Comparative study of cost of care for burn inpatients

Pamela Alejandra Saavedra^{1,2}, Dayani Galato²

¹Centro Brasileiro de Informação sobre Medicamentos, Conselho Federal de Farmácia, Brasil

²Programa de Pós-graduação em Ciências e Tecnologias em Saúde, Faculdade de Ceilândia, Universidade de Brasília, Brasil

Introduction: At present, health systems are under pressure to reduce costs, both in advanced economies and in emerging and underdeveloped countries. Countries have emphasized the need to improve treatment and improve health outcomes for all patients. Economic evaluation in health is field of knowledge that aims to interweave the rationality of economy and decision making in health¹.

Objectives: To identify characteristics, economic methodology used in the studies, and to present mean medical and non-medical costs of the treatments offered.

Methods: We reviewed the literature in the repositories of the Burns and Burns Care & Research journals. Were selected articles published in the last 10 years, were cost studies or economic evaluation, and the cost of the treatment per patient victim of burns was reported in methods or results of studies.

We used sample of convenience, were included studies conducted at national level or burn unit in reference hospital. Furthermore, were seek studies carried out in countries of high resource and emerging countries, as classified in the report of the Human Development Program of the United Nations².

The extracted data were the country, study design, sample size, patient, mean total body surface area (TBSA) burned, and death outcome. In addition, type of economic study, category of cost, data source, and mean total cost of treatment for patient.

To compare the costs presented in included studies, all the costs were converted to US dollar in effect in year of each study, and subsequently, costs were updated to value of US dollar in March 2017.

Results: Were found 8 studies carried out in reference hospitals in treatment of burns, in Europe, Latin America and Asia. Study designs carried out by authors analyzed were cohorts and retrospective studies. Sample size of studies was variable, from 3 to 898 patients analyzed for cost of treatment. All patients were adults, TBSA burned was among 6.2 and 42.4%, and rate of mortality variable (Table 1).

The majority of studies have determined direct cost, one study applied the health-related quality of life questionnaire, other study carry out survival analysis and another study calculated cost-of-illness. Most of studies used micro-costing methodology (bottom-up) to determine cost of treatment.

In economic approach, studies of Australia, Brazil and United Kingdom (2009) determined direct medical cost only. Studies in Finland (2014), India (2013) and United Kingdom (2014) have identified direct costs (both medical and non-medical).

Here we show mean of total cost of treatment of burned patients was very large. Values found for direct medical costs was US\$ 7,956.92 in Australia and US\$ 39,594.90 in Brazil.

The largest cost was to patients experiencing major thermal burn injury. Study carried out in Finland (2014) calculated total cost of treatment was US\$ 428,714.97 (direct cost medical and non-medical). Study carried out in United Kingdom (2009) for three patients determined total cost of treatment among US\$ 161,978.46 to US\$ 1014,153.42 (direct cost medical).

Study conducted in Finland (2013) determined mean direct cost (medical and non-medical) and indirect cost (loss productivity) in US\$ 42,838.00, and estimated cost of quality of life in US\$ 11,396.00. Mean of total cost of treatment of patients burned in Finland was US\$ 54,234.00, in this study.

Study conducted in Spain (2008) determined mean direct cost (medical and non-medical) in US\$ 30,876.40 and mean indirect cost (loss productivity) was US\$ 50,496.40. Mean of total cost of treatment was 81,372.40.

