

Cost Analysis of Pressure Ulcers Cases in Acibadem Healthcare Group

Saliha Koc¹, Neşe Bakoglu², Aslıhan Bardak^{3*}

¹Acibadem Healthcare Group Nursing Services Director(MS)
Acibadem Healthcare Headquarters , Turkey

²Acibadem Healthcare Group Nursing Services Directorship Project Specialist(PGdip)
Acibadem Healthcare Headquarters, Turkey

³Acibadem Healthcare Group Maslak Hospital Nursing Services Manager (MSN)
Maslak, Turkey

*Corresponding author's email: aslihan.bardak@acibadem.com.tr

ABSTRACT---

Background: Although the number of pressure ulcer prevention manuals have increased, in the hospitals there can not be seen any visible changes in the cost of pressure ulcer and wound care. According to Agency for Healthcare Research(AHRQ) in the US, pressure ulcer cost ranges \$9.1-\$11.6 billion per year. In addition to that the cost of individual patient care ranges between 20,900 and 151,700 per case. Regarding the lawsuits every year there have been 17,000 pressure ulcer cases which is seen the second most common lawsuit cases and each year around 60,000 patients die due to the pressure ulcer. Since the table is that much serve, focusing on the prevention cost rather than the standard care cost will provide more benefit to country, hospital, patient and patient's family and the care provider. Therefore as being Acibadem Healthcare Group, we aimed to calculate the cost of pressure ulcer treatment in one pilot hospital to present the cost effectiveness of the standard care for pressure ulcer.

Objectives: Calculate the cost of treatment of pressure ulcers in Acibadem Healthcare Group hospitals¹.

Method: The cost of treatment of patients developing pressure ulcers in AHG(Acibadem Healthcare Group) in 2012 was calculated at every stage and total cost per patient for the company was calculated. These costs were created in line with the data from patient services pricing department.

Population: All patients developing pressure ulcers in 13 hospitals of Acibadem Healthcare Group in 2012.

Data analysis: Datas regarding the costs are received from the department of patient services for the each item of the prevention steps.

Results: As a result of the cost analysis conducted in AHG, it was established that the cost of nursing care was minimum \$13 and maximum \$31, and the cost ranges of hospital accommodation (bed & room), wound care products, physician consultation(per visit), surgical intervention, medications, laboratory tests were between \$987 and \$6.917, \$11 and \$221, \$106 and \$146, \$158 and \$18.533, \$66 and \$8.826, and \$87 and \$165 respectively. It was concluded that total cost of pressure ulcers developing in the year 2012 were in the range of \$340.077 to \$2.452.686.

Keywords--- Cost, Pressure ulcers, Cost analysis, Acibadem Healthcare Group, Turkey

Acknowledgement: We would like to thank Jale Turkoglu(MSN) who has shown ultimate contribution to this study.

1. OVERVIEW TO THE COST OF PRESSURE ULCER

Pressure ulcers are defined as ischemia, cell death and tissue necrosis developing as a result of long-term exposure of tissues to pressure and appearing particularly on bone spurs of the body(Bozbas, Gurer, 2011). Healthcare institutions worldwide stated pressure ulcers as a major problem due to their effects to the patient quality of life and increase healthcare costs.

Pressure ulcers are defined as chronic ulcers that take longer to heal. An estimated 15% of acute care patients develop pressure ulcers, and they have shown an increase by 63% in recent years.

In a study by Bennett et al. (2004), the cost of treatment of pressure ulcers was estimated to be approximately 4% of UK Health Service spending. In addition to this, it was determined that cause of death in 4.708 people who lost their lives between 2003 and 2008 was pressure ulcers. According to Bales and Padwojski (2009), the costs associated with pressure ulcers in the hospital sector is estimated to reach a figure as high as \$ 11 billion per year in the USA.

Pressure ulcers are associated with sepsis and mortality in long-term hospitalized patients. Around 60.000 people die every year due to complications arising from pressure ulcers(hospital acquired) in the USA. Cost of treatment of pressure ulcers per case ranges between \$20.900 and \$151.700 and its annual cost is approximately \$11 billion (AHRQ, 2011).

Establishing pressure ulcer risk factors is among the most basic initiatives in reducing prevalence and incidence. Risk assessment scale should be used so that risk assessment is based on evidence. The most well known of these scales are “Norton”, “Gosnell”, “Braden”, “Knoll“ and ”Waterlow” scales. Ayello (2001) represented that the Braden scale is the most reliable and valid risk assessment scale that can be used for patient groups with a wide age range in the USA.

2. METHOD

Throughout the research retrospective approach is used.

