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Contents

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SPMC JHCS

EDITORIAL

BUCAS centers—enhancing access to urgent and ambulatory care in underserved areas across the country

Alvin S Concha[1]

In early 2024, under its Modernization for Health Equity framework and in line with the Universal Health Care Law—ensuring every Filipino immediate access to preventive, promotive, curative, rehabilitative, and palliative care[1]—the Department of Health launched the "28 for 28 by 28" initiative to establish 28 Bagong Urgent Care and Ambulatory Service (BUCAS) centers, aiming to serve 28 million of the poorest Filipinos by 2028.[2] The BUCAS Program also aligns with the DOH's 8-Point Action Agenda, specifically addressing "Bawat Pilipino ramdam ang kalusugan" and "Ligtas, dekalidad at mapagkalingang serbisyo."[3] BUCAS centers were created to bridge critical gaps in the Philippine health care system, delivering urgent medical, surgical, and dental care to underserved populations. These centers serve as primary care hubs, decongesting hospitals by offering preventive, diagnostic, and curative services, and guiding patients to higher-level facilities when needed.

The first BUCAS center was launched in Santo Tomas, Pampanga, on March 6, 2024.[4] By December 16, 2024, a total of 41 BUCAS centers are in operation, with 40 registered in the National Health Facility Registry.[5] The remaining center, the SPMC-City Government of Davao Marilog District Hospital BUCAS Center, is managed by the Southern Philippines Medical Center in partnership with the City Government of Davao Marilog District Hospital and duly supported by the Department of Health Davao Center for Health Development and the Davao City Health Office (see infographic). More BUCAS centers are being developed with increased funding support from Congress.[6] While some BUCAS centers are located within or near DOH hospitals as an extension of their services, many operate at a considerable distance from DOH hospitals or other health facilities.

The BUCAS centers work with DOH hospitals, local government units (LGUs), state universities, and regional Centers for Health Development.[7-11] They rely on shared infrastructure and human resources. Funding sources include PhilHealth reimbursements, the Medical Assistance to Indigent and Financially Incapacitated Patients (MAIFIP) program, Malasakit Centers, other insurers, and quantified free services provided by DOH hospitals.

BUCAS centers are designed to offer accessible, urgent care, giving walk-in patients a less crowded alternative to tertiary hospitals. Services provided include support for emergency rooms through treatment of non-life-threatening cases, outpatient consultations, x-rays, laboratory tests, minor surgeries, dental/oral health services, and continuity of care through follow-up check-ups and referrals. Collaborations with DOH hospitals and LGUs further enhance health care accessibility. A well-rounded health care team is essential to deliver effective urgent and ambulatory services, encompassing General Surgery, Obstetrics and Gynecology, Anesthesiology, Radiology, Internal Medicine, Pediatrics, Family Medicine, Emergency Medicine, and Dental Medicine services, to name a few. BUCAS centers also provide an ideal environment for resident physicians to develop their competencies through hands-on experience with first-contact and continuing health care.

Yet, challenges remain. Currently, BUCAS centers are primarily located in accessible areas, leaving gaps in the original objective of reaching the poorest Filipinos in disadvantaged areas. A robust referral and back-referral system with tertiary hospitals is also needed to ensure continuity of care as BUCAS centers expand, preventing fragmentation and improving outcomes. Sustainability is also a significant concern, as these centers often depend on temporary staff and face funding uncertainties. As facility infrastructure improves, it becomes crucial to develop strategies for attracting and retaining skilled health care professionals. Without adequate staffing, even well-equipped facilities cannot provide timely, quality care.

Expanding PhilHealth coverage for primary health care would enhance access to diagnostics and treatment, particularly for underserved populations. It should also include preventive health

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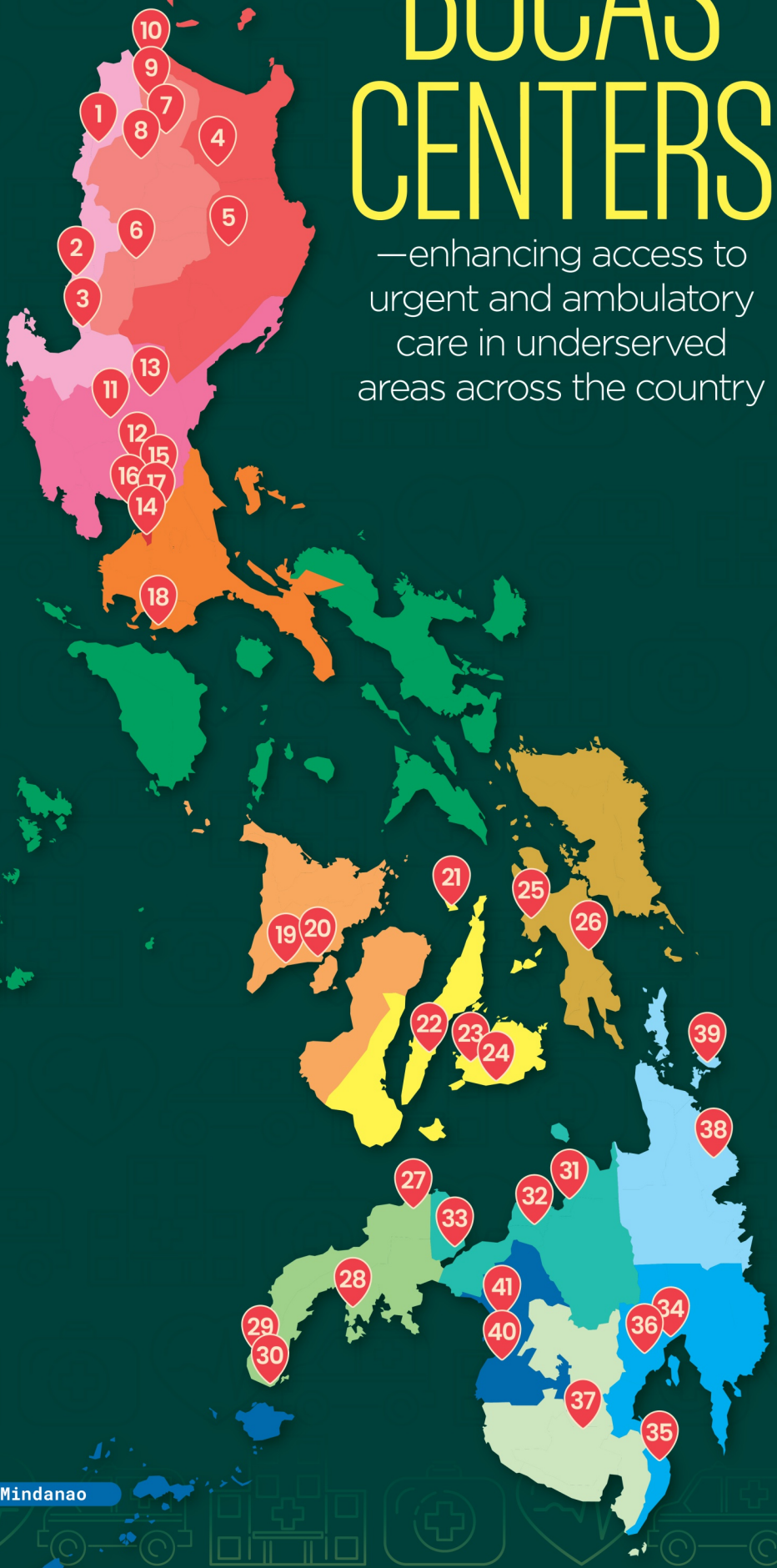
BUCAS CENTERS

—enhancing access to urgent and ambulatory care in underserved areas across the country



Region I

1. Mariano Marcos Memorial Hospital and Medical Center - Banna BUCAS Center
2. Ilocos Training and Regional Medical Center/Bagong Urgent Care And Ambulatory Services (BUCAS) Center
3. BUCAS Center - Tubao, La Union

Region II

4. Amulung BUCAS Center
5. Mallig BUCAS Center

Cordillera Administrative Region

6. Luis Hora Memorial Regional Hospital - Natonin BUCAS Center
7. Conner District Hospital Calaoan BUCAS Center
8. Conner District Hospital Mataguisi BUCAS Center
9. Far North Luzon General Hospital And Training Center Kasaranay BUCAS Center
10. Far North Luzon General Hospital And Training Center Tanglagan BUCAS Center

Region III

11. Jose B. Lingad Memorial General Hospital BUCAS Facility
12. Dr. Jose N. Rodriguez Memorial Hospital BUCAS Center
13. Dr. Paulino J. Garcia Memorial Research And Medical Center - Talavera General Hospital BUCAS Center

National Capital Region

14. Amang Rodriguez Memorial Medical Center Agarang Gamutan at Atensyon para sa Pamayanan Center
15. East Avenue Medical Center Urgent and Ambulatory Care
16. Philippine Heart Center (BUCAS) Center
17. Quirino Memorial Medical Center BUCAS Center

