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Original Research Article

The Prevalence and Associated Risk Factors of Pressure Injury among Adults at King Saud Medical City, Riyadh

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Abstract

Background: Pressure injuries rank among the top five most frequent causes of patient injury worldwide. Usually, these ulcers develop in the body's bony regions where there is a higher chance of pressure and tissue deformation. Pressure injuries are still a common and severely incapacitating ailment, even with advances in medical understanding and the development of efficient therapies and preventative measures. They result in large socioeconomic consequences since they place a heavy load on the healthcare system and the affected individuals. ***Objectives:*** To assess the occurrence rate, identify correlated risk factors, and analyze additional indicators related to pressure injuries diagnosed within the care units of King Saud Medical City throughout the study period. ***Methodology:*** A descriptive cross-sectional study was undertaken at King Saud Medical City in Riyadh during the months of August and September 2023. The study focused on patients with newly identified pre-existing pressure injury lesions. Demographic information and associated risk factors were recorded in the study's data extraction sheet after obtaining participants' consent to engage in the research. The study commenced following approval from the institutional review board of king Saud medical city research and Innovation center, Riyadh. The gathered data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 26. Descriptive statistics, bivariate and multivariate logistic regression were computed to assess the statistical association, using odds ratio. Significance of statistical association was assured and tested using 95% confidence interval and P-Value of < 0.05 is considered statistically significant. ***Results:*** A total of 250 patients with pressure ulcers were identified during the study period. Most of the study participants were male, and the mean age of the participants was 59.2 years. The prevalence of pressure injuries in the hospital units included in the study was 18.8%. The sacral region was the most affected site, with 121 patients (48%) having pressure injuries in that area, while 83 patients (33%) had pressure injuries in the gluteal area. The most frequently associated comorbidities were hypertension, present in 140 patients (56%), and diabetes mellitus, present in 123 patients (49.2%). ***Conclusion:*** The prevalence of pressure ulcers was high among admitted patients at King Saud Medical City, Riyadh. Primary prevention health promotion programs should be implemented to prevent the occurrence of pressure injuries in our healthcare facilities and the community at large.

Keywords: Pressure injury, pressure sore, pressure wound, pressure ulcer, bed sore, prevalence, risk factors.

Definition of Terms: The term "pressure injury" is preferred because it encompasses all stages of pressure injuries, including stage I, which has implications for public health because it shows merely discolored skin rather than an ulcer. Similar connotations are conveyed by synonyms like decubitus ulcer, bed sore, pressure ulcer, pressure sore, and others that are still often used in literature. As a result, these terms may be used interchangeably in this study or in the studies that are cited. The purpose of this acknowledgment is to identify and explain synonymous terminology that was used in the study's authoring.

INTRODUCTION

Pressure injuries pose a considerable challenge in healthcare systems worldwide. These injuries affect the well-being of more than seven million people globally. Proper risk management strategies are crucial

to mitigate their impact and enhance patient outcomes [2].

Pressure ulcers are a worldwide health concern that impacts both residents of the community and inpatients. They are especially common among the elderly and individuals with physical or motor impairments. Determining the elements that contribute to pressure ulcer development and effectively providing nursing care requires a complete understanding of these aspects [13]. A pressure ulcer is a particular type of injury caused by pressure, or a combination of pressure and shear forces, which is localized over the bony prominence and affects the skin and/or underlying tissues [12]. The magnitude and degree of damage to the muscles, underlying tissues, skin, and surface area over bony prominences that pressure ulcers cause can vary [16]. Indeed, pressure ulcers represent a significant financial burden in healthcare. They rank as the third most expensive medical condition, following cancer and cardiovascular disorders [12]. Even though pressure injuries are mostly avoidable, they still pose a serious risk to patients' safety and are linked to higher death rates, lower life expectancy, longer hospital admissions, and higher medical expenses. They also influence people's overall health results, inflicting pain, and suffering, upsetting body image, and postponing healing [16]. A vast variety of people are susceptible to pressure ulcers. Reduced physical activity and restricted mobility are major contributing factors [11].

The National Pressure Ulcer Advisory Panel (NPUAP) and the European Pressure Ulcer Advisory Panel (EPUAP) have recognized four categories of pressure ulcers based on their severity. Pressure ulcers are categorized into four stages, which range from stage I to stage IV.

