



Research article

# ASSESSING THE APPROPRIATENESS OF STRESS INDUCED ULCER PROPHYLAXIS FOR HOSPITALIZED PATIENTS

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### ARTICLE INFO

### ABSTRACT

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**Purpose:** This study's objective was to explore assessing the appropriateness of stress-induced ulcer prophylaxis for hospitalized patients.

**Patients and methods:** A cross-sectional study were conducted for 3 months among hospitalized patients at AL-Kuwait Hospital in Sana'a, Yemen.

**Results:** Among all the study participants, nearly 17 (14%) out of 120 patients were approved for stress-induced ulcer prophylaxis in the past 3 months. 42 (35%) of the patients in our study were never candidates for a stress-induced ulcer prophylaxis regimen, neither globally nor locally, where controversy around disapproval globally and approval locally and vice versa was present in 61 (51%) patients. The most common indication for proton pump inhibitors was stress-induced ulcers, followed by gastric ulcers, duodenal ulcers, and people receiving glucocorticoids and NSAIDs in certain amounts. PPI use was significantly more prevalent among hospitalized patients, followed by outpatients.

**Conclusions:** Stress-induced ulcer prophylaxis as well as not following up with the global protocols were common among hospitalized patients. pieces of advice are recommended in this situation.

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## 1. Introduction

A stress-induced ulcer is a prevalent acute erosive or ulcerative condition affecting the stomach and duodenum. It arises in adults and children due to stressful mental and physical circumstances. Situations of this nature can potentially emerge as a result of surgical procedures, significant injuries, particularly cerebro-cranial trauma, third-degree burns, septicemia, intensive therapy, individuals with respiratory, hepatic, or renal insufficiency, cases of carcinoma, and individuals receiving glucocorticoids and NSAIDs in specific dosages [1]. In stress-induced ulcers, precaution is the recommended approach over therapy, as is the case with most predictable medical disorders [2]. The use of stress-induced ulcer prevention is considered a fundamental therapeutic approach for hospitalized patients to mitigate the adverse outcomes associated with stress ulceration [3]. However, note that not all hospital admissions require this prophylactic regimen, and it is crucial to follow proper clinical practice norms [4]. Selecting the right preventive therapy mostly relies on forecasting the severity of the ulcer. This is achieved by assessing the patient's condition to prevent superfluous indications and address any negative cost-benefit concerns [5]. Despite the

existence of global guidelines for SUP, clinicians worldwide still face significant challenges adhering to them. In professional contexts, physicians often engage in frequent practice, leading to insufficient utilization of acid suppression medication [6]. Another pertinent instance in our region is the overutilization of PPI for both hospitalized and non-hospitalized patients in the Abha region [7]. Stress ulcer prevention regimens commonly use both proton pump inhibitors (PPIs) and H2 blockers. However, only a limited number of specific PPIs have been demonstrated to be effective in treating stress ulcers [8]. Furthermore, it's crucial to take into account the unexpected dosage that may be required. To ensure treatment uniformity, adhere to established international guidelines. It is widely accepted that any indicated drug should possess a clearly defined purpose of indication and be an approved medication for its intended use. This worldview grants physician's worldwide immunity from legal liability [9]. There is a lack of studies that have evaluated the extent to which physicians in metropolitan regions of Yemen comply with SUP prescribing guidelines for PPI drugs. Hence, the objective of this study was to assess the level of compliance among physicians with the prescribing guidelines for proton pump inhibitor (PPI) medication in the context of secondary care at Al-Kuwait Hospital in Sana'a, the capital city of Yemen.

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## 2. MATERIALS AND METHODS

### 2.1 Study design:

This research study employed a cross-sectional survey design and spanned a duration of 40 days, specifically from September to October 2023, at Al-Kuwait Hospital located in Sana'a, Yemen.

### 2.2 Sampling Size

The study encompassed a sample size of 120 patients who were admitted to the hospital. We conducted this research at Al-Kuwait Hospital in Sana'a, Yemen, focusing on the prevalence of stress-induced ulcers among both inpatients and intensive care unit patients. The study assumed that the data collected from official patient files indicated a lack of adherence to global protocols and the implementation of random local-made policies for surgical procedures (SUP) in Yemeni hospitals, which lack clinical studies or evidence.

