

Original Research Article

Epidemiological characterization of raw areas at the hospital general de México: a 4-year retrospective analysis

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ABSTRACT

Background: To identify the epidemiological characteristics of raw areas at the Hospital General de México.

Methods: An observational, cross-sectional and descriptive study was conducted to describe the presentation and management characteristics of raw areas at the Hospital General de México from January 1, 2022, to December 31, 2025. Variables included age, gender, occupation, affected area, wound classification and treatment. A non-probability sample was obtained from a 4-year retrospective review. Data were analyzed using descriptive statistics with the SPSS v26.0 statistical package.

Results: A total of 306 patients were selected. The predominant age group was 21 to 40 years (n=113, 36.9%), 200 (65%) were male and 103 (33.7%) were employees. Observed comorbidities included allergies in 54 (17.6%) and fractures in 29 (9.5%). The most affected areas were the head (n=76, 24.8%) and the right thigh (n=33, 10.8%). Wounds involving bone accounted for 110 cases (36.3%), while muscle involvement was seen in 107 (35.3%). Cultures identified *Staphylococcus aureus* in 97 (31.7%) and *Pseudomonas aeruginosa* in 91 (29.7%). Pain was reported by 205 (68%) patients. Initial treatment consisted of surgical cleansing and debridement in 206 (67.3%); definitive treatment included advanced dressing placement in 104 (34%) and skin graft harvesting and application in 89 (29.1%).

Conclusions: Male patients predominated, with the head being the most frequently affected area. *Staphylococcus aureus* and *Pseudomonas aeruginosa* were the most common pathogens. The primary initial treatment was surgical cleansing and the leading definitive treatment was advanced dressing placement.

Keywords: Epidemiology, Raw areas, Wound classification, Wound management

INTRODUCTION

Raw areas are understood as open skin lesions, surgical wounds, ulcers or areas exposed after trauma; knowledge of these is essential for clinical management, healing and, above all, the prevention of complications.¹ Patient-specific variables, including age, comorbidities and immunological status, contribute to varying susceptibility to infections during wound management.² Aguado et al mention that the epidemiological profile of patients treated for wounds highlights adults over 60 years of age (42.2%),

males (52%), low socioeconomic status (97.5%) and particularly patients undergoing oncological treatment (46.6%).³ Chronic non-communicable diseases such as diabetes, cardiovascular diseases, oncological conditions and immunosuppression, among others, contribute to complications.⁴ Wound complications include local factors: pain, hemorrhage and edge dehiscence; and general factors: syncope, lipothymia, hypovolemic shock and clinical conditions due to organ involvement.⁵ It is crucial to detect wound complexity, which is classified by grades: Grade I: involves epidermis and dermis. Grade II: involves subcutaneous cellular tissue or hypodermis.

Grade III: involves fascia and muscle. Grade IV: involves bone.⁶ Based on a study of 786 cultures, the predominant bacteria were *Pseudomonas* spp. (32.69%), followed by *Klebsiella* spp. (29.26%), *Staphylococcus aureus* (17.93%), *Acinetobacter* spp. (11.57%), *Escherichia coli* (5.21%), *Proteus* spp. (2.16%), *Enterobacter* spp. (1.01%) and *Serratia* spp. (0.12%).⁷

Thus, wound healing is considered a dynamic process involving various immune and structural cells, consisting of four phases: hemostasis, inflammation, proliferation and remodeling.⁸ If the phases of the healing process do not occur in an orderly and timely manner, chronic wounds develop.⁹ Hence the importance of initial and supportive treatment; defining the best therapeutic strategies and managing biofilm formation are crucial aspects of wound care.¹⁰ The gold standard in managing biofilms in chronic wounds consists of systemic antimicrobial therapy combined with wound debridement.¹¹ In particular, wound debridement is a fundamental step in biofilm management, as it removes devitalized tissue, debris and the outer layers of the biofilm, facilitating proper healing.¹²

Furthermore, evidence supports the effectiveness of topical analgesic interventions and antimicrobial dressings to optimize healing. Systemic factors such as nutrition, oxygenation and glycemic control are critical determinants of the healing process, according to Vera et al.¹³ Therefore, the purpose of this study is to present the epidemiological characteristics of raw areas in a General Hospital.