1. Stage I: Intact skin with non-blanchable redness
2. Stage II: Partial thickness loss of dermis
3. Stage III: Full thickness skin loss involving damage or necrosis of subcutaneous tissue.
4. Stage IV: Full thickness tissue loss with exposed bone, tendon, or muscle [15].

The higher expense is related to the treatment of wound infections, debridement / closure operations, dressing supplies, specific mattresses / cushions, hospital stay, home care services, and time away from work [8].

The primary risk factors for pressure ulcers include loss of sensory perception (impaired state of consciousness) and immobility [7].

Despite careful efforts, pressure ulcers can still develop, leaving patients vulnerable not only during hospitalization but also after discharge home [2].

Evidence suggests that the prevalence of pressure ulcers among hospitalized patients varies significantly around the world. Furthermore, the same study demonstrates that several factors contribute to this variation [18].

The prevalence of pressure injuries among outpatients is currently unknown, although they are also common among patients living in nursing homes [3]. Some wound care experts advocate a comprehensive approach for patients with wounds, considering not only the physical aspects but also psychological variables, such as nutritional condition and underlying disease states [15].

The global burden of disability due to pressure ulcers is not well understood, and studies have not thoroughly examined the connection between pressure ulcer prevalence and each country's sociodemographic index [19]. Our research aims to address and fill the gaps in the existing literature related to this subject matter.

Our objectives in this study are to document the occurrence of pressure ulcers and to identify the risk factors and circumstances that contribute to their development. This aligns with the recommendations put forth by the National Pressure Ulcer Advisory Panel, which examined the occurrence, stages, sites, and risk factors associated with pressure ulcers in intensive care units of Saudi teaching hospitals [14].

The impact of pressure ulcers on patients can be significant; nevertheless, it is acknowledged that a considerable number of these occurrences are preventable [10]. Considering the often- preventable nature of pressure ulcers, the incidence of this harm to patients serves as a critical indicator of nursing standards [10].

One can identify individuals at risk of developing ulcers by thoroughly understanding the etiology of pressure-induced skin and soft tissue injuries. This knowledge allows for targeted application of preventive measures to those specific patients [3].

The literature has identified over a hundred risk factors for the development of pressure- induced].tissue and skin injuries. These factors can be categorized into two groups: those that influence an individual's susceptibility and tolerance, and those that affect the magnitude and duration of pressure. Among the most significant risk factors are poor perfusion, malnutrition, immobility, and sensory loss [3]. Minimizing the risk and occurrence of pressure ulcers requires an understanding of these linked factors. Furthermore, knowing these risk variables provides a baseline for developing appropriate preventative strategies, thereby slowing the disease's progression [16].

In recent times, significant advancements in preventing pressure ulcers have been witnessed in developed nations, primarily propelled by the introduction of advanced equipment and devices [12].

METHODOLOGY

Study design, Setting and time frame:

A cross-sectional situational analysis survey design was conducted to identify patients with pressure injury and the associated potential risk factors for their development across different clinical settings and homecare services at King Saud Medical City in Riyadh. Data collection for the hospital units took place in August and September 2023, while for the homecare patients, it occurred in October of the same year.

In the Kingdom of Saudi Arabia, King Saud Medical City, Riyadh, is a well-known public referral hospital and level one trauma center. Having been founded in 1956, it is one of the biggest tertiary care facilities in the nation, with a total bed capacity of about 1500, including 200 beds for intensive care units. As the main referral facility for orthopedic, trauma, and neurosurgery in Saudi Arabia, the hospital is extremely important. Notably, the cases of pressure injuries in these wards and units were the focus of our investigation.

Participants, sampling method, and sample size:

Patients hospitalized in orthopedic, neurology, general surgery, medicine, and stroke units with pressure injuries participated in the study, including home care and inpatient wards.

During the study period, patients with pressure injuries in the designated care sites were chosen using purposive sampling approaches.

Sample size calculation:

The sample size was determined using the following formula $\frac{z^2 \text{a}/1(P)(1-P)}{d^2}$ Where the z value is 1.96 corresponding to 95% confidence interval, and assumed prevalence of 5.7% from previous study conducted in Saudi Arabia, among General Medical and Surgical Units patients in Jeddah Saudi Arabia, and margin of error of 2.5%, the final sample size was calculated to be around 250 [8].

Data collection tool:

Twenty participants from the pilot sample—who were also included in the final sample—were used by the authors to test a structured questionnaire. Pre-testing took place in the context of the study to assess clarity, sequencing, dependability, internal consistency, and the overall amount of time needed to gather data. Subsequently, the final instrument incorporated feedback obtained from the pretest piloted samples. Furthermore, an Arabic translation of the questionnaire was made.