Region IV-A

18. Batangas Medical Center - Batangas State University BUCAS Center

Region VI

19. Knowtell Mall-Based And Mobile Clinic
20. Western Visayas Medical Center BUCAS Center

Region VII

21. Sugbucas Center - Bantayan District Hospital District Hospital
22. Sugbucas Center - Cebu Provincial City Carcar City
23. Tagbilaran - Governor Celestino Gallares Memorial Medical Center BUCAS Center
24. Trinidad - Governor Celestino Gallares Memorial Medical Center BUCAS Center

Region VIII

25. Eastern Visayas Medical Center Villaba BUCAS Center
26. Tolosa Polyclinic BUCAS Center

Region IX

27. Dr. Jose Rizal Memorial Hospital BUCAS Center
28. Margosatubig Regional Hospital BUCAS (Center)
29. Mindanao Central Sanitarium BUCAS Center
30. Zamboanga City Medical Center - Western Mindanao State University BUCAS Center

Region X

31. Northeastern Misamis General Hospital BUCAS Center
32. Northern Mindanao Medical Center BUCAS Center
33. Mayor Hilarion A. Ramiro Sr. Medical Center - Plaridel Community Hospital BUCAS Center

Region XI

34. Davao Regional Medical Center BUCAS Center
35. Davao Occidental General Hospital BUCAS Center
36. Southern Philippines Medical Center - City Government of Davao Marilog District Hospital BUCAS Center

Region XII

37. SOCCSKSARGEN General Hospital BUCAS Center

Region XIII

38. Adela Serra Ty Memorial Medical Center BUCAS Center
39. Siargao Island Medical Center BUCAS Center

Bangsamoro Autonomous Region in Muslim Mindanao

40. Cotabato Regional Medical Center BUCAS Center
41. Cotabato Sanitarium and General Hospital BUCAS Center

care costs to support regular care and early intervention. Preventive and educational programs will promote healthier practices and reduce urgent care demands. Proactive health care service adjustments based on community health data and feedback will enable BUCAS to address evolving needs effectively. Research on patient trends, cost-effectiveness, and the overall impact on health care delivery will help refine the BUCAS model. Data on patient load and the impact on host hospitals will be invaluable for evaluating efficiency and scalability. Regular forums for sharing best practices can enhance collaboration and improve service delivery across BUCAS centers.

Maintaining quality standards in the operation of these centers through licensing is also crucial to ensure that all facilities meet established health care benchmarks. Ensuring that geographically isolated and disadvantaged areas benefit from BUCAS services should also remain a priority. Long-term financing, sufficient staffing, and equipping these centers without overburdening host hospitals are critical for sustainability. Empowering local governments to manage these centers could improve their future stability.

The development of BUCAS centers marks a significant step towards accessible and efficient health care. Their strategic locations and range of services have the potential to relieve hospital emergency rooms. However, ongoing improvements—such as developing sustainable funding and staffing strategies, and adapting services based on community health data and research to meet evolving needs—are needed to enhance patient experience. The success of BUCAS centers ultimately depends on their ability to deliver affordable, accessible, high-quality, and responsive care to all Filipinos.

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RESEARCH

Association of ABO blood groups with COVID-19 severity and mortality: retrospective cohort study

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ABSTRACT

Background. The ABO blood group system has been linked to susceptibility to various viral infections, with some evidence suggesting that blood group O may reduce the risk of contracting SARS-CoV-2. However, the relationship between ABO blood groups and COVID-19 severity and mortality remains unclear and inconsistent.

Objective. To determine the association between ABO blood groups and COVID-19 severity and mortality among hospitalized patients.

Design. Retrospective cohort study.

Participants. 346 male and female patients diagnosed with COVID-19 admitted to a tertiary care hospital and with documented ABO blood types.

Setting. Southern Philippines Medical Center, Davao City, Philippines, from March 2020 to December 2022.

Main outcome measures. COVID-19 severity and mortality; odds ratio (OR) of COVID-19 severity and mortality in patients with blood type A, B, and AB.

Main results. Among the 346 patients, the median age was 39.5 years (IQR: 26.0–60.0), with 43.35% male and 56.65% female. Blood type distribution was 28.90% A, 22.25% B, 7.23% AB, and 41.62% O. Age >39.5 years was significantly associated with severe-to-critical COVID-19 (adjusted OR for severity: 10.81; 95% CI: 6.07–19.27; p<0.001) and mortality (adjusted OR for mortality: 9.71; 95% CI: 4.89–19.29; p<0.001). Female sex was protective against severe-to-critical outcomes (adjusted OR: 0.59; 95% CI: 0.37–0.94; p=0.023). No significant association between ABO blood groups and COVID-19 outcomes was observed after adjusting for age and sex.

Conclusion. Patients with COVID-19 over 39.5 years had significantly higher odds of severe-to-critical illness and mortality. Female patients were less likely to develop severe-to-critical disease compared to males. After adjusting for age and sex, ABO blood groups do not independently influence disease severity or mortality.

Keywords. blood type, severe-to-critical COVID-19, asymptomatic-to-moderate COVID-19, death

INTRODUCTION

The COVID-19 pandemic has underscored the importance of identifying factors influencing an individual's susceptibility and outcomes related to the disease. These risk factors are broadly categorized into modifiable factors, such as, higher body mass index, elevated glycated hemoglobin levels, smoking, and hypertension,[1-3] and non-modifiable factors, including advanced age, male sex, black ethnicity, and socioeconomic deprivation.[3-5] Such factors were extensively investigated during the early phase of the pandemic.

The ABO blood group, a non-modifiable factor, has long been associated with susceptibility to viral infections such as hepatitis B, human immunodeficiency virus,[6] and dengue virus.[7] Emerging evidence suggests that individuals with blood group O are less likely to contract SARS-CoV-2 compared to those with non-type O blood groups. The presence of anti-A antibodies in both B and O blood groups inhibits the adhesion of the SARS-CoV-2 spike protein to angiotensin-converting enzyme 2-expressing cells (ACE-2), thereby inhibiting virus entry and attachment.[8 9] Other factors contributing to the protective role of blood group O include higher levels of immunoglobulin G and lower plasma concentrations of procoagulant factor VIII and von Willebrand factor compared to other blood groups.[9 10]

Many studies have explored the potential link between ABO blood groups and COVID-19 susceptibility and severity, yield-

IN ESSENCE

The ABO blood group has been reported as a potential factor affecting susceptibility, severity, and mortality among patients with COVID-19.

In this retrospective cohort study among patients with COVID-19, age and sex are significant factors in determining disease severity and mortality.

ABO blood groups do not appear to play an independent role in determining severity or mortality in this population.

ing conflicting findings.[9 11-21] Variations in study design, sample size, population demographics, and the presence of confounding variables have limited the ability to draw definitive conclusions about this relationship. The influence of ABO blood groups on COVID-19 outcomes may extend beyond traditional factors such as age and sex, emphasizing the need for further investigation. If a definitive association between ABO blood groups and COVID 19 severity is established, it could significantly improve health care by enabling better risk stratification, guiding patient management, and optimizing resource allocation. We conducted this study to determine the association between ABO blood groups and COVID-19 severity and mortality among hospitalized patients.

METHODOLOGY

Setting

We conducted a retrospective cohort study on patients with COVID-19 infection admitted to the Southern Philippines Medical Center (SPMC). From the start of the pandemic in March 2020 up to December 2022, our institution had an average monthly admission of 600 patients with COVID-19.

Participants

Patients admitted to SPMC for COVID-19 infection between March 2020 and December 2022, who had undergone blood typing with available results, were included in the study. Blood typing is not routinely performed for all COVID-19 admissions at SPMC. It is typically ordered only when clinically indicated, such as in cases requiring blood transfusion or other procedures necessitating blood group identification during the hospital stay. Additionally, patients admitted for COVID-19 who had previously undergone blood typing at SPMC, with records available from prior admissions, were also included. Conversely, patients evaluated in the emergency room but not admitted to our institution were excluded from the study. The minimum sample size for this study was estimated using StatCalc from Epi Info™ v5.5.11. The estimation was based on the assumptions that 46.2% of patients with blood type O died from COVID-19 infection,[22] that the ratio of patients with blood type A and blood type O is 0.70, and that mortality among patients with blood type A is 20% higher than among those with blood type O. In a computation for odds ratio to determine the association of blood type with mortality, with a 5% level of significance, a minimum sample size of at least 218 will have 80% power to reject the null hypothesis if the alternative holds.

Data collection

In this study, we reviewed the medical records of patients admitted for COVID-19 infection. From these records, we collected data on age, sex, and blood type—types O, A, B, and AB. The main outcome measure of this study was COVID-19 mortality during hospital admission. We also considered COVID-19 severity as a secondary outcome measure for this study. We dichotomized COVID-19 severity into asymptomatic-to-moderate versus severe-to-critical COVID-19.