METHODS

An observational, retrospective and descriptive study was conducted at the Hospital General de México from January 1, 2022, to December 31, 2025. Patients admitted to the plastic and reconstructive surgery service presenting with wounds were included to describe their epidemiological characteristics. Exclusion criteria consisted of patients initially treated at other hospitals, subsequent follow-up cases and medical records with incomplete data. A non-probability sample covering this 4-year retrospective period was utilized.

A clinical history review was performed to identify age, sex, occupation, comorbidity, affected area, wound classification, bacterial identification and treatment. Once collected, variables were analyzed using relative and absolute frequencies for qualitative variables, while quantitative variables were represented by the mean and standard deviation, using the SPSS v26.0 statistical package.

RESULTS

To determine the epidemiological characteristics of raw areas in patients treated at the Hospital General de México over a 4-year retrospective period, 306 records were selected, of which 170 (56%) were from out-of-city patients. The predominant age group was 21 to 40 years

(n=113, 36.9%), 200 (65%) were male and 103 (33.7%) were employees. Further details are provided in Table 1. The observed comorbidities included allergies in 54 (17.6%), fractures in 29 (9.5%) and surgical history or substance abuse in 23 (7.5%) (Table 2).

The affected anatomical site was the head in 76 (24.8%), the right thigh in 33 (10.8%) and the left thigh in 32 (10.5%) (Table 3). The average wound size was 72 cm². Wounds were classified as involving bone in 110 cases (36.3%) and muscle in 107 (35.3%), as shown in Figure 1.

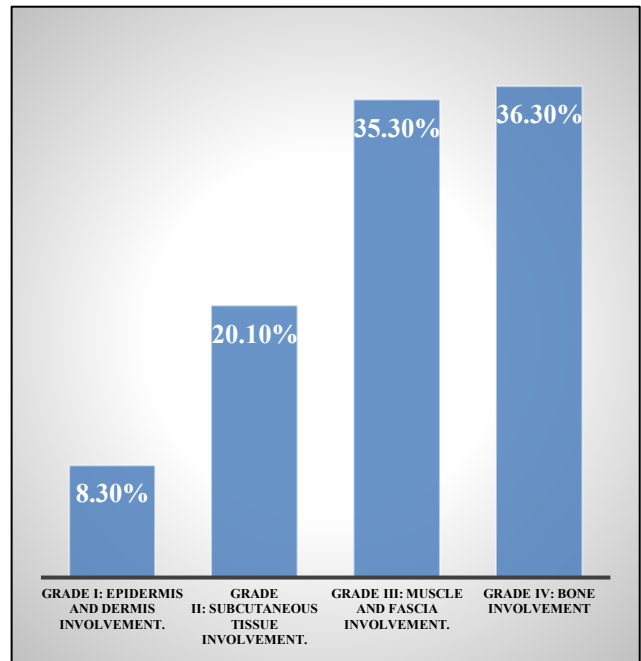


Figure 1: Wound classification in patients with raw areas (n=306).

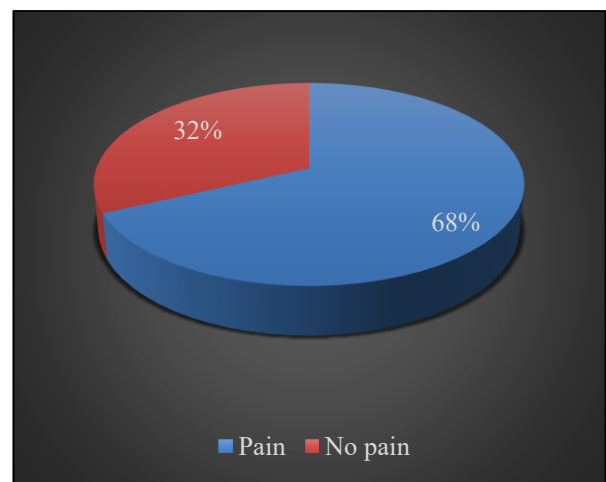


Figure 2: Frequency of pain in patients with raw areas (n=306).