Sampling techniques:

Employing proportionate stratified sampling based on the patients admitted to the hospital units and diagnosed with PI during the study period. The investigators and certified nurses made daily visits to the units.

Data processing, management, and analysis plan:

Collected data were entered into Excell sheet and exported to SPSSS version 26, descriptive analysis, average mean, percentage, and frequency were used. Tables and figures were used to summarize the study data.

Inclusion criteria:

The included hospital units comprised of general surgery, orthopedic, medical, stroke, spinal and homecare patients. All patients, regardless of gender, aged 18 years or older, who were under the care of the study units during the study period and had a pressure injury were included in the study.

Exclusion criteria:

Patients with pressure injuries under specific units will be excluded from the study. These units comprise Intensive Care (ICU), Coronary Care units (CCU), pediatric wards, obstetrics and gynecology wards, individuals with major psychiatric disorders, and emergency department patients.

Ethical consideration

The study received ethical approval from the KSMC Research and Innovation Center Institutional Review Board (IRB) committee (Reference No.: H1R1-07-jun 23-01).

Participants or their relatives were informed about the study's purpose and the data to be collected, including access to their hospital electronic records. Additionally, informed written consent was obtained.

RESULTS

The prevalence of PI in King Saud medical city, Riyadh admitted patients was 18.8%, whereas the prevalence of PI among homecare patients was 4.4%.

Overall, a total of 250 patients with PI were included in the study. Table 1 shows the socio-demographic characteristics of the study participants. Most of the participants represented in our sample were males 132 (52.8%) and the mean age was 59.52 years. The most represented age category was 62-73 years (26%). most of the represented sample are married 155 (62.0%). The minority of the participants were smokers 55 (22%). About one-third of the participants 87 (34.8%), have not had formal education.

Table 1: Socio demographic data & clinical characteristics of the study participants (n=250)

Variable	Category	Frequency	Percent
Gender:	Male	132	52.8
	Female	118	47.2
Age (year):	18_29	24	9.6
	29_40	23	9.2
	40_51	31	12.4
	51_62	50	20.0
	62_73	65	26.0
	73_84	39	15.6
	84_95	18	7.2
	Mean average	59.52	
Marital Status:	Single	39	15.6
	Married	155	62.0
	Divorced	8	3.2
	Widowed	48	19.2
Smoking History:	YES	55	22.0
	NO	195	78.0
Educational Level:	No formal education	87	34.8
	Primary school	56	22.4
	Secondary school	66	26.4
	Diploma	6	2.4
	University degree	35	14.0
Comorbidities:			
• Diabetes mellitus		123	49.2
• Hypertension		140	56.0
• Cardiovascular diseases: Cerbro Vascular Accident (CVA), ischemic heart disease (IHD), Congestive Heart Failure (CHF) & Atrial Fibrillation (AF)		87	21.2
• Epilepsy		13	5.2
• Chronic Obstructive Pulmonary Disease and other pulmonary diseases		16	6.4
• Chronic kidney disease		10	4.0
• Dementia		7	2.8
BMI(n=227):	<18.5 under weight	11	4.8%
	18.5 – 24.9 normal	88	38.8%
Variable	**Category**	**Frequency**	**Percent**
	25-30 overweight	97	42.7%
	More than 30 obese	31	13.6
HbA1C (84) (n=84):	<6.5	31	38.3%
	6.6-9	35	39.5%
	>9	18	22.2%
		165	31.6 (7.1)
Hemoglobin level%: (n=239)	<10 gm	109	45.6%
	>10 gm	130	54.4%
eGFR (n=240)	> 60	187	77.9
	30-59	27	11.3
	<30	26	10.8
T-WBC (n=239):	Mean/SD -9.5/5.7		
Platelets (n=240)	Mean/SD -312.9/164.2		
LDL-C (n=82)	Mean/SD – 3.1/1.1		
Triglycerides (n=84)	Mean/SD – 1.6/0.8		
Albumin (N=165)	Mean/SD – 31.6/7.1		

The most common comorbidities in our studied sample were Hypertension 140 (56%) and Diabetes Mellitus 123(49.2%). Notably also most of our study sample had two or more comorbidities, 228 (91.2%). The remaining frequencies and percentages of the associated comorbidities were shown in table 1.