### 2.3 Study Instrument and Data Collection

The data on the patients was acquired from the official patient records of the hospital, encompassing both hospitalized patients and those in the intensive care unit. The collected data included information on sex, age, admitting diagnosis, weight, serum creatine, protein-protein interaction (PPI), dosage, frequency, route, international normalized ratio (INR) and platelet count (from the first to the third day of admission), history of gastrointestinal (GI)-related issues, and admitting unit. Patients who received PPI for a specific indication met the exclusion criteria. The collected data was subjected to analysis based on established recommendations to determine if the patient satisfied the requirements for stress-induced ulcer prophylaxis (SUP). We assessed the patient's eligibility for SUP criteria using recommendations from the American Society of Healthcare Pharmacists (ASHP) and the American Gastroenterology Association (AGA). Clinical pharmacists assisted in conducting a diagnostic procedure. The objective of this procedure was to expand the range of potential accurate indications and prevent any overlooked or insignificant data that could result in severe complications, such as gastrointestinal hemorrhage, perforation, and mortality.

### 2.4 Ethical Considerations

The present study received approval from the Ethics Regional Committee of Lebanon International University in Yemen, as well as from the management of the community pharmacies (REC#2023-09-65). Additionally, we provided comprehensive information to all participants and obtained their written informed consent prior to their involvement in the study.

### 2.5 Statistical Analysis

We inputted the information from the filled-out forms into an Excel spreadsheet and then transferred it to the Statistical Package for Social Sciences (SPSS), version 20 for Windows, to conduct statistical analysis. Data analysis involved the utilization of both descriptive and inferential statistics. For continuous characteristics, the study employed an independent Student's t-test to compare hospitalized male and female patients in facilities and critical care units.

## 3. Results:

The study included a sample size of 120 hospital admissions. Out of the total number of patients, 83 (69%) were male and 37 (31%) were female. These patients were divided into male and female facilities and an intensive care unit. The greater capacity of male facilities explains the prevalence of male patients. The

following data presents gender demographic information (Table 1.1 and Figure 1.1).

Gender	Frequency	Percentage
Male	83	69%
Female	37	31%

Table 1-1: Frequencies of gender.

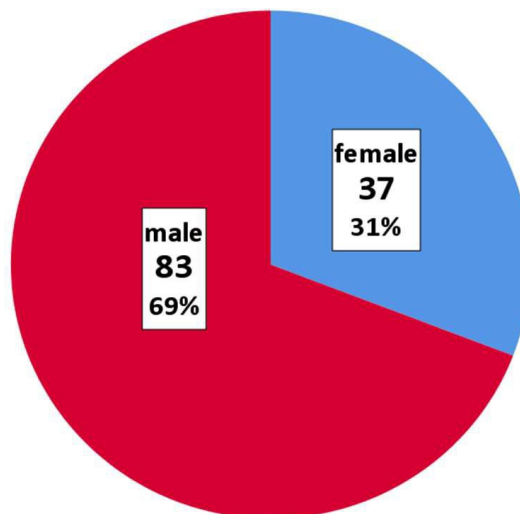


Figure 1-1: Frequency of gender.

The data presented in Table 1.2 and Figure 1.2 indicate that our study focuses on older patients. Therefore, we categorized the patients into two groups: elderly patients, defined as those over 65, and non-elderly patients, defined as those under 65. Out of the total number of patients, 27 (22.5%) were old. Only 6 (22.2%) of them received admission to the ICU, while 21 (77.8%) were in patients who were not seriously ill. Out of the total number of patients, 93 (77.5%) were not old. The Intensive Care Unit (ICU) admitted 27 (29%) of them, while non-ICU institutions hospitalized 66 (71%) of them. The data shown in Table 1-2 and Figure 1-2 illustrate the distribution of patients categorized by age per department, specifically ICU and non-ICU. Seniors are more like a smaller group of patients in both intensive care units and other care units, which suggests that they don't need to use proton pump inhibitors (PPIs) as much in general.

	Elderly	Non-elderly	Total
Inpatient	21 (24%)	66 (76%)	87 (72.5%)
ICU	6 (18%)	27 (82%)	33 (27.5)
Total	27 (22.5)	93 (77.5)	120

Table 1.2: Age group population per departments.

