a projection for 2030 of a N = 5.6 million people affected [19], which suggests that with the way of life in similar countries it would be expected that this clinical situation begins to increase its prevalence.

Among the limitations of the review is that the studies on UI carried out in Chile and LAC are from a theoretical-practical approach, considering pathophysiology, treatment and rehabilitation of the pelvic floor, but do not perform analysis of health costs or loss of productivity, so it could not include local or regional studies. Another limitation was the heterogeneity of the methodological designs and the dissimilar characteristics of the studies, as well as the lack of updating at the international level in economic evaluations on this topic.

It is worth mentioning that the programs implemented in Chile and LAC for UI, consider the health DC of the UI treatments determined by the health insurance or health insurance they have, without considering the loss in productivity and/or QoL. In Chile, close to 100% of the population is covered by some health insurance, of the total 80% being covered by public health insurance or FONASA. For example, for reparatory surgery by UI the co-payment by

the FONASA beneficiaries in the public hospital network can until US\$60 on the other hand, given that the waiting list for non-priority treatment is long, since 2022 a package was incorporated for surgical treatment of the nocturia of effort with a co-payment by the beneficiary close to US\$1,000 and can be attended in an institution in agreement [33,34]. As for the population with the highest economic income belonging to the private health insurance (ISAPRE), the values that the beneficiary must pay will depend on the coverage of the contracted plan and the use or not of the institution of preference according to the ISAPRE to which the person belongs, ranging from US\$ 300 to US\$600 for reparatory surgery. Despite the above, difficulties persist for women to access care that determines more complex health-disease processes, also considering that in Chile the overall burden of disease in women is greater than in men [35].

Epidemiological and demographic changes, modern lifestyle, environmental risk factors and emergency and disaster situations, make public policies must be dynamic and updated according to local reality. In this case, it is necessary to consider the UI as a clinical situation that must be evaluated both in the repercussions on QoL and the costs involved, training and updating primary care professionals for prevention and early detection. On the other hand, worldwide cost studies are not updated or mostly do not consider women under 50 years of age in this problem.

Conclusion

In conclusion, in recent years health economics has been a key area in decision-making in public policies, since, with their studies, health services support the development of strategies to deal with critical situations by considering the costs involved in the different alternatives. Regarding UI, the studies analysed demonstrated high direct costs, both health and non-health and indirect costs translated into a decrease in labour productivity that leads to the subsequent economic loss for society. It is recommended to carry out new economic and prevalence evaluation studies on this subject, to provide updated information to decision makers.

Authors' Contribution To The Manuscript:

J Aránguiz-Ramírez: Selection of studies, Manuscript writing.

P Olivares-Tirado: Selection of studies, Thesis Director

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Conflict Of Interest

All authors declare that they have no conflicts of interest.

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