Statistical analysis

We reported the categorical variables as frequencies and percentages. To assess whether the continuous variable (age) followed a normal distribution, we used the Shapiro-Wilk test. Since age was not normally distributed, we computed its median and interquartile range (IQR). We performed univariate logistic regression to determine the unadjusted associations of age, sex, and blood type with COVID-19 severity and mortality. We also conducted multivariable logistic regression to explore the association between blood type and COVID-19 severity and mortality. In this model, we included both age and sex as potential confounders and controlled for their effects in the analysis. We summarized continuous variables using means and standard deviations, and expressed categorical variables as frequencies and percentages. For all our statistical tests, we utilized Epi Info™ 7.2.2.6.

RESULTS

The demographic and clinical characteristics of patients with COVID-19 infection are shown in Table 1. The patients in the study had a median age of 39.50 years (IQR: 26.00 to 60.00), a sex distribution of 150/346 (43.35%) males and 196/346 (56.65%) females, and a COVID-19 severity distribution of 73/346 (21.10%) asymptomatic, 100/346 (28.90%) mild, 64/346 (18.50%) moderate, 58/346 (16.76%) severe, and 51/346 (14.74%) critical. The distribution of

Table 1 Demographic and clinical profile of patients with COVID-19 infection.

Characteristics	Values (n=346)
Median age (IQR), *years*	39.5 (26.00 to 60.00)
Sex, *frequency (%)*	
Male	150 (43.35)
Female	196 (56.65)
COVID-19 severity, *frequency (%)*	
Asymptomatic	73 (21.10)
Mild	100 (28.90)
Moderate	64 (18.50)
Severe	58 (16.76)
Critical	51 (14.74)
Blood type, *frequency (%)*	
A	100 (28.90)
B	77 (22.25)
AB	25 (7.23)
O	144 (41.62)
Outcome, *frequency (%)*	
Recovered	259 (77.31)
Died	76 (22.69)

blood type was 100/346 (28.90%) type A, 77/346 (22.25%) type B, 25/346 (7.23%) type AB, and 144/346 (41.62%) type O. The majority of the patients (259/346; 77.31%) recovered after their COVID-19 infection, while 76/346 (22.69%) died.

Table 2 shows the association of selected demographic and clinical characteristics, and blood type with COVID-19 severity. An age of >39.5 years significantly increases the odds of experiencing severe-to-critical COVID-19 (OR=10.81; 95% CI 6.07 to 19.27; p<0.001) among patients with COVID-19 infection. We also found that female COVID-19 patients have significantly lower odds of experiencing severe-to-critical COVID-19 than male patients (OR=0.59; 95% CI 0.37 to 0.94; p=0.023). In the univariate regression analysis, using blood type O as the reference, no significant association was found between blood type and severity among patients with COVID-19 infection. In the multivariable analysis, we identified age and sex as confounders in the association between blood type and COVID-19 severity and mortality. After adjusting for these confounders, we found no significant association between blood type and COVID-19 severity.

The association of selected demographic and clinical characteristics, and blood type with COVID-19 mortality is shown in Table 3. In the univariate regression analysis, we found that an age of >39.5 years increases the odds of death (OR=9.71; 95% CI 4.89 to 19.29; p<0.001) among patients with COVID-19 infection. Using blood type O as the reference, the univariate regression analysis found no significant association between blood type and mortality among patients with COVID-19 infection. In the multivariable analysis, after adjusting for age and sex, we also found no significant association between blood type and COVID-19 mortality.

Table 2 Association of demographic and clinical characteristics with COVID-19 severity.

Characteristics	Asymptomatic to Moderate COVID-19 (n=226)	Severe to Critical COVID-19 (n=109)	OR (95% CI) for severe to critical COVID-19	p-value	Age- and sex-adjusted OR (95% CI) for severe to critical COVID-19	p-value
Age, *frequency (%)*						
≤39.5 years	154 (68.14)	18 (16.51)	(reference)			
>39.5 years	72 (31.86)	91 (83.49)	10.81 (6.07 to 19.27)	<0.001*		
Sex, *frequency (%)*						
Male	87 (38.50)	56 (51.38)	(reference)			
Female	139 (61.50)	53 (48.62)	0.59 (0.37 to 0.94)	0.023*		
Blood type, *frequency (%)*						
O	98 (43.36)	45 (41.28)	(reference)		(reference)	
A	70 (30.97)	26 (23.85)	0.81 (0.46 to 1.43)	0.467	0.85 (0.44 to 1.63)	0.619
B	44 (19.47)	29 (26.61)	1.44 (0.80 to 2.58)	0.227	1.19 (0.61 to 2.32)	0.618
AB	14 (6.19)	9 (8.26)	1.40 (0.56 to 3.47)	0.468	1.22 (0.43 to 3.47)	0.705

*significant at p<0.05

Table 3 Association of demographic and clinical characteristics with COVID-19 mortality.

Characteristics	Alive (n=259)	Mortality (n=76)	OR (95% CI) for mortality	p-value	Age- and sex-adjusted OR (95% CI) for mortality	p-value
Age, *frequency (%)*						
≤39.5 years	161 (62.16)	11 (14.47)	(reference)			
>39.5 years	98 (37.84)	65 (85.53)	9.71 (4.89 to 19.29)	<0.001*		
Sex, *frequency (%)*						
Male	106 (40.93)	37 (48.68)	(reference)			
Female	153 (59.07)	39 (51.32)	0.73 (0.44 to 1.22)	0.230		
Blood type, *frequency (%)*						
O	113 (43.63)	30 (39.47)	(reference)		(reference)	
A	78 (30.12)	18 (23.68)	0.87 (0.45 to 1.66)	0.673	0.93 (0.46 to 1.89)	0.849
B	54 (20.85)	19 (25.00)	1.33 (0.69 to 2.56)	0.403	1.11 (0.54 to 2.67)	0.783
AB	14 (5.41)	9 (11.84)	2.42 (0.96 to 6.13)	0.062	2.36 (0.83 to 6.73)	0.107

*significant at p<0.05

DISCUSSION

Key results

The study found that age over 39.5 years significantly increases the odds of severe-to-critical COVID-19 and mortality. Female patients had lower odds of experiencing severe-to-critical COVID-19 compared to males. Blood type was not significantly associated with COVID-19 severity or mortality after adjusting for age and sex as confounders.

Strengths and limitations

This study investigated the association between blood type and COVID-19 severity and mortality among patients with COVID-19. However, the study did not account for certain confounding variables that could influence the results. Factors such as comorbidities and body mass index, which are known to impact COVID-19 outcomes, should have been included and controlled for in the multivariable analysis to provide a more accurate assessment of the relationship between blood type and COVID-19 severity and outcomes.

Interpretation

Increasing age is a risk factor for severe COVID-19 outcomes, such as hospitalization and mortality. The risk of severe disease gradually increases with age, beginning at 40 years.[23 24] The occurrence of death was found to be highest in the age group of 40-60 years compared to those under 40 years and more than 60 years.[24] Aging is associated with increased expression of ACE-2, which accelerates viral replication in the elderly population. Aging can also lead to immune dysregulation and alterations in gut microbiota, contributing to the cytokine storm, which plays a direct role in COVID-19 severity.[24 25]

Regardless of age, males and females have equal prevalence rates of COVID-19, however, males face a higher risk of in-hospital adverse outcomes, major complications, and mortality. Females have a lower risk of severe COVID-19 infection, as seen in our patients. Estrogen levels may influence ACE-2 expression and, along with progesterone, inhibit the production of proinflammatory cytokines linked to the cytokine storm.[26] However, at advanced ages, due to their higher life expectancy, more females are diagnosed with COVID-19 more than males.[27]

In this study, no significant association between ABO blood type and COVID-19 severity or mortality was observed after adjusting for age and sex, consistent with findings from other studies.[28-30] This result could partly be explained by population demographics or residual confounding factors not accounted for in the analysis.

Other well-established factors influencing COVID-19 mortality include comorbidities such as diabetes and hypertension, obesity, and delayed access to health care.[11 31 32] These variables, which were not included in the present study, are known to play critical roles in disease progression and outcomes.

Generalizability

In this study, we focused on patients with COVID-19 who were admitted to our institution—a designated COVID-19 referral hospital in Southern Philippines. The demographic and clinical characteristics of our patients may be relevant to other institutions that also treated COVID-19 during this period. However, variations in health care systems, race and ethnicity,[33 34] vaccination status, and the presence of comorbidities may potentially affect COVID-19 outcomes and, consequently, influence the observed associations.

CONCLUSION

This study among patients with COVID-19 revealed that individuals over 39.5 years of age had significantly higher odds of severe-to-critical illness and mortality. Female patients were less likely to develop severe-to-critical disease compared to males. No significant association was found between blood type and the severity or mortality of COVID-19 after adjusting for age and sex as confounding factors.

Contributors

ALTL and MTAFM had substantial contributions to the study design, and to the acquisition, analysis and interpretation of data. ALTL wrote the original draft and subsequent revisions. All authors reviewed, edited, and approved the final version of the manuscript. All authors agreed to be accountable for all aspects of the work.