Overall, the average BMI was 26.9 kg/m² in our sample, with 97 Participants (42.7 %) were Overweight and 31(13.6%) were obese with BMI more than 30kg/m².

The remaining hematological and biochemical parameters of the study participants were shown in Table 1.

Table 2: Sample distribution of hospital units

Unit	Total admission (Aug& Sep 2023)	PI Frequency	PI Unit Percent	PI Total percentage
Orthopedic surgery wards	267	59	22.1%	28.1 %
Spinal surgery wards	48	12	25%	5.7%
Internal medicine wards	169	17	10.05%	8.1 %
General surgery wards	260	57	21.9%	27.1 %
Stroke (cerbro-vascular accident) wards	146	36	24.7%	17.1%
Nephrology, Isolation, clinical decision, and oncology wards	225	29	12.9%	13.8%
Home care services	917	40	4.4%	
Total	2032	250	100%	

Table 2 depicts the sample distribution of the admitted patients at the various hospital units. Most patients who had PI were from orthopedic, internal medicine, general surgery, and stroke units. The prevalence of PI among included hospital units was 18.8% and the prevalence of PI among homecare patients was 4.4%.

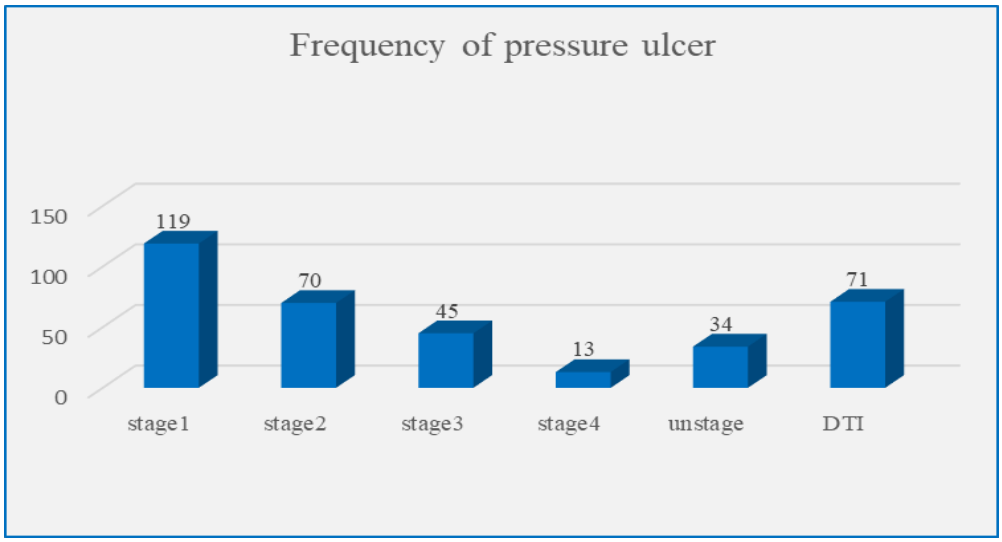

Fig 1: Pressure ulcer study sample stages

Based on pressure injury staging, P.I stage 1 was the most detected stage 119 (48%), while 70, 45 and 13 had stage II, III and IV respectively, as shown in Figure 1.

Table 3: Specific Sites and frequency distribution of PI

Site	Category	Frequency	Percent %
Ears/ Nose		71	21.2
Nape, scapula/ shoulder		27	5.2
Abdomen/ flank		16	6.4
Back		20	8.0
Elbow		12	4.8
Sacral area		121	48.2
Gluteal area, trochanters/ hips		120	33.2
Perineal/ inguinal/ groin		17	6.8
Knees		11	4.4
Legs		22	8.8
Ankles, heels, and feet		82	5.2
Total		508	

Site	Category	Frequency	Percent %
Mobility	Yes	137	56.4
	No	106	43.6
Change of position	Yes	198	80.5
	No	48	19.5
Sensory Perception	Yes	135	54.2
	No	114	45.8
Moisture	Yes	217	86.8
	No	33	13.2
Air mattress	Yes	137	56.4
	No	106	43.6

Table 3 shows the pressure injury diagnosed specific sites, the sacrum was the most frequent site 121 (48.2%), this followed by the gluteal area 120 (16.3%). The remaining sites' representation are shown on table 3 above. Notably, some patients developed pressure injury at more than one site.