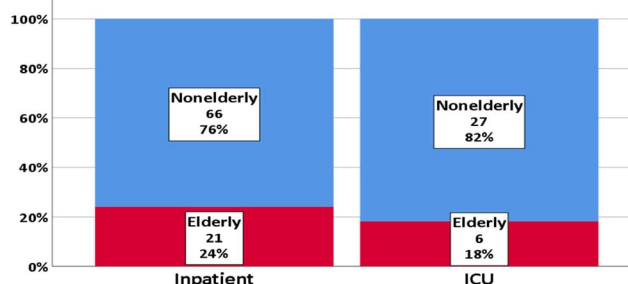


Figure 1-2: Age group population per departments.

Table 1.3 demonstrates a notable disparity between male and female patients in terms of the prophylaxis of stress-induced ulcers. Pantoprazole was the most commonly prescribed medicine, particularly in the ICU, with 52 prescriptions (60% of ICU patients). This is due to its limited range of interactions with other pharmaceuticals, which it eliminates through various pathways. Furthermore, the female section predominantly utilizes esomeprazole.

	Inpatient	ICU	Total (%)
<b>Pantoprazole</b>	52	28	80 (66.6%)
<b>Esomeprazole</b>	28	2	30 (25%)
<b>Rabeprazole</b>	6	0	6 (5%)
<b>Omeprazole</b>	1	3	4 (3.33%)
<b>Total (%)</b>	87 (72.5%)	33(27.5%)	120

Table 1.3: Proton-Pump Inhibitors Frequency.

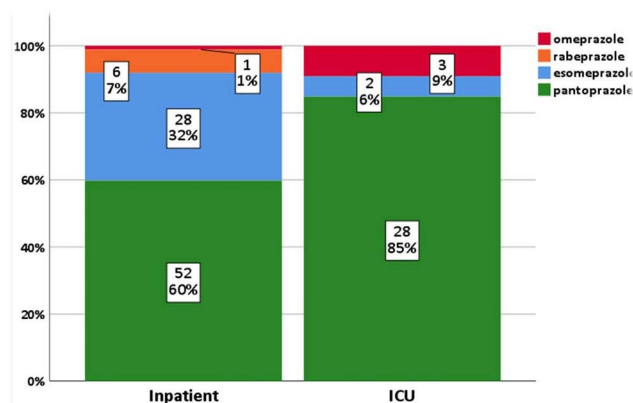


Figure 1.3: Proton-Pump Inhibitors Frequency.

Figure 1.4 illustrates the range of choices of proton pump inhibitors (PPIs) observed in male and female departments across both intensive and non-intensive care units. Physicians consistently used the same generic name during that period, likely due to the marketing of a particular drug.

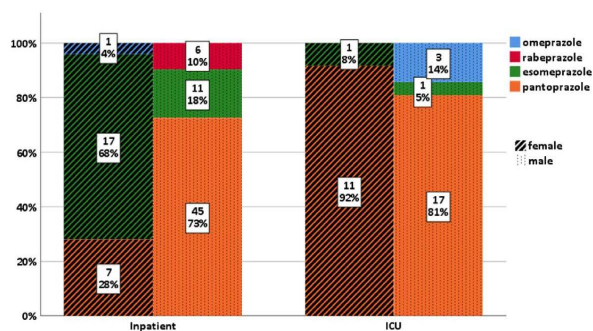


Figure 1.4: Proton-Pump Inhibitors Frequency Per Gender & Location

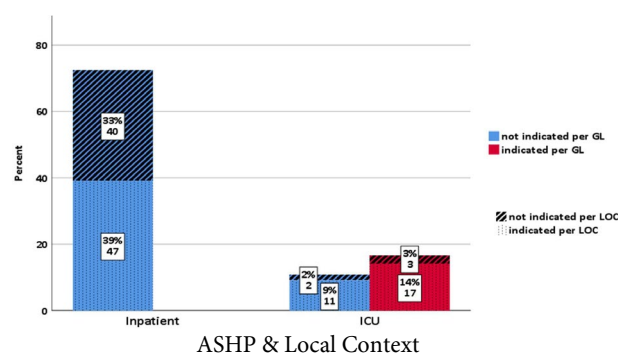
It is seen in Tables 1.4 and Figures 1.5. After applying the global guideline on the Appropriateness of Stress-induced Ulcer Prophylaxis to our sample, we found that we eliminated 100 patients (83.3%) from the list of appropriate indications, and only 20 patients (16.6%) met the criteria for stress-induced ulcer prophylaxis (SUP). On the other hand, our specific circumstances showed that we approved the indication for 75 (62.5%) patients, which increases the likelihood of accurate indication for inpatients and aligns with the outcomes of implementing guidelines in ICU patients. Below is the population frequency for SUP indication according to ASHP and local contexts.