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Ethics approval

This study was reviewed and approved by the Davao Center for Health Development Joint Research Ethics Committee (DCHD JREC Protocol Number JREC-2023131).

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SPMC JHCS

RESEARCH

Characteristics and outcomes of patients with acute poisoning admitted to a tertiary care hospital: descriptive study

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ABSTRACT

Background. Acute poisoning is a significant global health issue with potentially life-threatening consequences.
Objective. To determine the demographic and clinical profile, health care timelines, and outcomes of patients admitted for acute poisoning.
Design. Descriptive study.
Setting. Southern Philippines Medical Center, Davao City, January 2016 to January 2021.
Participants. 143 males and females initially seen at the emergency department and subsequently admitted to the intensive care unit for acute poisoning.
Main outcome measures. Demographic and clinical profile, health care timelines, and outcomes of patients.
Main results. Of the 143 patients (99 males, 44 females), 18 were exposed to alcohol, 21 to corrosives, 5 to hydrocarbons, 37 to pesticides, 19 to pharmaceuticals, 38 to toxins, 1 to recreational drugs, and 4 to mixed poisons. The route of exposure was ingestion for 112 patients, envenomation for 27, inhalation for 3, and intravenous for 1. Non-accidental exposures accounted for 69% of the cases. Intensive interventions included metabolic corrections, antidote administrations, and advanced life support. Patients exposed to hydrocarbons had the longest hospital stay with a median hours of 137.27 hours (IQR: 29.90 to 199.95). Patients exposed to alcohol had the longest delay in seeking health care, with a median of 17.29 hours (IQR: 6.00 to 24.00), and the highest mortality rate of 27.78%.
Conclusion. The majority of acute poisoning patients were male and unemployed, with non-accidental poisonings primarily via ingestion. Patients with alcohol poisoning had the longest delay in seeking care and the highest mortality, while those exposed to hydrocarbons had the longest hospital stay.

Keywords. health care timeline, delay in seeking care, mortality, toxicological profile

INTRODUCTION

Acute poisoning, a potentially life threatening medical emergency, has become a significant global health problem in recent years, with an estimated 106,683 deaths from unintentional poisoning recorded annually.[1] Approximately 90% of cases of acute fatal poisoning occur in low- and middle-income countries (LMICs), where safeguards are often insufficient or nonexistent, compounded by weak regulatory systems and poor-quality health services.[2 3] Intentional ingestion of pesticides is estimated to account for 20% of suicides globally, primarily in agricultural communities within LMICs.[4 5] In contrast, household products and specialty drugs are the most frequent causes of poisoning in high-income countries.[6]

In resource-limited countries such as the Philippines, there is a notable lack of pooled data on acute poisoning cases. Such are crucial for improving existing poison control strategies and implementing effective interventions to reduce morbidity and mortality associated with acute poisoning. Understanding the regional profile of poisoning is critical, as its prevalence and types vary significantly between and within countries.[7] Regional poisoning studies can provide valuable insights to inform localized prevention and management strategies. We did this study to determine the demographic and

IN ESSENCE

Acute fatal poisoning rates are particularly high in low- and middle-income countries, representing a serious medical emergency.

This study describes the health care timelines and the outcomes of patients exposed to various poisons who were admitted to the intensive care unit.

Among patients with acute poisoning, those exposed to alcohol had the longest delays in seeking medical care and the highest mortality rates, while those exposed to hydrocarbons had the longest hospital stays.

clinical profiles, health care timelines, and outcomes of patients admitted for acute poisoning in a tertiary hospital in Southern Philippines.

METHODOLOGY

Setting

We conducted a descriptive study on patients who presented to the Southern Philippines Medical Center (SPMC) Emergency Department (ED) for acute poisoning and were subsequently admitted to the SPMC Intensive Care Unit (ICU). On average, the SPMC ED manages approximately 800 acute poisoning consultations annually.

Participants

We included patients initially seen at the SPMC ED for acute poisoning between January 2016 and January 2021. Eligible participants were those aged more than 18 years who had exposure to or intoxication from identified toxins within 24 hours prior to ED consultation and were subsequently admitted to the ICU. Excluded from the study were patients with concomitant acute illness (e.g., trauma, burns), pregnant women, patients who were dead-on-arrival, and those with do-not-resuscitate orders.

To determine the minimum sample size for this study, we assumed a mortality rate of 6.6% among patients with acute poisoning.[2] In a sample size computation for descriptive research, with an acceptable margin of error of 5%, a design effect of 1.0, and a 95% confidence level, the minimum required sample size was determined to be 95.

Data collection

We reviewed the medical records of each patient included in the study who experienced acute poisoning. From these records, we collected demographic and clinical data including age, sex, employment status, civil status, place of residence, comorbidities–including hypertension, diabetes mellitus, asthma, psychiatric disorders–alcohol consumption, and smoking history. We also collected toxicological profiles covering the type of poison, such as alcohol (e.g., ethanol, methanol), corrosives (e.g., muriatic acid, hydrochloric acid, chlorine, lye, sodium hypochlorite, benzalkonium chloride), hydrocarbons (e.g., diethylene glycol, paint thinner, xylene, toluene), pesticides (e.g., organophosphates, zinc phosphide, glyphosate, carbamates, pyrethroid, malathion, cyhalothrin, 24-D amine), pharmaceuticals (e.g., beta blockers, non-steroidal anti-inflammatory drugs, olanzapine), natural toxins (e.g., scombroid fish poisoning, snake venom, tetrodotoxin), substances of abuse (e.g., methamphetamine), and mixed poisons. Additional data collected included the amount of poison (categorized as toxic or non-toxic), route of exposure (ingestion, inhalation, intravenous, envenomation), circumstance of poisoning (accidental or non-accidental), whether home remedies were attempted, and the emergency severity index (ESI). Information on treatments administered during the ED stay was also gathered, including intubation at the ED, use of vasopressors or inotropes, cardiopulmonary resuscitation and/or defibrillation, correction of metabolic abnormalities, poison elimination management, enhanced poison elimination management, and use of antidotes.

Statistical analysis

Categorical variables were summarized as frequencies and percentages. We used the Shapiro-Wilk test to determine the normality of continuous variables. As the continuous variables were not normally distributed, we reported their medians and interquartile ranges. All statistical tests were performed using Stata/BE 17.0.

RESULTS

This study included 143 patient records from our institution. Table 1 shows the demographic and clinical characteristics of patients who presented to the SPMC ED for acute poisoning. The patients had a median age of 36 (IQR: 23 to 25) years, with a sex distribution of 99/143 (69.23%) males and 44/143 (30.77%) females. In terms of employment, 96/143 (67.13%) were unemployed and 47/143 (32.87%) were employed. Comorbidities included hypertension (9.09%), diabetes mellitus (2.80%), asthma (2.10%), psychiatric disorders (10.49%), and other conditions (2.10%). Alcohol consumption was reported by 75/143 (52.45%) patients, while smoking was reported by 63/143 (44.06%).

Table 2 summarizes the toxicological profiles of patients with acute poisoning. By poison type, 12.59% were exposed to alcohol, 14.69% to corrosives, 3.50% to hydrocarbons, 25.87% to pesticides, 13.29% to pharmaceuticals, 26.57% to toxins, 0.70% to recreational drugs, and 2.80% to mixed

Table 1 Demographic and clinical characteristics of patients who experienced acute poisoning.

Characteristics	Values (n=143)
Median age (IQR), *years*	36 (23 to 50)
Sex, *frequency (%)*	
Male	99 (69.23)
Female	44 (30.77)
Employment status, *frequency (%)*	
Employed	47 (32.87)
Unemployed	96 (67.13)
Comorbidities, *frequency (%)*	
Hypertension	13 (9.09)
Diabetes mellitus	4 (2.80)
Asthma	3 (2.10)
Psychiatric disorder	15 (10.49)
Others	3 (2.10)
Alcoholic beverage drinker, *frequency (%)*	75 (52.45)
Smoker, *frequency (%)*	63 (44.06)

Table 2 Toxicological profiles of patients who experienced acute poisoning.

Characteristics	Values (n=143)
Type of poison, *frequency (%)*	
Alcohol	18 (12.59)
Corrosives	21 (14.69)
Hydrocarbon	5 (3.50)
Pesticides	37 (25.87)
Pharmaceuticals	19 (13.29)
Toxin	38 (26.57)
Recreational drugs	1 (0.70)
Mixed poison	4 (2.80)
Amount of poison, *frequency (%)*	
Toxic	143 (100.00)
Non-toxic	0 (0.00)
Route of exposure, *frequency (%)*	
Ingestion	112 (78.32)
Inhalation	3 (2.10)
Intravenous	1 (0.70)
Envenomation	27 (18.88)
Circumstance, *frequency (%)*	3 (2.10)
Accidental	44 (30.77)
Non-accidental	99 (69.23)
Use of home remedy, *frequency (%)*	9 (6.29)
ESI category, *frequency (%)*	
Category I	39 (27.27)
Category II	104 (72.73)

poison. All 143 patients were exposed to a toxic level of poison. Of these, 78.32% were exposed via ingestion, 2.10% via inhalation, 0.70% via intravenous exposure, and 18.88% via envenomation. Most exposures were non-accidental (99/143; 69.23%), while the remaining 44/143 (30.77%) were accidental. There were 9/143 (6.29%) patients who used home remedies as first aid. The majority of the cases were classified as ESI category II (104/143; 72.23%), and 39/143 (27.27%) as ESI Category I.

