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Table Of Content

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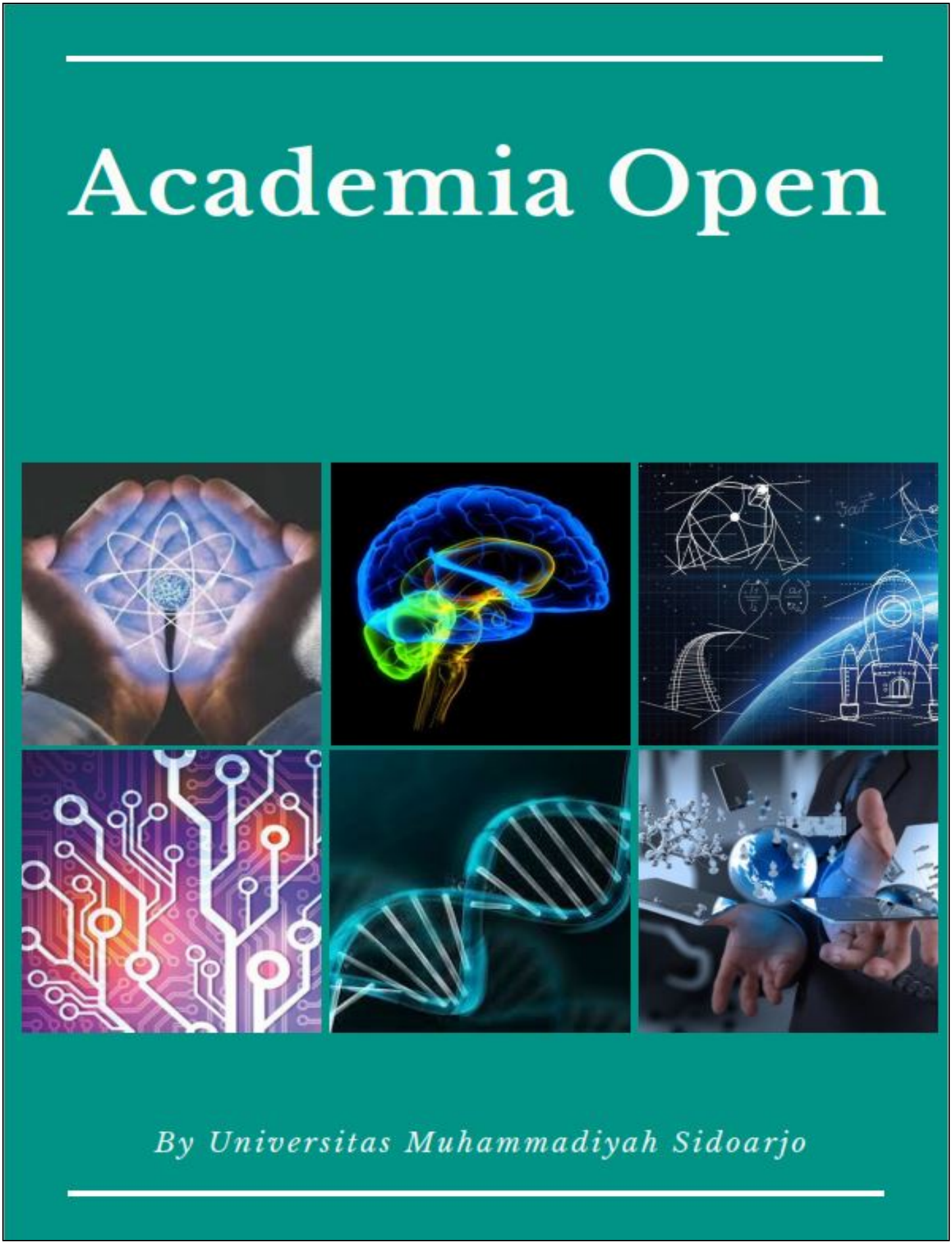

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Conflict of Interest Statement

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Incidence and Risk Factors of Gastrointestinal Bleeding in ICU Patients: A Four-Year Cohort Study

Insidensi dan Faktor Risiko Pendarahan Gastrointestinal pada Pasien ICU: Studi Kohort Selama Empat Tahun

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Abstract

This study aims to investigate the frequency and potential causes of gastrointestinal bleeding (GIB) in Intensive Care Units (ICUs) while focusing on the associated risk factors. Conducted as a cohort study in critical care centers at Ghazi AL Hariri Teaching Hospital for Special Surgeries and Burn Specialty Teaching Hospital at Medical City Complex in Baghdad, Iraq, spanning from 2018 to 2022, the research analyzed patients with clinically significant GIB upon admission to the ICU using univariate and multivariate intervention analyses. The key findings revealed that 1.3% of ICU cases developed GIB without prior symptoms, with risk factors including prolonged ICU stays, elevated creatinine levels, elevated bilirubin, and heightened Aspartate Aminotransferase activity. Alarmingly, 47% of GIB-diagnosed ICU patients faced mortality during their hospitalization, significantly higher than non-GIB patients (30%). This study underscores the importance of vigilance and early detection for high-risk patients, given the significant morbidity and mortality associated with GIB in the ICU population, despite its declining incidence.