256 patients from 13 hospitals of Acibadem Healthcare Group(AHG) who developed pressure ulcers between January 2012 and December 2012 were identified and cost analysis was conducted by classifying them according to 4 stages.

The costs of pressure ulcers were calculated per patient. Cost headings are designed on the basis of ulcer healing in each stages. There are two main ways of getting data to make an analysis which are; 1- Sentinel Event System Reports(for the determination of number of patients with the pressure ulcer) and 2- Patient Services Pricing Department(for the definition of treatment cost). The costs given by the pricing department based on a bottom-up approach and the costing are calculated from the patient perspective.

Table 1-European Pressure Ulcer Advisory Panel Pressure ulcer Classification System (2003)

Class	Characteristics
Stage I	Discoloration, rash, edema, warmth, hardness in the skin (particularly in individuals with darker skin).
Stage II	Skin loss in epidermis, dermis or both. Superficial abrasions and redness.
Stage III	Full-thickness skin loss, necrosis of subcutaneous tissues
Stage IV	Extensive destruction, tissue necrosis, damage to bone, muscle and supporting structures – full thickness skin loss.

During the assessment of the cost of pressure ulcers, the costs of nursing care, hospital accommodation (bed & room), use of care products, medications, laboratory tests, physician assessment, use of wound care products, and surgical intervention were considered. In Table 2, the items studied and their costs are given.

Since hospitalization period of a patient is lengthened by pressure ulcer, costs of care and treatment were reflected in addition to the invoice of the patient.

1. LIMITATION OF THE STUDY

There has not been any estimation cost of treatment in Turkey by pressure ulcer severity(stages). This was a prior obstacle. The other obstacle was occurred when determining the cost effectiveness of the standard care and prevention.

Acibadem Healthcare Group can only calculate the treatment due to study's scope. The cost of prevention needs to be hold as another study. Therefore this study can not compare the costs for prevention and the standard care.

2. RESULT

3.1 The Cost of Pressure Ulcer by Stages

Table 2- Cost Sheet for Pressure Ulcers in AHG

Type of Stage	Cost Headings	Cost Per Unit(TRY*)
Stage 1	**Cost of nursing care (assessment, positioning, patient training...) 3 hours	30
	Cost of bed and room (3-4 days)	2.237 – 2.983
	Using care products (moisturizing solution, transparent cover)	25-100
Stage 2	*Cost of nursing care (Assessment, positioning, patient training...) 4 hrs	40
	Cost of bed and room (3-21 days)	2.237 – 15.666
	Medication (oksitin , silverdin, normal saline amp...)	150 – 10.000
	Lab (CRP, albumin, blood count...)	196
	Use of Wound care products (dressing, dressing with gel)	25 - 100
	Physician consultation	240 - 330
Stage 3	*Cost of nursing care (assessment, positioning, patient training...) 5 hrs	50
	Cost of bed and room (3-21 days)	2.237 – 15.666
	Medication and Antibiotics (oksitin ,silverdin, normal saline amp...)	150 – 15.000
	Lab (CRP, Albumin, Blood count...)	196
	Wound culture	178
	Use of wound care products (dressing, dressing with gel)	300 - 500
	Physician consultation	240 - 330
	VAC use	2.000 – 42.000
	Debridement	358 – 4.000
	Sepsis**	
Stage 4*	*Cost of nursing care (assessment, positioning, patient training...) 7 hrs	70
	Cost of bed and room (3-21 days)	2.237 – 15.666
	Medication and antibiotics (oksitin , silverdin, normal saline amp....)	150 – 20.000
	Lab (CRP, albumin, blood count...)	196
	Wound culture	178
	Use of wound care products (dressing, dressing with gel)	300 - 500
	Physician consultation	240 - 330
	VAC use	2.000 – 42.000
	Debridement	358 – 4.000
	Graft operation	12.234-14.234
	Sepsis**	
	Multiple organ deficiency	
	Death	

*Turkish Lira

**Calculated on the basis of Salary Scale of Nurses in AHG. According to this, gross salary of a nurse with a nursing degree from university who's been working for 1-3 years in Istanbul-Group 2 was established as 1.160\$ (daily gross 38\$)