The frequency distribution of the study sample regarding their mobility, ability to change position and perception of sensory stimuli, moisture and the availability of air mattress are shown in table 3. Most of our study sample participants were mobile 137(56.4%), however, 198(90.5%) were able to change their body position. 135 (54.2%) had sensory perception, 219 (86.8%) had moisture around their body parts. Most of the reviewed sample 137 (56%) had air mattresses.

Table 4: Correlation between Age, Smoking history BMI, Recent surgery and MVA and PI stage I

Age (Chi-square: 1.698, p value: 0.945)		**STAGE 1**		**Total**
		No	**Yes**	
18-29	f	11	13	24
	%	45.8%	54.2%	100.0%
29-40	f	14	9	23
	%	60.9%	39.1%	100.0%
40-51	f	15	16	31
	%	48.4%	51.6%	100.0%
51-62	f	25	25	50
	%	50.0%	50.0%	100.0%
62-73	f	36	29	65
	%	55.4%	44.6%	100.0%
73-84	f	21	18	39
	%	53.8%	46.2%	100.0%
84-95	f	9	9	18
	%	50.0%	50.0%	100.0%
Total	f	131	119	250
	%	52.4%	47.6%	100.0%
Smoking History (Chi-square: 7.270 p value: 0.007)		STAGE 1		
		NO	YES	Total
Yes	f	20	35	55
	%	36.4%	63.6%	100.0%
No	f	111	84	195
	%	56.9%	43.1%	100.0%
Total	f	131	119	250
	%	52.4%	47.6%	100.0%
BMI (Chi-square: 7.045 p value: 0.134)		**Stage 1**		**Total**
		No	**Yes**	
under weight	f	7	4	11
	%	63.6%	36.4%	100.0%
normal	f	41	49	90
	%	45.6%	54.4%	100.0%
overweight	f	50	47	97
	%	51.5%	48.5%	100.0%

Age (Chi-square: 1.698, p value: 0.945)		**STAGE 1**		**Total**
		No	**Yes**	
obese	f	16	14	30
	%	53.3%	46.7%	100.0%
morbid obesity	f	16	5	21
	%	76.2%	23.8%	100.0%
Total	f	130	119	249
	%	52.2%	47.8%	100.0%
Recent surgery (Chi-square: 3.078 p value: 0.079)		**Stage 1**		
		No	**Yes**	Total
No	f	95	78	173
	%	54.9%	45.1%	100.0%
Yes	f	26	36	62
	%	41.9%	58.1%	100.0%
Total	f	121	114	235
	%	51.5%	48.5%	100.0%
MVA (Chi-square: 0.045 p value: 0.883)		**Stage 1**		Total
		No	**Yes**	
No	f	119	109	228
	%	52.2%	47.8%	100.0%
Yes	f	12	10	22
	%	54.5%	45.5%	100.0%
Total	f	131	119	250
	%	52.4%	47.6%	100.0%

Table 4 shows the analysis results of the Chi-square and P values of the correlation between different parameters and the development of stage I PI. There was a significant statistical correlation between smoking history, P-value less than 0.05, whereas there was no significant correlation between Age, BMI, recent surgery and recent motor vehicle accident and PI stage I, p- value was more than 0.05.

Table 5: Correlation between immobility, sensory perception and moisture and PI stage I

Immobility (Chi-square: 5.059, p value: 0.025)		**Stage 1**		**Total**
		No	**Yes**	
No	f	61	42	103
	%	59.2%	40.8%	100.0%
Yes	f	62	77	139
	%	44.6%	55.4%	100.0%
Total	f	123	119	242
	%	50.8%	49.2%	100.0%
Sensory perception (Chi-square: 0.003, p value: 0.956)		STAGE 1		
		No	Yes	Total
No	f	25	23	48
	%	52.1%	47.9%	100.0%
Yes	f	104	94	198
	%	52.5%	47.5%	100.0%
Total	f	129	117	246
	%	52.4%	47.6%	100.0%
Moisture (Chi-square: 8.603, p value: 0.002)		**Stage 1**		
		No	**Yes**	**Total**
No	f	48	66	114
	%	42.1%	57.9%	100.0%
Yes	f	82	53	135
	%	60.7%	39.3%	100.0%
Total	f	130	119	249
	%	52.2%	47.8%	100.0%

Table 5 shows the Correlation between immobility, sensory perception and moisture and PI stage I. The analysis shows that, there was a significant correlation between immobility and presence of moisture

and the development of PI stage I, p-value less than 0.05, whereas there was no significant correlation between sensory perception and PI stage I, p-value more than 0.05.