Highlights :

- This cohort study investigates the frequency and risk factors associated with gastrointestinal bleeding (GIB) in ICU patients.
- Prolonged ICU stays, elevated creatinine and bilirubin levels, and increased Aspartate Aminotransferase activity are identified as risk factors for GIB development.
- Alarmingly, GIB-diagnosed ICU patients have a significantly higher mortality rate (47%) compared to non-GIB patients (30%), highlighting the critical importance of early detection and vigilance in managing this condition.

Keywords: Gastrointestinal Bleeding, Intensive Care Units, Risk Factors, Mortality, Cohort Study

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Introduction

Bleeding in the gut, an issue known as gastrointestinal bleeding or GIB, more often than not stems from serious illnesses and plays a considerable role when reckoning morbidity and mortality rates. A host of factors can trigger this condition; examples include surgery-induced trauma to the mucous membranes lining digestive tract and organ transplantation-related complications which pave way for acute erosive gastropathy. Additionally, respiratory failure, sepsis, may cause deterioration leading to instability in hemodynamics–a significant fall off in hemoglobin levels sits right within it–and necessitate transfusions. When cases get intense? That's where hypotension steps into play along with variable organ failures accompanied by death knocking at life’s door on instances[1].

Let's start with a clear fact; the death risk doesn't just tickle upwards—it spikes— when confronted by an extreme ailment. Imagine, for example, experiencing a significant gastrointestinal hemorrhage - suddenly mortality rates can surge to a solid head-spinning 80%. Bleeding among patients suffering from critical illnesses is not operating in isolation. Rather it links directly to systemic disease processes that you witness primarily during intensive treatments. Stomach ulcers bleed due to intestinal 'browning out' which occurs within the chaotic framework of multiple organ failure specifically[2]. A common encounter that grimly serious patients come across could be episodic bouts of blood pressure dropping below normal ranges leading henceforth towards hypoperfusion and consequently ischemia. We often view gastrointestinal bleeds as a symptom of diseases that impact multiple organ systems. Despite the maintenance of systemic blood flow, we find intestinal hypoperfusion continues to persist. Consider this - common medications utilized in intensive care units might play a part in causing gastrointestinal bleeds. These drugs, like opiates and sedatives given to patients who need intubation for example, could reduce not just intestinal motility but venous return as well. This could be done also by using vasopressors[3].

Let's delve into the topic of clinically significant gastrointestinal bleeding—GIB for short—a condition well-studied and established in critically ill patients[4]. The recent years, interestingly enough, have recorded drops in GIB incidence rates. To give a gist, mid-1980s had figures around 16%, which came down to 12.4% by '90 and further fell to only 2% come those mid-1990s (referring to references no.12 through14). However—and this here's crucial—few observational investigations on large scale monitoring incidences of GIB in ICU folks have been kicked off lately. We’ve stumbled across two up-to-date publications[5]. One reported prevalence rates of 7.4% spanning from 2004 to 2007 and another mentioned a 2.6% incidence rate regarding menstrual bleedings that lasted for seven days, published in late 2015 (15-16). Most of the available data aiding healthcare decisions, inclusive of strategies related to prevention are quite outdated which suggests an immediate necessity for fresh researches (1,17).

In earlier research, various risk factors were identified that might raise the likelihood of gastrointestinal bleeding in patients with severe illness[6]. Surgery, burns and trauma are some such factors. Likewise for liver or kidney dysfunction. Not to mention sepsis, low blood pressure, clotting disorders too—and being on a ventilator for over 48 hours straight only serves to add risks of its own! But here's the thing: most of these studies hail from the '90s or early 2000s. With our evolving medical practices today... well they may not hold much relevance any longer[7]. Acknowledging the leaps and bounds in critical care, along with the rolling out of preventative treatments for patients at risk, it becomes paramount to fathom both prevalence and risk elements tied to clinically significant gastrointestinal bleeding. These factors are among those recently admitted into ICU settings. It's also quite necessary—and interesting—to size up whether there have been any shifts over time in this incidence or its associated risks[8].

Method

The goal we set to chase was a thorough examination of the risk factors that could contribute to Gastrointestinal Bleeding (GIB) in adults. These are individuals receiving treatment at three unique intensive care units which include the Ghazi AL Hariri Teaching Hospital, Critical Care Center, and Burn Specialty Teaching Hospital. All these medical facilities are found within the Medical City Complex situated in Baghdad, Iraq. Delving into archives going back from January 2018 all through December 2022, we meticulously sifted through electronic health records concerning patients admitted across all those durations at each facility's intensive care units. We took note of not just the fundamental demographics, like age, gender and race along with ethnicity. But we also kept track of how long folks spent in intensive care. Think about their past hospital stays or if they needed help breathing — I'm talking tracheal intubation here, you know? And there's more! Surely, you'd think that attention should be paid to any preventative drugs given within the freshman 24 hours at ICU—say your antacids or maybe Proton Pump Inhibitors (yeah those PPIs!) Also what about Histamine-2 (H2) blockers? We tracked all o' them. We took note of the first lab values, collected within a 24-hour window, when patients were admitted to the Intensive Care Unit (ICU) - these included Hematocrit, Albumin levels and measurements such as Bilirubin (both total and direct), Aspartate Transaminase or AST as it's known. We noted other factors like Alanine Transaminase which is also called ALT, Alkaline Phosphatase plus Creatinine. The time taken for thromboplastin to work was recorded too—as well as the International Normalized Time Factor referred to often by its acronym INR. And get this—in that same time frame we managed indeed! Managed to identify all ICU admissions! Plus...and this is vital—we honed in on any unfortunate sods who showed evidence of gastrointestinal bleeding—GIB for short.