Exudate was present in 120 (40%) cases. Cultures identified *Staphylococcus aureus* in 97 (31.7%), *Pseudomonas aeruginosa* in 91 (29.7%) and *Serratia*

marcescens in 18 (5.9%). Further culture results are shown in Table 4.

Regarding clinical characteristics, pain was observed in 205 (68%) of the study patients (Figure 2). Initial treatment

was surgical cleansing and debridement in 206 (67.3%). Definitive treatment involved advanced dressing placement in 104 (34%) and skin graft harvesting and application in 89 (29.1%) (Table 5).

Table 1: General characteristics of patients with raw areas (n=306).

General characteristics	Frequency (N)	%
Age groups		
23 months	1	0.3
2 to 12 years	13	4.2
13 to 20 years	30	9.8
21 to 40 years	113	36.9
41 to 65 years	109	35.6
Over 65 years	40	13.1
Gender		
Male	200	65.0
Female	106	35.0
Occupation		
Employed	103	33.7
Homemaker	60	19.6
Unemployed	60	19.6
Merchant / Trader	42	13.7
Student	41	13.4

Table 2: Comorbidities of patients with raw areas (n=306).

Comorbidity	Frequency (N)	(%)
Allergies	54	17.6
None	45	14.7
Fractures	29	9.5
Surgical history, substance abuse	23	7.5
Type 2 Diabetes Mellitus, surgical history	17	5.6
None*	11	6.9
Type 2 Diabetes Mellitus, surgical history, substance abuse	10	3.3
Type 2 Diabetes Mellitus, hypertension, surgical history	10	3.3
Surgical history, substance abuse, fractures	9	2.9
Type 2 Diabetes Mellitus	8	2.6
Hypertension and surgical history	8	2.6
Oncological history, surgical history	7	2.3
Surgical history and fractures	6	2.0
Rheumatological history, surgical history	6	2.0
Surgical history	5	1.6
Oncological history	4	1.3
Surgical history, substance abuse, hypertension	4	1.3
Substance abuse	3	1.0
Type 2 Diabetes Mellitus, surgical history, substance abuse, fractures	3	1.0
Type 2 Diabetes Mellitus, hypertension	3	1.0
Rheumatological history	2	0.7
Rheumatological history, allergies, substance abuse	2	0.7
Oncological history, surgical history, substance abuse	2	0.7
Surgical history, allergies, substance abuse	2	0.7
Type 2 Diabetes Mellitus, surgical history, fractures	2	0.7
Hypertension	1	0.3
Others	20	6.5

Table 3: Affected anatomical sites in patients with raw areas (n=306).

Anatomical site	Frequency (N)	(%)
Head	76	24.8
Right thigh	33	10.8
Left thigh	32	10.5
Right hand	18	5.9
Left leg	13	4.2
Left hand	12	3.9
Lumbar region	10	3.3
Genitalia	10	3.3
Right leg	10	3.3
Perineum	9	2.9
Left knee	9	2.9
Neck	8	2.6
Abdomen	7	2.3
Right forearm	6	2.0
Left forearm	6	2.0
Thorax	5	1.6
Left foot	5	1.6
Right arm	4	1.3
Left shoulder	4	1.3
Right leg and foot	4	1.3
Left arm	3	1.0
Right knee	3	1.0
Gluteal region	2	0.7
Genitalia and perineum	2	0.7
Right thigh and leg	2	0.7
Left thigh and leg	2	0.7
Left arm and forearm	2	0.7
Back (excluding lumbar region)	1	0.3
Right shoulder	1	0.3
Right foot	1	0.3
Others	7	2.3

Table 4: Culture results of patients with raw areas (n=306).