DISCUSSION

Our study assessed the occurrence rate of PI among Admitted patients at Different Care Units & The homecare Patients under The Services of KSMC-R.

It will be possible to create helpful Key Performance Indicators (KPI) of the burden and concern surrounding this health issue by recording the prevalence and related risk factors for the development of pressure injury. It will also direct future research into the services needed and public health initiatives to address this illness [16].

Of the patients in our study, 48.8% were older than 62 years. The age factor has an impact on the skin's renewal and structure. As people age, their skin becomes more fragile and is more susceptible to pressure injuries [16].

The prevalence of PI among included hospital units was 18.8% and the prevalence of PI among homecare patients was 4.4%.

In comparison to the hospital sample and other studies conducted in Saudi Arabia, the prevalence of PI in our homecare services sample was lower than that of the hospital sample. This can be explained by the fact that multidisciplinary healthcare experts regularly visit patients who receive homecare services. These teams more frequently monitor, evaluate, assist, instruct, record, and report on their comprehensive review.

Numerous nations have carried out prevalence studies on PI, and the reported percentage in the literature ranges greatly from 8.1% to 16.8%. Because various patient populations and healthcare systems exist in different nations, these results may change [16].

Additionally, a broad range of occurrences among hospitalized patients is revealed by systematic review research. (1% to 54%) in Europe, 6% in Australia, 2.7% to 16.8% in Asia, and 3.1% to 30% in the United States [16].

Examining the local studies, which were carried out in an identical environment to ours, showed that although they did not include stage I PI, which made up the largest portion of our study, the frequency of PI among critically ill patients admitted to the intensive care unit was high (35.7%). The latter study was carried out over a longer time frame—six months—than ours.

The critically ill patients in the intensive care unit served as the study setting for them [14]. We did not include this unit in our study. They concur with us that the hip and sacral regions were the most frequently affected by PI development. Since King Saud Medical City is one of the biggest trauma centers in the Kingdom, the results of our study should inform future policies and set goals for primary preventive initiatives to lower the incidence of pressure injury (PI) among hospitalized patients [14]. In a study conducted in 2019 by Hashem Alhashem, it was revealed that the incidence and prevalence of pressure injuries in a prospective cohort study at King Abdulaziz Medical City in Jeddah was 5.7%. Like our study, they also excluded individuals from intensive care units, obstetrics, gynecology, or pediatrics [8]. According to a different study conducted in Madina, Saudi Arabia, by Alya Almutairi *et al.*, the prevalence of pressure injury in stages I through IV was 8%. They evaluate the hospital's acquired PI rates in comparison to a hospital that has staff, patient, and family caregiver education programs in place. Their study was one of the few that provided the prevalence of nosocomial PI. Their study acknowledged the influence of healthcare environments on the incidence of pressure injuries (PI), underscoring the significance of hospital staff members' routine observation of admitted patients. [2].

The Norwegian study conducted in a common medical unit revealed significant variables for pressure injury (PI) development. The sacrum was found to be the most common location for PI, which is consistent with our findings. Furthermore, most reported PI cases were stages I and II, which also aligns with the results of our study [17].

In a study conducted by Gehan H *et al.*, in Sakaka, Saudi Arabia, the researchers examined the prevalence and risk factors related to pressure injuries (PI) and included intervention methods. The study confirmed that nursing education on identifying, preventing, and managing PI is effective in reducing the occurrence of PI in immobilized patients. This finding aligns with the goals of our investigation [5].

In the meantime, a study conducted in Palestine by Omar Al Mahmoud and Jamal A.S. Quddumi revealed a significant prevalence of PI (33%) in the ICU units [9]. It also demonstrates that friction, mechanical ventilators (MV), and hospital days were important risk factors for the development of pressure ulcers. However, in their study group, there was no statistically significant relationship seen between the formation of PI and BMI, wetness, or immobility. On the other hand, smoking, immobility, and moisture showed a strong association in our investigation. The development of stage I P-II did not exhibit a significant link with Contrary Age, sensory perception BMI, or recent motor vehicle accident (p-value was >0.05) or the ulcer stage I diagnostic ($p<0.05$).