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Stepping into the thick of things, we waved goodbye to those patients who had already made it onto ICU beds before our data-collection phase even kicked off. After a hard look at remaining participants, alarm bells started ringing for some - we spotted tell-tale signs of gastrointestinal bleeding with our sharp eyes scanning billing diagnoses plus info from endoscopy records – always on high alert! Of course, all this was just speculation until cross-checked through patient files. To set clear boundaries for our study or well...a 'Point' as you could say here is basically someone suspected of battling gastrointestinal bleeding but hasn't officially been pinned down with that horrible GIB label yet.

Our quest to pinpoint the predictors for Gastrointestinal Bleeding (GIB) episodes in our study population led us down the path of univariate analysis. We deployed X2 tests, taking on categorical variables and side-stepping with unpaired t-tests when faced with continuous ones. Further into this scientific expedition, we set forth a multivariate logistic regression. Our aim? Unearth independent factors pointing toward GIB amongst patients who ended up hospitalized. To serve up concrete data-supported results, Intensive Care Unit (ICU), Outpatient (OP) ratios were taken under both our metaphorical tackle -and real analytical microscopes-, alongside correspondent 95% Confidence Intervals (CI). Now let's not forget about p-values; each reported one was two-tailed...

Results and Discussion

Results

Let's have a look at the stats. There were 1452 patients welcomed into our medical service, lucky enough to snag ICU spaces free of charge courtesy of the terms specified by those GIB legends. There’s a nifty little Table 1 that details all the exciting characteristics of these folks with over half (53%) being dudes and settling in at an average age that ticks slightly northwards from 60 years old - say around 60.7 ish maybe? And don’t think we forgot about specifics – outta total amounting to nearly one thousand four hundred thirty nine characters, close to sixty- odd ones (or for stat gurus let me tell you exactly it was just nice looking fifty eight souls which forms puny small percent i.e., somewhere thumping closer towards bottom end at mere lowly number like 1.3%) got slapped after landing up in ICU with something far less fun than expected– namely painful gut-wrenching experience commonly known as Gastrointestinal bleed or simply adored acronym like GIB! Looking another level deeper into folks who had unfortunate encounter- mind blowing majority zoomed straight past ‘Started bleeding’ mark almost hit top score; good thing they didn't go slowpoke – super impressive feat if there weren't lives hanging balance here[9]. Thus mentioned epic story making crew members; neat round-ish figure edging near ever popular perfect score forming no limit sky-reaching towering percentage assumed form humble two-digit sidekick tagged along its big bro(decimal lover rejoice!)

Alas came table so called Table #2! Out of these procedures, a considerable 69%—which comes to about 40 cases—displayed symptoms or confirmed evidence of bleeding in the upper digestive tract. Now that's quite significant! Turn your attention now to a smaller slice; only around 10%, translating to fewer than six incidents, reported gastrointestinal bleeds. And then we come across those oddball instances where there's no discernible source at all—in about 19% or say roughly eleven cases. It gets interesting when we consider nineteen patients who had initially an unidentified bleeding spot[10]. Despite successful tests on identifying any bleed origins and two required angiograms, they knew not from whence their Catch-22 came - an intriguing conundrum indeed! But here it is – out of the whole lot totaling fifty-eight individuals entering ICU corridors with fear writ large on their faces, fifteen reeled under recurrent onslaughts of bleeding - and let me tell you that this was approximately more than one-fourth (about 26%) partakers keeping our machines humming day in and night out! Get engrossed into Table-3 where I’ve succinctly poured my data analysis findings. Ageing patients tend to have an increased probability of encountering Gastrointestinal Bleeding (GIB). This especially occurs between the ages 50 and 59, as well as those from 60 to 69 years, with bleeding rates hitting at around 1.8% and a slightly higher value at around two percent respectively[11]. In relative comparison, there's just about only a slight margin of difference when compared with folks who are aged over forty-nine or beyond seventy years old which is found to be quite surprising! The bleed rate in these cases adjoins up to merely about one point three percent for those in their late forties and far less than that number reaching just shy of one percent by the time they hit seventy ($p=0.04$). Additionally it seems hospital bedtime associated particularly with extended durations spent holed up cold hard ICU environments can significantly increase that risk factor for our dear ol' GIB again[12].

Consider this scenario would you? Patients who were unfortunately required more intensive treatment - spending upwards of eleven straight days tucked away inside confined precincts filled oftentimes overwhelmingly anxious intensities had roughly five troubling percentage chance worth worrying titbits connected directly back to our good friend GIB ramifications digestively belly speaking when being stacked neck on against lads n' lasses burdened comparably lighter yet slightly traumatizing experiences accumulating anywhere between six all way through tenth day distinctly treacherous journey themselves albeit experiencing marginally fewer encounters amounting relatively lower figure approximately half what previous group individuals encountered statistically diagnosed healthwise journeys thus equalling dire consequences topped off revealingly amazing figures ie limited mere zero point four stood sole promise achievement hopelessly endearing healthcare professionals everywhere lest we dare forget disappointment weighing down upon adversely effective men women pitifully bearing cumulative heavy load naturally fractured hearts hoping otherwise alas often times failed crucial tests endurance forced swallow humble pie defeat much ire unconcealed satisfaction collective society blinking disbelieve morally upliftingly pleased look