	Indicated per LC	Not indicated per LC	
<b>Indicated per Guideline</b>	17 (85%)	3 (15%)	20 (16.66%)
<b>Not indicated per Guideline</b>	58(58%)	42 (42%)	100 (83.3%)
<b>Total</b>	75 (62.5%)	45(37.5%)	120

Table 1.4: Population frequency for SUP indication per ASHP & Local Contexts.

Out of the 15 patients (16.6%) who were included in the guideline, all of them were exclusively in the ICU. However, not all 33 ICU patients (27.5%) fit the requirements for SUP, indicating that the worldwide guideline only applies to critically ill people admitted to the ICU. The guideline did not approve the use of SUP for patients in non-ICU departments. Despite the guideline outcomes, the local settings included 47 (54%) of the 87 non-ICU patients and approved them for SUP. Two patients in the intensive care unit lacked approval for supraventricular pumping (SUP) according to both global guidelines and local settings. Figure 1.5 and Table 1.4 illustrate this phenomenon.

Figure 1.5: Population frequency for SUP indication per



#### 4. DISCUSSION

In contrast to several studies, our study did not demonstrate gender equity, as it consisted of 83% males and 27% females. We hypothesise that this phenomenon stems from the higher capacity of male facilities in our region compared to female facilities. This elucidates the disparity observed in the study conducted by Abdallah D et al., whereby it was shown that females (77%) exhibited a higher propensity to undergo SUP regimens as a result of their diminished capacity to cope with stress [10]. Based on the suitability of stomach anti-secretory therapy in hospital settings, the utilization of suprapalatine (SUP) is more probable when senior individuals are involved [11]. Our investigation revealed similarities between senior patients and a smaller sample of patients in both intensive and non-intensive care units. This suggests that elderly patients may require less PPI for the management of stress-induced mucosal lesions, which contradicts the findings of Sebastian SS et al., on the other hand [11]. The present investigation utilized only four specific agents of proton pump inhibitors (PPIs), namely pantoprazole, esomeprazole, rabeprazole, and omeprazole, for the treatment of SUP. This aligns with the findings of Molloy's 2010 study, which documented the usage of four licensed PPI drugs in SUP worldwide [12]. The present investigation reveals that a significant proportion of prescriptions were for pantoprazole. This finding aligns with the study conducted by Blume H et al., which also concluded that pantoprazole is the most suitable option. We choose it from its family due to its limited range of interactions with other medications. Apart from its diverse excretion pathways, this specific substance has undergone extensive research among proton pump inhibitors (PPIs) and has been the most commonly prescribed medication