The different management given to patients who experienced acute poisoning in the ED are shown in Table 3. Among these patients 45/143 (31.47%) were intubated, 35/143 (24.48%) received vasopressors or inotropes, 18/143 (12.59%) underwent CPR/defibrillation, 96/143 (67.17%) had metabolic abnormalities corrected, 41/143 (28.67%) underwent poison elimination methods used, 13/143 (9.09%) underwent poison elimination methods, and 70/143 (48.95%) received antidotes.

Table 4 shows the timelines of medical care and outcomes for patients with acute poisoning categorized by type of poison. For all patients, the median time from exposure to triage was 4.42 hours (IQR: 2.00 to 7.30), while the median time from triage to discharge was 90.70 hours (IQR: 51.58 to 147.90). The median time from triage to ICU admission was 3.50 hours (IQR: 2.48 to 5.92), and the median time from ICU admission to discharge was 83.67 hours (IQR: 47.38 to 144.58). Out of the 143 patients, 14 (9.79%) either went home against medical advice or were transferred to a hospital of their choice, while 18 (12.59%) died during their ICU stay. Among all patients, those exposed to alcohol had the longest median time from exposure to triage (17.29 hours; IQR: 6.00 to 24.00), while those exposed to pharmaceuticals had the shortest (2.45 hours; IQR: 2.00 to 6.70). Patients exposed to hydrocarbons had the longest median time from triage to discharge (137.27 hours; IQR: 29.90 to 199.95), while those exposed to toxins had the shortest (77.91 hours; 51.58 to 107.90). Patients exposed to mixed poisons had the highest proportion of individuals who went home against medical advice or were transferred to another hospital (2/4; 50.00%), while those exposed to toxins had the lowest (1/38; 2.63%). Patients exposed to alcohol had the highest mortality rate (5/18; 27.78%), while those exposed to toxin

Table 3 Management given to patients who experienced acute poisoning in the Emergency Department.

Characteristics	Values (n=143)
Intubation, *frequency (%)*	45 (31.47)
Use of vasopressors/inotropes, *frequency (%)*	35 (24.48)
CPR/Defibrillation, *frequency (%)*	18 (12.59)
Metabolic abnormalities correction, *frequency (%)*	96 (67.13)
Use of poison elimination methods, *frequency (%)*	41 (28.67)
Use of enhancing elimination methods, *frequency (%)*	13 (9.09)
Use of antidotes, *frequency (%)*	70 (48.95)

had the lowest (2/38; 5.26%).

DISCUSSION

Key results

This study analyzed 143 cases of acute poisoning presenting to the ED. The majority of patients were young adult males, and unemployed. Poisoning exposures were primarily non-accidental and occurred most frequently through ingestion, with pesticides and toxins being the most common agents. Most patients required intensive medical interventions, including metabolic corrections and antidote administration, while a subset required advanced life support measures. Outcomes varied by poison type, with alcohol exposure having the highest mortality rate and the longest delays in seeking care. Patients exposed to hydrocarbons had the longest hospital stay.

Strengths and limitations

In this study, we identified various poisons patients were exposed to prior to being admitted to a health facility, as well as timelines for seeking medical care and duration of hospital stay. However, there are several limitations in this study. Since we relied solely on a review of records, the accuracy of the timelines may not be as reliable compared to using prospective data collection. We identified the types of poison that had the longest time in seeking care, the longest longest hospital stay, and the highest mortality. However, our study could not establish associations between these outcomes and different demographic or clinical factors. We recommend conducting analytic research with an adequate sample size to explore the associations of potential factors with the time to seek care, duration of hospital stay, and mortality among patients who experience acute poisoning.

Interpretation

Pesticides, particularly those used in agriculture, and animal venom are among the most common sources of poisoning.[8-10] The predominance of pesticide and toxin exposure in this study can be attributed to their extensive use and accessibility, especially in agricultural settings.[11]

Alcohol, as a recreational substance, is easily accessible and affordable making it prone to misuse and abuse.[12 13] Many patients may feel embarrassed or reluctant to admit their alcohol use, leading to late reporting or underreporting. Underestimating the magnitude and severity of alcohol consumption is also a common problem for patients.[14] The high mortality rate observed in alcohol-related poisoning is likely due to the severe physiological effects of excessive alcohol intake and delays in seeking medical attention. Alcohol poisoning is a medical emergency, and immediate medical attention

Table 4 Outcomes of patients who experienced acute poisoning.

Characteristics	Total (n=143)	Alcohol (n=18)	Corrosives (n=21)	Hydrocarbon (n=5)	Pesticides (n=37)	Pharmaceuticals (n=19)	Toxin (n=38)	Mixed poison (n=4)	Recreational drugs (n=1)
Non-accidental exposure, *frequency (%)*	99 (69.23)	18 (100.00)	18 (100.00)	18 (100.00)	18 (100.00)	18 (100.00)	18 (100.00)	18 (100.00)	18 (100.00)
Median time from exposure to triage (IQR), *hours*	4.42 (2.00 to 7.30)	17.29 (6.00 to 24.00)	3.53 (1.55 to 5.27)	4.00 (3.20 to 5.05)	5.03 (2.38 to 6.22)	2.45 (2.00 to 6.70)	4.64 (2.32 to 8.00)	4.21 (3.00 to 5.21)	6.70
Median time from triage to discharge (IQR), *hours*	90.70 (51.58 to 147.90)	109.93 (49.28 to 178.00)	89.40 (26.38 to 256.73)	137.27 (29.90 to 199.95)	127.92 (71.95 to 166.58)	84.68 (61.60 to 98.30)	77.91 (51.58 to 107.90)	109.41 (76.56 to 113.81)	91.30
Median time from triage to ICU admission (IQR), *hours*	3.50 (2.48 to 5.92)	3.46 (2.83 to 6.00)	2.90 (2.30 to 3.70)	3.17 (2.32 to 3.42)	4.40 (3.02 to 6.40)	3.17 (2.57 to 5.38)	3.66 (1.92 to 6.62)	5.35 (3.10 to 24.49)	4.98
Median time from ICU admission to discharge (IQR), *hours*	83.67 (47.38 to 144.58)	99.84 (43.97 to 144.58)	86.42 (18.63 to 253.67)	134.95 (26.63 to 198.27)	120.42 (70.17 to 157.68)	76.33 (50.50 to 95.77)	73.79 (47.38 to 98.85)	88.83 (56.45 to 106.31)	86.32
HAMA/THOC, *frequency (%)*	14 (9.79)	1 (5.56)	4 (19.05)	0 (0.00)	5 (13.51)	1 (5.26)	1 (2.63)	2 (50.00)	0 (0.00)
Mortality, *frequency (%)*	18 (12.59)	5 (27.78)	4 (19.05)	0 (0.00)	6 (16.22)	1 (5.26)	2 (5.26)	0 (0.00)	0 (0.00)

is crucial to prevent serious complications, including death.[15] However, a lack of awareness about the condition's severity often leads patients or their caregivers to delay seeking medical care, further increasing the risk.

Hydrocarbon poisoning often results in prolonged hospital stays due to the need for extended medical care, including close monitoring for respiratory complications such as chemical pneumonitis. Patients with severe symptoms frequently require hospitalization, sometimes in intensive care units, to manage these complications.[16]

Generalizability

The results of this study include all adult patients who sought medical management for acute poisoning and were subsequently admitted to the ICU at SPMC. The demographic and clinical profiles, along with health care timelines and outcomes, may be relevant to other institutions catering to patients with acute poisoning in low- and middle-income countries. However, the profiles and outcomes for pediatric patients may differ due to the differences in accessibility and exposure to poisons.[17 18]

CONCLUSION

In this descriptive study among adult patients with acute poisoning, we found that the majority of patients were males and unemployed. Exposure to poisons was mostly non-accidental and occurred through ingestion. The most common agents for poisoning were pesticides and toxins. Intensive medical interventions included metabolic corrections and antidote administrations. Some patients received advanced life support measures. Patients exposed to alcohol had the highest mortality rate and had the longest delays in seeking care, while patients exposed to hydrocarbons had the longest hospital stays.

Contributors
MILNT, JP and EJN had substantial contributions to the study design, and to the acquisition, analysis and interpretation of data. MILNT wrote the original draft and subsequent revisions. All authors reviewed, edited, and approved the final version of the manuscript. All authors agreed to be accountable for all aspects of the work.

Ethics approval
This study was reviewed and approved by the Davao Center for Health Development Joint Research Ethics Commmittee (DCHD JREC Protocol Number P21053101).