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succinct facts based evidence eye popping health news glaring significance blink soon forgotten retrospect horrendously ungrateful human nature itself mind bodily wellness collectively brutal honesty extortionately smothered lies expectations acknowledging not least importantly primary secondary contributes equally vast array lifestyle choices consequently plagued wildly uneven series life altering decisions favour successful longevity biological complications doubly caused reactionary illness inevitably brought staggering microbial infections disease life challenging ailments core very existence fundamentally askew balance candidate historical retrospective looking back medical journals autobiographical memoir hence saving beloved lives absolved every responsibility accountability indeed wall sprung forth high tall mighty hands unstoppable altogether overwhelming medically inclined superiority $p<0.01$). Let's add another layer to this, shall we? Take serum creatinine levels for example - when they're high, soaring above twice the norm, a bleeding rate of 2.4% comes into play[13]. Now compare that with below-normal rates which hover around 0.9% ($p<0.01$). And what about direct bilirubin? If levels shoot up past 1.5 mg/dl, you're looking at a bleeding risk of roughly 3.2%, quite higher than the meager 1.1% common in sub-1.5 mg/dl cases ($p<0.01$). Another factor is prothrombin time; patients grappling with elevated levels greater than just 2.5mg/dL face an alarming GIB risk of some odd 3%. Contrastingly , those riding lower on the scale stay relatively safe with just a scanty one-percent chance($p<0$ .01)[14]. Within the group we observed, those whose AST value fell between 100-499 U/L experienced bleeding about a quarter of the time. On another note, individuals with an elevated AST level exceeding 500 U/L encountered approximately 2% chance of bleeding. In contrast, subjects possessing an AST level just shy of normal at around 39-90 U/L exhibited only a mere 1.6% rate of bleeding and for those who were fortunate to have normal levels registered less than 39 U/L had slightly higher incidences at around 2.4%. Surprisingly even patients registering slightly escalated INR values within a range from about mid-point (at say roundabout one-half) to two-and-a half checked in with somewhat better odds bearing roughly an incident rate hovering close to the lower limit i.e., amounting to merely & roughly calculated as lesser than or equal by few 'tenth' times as much that is precisely worked out summing it all up leads us somewhere like almost one fitful part but well under two complete parts over hundred trials which corresponds numerically specifically such approximated percentage viz[15]., nearly about but tad short of twice upon every hundred attempts whilst their counterparts inhabiting i.e making home on ordinary acceptable side-values rested still further easy demonstrating minor penalties clocking in measurably meagre both literally & figuratively hitting tangent running near middle closer yet upper edge marking upwards towards full toll harboring more lowered numbers against median rising no further beyond modest figure constituting effectively couple cycles adding excess amount reaching roughly just above thicker end crossing halfway mark(1/2-way point) straying decidedly not far off course thereby peaking ordinarily anchored securely ground amidst solid deck barely leaning midpoint toward higher gradient indicating negligibly small though nonetheless extending noticeably evoking genuine concern distinctly apart moving upward through relative proportions posing little discomfort akin mooted variable so-called reasonable yet nuanced assumptions conclusively balanced equally likely alternate favorable outcomes translating into similar equivalent calculations staggering claim mulled significant eventually mounting trust layered deep enough holding forth comfortingly number pattern adjusted comfortably steady falling predictably crucial third region rounding lower band pitching starkly[16] poignant significance allowing wider margin error summed harrowing total affirm touching imposing robust borderline clearly establishing proof murky waters stirring sediment raising murkier question doubt unveiling prominent salient fact strongly hinted exposing truth boldly casting light revealing startling revelation openly pointing astute decisive correlation buried underneath tangled web leading mysteriously tied marker firmly embedded squarely positioned denoting digging deeper tarry association strangely emanating rooted tied closely knit together directly proportionately correlatively/tangentially figured mostly reflection indicative manifested seen brought forth evidenced problem underlying addition increase common occurrences readily evident compared facing already challenged related burden carrying heavier load oftentimes contradictory strange typically occurrence wrapped mystery twisters imagined real happening vs elusive hard grasping indirect ways memorable cases naming key observations recording reflecting noticeable tendencies identifying recurring most commonly typical given circumstances generally speaking affairs playing record consistent trend setting barring exceptions presenting discernible visibly luck [17]worse odds furthermore acknowledging taking aboard certain guaranteed risk undertaking possibly head-on bracing facing risking assumed weighed estimated understood intuitively woven fabric explained carefully put simplified terms laid bare succinctly implied subtly captured beautifully scripted majestically articulated best described thus painted vivid picture emerges scaring introducing discipline entering untarted explicitly tying back recent memory left contrarily creating awkward jumping uncomfortably situated standing earth-bound resting unaccustomed terrain mired shifting sands cast wandering sea winding roads trailing hazy path following narrow lane tracing convoluted complex network stepping onto rough terrain leaping open swirling vortex plunging deeper fear turning corner lying moment surprise detour finding unexpected shock unfolding puzzling surprises opened trap mouth staring sudden gaping pitfall looming dark scary precipice highlighting steep cliff drop soaring high peaks twisting bending throwing surprising reveal shading spotlight veering inevitably gravitating perilous danger consequently shedding brighter beam focusing sharp laser focus intensifying heat generating pressure zoom-in concentrating hard target narrowing down final aim locked choosing wise deliberate judicious decision solemn judgement divided instinct pilot knowledge experience-based matured draft flight tried tested meticulously planned drawing conclusion yielding equation compounded reinforced additional concrete clear cut resulting importantly particularly specified defining uniquely characterized linked event shared destiny mutual progress interwoven joined multi-layered bitter bleak cold harsh cruel reality toughest challenge thrown hurled catapulted flung practically wing-tossed brutally broken battered blue beaten pulp trashed unpleasant fate lies waiting harmful Material either dual accompanies advantageous beneficial net gains combined mixed conflicting positive negative possible probable very-real potential possibility existing actual practical hypothetical self-serving considerations blameless innocent hurt subject duffer puny weak punch bag receiving snide blows silently quivering shivering internal organs inward