Studying investigations on hospitalized patients in East Africa regarding the prevalence and related risk factors. A 2017 study conducted by AAbiru Neme *et al.*,

Our research and their study share many of the same goals and objectives. In their sample, PI was present in 15.7% of cases. Additionally, they found that PI was more common in patients with a BMI under 18.6 kg/m2 than in overweight individuals. There was no statistically significant correlation seen in our study between BMI and the onset of stage I ulcers. In contrast to our study, which identified no significant link between immobility and Ulcer stage I, they also discovered that patients who were unable to adjust their posture had a higher risk of developing pressure injuries. The majority of their sample as depicted [1].

In another study conducted in Ethiopia, a prevalence of 13.4% of pressure injuries (PI) was found [13]. The study also revealed a strong correlation between the development of PI and factors such as lack of position change, restricted sensory awareness, and immobility [13]. However, in our research, we only found a strong correlation between immobility and the presence of stage I PI.

In their comprehensive research, Kallman Ulrika examined global literature and revealed that pressure injuries (PI) can be prevented through interventions. They demonstrated a consistent decline in PI cases after implementing intervention techniques and concluded that patient safety programs should be put in place to prevent PI in at-risk individuals. They also provided data showing how these programs can reduce the prevalence of PI in Swedish hospitals nationwide [11].

Our research has shown that there is a connection between relevant risk factors, clinical characteristics, and demographics. However, a study in Kenya has revealed that the likelihood of pressure injuries (PI) developing is influenced by a complex interaction of factors. This indicates that no single risk factor can entirely explain the risk of developing PI [16].

Our current study indeed has several strengths. Being the first research conducted in this crucial clinical area at a large trauma and emergency referral center in Riyadh, it explores the associated risk factors and prevalence of pressure injuries (PI) among admitted patients. Additionally, our study reports the prevalence of PI and its associated risk factors for homecare patients. The prospective data collection process adds rigor to our findings. While the scarcity of published literature on this topic in Saudi Arabia limits direct comparisons, your study has significant implications for clinical practice. It can serve as a benchmark for healthcare providers to establish robust preventive measures for averting PI in their setting.

The sample size for our current investigation was determined based on data from a previous study conducted in Saudi Arabia, which is a limitation. Additionally, the study was restricted to eight weeks. Although our study was cross-sectional, meaning that participants were only examined once instead of being followed up over time, it still has implications for clinical practices. Medical professionals can use it as a benchmark to develop strong preventive measures to prevent the development of pressure injuries (PI) in both the community and hospitals [16].

CONCLUSION

The present study revealed the prevalence of PI among admitted patients to be 18.8% and among the homecare patients to 4.4% It was found out that there were a significant statistical correlation between smoking history and PI stage I, and has also found that there were significant correlation between immobility and the detection of PI stage I. Healthcare professionals should be updated on preventive guidelines, healthcare standards and key performance indicators related to PI.

REFERENCES

- Neme, A., Wolancho, W., Nemera, G., & Yohanes, Y. (2020). Prevalence of pressure ulcer and associated factors among hospitalized adult patients in public hospitals Sidama zone, south nations, nationalities, and peoples' regional state, Ethiopia, 2017. *J Prim Care Gen Pract*, *3*(3), 31-45. https://www.alliedacademies.org/journal- primary-care-general-practice/
- Al Mutairi, A., Schwebius, D., & Al Mutair, A. (2020). Hospital-acquired pressure ulcer incident rates among hospitals that implement an education program for staff, patients, and family caregivers inclusive of an after discharge follow-up program in Saudi Arabia. *International Wound Journal*, *17*(5), 1135-1141. https//doi.org/10.1111/iwi.13459
- Berlowitz, D. (2022). Epidemiology, pathogenesis, and risk assessment of pressure – induced skin and soft tissue injury, Uptodate.
- Bereded, D. T., Salih, M. H., & Abebe, A. E. (2018). Prevalence and risk factors of pressure ulcer in hospitalized adult patients; a single center study from Ethiopia. *BMC research notes*, *11*, 1-6. https://doi.org/10.1186/s13104-018-3948-7
- Hefnawy, G., & Abd El-Monem, D. (2017). Prevalence of pressure ulcers with the study of the impact of pressure ulcer educational program on registered nurses' knowledge and practice in Prince Miteb Bin Abdulaziz Hospital, Sakaka City, Saudi Arabia. *Journal of Health, Medicine and Nursing*, *43*, 106-117.
- Chen, G., Lin, L., Yan-Lin, Y., Loretta, C. Y. F., & Han, L. (2020). The prevalence and incidence of community-acquired pressure injury: a protocol for systematic review and meta-analysis. *Medicine*, *99*(48), e22348. https://journals.lww.com/md-journal/Fulltext/2020/11250/The_prevalence_and_incidence_of_community_acquired.4.aspx
- Gedamu, H., Hailu, M., & Amano, A. (2014).