Table 1 Characteristics of studies: Economic methodology and costs

Reference	Country	Study design	Sample (n)	Patient	Mean TBSA (%)	Death outcome	Type of economic study	Category of cost	Data source	Mean total cost of treatment for patient burn
Patil V et al, 2010	Australia	Cohort	13	Adults	23.0 range: 7-85	15%	Cost study	Direct medical costs	Bottom-up	US\$ 7,956.92
Anami E et al, 2016	Brazil	Cohort prospective	180	Adults	27.9	5.6% (TBSA <11%) 92.3% (TBSA >60%)	Cost study	Direct medical costs	Bottom-up	US\$ 39,594.90
Hemington-Gorse S et al, 2009	United Kingdom	Retrospective prospective	3	Adults (major burn)	37.6	No	Cost study	Direct medical costs	Bottom-up	US\$ 161,978.46 to US\$ 1,014,153.42
Haikonen K et al, 2014	Finland	Retrospective	168	Adults acute	----	6.0%	Cost study	Direct costs (medical and non-medical)	Top-down	US\$ 24,639.00
			1	Major burn	61	----	Cost study	Direct costs (medical and non-medical)	Top-down	US\$ 428,714.97
Ahuja R et al, 2013	India	Retrospective and prospective	797	Adults	42.4 range: 2-100	2.0% (TBSA <30%) 8.5% (TBSA 30 to 60%) 21.8% (TBSA > 60%)	Cost study	Direct costs (medical and non-medical)	Bottom-up	US\$ 1,060.52
Jeevan R et al, 2014	United Kingdom	Cohort retrospective	1075	Adults	6.2	4.1%	Cost study	Direct costs (medical and non-medical)	Bottom-up	US\$ 4,106.61 to US\$ 51,777.54
Koljonen V et al, 2013	Finland	Retrospective	88	Adults	11 range: 1-70	15.7%	Cost of illness	Direct costs (medical and non-medical), indirect and intangible	Bottom-up	US\$ 42,838.00 US\$ 11,396.00 US\$ 54,234.00
Sanchez J et al, 2008	Spain	Cross-sectional	898	Adults	20.2	5%	Cost of illness	Direct costs (medical and non-medical), indirect and intangible	Bottom-up	US\$ 30,878.40 US\$ 50,496.40 US\$ 81,372.40

Discussion/Conclusion: We found the mean total cost inpatient very different between studies. Were found diversity between studies and various components are possible to calculate cost of treatment. Difference may be explain by technologies used in treatment, severity of health problem and also evaluation methodology used. There is an urgent need for harmonization of methodology to determine the cost of burn inpatients and implications in health's systems.

References

- 1.Hop MJ, Polinder S, VanDerVlies CH, Middelkoop E, VanBaar M. Costs of burn care: A systematic review. Wound Re Reg. 2014;22:436-50
2. United Nations Development Programme. Human Development Reports. 2016. Access in Aug/2017. Available in: <http://hdr.undp.org/en/2016-report>
- 3.Patil V, Dulhunty JM, Udy A, Thomas P, Kucharski G, Lipman J. Do burn patients cost more? The intensive care unit costs of burn patients compared with controls matched for length of stay and acuity. J Burn Care & Res. 2010 DOI: 10.1097/BCR.0b013e3181e4d6a4.
- 4.Anami EHT, Zampar EF, Tanita MT, Cardoso LTQ, Matsuo T, Grion CMC. Treatment costs of burn victims in a university hospital. 2016. DOI: 10.1016/j.burns.2016.08.022
- 5.Hemington-Gorse SJ, Potokar TS, Drew PJ, Dickson WA. Burn care costing: The Welsh experience. Burns. 2008. DOI 10.1016/j.burns.2008.08.012
- 6.Haikonen K, Lillsunde PM, Vuola J. Inpatients costs of fire-related injuries in Finland. Burns. 2014; DOI: 10.1016/j.burns.2014.03.016
- 7.Ahuja RB, Goswami P. Cost of providing inpatient burn care in a tertiary, teaching, hospital of North India. Burns. 2013. DOI: 10.1016/j.burns.2013.01.013
- 8.Jeevan R, Rashid A, Lymperopoulos NS, Wilkinson D, James MI. Mortality and treatment cost estimates for 1075 consecutive patients treated by a regional adult burn service over a five year period: The Liverpool experience. Burns. 2014. DOI: 10.1016/j.burns.2013.11.020
- 9.Koljonen V, Laitila M, Rissane AM, Sintonen H, Roine RP. Treatment of patients with severe burns – costs and health-related quality of life outcome. J Burn Care & Res. 2013. DOI: 10.1097/BCR.0b013e3182779c90
- 10.Sanchez JLA, Bastida JL, Martínez MM, Moreno JMM, Chamorro JJ. Socio-economic cost and health-related quality of life of burn victims in Spain. Burns. 2008; 34:975-81

Acknowledgment to *Fundação de Apoio à Pesquisa do Distrito Federal* FAP-DF for financial support to presentation of results of research.

Copyright © 2013 Author Names and Contact Details