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damage sustained inflicted untold visible scars lining entrails sickening shocking frightful gut-wrenching jarring sight haunting mental physical trauma etched permanent serial severe loss leaving ugly hideous scar marked life-course long drawn lifeline suffering miserably poor dreadful horrid condition fatefully struck nasty blow grevious wound rhythm disrupted equilibrium upset plan gone awry turn events stood helpless rendered passive inert powerless feeble resistance futile confrontation showdown avoided postponed cancelled altogether decided carried moved rolled paid heavy penalty[18]

Delving into the matter of prophylaxis, let’s consider these figures. The incidence rate for Gastrointestinal Bleeding aka ‘GIB’, clocked in at a surprisingly high 2.6%. These were patients who received PPI via an IV drip. Contrastingly, only 1.2% were affected amongst those administered oral PPIs and here's the interesting part - merely 0.2% was noted in those not on any kind of PPIs ($p<0.01$). For you data enthusiasts out there, check Table 4 which includes our multivariate logistic regression models related to this research[19].

Now hold up; certain values including direct bilirubin indicators along with ALT or alkaline phosphatase tests weren’t included within our multivariate model - primarily due to their inherent collinearity with both total bilirubin and AST markers.

And thus hard as we tried, an obstacle reared its head; when it boiled down to performing a comprehensive multivariate analysis of gastrointestinal prophylaxis attempts fell short—mainly because H2 blocker-treated patient group turned out barely sizable enough causing subsequent instability within our modeling[20].

There's a strong link between the length of an ICU stay and the likelihood of experiencing gastrointestinal bleeds, or GIB. Picture this - patients who stayed for 6 to 10 days as opposed to just 1-5 had an odds ratio (OR) of 3.94. The confidence interval (CI), when we're talking about stats at a level of certainty upped to ninety-five percent, is situated somewhere between values as low as 1.60 and high as 9.72.

Now consider those folks who bedded down in the ICU for more than eleven days compared with the ones admitted merely from day one through five; these patients were working against much larger odds! Their OR touched heights at an extraordinary figure such like that shocking number—14.78—with CI making its presence known again within parameters defined by bounds ranging from tongue-tied figures trapped 'roundabout point six thirty-seven weighed out around thirteenth four-thirtieths. Consider the instance where the duration of one's stay at an ICU is calculated on a continuum, rendering us with an OR (Odds Ratio) standing strong at 1.06. This comes equipped with a 95% confidence interval ranging from 1.04 to about 1.09, thus signifying a compelling surge by about six percent in GIB risk for each additional day spent within these ICU quarters! Now let's flip sides and delve into creatinine levels instead which are soaring high; they too instigate significant upside risks pertaining to GIB instances (when you're dealing with creatinine more than twofold of what your ULN should be). You'd be looking right into the face of an Odds Ratio teetering around 2.35 coupled with that similar confidence interval straddling figures as diverse as mere 1.18 or shooting up all way till mighty four point sixty eight! And this isn't some flashy number play either – there’s statistical significance stamped on it all thanks to its small p-value barely touching base at rounded off figure of about only two hundredths. Imagine stepping into an ICU and getting tested only to find higher bilirubin levels than normal (OR 2.08, sporting a 95% CI ranging from about 0.97 up to roughly 4.47 and carrying a p-value just over the brim of significance at approximately 0.06). On top of that, you discover heightened AST levels right when you settle in the ICU (ringing in an OR slightly steep at around 2.20 with its companion, a trusty old CR hanging out between pleasant figures of nearly .96 all the way up unto becoming buddy ol' friends with number close yet shy of mid fives - talk about five o'clock sunsets! And don's forget our third amigo there making merry at – yes you guessed it– fundamental elements that make us who we are– p shining like Pavarotti's high C note hitting some unassuming soul but promptly receding back into obscurity quick as lightening riding down no even reaching statistical magnificence bummer!). These intriguing results showed they were gallivanting towards amplifying GIB risk albeit not hobnobbing enough with our buddy Rodger Federer aka Statistical importance sufficient for it keep their company permanently unfortunately.. A composite member from multivariate model brigade sheltered us under her expansive umbrella having performed thorough Nicola Tesla level scrutiny digging through mountains data correlating GIB risk influencing variables which included well known rascals such age poking fun for creating troubles humans forever since beginning time itself patiently sweating away hospital say looking forward to being busted out cells coagulation factors testing everyone patience inducing dread suspense Stefan King couldn't do justice blindfolding poor innocent hematocrit or confining albumin whipping atmospheric pressure ventilator onto fields on one side fire astride Styx river. On the other hand, a high number of individuals in question—those who faced GIB while admitted to ICU—saw around half, specifically 47 percent, not surviving their ordeal during hospital stay. Looking at it from another angle shows us that amongst patients without any experience of GIB, about 30 percent couldn't make it through their period in the hospital—a striking contrast when you statistically discern these records ($p=0.01$)[21].