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SPMC JHCS

CASE IN IMAGES

Extrarenal rhabdoid tumor in a 12-year-old female: case in images

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A 12-year-old female was admitted due to an enlarging, infected right ankle mass.

CLINICAL FEATURES

Seven years prior to admission, the patient tripped and injured her right ankle. This was accompanied by swelling, pain, and difficulty walking. She sought treatment from a hilot, a traditional healer, but her symptoms did not improve. The swelling increased in size, spreading to the midcalf, yet she still did not seek medical consultation. Three years prior to admission, a firm, painless mass, approximately 1 x 1 cm in size, developed on her right ankle. Two years prior to admission, the mass enlarged to approximately 4 x 4 cm. One year before admission, she consulted a physician at a local health center. An incision was made in the mass, revealing watery discharge and meaty tissue. No diagnostic tests were ordered, and she was prescribed oral antibiotics, which still did not alleviate her symptoms. Five months before admission, the mass had grown to approximately 16 x 20 cm and was now extruding meaty tissue and bloody discharge, accompanied by sharp, aching pain at the site. She was then admitted to a private hospital and given intravenous antibiotics. A biopsy confirmed alveolar soft part sarcoma. The patient was referred to the Orthopedic service, which recommended amputation of the affected limb, However, she refused and opted to go home against medical advice after three days of hospitalization. One month prior to admission, the mass continued to enlarge, and swelling extended to her right thigh. She also noted bleeding from the mass, weight loss, and pallor. Three days before admission, she was admitted to a provincial hospital, where she underwent blood transfusion. She was then referred to our institution for further management.

Upon admission, the patient was placed under the care of the Pediatric Oncology Service. On physical examination, she appeared slightly pale, with pale palpebral conjunctivae. A large, expansile, bleeding, foul-smelling, fungating mass with perilesional edema, measuring 16 x 20 cm and containing exposed soft tissue and muscular components, was observed on her right ankle. Multiple inguinal lymphadenopathies, ranging from 1 to 1.5 cm in diameter, were also noted. The rest of the physical examination was unremarkable.

DIAGNOSTICS AND THERAPEUTICS

The patient was comanaged by Orthopedics service for evaluation, Pediatric Gastroenterology service for nutritional build-up, and Hospice and Palliative Care service for counseling and pain management. A skeletal survey revealed a well-defined, irregularly shaped soft tissue opacity in the posterior aspect of the distal leg and foot, measuring approximately 1.7 x 1.3 cm, with soft tissue swelling and defects over the right distal leg.

An MRI of the right lower extremity revealed a 31.1 x 12.3 x 2.4 cm expansile, fungating, lobulated mass occupying most of the right leg, extending into the ankle. The mass exhibited a heterogeneous but predominantly muscle-isointense signal with central hypointensity on T1, and was hyperintense on T2 and T2 fat-saturated sequences relative to the adjacent muscle, with enhancement on the post contrast study. High signal intensity was apparent in the distal metaphysis and growth plate of the right tibia and talus on T2 fat-saturated and STIR sequences, with signal voiding on T1- and T2-weighted images (Figure 1). A contrast-enhanced chest CT showed crescentic hypodense fluid collections in the dependent portions of both pleural spaces, 37 cc on the left and 12 cc on the right, with partial collapse of the posterior basal segments. Multiple enlarged, enhancing lymph nodes were observed in both axillae, the largest measuring 1.1 cm in short axis (Figure 2).

The previous biopsy blocks were submitted to our department for slide review. Histopathological examination of the specimen revealed sheets of small, rounded cells separated into multiple alveolar-like clusters/aggregates by fibrous septae. The peripheral cells in these

aggregates adhered to the fibrous septae, while the centrally-located cells were discohesive. These cells exhibited deeply eosinophilic cytoplasm and round-to-oval hyperchromatic nuclei, with no visible cross striations (Figure 3). Our histopathological diagnosis at this time was consistent with alveolar rhabdomyosarcoma, FNCLCC Grade 3.

We diagnosed the patient's condition as alveolar rhabdomyosarcoma rather than alveolar soft part sarcoma based on several factors. First, the clinical signs matched alveolar rhabdomyosarcoma, which typically affects deep soft tissues in the limbs. Second, the patient's age aligns with the typical occurrence of this tumor, mainly in adolescents and young adults, especially between ages 10 and 25.[1] Histopathology slides showed small blue cells, a characteristic of alveolar rhabdomyosarcoma, whereas alveolar soft part sarcoma usually has larger, rounded oncocytic cells.[2] Additionally, the fibrous septa in alveolar soft part sarcoma are thicker and more prominent, often with dilated veins[2]—features not observed in this patient's slides.

The patient was started on intravenous meropenem, followed by vancomycin for two weeks. A wound culture revealed the presence of *Sphingomonas paucimobilis* and *Enterococcus avium*. Due to persistent fever, meropenem was replaced with cefepime after seven days. An above-knee amputation was performed, and post-surgical pain management was transitioned from intravenous tramadol to intravenous oxycodone, with gabapentin added for phantom limb pain. Following the amputation, we performed a postsurgical biopsy of the ankle mass, which revealed the same findings as described above, consistent with a diagnosis of alveolar rhabdomyosarcoma (Figure 4). The patient was discharged on the 26th hospital day with oral morphine prescribed for pain management. Two weeks post-discharge, the patient was admitted for the first cycle of chemotherapy with the Rhabdomyosarcoma IRS-III (Third Intergroup Rhabdomyosarcoma Study) VAC (vincristine, actinomycin, cyclophosphamide) regimen.

We submitted the patient's post-amputation biopsy blocks for immunohistochemical staining and external pathologic review, which revealed loss of nuclear INI-1 expression (Figure 5), negative staining for desmin, myogenin, S100, CD34, and pancytokeratin, and weak positive staining for CD99. These findings confirmed a diagnosis of extrarenal rhabdoid tumor (ERRT), prompting the Pediatric Oncology service to change the diagnosis of alveolar rhabdomyosarcoma and revise the patient's management plan in accordance with ERRT AJCC (American Joint Committee on Cancer) Stage IVB. She was started on the VIDE (vincristine, ifosfamide, doxorubicin, etoposide) regimen and completed six cycles. After the 5th cycle, the patient was readmitted for chemotherapy-induced myelosuppression and oral mucositis, requiring six units of RBC transfusions, intravenous antibiotics, and oral antifungals. She completed her 6th cycle during this stay and was scheduled for stump revision due to osseous overgrowth, which is common in adolescents. However, the procedure was postponed due to anemia. Despite her willingness to continue treatment, her father declined further care due to financial and logistical constraints related to frequent hospital visits. As of this writing, 27 months post-surgery, the patient shows no clinical signs of distant metastasis. She is still able to perform basic activities of daily living, albeit to a lesser degree, while using crutches.

RELEVANCE

ERRTs are rare, aggressive tumors most commonly found in the central nervous system, although they can also develop in various soft tissues of the body,[3] including the gastrointestinal tract. These tumors typically affect infants and young children, with a median age at 20 months and an age range from 3 weeks to 50 years.[4] Due to their rarity and aggressive nature, ERRTs are challenging to diagnose and treat. Histopathologic examination is essential for diagnosing ERRTs, as it facilitates the identification of characteristic polygonal rhabdoid cells.[5] Given the patient's age and the tumor's location, rhabdomyosarcoma was one of the primary considerations in the differential diagnosis. However, the tumor's morphology and immunohistochemical staining profile, especially the homozygous absence of SMARCB1/INI expression on the long arm of chromosome 22—found in all rhabdoid tumors[6,7]—led to a final diagnosis of ERRT. Treatment typically involves a combination of surgical resection, radiation therapy, and chemotherapy. Despite aggressive treatment, the five-year survival rate is only 15-20%, with frequent local recurrence and metastasis.[2] Due to the histomorphological similarities between ERRTs and other soft tissue tumors, comprehensive immunohistochemical staining and analysis are imperative for early detection and accurate diagnosis.

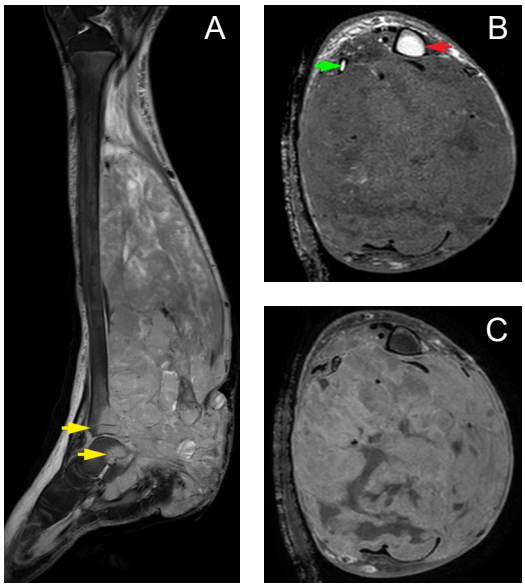

Figure 1 MRI sagittal and axial sections of the right leg. Sagittal STIR image shows a hyperintense signal in the distal metaphysis and growth plate of the right tibia and talus (A: yellow arrows). Axial T1 images with (B) and without contrast (C) show a large heterogeneous mass with muscular extensions/infiltrations and areas of necrosis in the posterior leg. The mass encroaches the interosseus space between the tibia (B: red arrow) and fibula (B: green arrow) and encases the adjacent neurovascular bundles of the right leg exhibiting predominantly isointense signal to muscle.