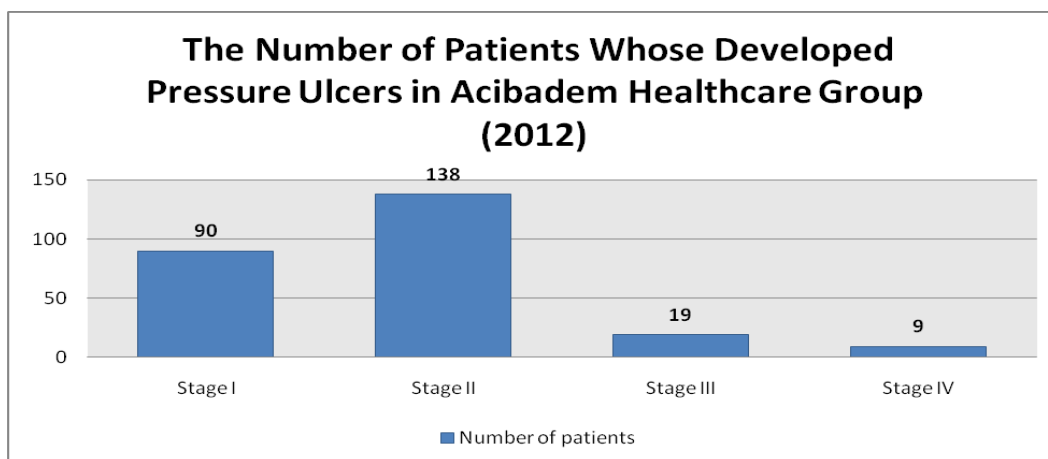


Figure 1 – Number of patients who developed pressure ulcer in AHG in 2012 by stages of pressure ulcer

As a result of the cost analysis conducted in AHG, it was established that the cost of nursing care was minimum \$13 and maximum \$31, and the cost ranges of hospital accommodation (bed & room), wound care products, physician consultation(per visit), surgical intervention, medications, laboratory tests were from \$987 to \$6.917, \$11to \$221, \$106 to \$146, \$158 to \$18.533 , \$66 to \$8.826 and \$87 to \$165 respectively. In the case of patients with Stage IV pressure ulcer requiring intensive care, the cost of stay in intensive care unit amounting to \$456 is added. In case of development of sepsis, monitoring in intensive care unit and use of antibiotics for up to 20-30 days are required.

Revis(2014) defined that stage I and stage II pressure ulcers are generally non operative intervention, while he defined stage III and stage IV as a surgical intervention. This definition notifies table II above. In the table II, it is seen that stage I and stage II pressure ulcer contains nursing care and bed & room and healing products, consultation, lab and medication cost whilst stage III and stage IV contains more comprehensive cost headings such as wound culture, VAC use, debridement, graft operation and etc.

Table 3-Costs of Pressure Ulcers in AHG, in 2012*

Group of Pressure Ulcer	Number of patients with pressure ulcer	Min Cost			Max Cost		
		TL	\$	£	TL	\$	£
Stage I	90-(%36)	206.280	90.512	54.575	280.170	122.753	74.111
Stage II	138-(%54)	398.544	174.797	105.443	3.633.816	1.591.088	960.786
Stage III	19-(%7)	108.471	47.536	28,709	1.480.480	648.215	391.428
Stage IV	9-(%3)	57.522	25.226	15.230	164.868	72.235	43.613
Total	256	770.817	338.071	203.957	5.559.334	2.434.291	1.469.938

* Exchange rate of 23.01.2014 was taken as the basis and the inflation rate has not been adjusted.

228 of 256 cases reported within AHG were found to have stage I and stage II pressure ulcers, which accounted for the largest figure as cost, as seen in Table 6. Costs of nursing care, accommodation (bed & room), use of care products and medication were included in the calculation. Nursing care constitute a large part of the treatment in preventing pressure ulcers (assessment, positioning, training the patient and the patient’s relatives). In AHG assessment for Stage I and Stage II, nursing care comprises 1.35% of the cost of pressure ulcer, whereas accommodation (bed and room) accounts for 86%. When recovery period is considered, minimum and maximum costs for stage 1 pressure ulcers were \$91.728 and \$124.652\$ respectively, while minimum and maximum costs for stage 2 pressure ulcers were \$177.317 and \$1.617.187 respectively.

Stage IV pressure ulcers account for 3% of total number of patients with pressure ulcers so they showed a lower cost in calculations made with respect to pressure ulcers in AHG.

Pressure ulcer quality indicator target, one of nursing quality indicators of Agency for Healthcare Research & Quality (2013) was 1 thousandths, whereas the ratio of patients developing pressure ulcers in AHG in 2012 was calculated as 0,07%.

3. DISCUSSION

In a study by Bennett et al. (2004), the cost of nursing care for pressure ulcers comprised 96% of total costs, while the ratio of this cost was 4% in AHG. In the resulting table, only the cost of nursing during the process of care for pressure ulcers was calculated.