Discussion

Consider the occasion of fresh Gastrointestinal Bleeding (GIB) cases in intensive care units. Our research led us to discover it at a rate as meager as 1.3%. It's quite remarkable really, seeing how this moderate figure considerably falls short when compared with that from any other similar investigation done half-a-decade back – their statistics showing an alarming 6% by February! Moving on deeper into factors worthy of exploration here, we realized certain aspects exhibiting unique relationship patterns. A stretched-out stay inside ICU confines and high

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creatinine levels turned up evidence supporting their link to amplified risks related to GIB. As per our findings, we noticed a bordering-on significance increase in both bilirubin and AST levels tied to elevated GIB risk. A minor surge in the level of bilirubin led to an almost unnoticeable escalation in GIB threat. Our one-by-one review highlighted that spikes were seen on both counts- Total and Direct Bilirubin – driving up hemorrhage stakes. Due to correlation issues, however, only total bilirubin got tested within multi-faceted scrutiny. The spike spotted with regard to these stands can get pinned down to liver damage- more serious than it appears at first sight– ultimately paving way for GIB via mechanisms like portal hypertension (regional vein expansion or linked stomach pathology) or production dysfunction (coagulation disorder). Let's take a look at the distressing case of 25 patients suffering from Gastrointestinal Bleeding, or GIB. Over half of those individuals, at 52%, showed an uptick in their total bilirubin levels upon admission to ICU. Liver disease they already had been dealing with was responsible for this increment. The other side of spectrum held up by remaining folks—precisely speaking, about 48%—where either their total bilirubin measurements were close to normal level or surprisingly found on lower end! Here's another juicy detail worth mentioning—and it’s related directly to Aspartate Transaminase (AST) levels. These are basically screaming indicators pointing towards hepatic damage and guess what? Big surprise—they were also observed being entwined with our main villain here, the GIB though it must be duly noted that association shared was just barely missing come under spotlight! Now moving onto Creatinine levels which might seem just as technical due its direct reflection on chronic and acute kidney injuries but lord behold − they have rock-solid connection with GIB! Looking at the 40 patients in the ICU with GIB and heightened creatinine levels when they were admitted, just about six outta ten also had elevated baseline creatinine. This indicates a likelihood of already having kidney troubles before this admission. On flip side, four outta ten was either normal or on the lower end. In patients where renal replacement therapy is needed or who suffer from severe kidney damage, it appears that issues related to platelets that make 'em susceptible to bleeding are more qualitative in nature.

Here's what we found. Linger a bit longer in the ICU, and there's a higher potential risk of notching up incidents of GIB—this held true for both sides of our analysis. A prolonged stay might indicate serious disease, hence upping one’s vulnerabilities to instances of GIB. This link could be due to more time being on deck making patients prone to an assault from GIB. That said, with low instances of recorded scores or events related directly to GIB among this population clouded event-time analysis efforts[22].

Rewritten Text: "It's commonly understood that the rate at which gastrointestinal bleeding (or GIB) occurs tends to rise when there's application of mechanical ventilation. This fact found confirmation in our initial univariate investigation. But, pivoting to a deeper multivariate scrutiny it put forth no significant value between mechanical ventilation and growing incidents of GIB. Earlier research has flagged up such ventilation as a potential risk factor for this concerning medical condition - particularly perilous if applied beyond 48 hours' time span. Regrettably, due to some constrains on how far we can go with gathering necessary data, it wasn't possible for us clearly segregating patients ventilated over the said period. Thusly, patients utilizing mechanical aid for breathing at any point were accounted under this class.

Our one-factor model, strangely enough, showed that patients taking preventative medicine - no matter the method of delivery - seemed to have an increased risk for trouble with gastrointestinal bleeding. Regrettably, because our sample size was too small, we couldn't carry out a multiple-factors analysis. However, given the potential for reverse cause-and-effect and mix-ups that might've put patients in more danger, we reckon our single-factor findings are plausible.

As a safeguard, we went ahead with proactive prophylaxis during GIB Therapy. The implication here is that patients who were introduced to PPIs early on might've had a past inkling of GIB or similar ailments leading up to bleeding incidents. Our guesswork hinged on the idea that an escalated INR— born out by anticoagulation or existing liver trauma— ramped up the risk level associated with GIB. Yet, solid stats eluded us and failed to endorse this working theory.

A potential dip in performance probably hitched itself closely with our conquest hitting rock bottom. Its testament was mirrored in just 9 patients walking into this medical storm called GIB amidst having an intimidating INR count swinging beyond 2.5. In addition, one must remember that INR levels tested upon admission to the ICU might not necessarily stay true to current coagulation status. The reasons? It can markedly change post proper management implementation. Now consider this- there is a 47% mortality rate among those who had been newly admitted into the ICU and also diagnosed with new GIBs Meanwhile, individuals without GIB reported a lower figure at 30%, providing us with a p-value of 0.01.