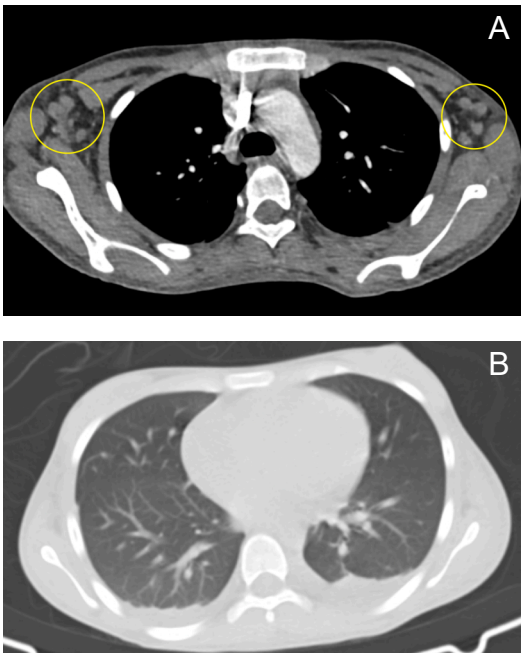

Figure 2 Axial views of the contrast-enhanced CT scan of the chest. Multiple enlarged, enhancing lymph nodes are seen on both axillae (A: yellow rings). Crescentic hypodense fluid collections are observed in the dependent portions of both pleural spaces, with a greater volume on the left than on the right (B).

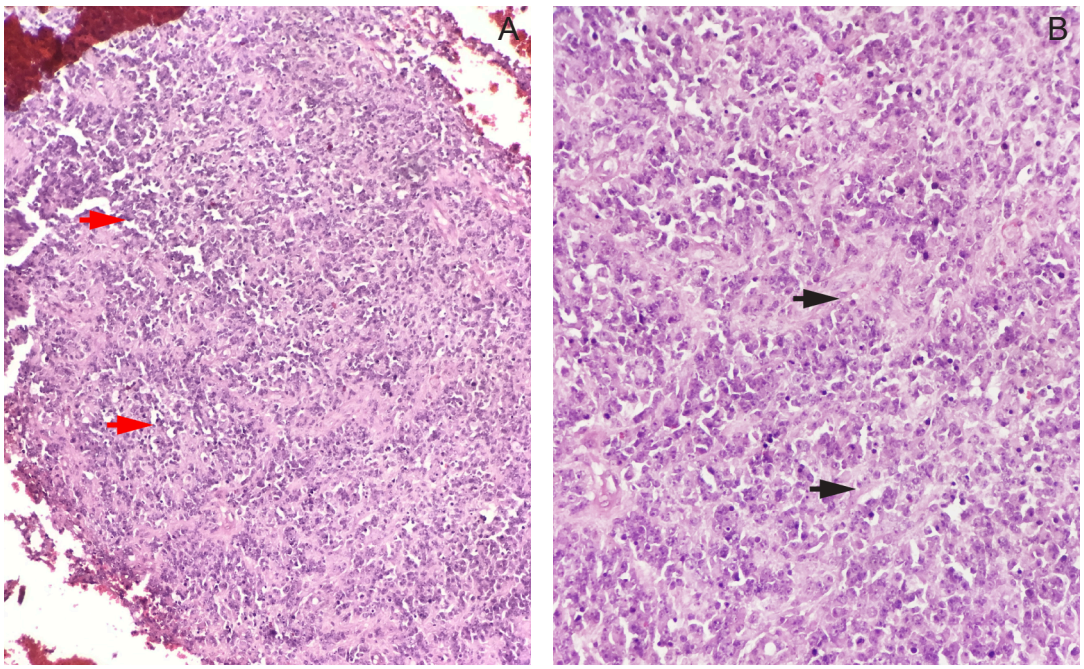

Figure 3 Histopathology of the right ankle mass submitted for review of slides at low-power field (A: hematoxylin-eosin stain, x100) and high-power field (B: hematoxylin-eosin stain, x400) views. Sheets of small, rounded cells with fibrous septae (B: black arrows) are observed, separating them into multiple alveolar-like cluster/aggregates (A: red arrows).

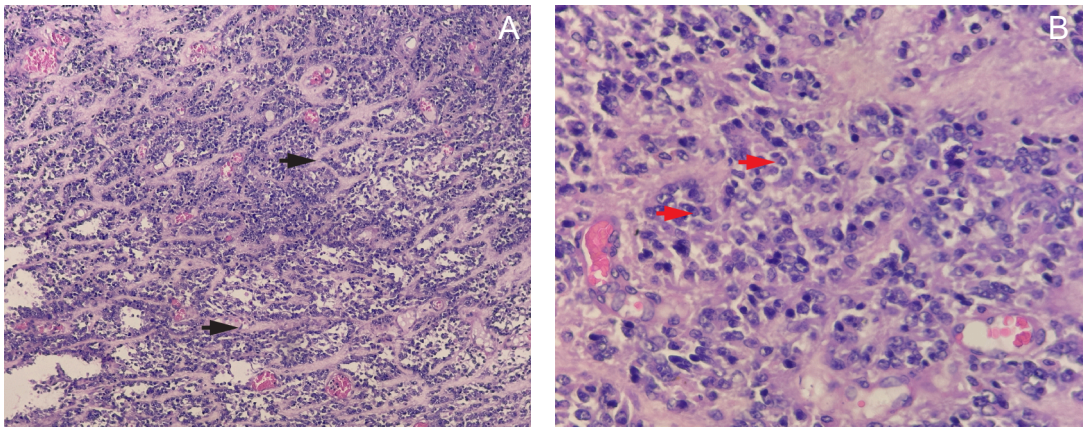

Figure 4 Histopathology of the entire right ankle mass at low-power field showing sheets of small, rounded cells with fibrous septae (A: black arrows) (A: hematoxylin-eosin stain, x100). At higher magnification, the cells exhibit deeply eosinophilic cytoplasm and round to oval hyperchromatic nuclei (B: red arrows) (B: hematoxylin-eosin stain, x400).

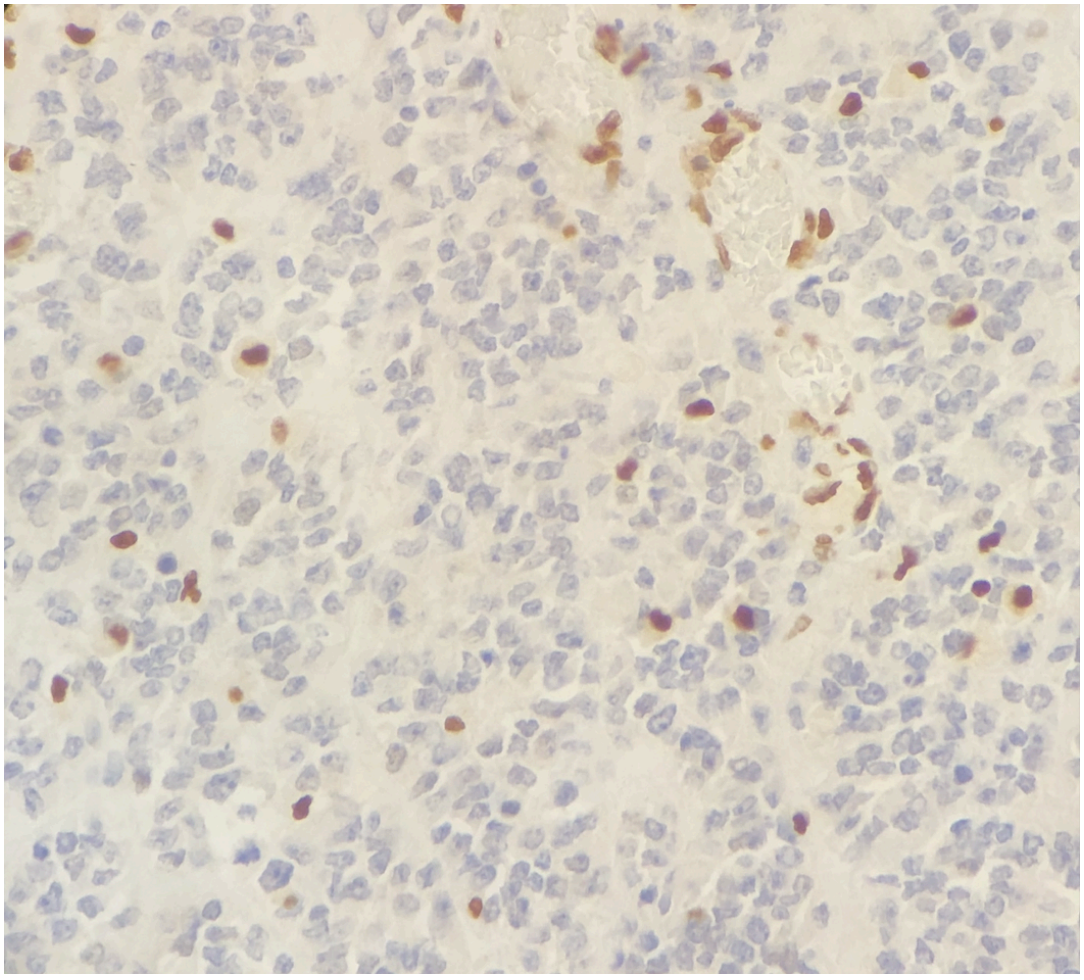

Figure 5 Immunohistochemical staining showing loss of nuclear INI-1 expression (x400).