Isolated microorganism	Frequency (N)	(%)
<i>Staphylococcus aureus</i>	97	31.7
<i>Pseudomonas aeruginosa</i>	91	29.7
<i>Serratia marcescens</i>	18	5.9
<i>Enterobacter cloacae</i>	14	4.6
Non-evaluable	13	4.2
<i>Enterococcus faecalis</i>	12	3.9
<i>Escherichia coli</i>	11	3.6
<i>Citrobacter freundii</i>	9	2.9
<i>Proteus mirabilis</i>	7	2.3
<i>Candida albicans</i>	5	1.6
<i>Acinetobacter baumannii</i>	5	1.6
No growth	5	1.6
<i>Staphylococcus lugdunensis</i>	4	1.3
<i>Morganella morganii</i>	4	1.3
<i>Klebsiella pneumoniae</i>	3	1.0
Negative	2	0.7
<i>Enterococcus faecium</i>	2	0.7
No culture performed	1	0.3

Continued.

Isolated microorganism	Frequency (N)	(%)
<i>S. aureus</i> and <i>C. freundii</i>	1	0.3
<i>K. pneumoniae</i> and <i>A. baumannii</i>	1	0.3
<i>Pseudomonas</i> spp. and <i>Proteus</i> spp.	1	0.3

Table 5: Initial and definitive treatment of patients with raw areas (n=306).

Treatment	Frequency (N)	(%)
Initial treatment		
Surgical cleansing and debridement	206	67.3
Skin graft harvesting and application	42	13.7
Flap	26	8.5
Surgical cleansing and negative pressure wound therapy (NPWT)	19	6.2
Surgical cleansing and dressing placement	11	3.6
Primary closure	2	0.7
Definitive treatment		
Advanced dressing placement	104	34.0
Skin graft harvesting and application	89	29.1
Flap	77	25.2
Primary closure	22	7.2
Surgical cleansing and negative pressure wound therapy	11	3.6
None	2	0.7
Negative pressure wound therapy placement	1	0.3

DISCUSSION

In this study, 306 patients were selected from a 4 years record review. The 21 to 40 years age group was the most frequent (36.9%) and males accounted for 65% of the population. It was observed that older adults represent 13.1% of the study subjects; however, some studies find no differences in wound healing related to age.^{14,15} The observed comorbidities were allergies in 17.6%, followed by fractures (9.5%) and surgical history/substance abuse (7.5%). This differs from the study by Quiroz-Williams et al where diabetes mellitus, obesity and smoking impacted wound infections.¹⁶ The most frequently affected anatomical sites in this cohort were the head and both thighs. The average wound size was 72 cm², with 36.3% involving bone and 35.3% involving muscle. In the study by Vela et al the most recurrent wounds were traumatic (26.6%) and diabetic foot ulcers (23.4%), the latter of which was not prominent in our study.¹⁷

Cultures identified *Staphylococcus aureus* in 31.7% and *Pseudomonas aeruginosa* in 29.7%. In another study by Isabelle et al the main causal agents were *Staphylococcus* spp. (81.2%) and *S. aureus* (22.5%), consistent with the high prevalence in our study population.¹⁸ Most patients presented with pain (68%). Initial treatment was surgical cleansing in half of the patients and surgical cleansing plus debridement in 67.3%. Definitive treatment utilized advanced dressings (34%) and skin grafting (29%). This aligns with initial treatments reported in other studies where surgical cleansing and debridement were performed

based on factors such as type of infection, soft tissue layers and hemodynamic status.¹⁹

A primary limitation is that the sample was restricted to the plastic surgery service, creating a selection bias toward complex wounds and excluding those managed by other specialties. This restricts the generalizability of the epidemiological data to the entire institution. Additionally, the cross-sectional nature of the study prevented long-term follow-up; therefore, critical post-discharge outcomes, including late recurrence of infections, total time to complete healing and long-term quality of life, were not assessed.

CONCLUSION

In the epidemiological characterization of raw areas at the Hospital General de México, males were more frequently affected, the head was the most common site of involvement and *Staphylococcus aureus* and *Pseudomonas aeruginosa* were the predominant pathogens. Initial treatment was surgical cleansing followed by debridement, which coincides with various studies in the literature. These results provide an epidemiological baseline for raw areas in this hospital and suggest new lines of research.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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