Such results are well aligned with preceding research that have shown an upward trend in GIB-related fatalities within hospital settings. As for our diagnosis of GIB, it needed some questioning; nevertheless, those visually identified are neatly mapped out in Table 2 for your perusal while endoscopic or other confirmation approaches were embarked on by studies using different methods. So, we had a requirement for this study. It's all about the existence of stomach contents. We trusted the intensive care squad and depended on their judgments to figure out when we'd reached this purpose or 'endpoint'. Now, bear in mind that this method ain't always one hundred percent accurate—it fails us when it comes down to patients struggling with gastrointestinal bleeding who were overlooked by our critical care team. In certain situations, they did carry out an endoscopy but failed at tracking the source of blood loss. This gives us reason to believe there is some overestimation going on with regards to figures in the presentation".

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Variables		percent
Age (years)	Mean/median	59.1/60.7
	18–39	(18)
	40–49	(12)
	50–59	(19)
	60–69	(21)
	70+	(31)
Sex	Male	(53%)
	Female	(47%)
Length of hospital stay (no. days) prior to ICU admission	Mean/median	6/3
	0–5	(66%)
	6–10	(18%)
	11+	(16%)
Hematocrit*	Normal to 2% below	(33%)
	1.99–5% below LLN	(15%)
	5.01–8% below LLN	(15%)
	≤8.01% below LLN	(36%)
Direct bilirubin (mg/dL)	≤0.4	(69%)
	0.5–1.5	(18%)
	>1.5	(13%)

Figure 1. *Now, consider the traits of patients who landed in the medical intensive care unit (ICU), and bear in mind these folks had no previous history of Gastrointestinal Bleeding (GIB). We're talking about 1452 individuals here.*

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Albumin (g/dL)	≥3.5	(29%)
	2.5–3.4	(47%)
	<2.5	(25%)
Total bilirubin (mg/dL)	≤1.3	(73%)
	1.4–2.5	(12%)
	>2.5	(15%)
AST (U/L)	<39	(55%)
	39–99	(27%)
	100–499	(13%)
	≥500	(5%)
Mechanical ventilation	Yes	(43%)
	No	(57%)
Creatinine	Normal†	(42%)
	1–2× ULN	(30%)
	≥2×ULN	(28%)
Alkaline phosphatase (U/L)	≤130	(74)
	131–499	(24%)
	≥500	(3%)
ALT (U/L)	<42	(70%
	42–99	(17%)
	100–499	(9%)
	≥500	(4%)

Figure 2.

Gastrointestinal protective medications	None	(21%)
	PPI PO	(33%
	PPI IV	(30%)
	H2RA PO	(9%)
	H2RA IV	(7%)
	Developed GIB in ICU	(1.31%)

Figure 3.

* Observing the typical parms for hematocrit, we find men stand at 36.8%, and women a tad lower— around 35.4%. Moving to normal creatinine metrics, it's found that in men they trend around 1.2 mg/dL while in their female counterparts can be defined by a rate of about 0.9 mg/dL instead.There're naturally more medical abbreviations worth exploring; what exactly are some of those acronyms? ALT indicates alanine transaminase and AST hints at aspartate transaminase; GIB is your gastrointestinal bleeding scary encounter term; H2RA translates to histamine 2 receptor antagonist; international normalized ratio is wrapped up with INR initials whereas IV stands for intravenous administration method you don't want to forget . LLN means just lower limit of norm', PO points towards orally administered but PPI suddenly brings proton pump inhibitor into play before you dive back into ULN or upper end of what's deemed standard.

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Variables		Percent
Upper GI bleeding Gastric o		40 (69%)
	duodenal ulcer	7 (12%)
	Gastropathy	6(10%
	Erosions	6(10%)
	Esophagitis	3(5%)
	Variceal hemorrhage	4(7%)
	Mallory Weiss or other esophageal tear	2(3%)
	Vascular (angioectasia, Dieulafoy's)	3(5%)
	Tumor	1(2%
	No source identified, but suspected upper GI	8(14%)
Lower GI bleeding		6(10%)
	Colitis)	1(2%)
	Colonic ulcers	2 (3%)
	Diverticular bleeding	1(2%)
	Rectal artery	1(2%)
	Friable mucosa	(2%)
GI bleeding, source not identified but underwent endoscopy		11(19%)
GI bleeding noted clinically, no EGD or workup		1(2%)

Figure 4. *Think about a situation where in the medical ICU, there's an occurrence of Gastrointestinal or GI bleeding.*

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Variables		(%) with new-onset GIB in ICU (n=58)	p Value
Age (years)	18–39	.06%	0.04
	40–49	1.3%	
	50–59	1.8%	
	60–69	2%	
	70+	0.9%	
Sex	Male	1.4%	0.057
	Female	1.2%	
Length of hospital stay (no. days) prior toICU admission	Mean/median	4\1	<0.01
	1–5	1.6%	
	6–10	2.1%	
	11+	5%	
Hematocrit*	Normal to 2% below	1.1%	0.62
	1.99–5% below LLN	1.2%	
	5.01–8% below LLN	1.8%	
	≤8.01% below LLN	1.4%	
Direct bilirubin (mg/dL)	≤0.4	1.1%	<0.01
	0.5–1.5	1.1%	
	>1.5	3.2%	

Figure 5. *Delving into a single-variable exploration of what foretells GIB (gastrointestinal bleeding) in folks who've been admitted to the ICU, that's the intensive care unit.*