In the case of cost analysis conducted in AHG, the number of patients with stage II pressure ulcers was higher so their costs were higher than that of patients with stage IV pressure ulcers. Even though a patient who developed pressure ulcer was at stage I, s/he should be admitted and monitored. Stage of the pressure ulcer may pass into a higher stage depending on the diagnosis, state of being immobilized, etc. of a patient developing stage I pressure ulcer. In their study, Allman et al.(1995) demonstrated that 57.9% of stage I pressure ulcers passed into stage II.

Pressure ulcer quality indicator target of NDNQI was 1 thousandths, whereas our average in AHG was 0,07%. This figure suggests that the result we obtained by pressure ulcer prevention guidelines we created to prevent nursing quality, and by training of nurses to improve their competencies is satisfactory but is open for improvement. The biggest reason for stage III and stage IV cases to be 11% in AHG was thought to be efficient implementation of pressure ulcer risk assessment and .

JCI was reported to publish a procedure in which stage I pressure ulcers will not be recorded in indicator monitoring form as of 2012 and pressure ulcers will be investigated as of stage II according to this procedure (JCI, 2010).

According to the literature, it is highlighted that the cost of stage IV pressure ulcers is high. Relatively low costs of stage III and stage IV in the cost analysis we undertook in AHG can be attributed to small number of cases.

In the case of an infection of pressure ulcers, increased costs were observed. Cases such as sepsis, etc. did not develop in 2012, demonstrating the efficiency of multidisciplinary nursing care to reduce risk of infection in AHG.

4. CONCLUSION & RECOMMENDATIONS

Pressure ulcer is still an increasing problem for many country. Especially countries like UK and USA have an effective action plan to decrease the number of hospital acquired pressure ulcer cases. These two countries take pressure ulcer cases too serious and approach to pressure ulcer from multi dimensions; as it has financial and legal importance.

Turkey can be defined as an under development country in terms of its healthcare practices. Although there are some pressure ulcer prevention plans in our healthcare system, it is not enough to encourage the healthcare worker to cut down pressure ulcer treatment costs.

For this reason there can be some suggestions for the future work:

- The cost of treatment estimation needs to be calculated stage by stage.
- As this study has one way view which means only treatment cost is calculated. Additionally cost effectiveness analysis can be conducted to compare prevention and treatment cost of the pressure ulcer.
- In addition to cost of interventions, mortality and probability of discharge rate needs to be investigated.
- From bottom to the top each health worker needs to be well informed about the cost of hospital acquired pressure ulcers.

5. REFERENCES

- Agency for Healthcare Research Quality(2013). Measure Summary. Retrieved from: <http://www.qualitymeasures.ahrq.gov/content.aspx?id=38513>.
- Agency for Healthcare Research Quality(2013).Are We Ready For This Change- Preventing Pressure Ulcers in Hospitals: A Toolkit for Improving Quality of Care. Retrieved from: <http://www.ahrq.gov/professionals/systems/long-term-care/resources/pressure-ulcers/pressureulcertoolkit/putoolkit.pdf> .

- Allman, R. M., Goode, P. S., Patrick, M. M., Burst, N., & Bartolucci, A. A. (January 01, 1995). Pressure ulcer risk factors among hospitalized patients with activity limitation. *Jama : the Journal of the American Medical Association*, 273, 11, 865-70.
- Ayello EA(2001). Why is pressure risk assessment so important. *Nursing2001*;75-79.
- Bales, I., & Duvendack, T. (January 01, 2011). Reaching for the moon: achieving zero pressure ulcer prevalence, an update. *Journal of Wound Care*, 20, 8, 376-7.
- Bennett, R. G., O'Sullivan, J., DeVito, E. M., & Remsburg, R. (January 01, 2000). The increasing medical malpractice risk related to pressure ulcers in the United States. *Journal of the American Geriatrics Society*, 48, 1, 73-81.
- Bozbas, G. T., & Gurer, G. (January 01, 2011). Current Treatment Approaches in Pressure Ulcers. *Sakarya Medical Journal*, 1, 4, 118-125.
- Brem, H., Maggi, J., Nierman, D., Rolnitzky, L., Bell, D., Rennert, R., Golinko, M., ... Vladeck, B. (October 01, 2010). High cost of stage IV pressure ulcers. *The American Journal of Surgery*, 200, 4, 473-477.
- Joint Commission International(2010). Nursing Sensitive Care(NSC) Measures.
- Revis, R., D. (2014). Pressure Ulcers and Wound Care Treatment & Management. Department of Surgery, Division of Plastic and Reconstructive Surgery, University of Florida College of Medicine.