for hospital admissions. However, esomeprazole was unaccounted for in the female department, which contradicts established global standards and evidence. This finding contradicts the findings of both Blume H and Molloy D investigations, which advocate for the prioritization of pantoprazole for patients admitted to the hospital [13]. The present investigation indicates a low prevalence of omeprazole prescriptions. This finding aligns with the research conducted by Zalloum N et al., which demonstrates the prevalence of omeprazole prescriptions in metropolitan areas as a result of their comparatively affordable price [14]. The previous chapter stated that the ASHP guideline only approved 20 patients (16.6%) for SUP. However, local settings have expanded the margin of proper indication to include 75 patients (62.5%) approved for SUP. This finding aligns with the research conducted by Al-Akhali K et al., which indicates that acid suppression medications are frequently recommended as a preventive measure for stress-induced ulcers, even in cases where there is no clear rationale for their use (Al-Akhali K et al., 2019). 7 Out of the 20 patients (16.6%) who were included in the current study, all of them were exclusively assigned to the ICU. However, not all 33 ICU patients (27.5%) satisfied the requirements for SUP, indicating that the global guideline only applies to critically ill people admitted to the ICU. This finding aligns with the study conducted by Eid SM et al., which found that there were no patients approved for SUP in non-ICU care units according to ASHP guidelines [15]. Local settings led to the approval of the SUP regimen for 47 out of 87 non-ICU patients (54%) as deserving. This is similar to the findings reported by Abdallah D et al., who found that 49% of patients who were not approved for SUP were prescribed PPIs by their physicians under specific circumstances [10]. However, Zalloum N et al. (2016) reported 87% of improper PPI indications, which contradicts this finding. The study also emphasized the need to adhere to globally agreed-upon guidelines for all eligible indications.<sup>14</sup>The present investigation demonstrates a deficiency in compliance with physicians' guidelines, which indicate that 83% of erroneous indications occur. The research by Abdallah D et al. (2023) supports this finding, revealing a significant lack of physicians' adherence to guidelines, leading to a 76% rate of mis-indications [10]. The study conducted by Abdallah D. et al. also documented a financial burden resulting from the excessive use of PPIs in SUP. The occurrence of this cost expenditure is anticipated to manifest in our study for the identical rationale. Our work has provided valuable insights into the utilization of prophylactic regimens for stress-induced ulcers in hospital settings. Our results confirm that proton pump inhibitors (PPIs) are being used too much, with 42 cases (35%) of wrong indications, which is in line with what other studies and research in the same field have found. The study reveals a significant lack of compliance with international guidelines on stress-induced ulcer prevention (SUP). Nevertheless, it highlights a substantial disparity between global norms and local factors. The standards fail to adequately address numerous significant local challenges. This highlights the necessity of adapting the local procedure to suit our country. While several studies have found that the selection of PPI agents is inadequate, it is important to note that our study focused on the most optimal choices and approved agents, specifically pantoprazole, esomeprazole, rabeprazole, and omeprazole. The inconsistent esomeprazole prescriptions in the female department are a result of targeted marketing efforts. We hold this belief because all prescriptions issued by physicians share a common trade name. Hence, the implementation of supervision and inspection is critical in ensuring adherence to appropriate professional medical practice standards. The outcomes of erroneous indications are a clear indicator of drug

overutilization is evident concerning the outcomes of erroneous indications. This observation suggests that there is a significant financial burden on patients, which should be taken into consideration considering that our population belongs to the slogger class. However, the study did not identify any apparent barriers to the implementation of global recommendations and protocols for professional care. medical practice, including outdated medical staff who may not be up-to-date with the latest guidelines and procedures. Our study's findings indicate that we have successfully identified and addressed all necessary materials and efficiencies required to standardize medical practice and improve clinical outcomes across our region.

## 5. CONCLUSION

Our research has shed light on the use of prophylactic regimens for stress-induced ulcers in hospitals. It has been confirmed that there is an excessive use of proton pump inhibitors (PPIs), with 42 cases (35%) being misindicated, as anticipated by previous studies and research in the same field. The investigation reveals a conspicuous lack of compliance with global standards and norms for retrieving professional medical practice, rather than a failure of medical professionals to stay informed with the newest guidelines and regulations. Our study's findings indicate that we have successfully identified and addressed all necessary materials and efficiencies required to standardize medical practice and improve clinical outcomes across our region. There is still a significant disparity between worldwide norms and local concerns when it comes to stress-induced ulcer prevention (SUP). The standards fail to adequately address numerous significant local challenges. This highlights the necessity of adapting the local procedure to suit our country. While several studies have found that the selection of PPI agents is inadequate, it is important to note that our study focused on the most optimal choices and approved agents, specifically pantoprazole, esomeprazole, rabeprazole, and omeprazole. The inconsistent esomeprazole prescriptions in the female department are a result of targeted marketing efforts. Physicians hold this belief because they associate all prescriptions with a common trade name. Therefore, supervision and inspection play a crucial role. It is imperative to adhere to appropriate professional medical protocols. The clear indicator of drug overutilization is evident in the outcomes of erroneous indications. This observation suggests that there is a significant financial burden on patients, which should be taken into consideration considering that our population belongs to the slogger class. However, the study did not identify any apparent barriers to implementing global recommendations and protocols for professional medical practice, such as outdated medical staff who are not up-to-date with the current guidelines and procedures. Our study's findings indicate that we have successfully identified and addressed all necessary materials and efficiencies required to standardize medical practice and improve clinical outcomes across our region.

## 6. Acknowledgments

We express our gratitude to all the volunteers involved in this study.

## 7. Author Contributions

All authors provided the data analysis, drafted or revised the paper, and approved the final version for publication, agreeing to take responsibility for all aspects of the work.

## 8. Disclosure

The authors of this study do not report any conflicts of interest.

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