Prevalence and associated factors of pressure ulcer among hospitalized patients at Felegehiwot referral hospital, Bahir Dar, Ethiopia. *Advances in Nursing*, *2014*(1), 767358. http://dx.doi.org/10.1155/2014/767358

- Al-Hashemi, H., Alqurashi, K., Jan, R., Farran, A., Al-Sabban, B., & Thomson, J. (2019). Incidence, prevalence, and complications of pressure ulcers in general medical and surgical units using a multidisciplinary model (Prospective cohort). *Biomedical Journal of Scientific & Technical Research*, *18*(1), 13340-13343. DOI: 10.26717/BJSTR 2019.18.003109.
- Qaddumi, J. A., & Almahmoud, O. (2019). Pressure ulcers prevalence and potential risk factors among intensive care unit patients in governmental hospitals in Palestine: A cross-sectional study. *The Open Public Health Journal*, *12*(1). DOI: 10.2174/1874944501912010121
- Wood, J., Brown, B., Bartley, A., Cavaco, A. M. B. C., Roberts, A. P., Santon, K., & Cook, S. (2019). Reducing pressure ulcers across multiple care settings using a collaborative approach. *BMJ open quality*, *8*(3), e000409. doi:10.1136/bmjoq-2018-000409
- Källman, U., Hommel, A., Borgstedt Risberg, M., Gunningberg, L., Sving, E., & Bååth, C. (2022). Pressure ulcer prevalence and prevention interventions–A ten-year nationwide survey in Sweden. *International wound journal*, *19*(7), 1736-1747. DOI: 10.1111/iwj. 13779.
- Borojeny, L. A., Albatineh, A. N., Dehkordi, A. H., & Gheshlagh, R. G. (2020). The incidence of pressure ulcers and its associations in different wards of the hospital: a systematic review and meta-analysis. *International Journal of Preventive Medicine*, *11*, 171. DOI: 10.4103/ijpvm.IJPVM 182 19.
- Belachew, T. (2016). Prevalence and associated factors of pressure ulcer among adult inpatients in Wolaita Sodo University Teaching Hospital, Southern Ethiopia. *Prevalence*, *6*(11).
- Amirah, M., Rasheed, A., Parameaswari, P., Awajeh, A., Issa, M., & Abdallah, M. (2019). Pressure injury prevalence and risk factors among adult critically ill patients at a large intensive care unit. *J Intensive Crit Care*, *5*(2), 9.
- Nadukkandiyil, N., Syamala, S., Saleh, H. A., Sathian, B., Ahmadi Zadeh, K., Acharath Valappil, S., ... & Al Hamad, H. (2020). Implementation of pressure ulcer prevention and management in elderly patients: a retrospective study in tertiary care hospital in Qatar. *The Aging Male*, *23*(5), 1066-1072. Journal homepage: https://www.tandfonline.com/loi/itam20, https://doi.org/10.1080/13685538.2019.1670156
- Sisimwo, P. K., Margai, M., Obaigwa, E., Mbatha, A., Mutua, A., & Atieno, W. Prevalence and risk factors for Pressure ulcers among adult inpatients at a tertiary referral hospital Kenya, 2021. *JOSR Journal of Nursing and health science*, *11*(2), 36-41.
- Børsting, T. E., Tvedt, C. R., Skogestad, I. J., Granheim, T. I., Gay, C. L., & Lerdal, A. (2018). Prevalence of pressure ulcer and associated risk factors in middle-and older-aged medical inpatients in Norway. *Journal of clinical nursing*, *27*(3-4), e535-e543. DOI:10.1111/jocn.14088
- Shiferaw, W. S., Aynalem, Y. A., & Akalu, T. Y. (2020). Prevalence of pressure ulcers among hospitalized adult patients in Ethiopia: a systematic review and meta-analysis. *BMC dermatology*, *20*, 1-10. DOI: 10.1186/s12895-020-00112-z
- Zhang, X., Zhu, N., Li, Z., Xie, X., Liu, T., & Ouyang, G. (2021). The global burden of decubitus ulcers from 1990 to 2019. *Scientific reports*, *11*(1), 21750. doi: 10.1038/s41598-021-01188-4