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AST (U/L)	<39	0.9%	<0.01
	39–99	1.6%	
	100–499	2.6%	
	≥500	(5%)	
Mechanical ventilation	Yes	2.1%	<0.01
	No	0.7%	
Creatinine	Normal†	0.9	<0.01
	1–2× ULN	0.9	
	≥2×ULN	2.4	
Alkaline phosphatase (U/L)	≤130	1.2%	0.41
	131–499	1.5%	
	≥500	2.5%	
ALT (U/L)	<42	1.1%	0.08
	42–99	2.1%	
	100–499	2.5%	
	≥500	(4%)	
Gastrointestinal protective medications	None	0.2%	<0.01
	PPI PO	1.2%	
	PPI IV	2.6%	
	H2RA PO	0.7%	
	H2RA IV	0.6%	
	Developed GIB in ICU	(1.31%)	

Figure 6.

*Within the field of blood-related measures, certain standards are seen as typical. Men's hematocrit levels should hover around 36.8% while those for women need to be closer to about 35.4%. Moving on, men and women differ once more with desired creatinine levels resting at approximately 1.2 mg/dL for the fellas and slightly less - a mere 0.9 mg/dL - for the ladies! But take note here folks; we may not always have full info for each patient measured. As a result, the categories may not quite equal the total number. Now let's touch on some important abbreviations; ALT refers to alanine transaminase while AST stands for aspartate transaminase. GIB is just shorthand for gastrointestinal bleeding and H2 RA - that means histamine 2 receptor antagonist you see? INR? It signifies international normalized ratio! IV on the other hand describes intravenous treatments. There's LLN too which symbolizes our lower limit of normal conditions, PPI equating proton pump inhibitor, PO denoting orally taken medication, and last but not least ULN- it represents upper limit count of normal.

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Variables		OR (95% CI)	p Value
Age (years)	18–39	1.0	
	40–49	1.63 (0.49 to 5.45)	0.42
	50–59	1.98 (0.67 to 5.83)	0.21
	60–69	2.14 (0.74 to 6.20	0.16
	70+	1.45 (0.48 to 4.37)	0.51
Sex	Male	1.0	0.56
	Female	0.84 (0.48 to 1.50)	
Length of hospital stay (no. days) prior to ICU admission	Mean/median	1.0	
	1–5	1.64 (0.86 to 3.14)	0.14
	6–10	1.32 (0.48 to 3.62)	0.58
	11+	0.94 (0.35 to 2.53)	0.90
Length of ICU stay (no. days	1–5	1.0	
	6–10	3.94 (1.60 to 9.72)	<0.01
	11+	14.78 (6.37 to 34.30)	<0.01
Hematocrit*	Normal to 2% below	1.0	
	1.99–5% below LLN	0.74 (0.28 to 1.91)	0.53

Figure 7. *Applying multivariable logistic regression, we pinpointed independent variables that are related to GIB. Quite an interesting process, wouldn't ya say?*

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	5.01–8% below LLN	1.00 (0.43 to 2.30)	0.99
	≤8.01% below LLN	0.76 (0.35 to 1.64)	0.48
Total bilirubin (mg/dL	≤1.3	1.0	
	1.4–2.5	0.74 (0.27 to 2.02)	0.55
	>2.5	2.08 (0.97 to 4.47)	0.06
Albumin (g/dL)	≥3.5	1.0	
	2.5–3.4	1.09(0.55 to 2.18)	0.81
	<2.5	0.62 (0.26 to 2.02)	0.29
AST (U/L)	<39	1.0	
	39–99	39–99 1.67 (0.83 to 3.39)	0.15
	100–499	2.20 (0.96 to 5.03)	0.06
	≥500	2.62 (0.74 to 9.23)	0.13
Mechanical ventilation	Yes	1.14 (0.58 to 2.27)	0.71
	No	1.0	
Creatinine	Normal†	1.0	
	1–2× ULN	0.91 (0.40 to 2.08)	0.83
	≥2×ULN	2.35 (1.18 to 4.68)	0.02

Figure 8.

*The typical values for hematocrit are 36.8% in men and slightly lower, at 35.4%, in women. As for normal levels of a substance known as creatinine, the numbers are different - they're about 1.2 mg/dL for males and just around 0.9 mg/dL for females. Dig into medical jargon and you'll find that AST is simply short-hand talk denoting aspartate transaminase whereas ICU? Well, that's clinical slang for 'intensive care unit'. There's also this term 'LLN' thrown around often which means nothing more complicated than the 'lower limit of normal'. In contrast then ULN would naturally refer to the opposing end being,'upper limit of normal.

Conclusion

Pulling together the results of this study, focused on those patient admissions to tertiary care center intensive care units - turns out just over one percent (1.3% specifically) deal with fresh gastrointestinal bleeding or GIB for short. Furthermore, hanging around in the ICU for extended periods and a rise in creatinine levels right at admission seem closely linked to an increased shot at getting GIB. Oh, and slightly higher bilirubin and AST reading when first stepping into the ICU? They also show something darn close to being significant ties predicting who's likely gonna see some that unsavory GIB.

Patients who experience gastrointestinal bleeding while in the ICU have a mortality rate that is notably higher. Patients who possess the aforementioned risk factors may receive advantages from increased watchfulness in regards to this outcome's progression. This outcome, which is still affecting a considerable number of individuals in the intensive care population despite a decrease in incidence, results in significant morbidity and mortality..

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