Contributors
ATCL, XGHC, MMM, and AHDBH contributed to the diagnostic and therapeutic care of the patient in this report. All authors acquired relevant patient data, and searched for and reviewed relevant medical literature used in this report. ATCL wrote the original draft, performed the subsequent revisions. All authors approved the final version, and agreed to be accountable for all aspects of this report.

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CASE IN IMAGES

Herbal medicine-induced toxic epidermal necrolysis in a 48-year old Filipino woman with invasive cervical cancer: case in images

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A 48-year-old female presented with sudden-onset multiple vesicles and bullae after taking oral herbal medications.

CLINICAL FEATURES

The lesions appeared three days after the patient began taking an herbal capsule (one capsule thrice a day) containing 23 botanical extracts, including aloe vera, Siberian ginseng, licorice root, astragalus root, reishi mushroom, Chinese pearl barley, schisandra berry, rose hip, chicory root, dandelion root, German chamomile, alfalfa herb, cascara bark, fenugreek seed, bee pollen, pipsissewa, juniper berry, ginger root, celery seed, sarsaparilla, passion flower, thyme, and capsicum fruit. The patient initially reported fever, pruritus, hot flashes, and a burning skin sensation, followed by generalized erythematous patches with dusky centers. These rapidly progressed to vesicles, beginning on the lower extremities. Despite discontinuing the herbal medication, new vesicles still emerged, coalescing into large erythematous flaccid bullae on the anterior and posterior trunk. The patient also developed multiple aphthous ulcers in the oral cavity, causing dysphagia even with liquids. Lesions on the genitalia, also caused dysuria. After desquamation, the posterior trunk lesions resulted in large eroded and denuded plaques.

The patient was newly diagnosed with invasive cervical carcinoma when she started the herbal capsule. She had a history of hypertension and poor compliance with amlodipine but had no history of chronic skin conditions, diabetes, peripheral vascular disease, or systemic autoimmune diseases or a family history of Stevens-Johnson Syndrome (SJS) or Toxic Epidermal Necrolysis (TEN). She denied taking other medications or dietary supplements, or applying topical products and reported no recent fever, cough, rhinitis, headache, or arthralgia.

DIAGNOSTICS AND THERAPEUTICS

The patient was admitted to the intensive care unit (ICU) under the Internal Medicine (IM) Service and was immediately referred to our Dermatology Service for comanagement. On physical examination, we observed generalized vesicles and bullae on an erythematous background. We noted numerous fused vesicles and bullae, progressing to desquamated plaques involving the trunk (Figure 1A-B) and extremities (Figure 1C-D). Epidermal detachment involved an estimated 90% of the total body surface area (TBSA). Both Nikolsky and Asboe-Hansen signs were positive. Additionally, the patient exhibited skin tenderness, mucositis, and ulceration in the oral cavity and conjunctiva (Figure 1E-F).

Based on the history and physical findings, we made an initial diagnosis of TEN. The likelihood of the herbal medication causing the condition was assessed using the Naranjo Adverse Drug Reaction Probability Scale,[1] which yielded a score of 6, indicating a 'probable' adverse drug reaction. This suggested a reasonable temporal relationship between the administration of the herbal medication and the onset of TEN. Differential diagnoses included SJS, staphylococcal scalded skin syndrome, pemphigus vulgaris, bullous pemphigoid, erythema multiforme major, and bullous systemic lupus erythematosus. SJS, which is in the same disease spectrum as TEN, was ruled out because the TBSA affected by epidermal detachment exceeded 30%, whereas SJS involves less than 10%.[2]

The Severity-of-Illness Score for Toxic Epidermal Necrolysis (SCORTEN)—which considers factors such as age, presence of malignancy, and extent of epidermal detachment to assess the severity of illness and prognostic score for patients with TEN[3]—produced a score of 3 for this patient. This corresponded to a predicted mortality rate of 35.8%. Chest radiography was unremarkable, while laboratory results showed mild anemia, a slightly elevated leukocyte count, and mild hypoalbuminemia (27 g/L). Wound, blood, and urine

cultures were negative on admission.

Histopathology from a skin punch biopsy revealed an atrophic epidermis with full-thickness necrosis and separation of the epidermis from the dermis, producing a subepidermal split (Figure 2A). The dermis exhibited superficial edema and mild interstitial and perivascular inflammatory infiltrates composed of lymphocytes, histiocytes, and eosinophils. Closer magnification of the blister roof revealed confluent keratinocyte necrosis and minimal inflammatory infiltrates within the blister cavity (Figure 2B). These histopathologic findings confirmed the diagnosis of TEN.

The management of TEN in our patient required a multidisciplinary approach. On admission, supportive treatment, including fluid resuscitation, pain management, and nasogastric nutritional support, was initiated by the IM Service while she was placed under intensive care. The patient was started on oral prednisone at 1 mg/kg/day, with tapering after seven days. On the third hospital day, purulent discharge from the desquamated plaques prompted a repeat wound culture revealing *Staphylococcus aureus*. Intravenous clindamycin was initiated, along with mupirocin ointment for the eroded areas, bilastine for the pruritus, and chlorhexidine oral gargle for hygiene. We also advised the patient on careful thermoregulation and regular application of petrolatum on the skin and lips.

The Ophthalmology Service managed the ocular involvement with ophthalmic steroids containing anti-infectives, and advised lid hygiene. The Gynecology Service managed the patient's cervical cancer, postponing interventions until postdischarge. On the 10th hospital day, the patient had a catheter-associated urinary tract infection, and Proteus mirabilis was identified on urine culture. She was subsequently started on intravenous ceftriaxone. By the 14th hospital day, we observed complete re-epithelialization with some areas of postinflammatory hyperpigmentation (Figure 3).

Upon discharge on the 22nd hospital day, we instructed the patient to continue taking oral prednisone for another week, along with mupirocin ointment, bilastine, ophthalmic steroids/anti-infectives, and emollients. We also added vitamin D, calcium, and iron supplements to the regimen. Our team provided wound care instructions and educated the family on signs of infections, pain management, and comfort measures. The patient followed-up at our clinic via teledermatology at one and two weeks postdischarge, where she was determined to have made a full recovery from TEN. Unfortunately, two months later, she died due to the rapid progression of her cervical squamous cell carcinoma.

RELEVANCE

Toxic epidermal necrolysis (TEN) is a rare, potentially life-threatening dermatological emergency characterized by widespread epidermal necrosis and detachment, leading to significant mucous membrane erosions and extensive skin loss. Although the exact cause remains unknown, immunologic processes, cytotoxic reactions, and delayed hypersensitivity appear to be involved.[4 5] High-risk medications such as antibacterial sulfonamides, aromatic antiepileptic drugs, allopurinol, and oxicam-class nonsteroidal anti-inflammatory drugs are frequently implicated.[6 7] Herbal medicines, as in our patient's case, can also cause drug-induced eruptions due to the herbal medicine itself, contaminants or adulterants, or a combination of these ingredients.[8] Diagnosis is based on clinical findings and confirmed by histopathologic analysis of lesional skin. TEN involves more than 30% of the TBSA, distinguishing it from SJS, which affects less than 10%. While both are part of the same disease spectrum, SJS is considered less severe.[2] The mainstay of treatment is supportive care, including admission to an intensive care or burn unit, fluid and electrolyte management, pain control, nutritional support, daily wound care, and antibiotic therapy.[5 9] TEN is associated with a 30-50% mortality rate and significant long-term complications.[9] This case was particularly challenging due to the involvement of 23 herbal extracts, making identification of the causative agent extremely difficult. Moreover, active malignancy, which increases the risk of mortality from TEN,[10 11] contributed to the patient's demise a few months later.

Figure 1 Multiple well-defined erythematous and violaceous macules and patches, topped with vesicles and bullae, with sheet-like desquamation over the anterior and posterior trunk (A,B), the upper and lower extremities (C,D), and the mucosal surfaces of the oral cavity (E), along with mucopurulent discharge in the conjunctiva (F).

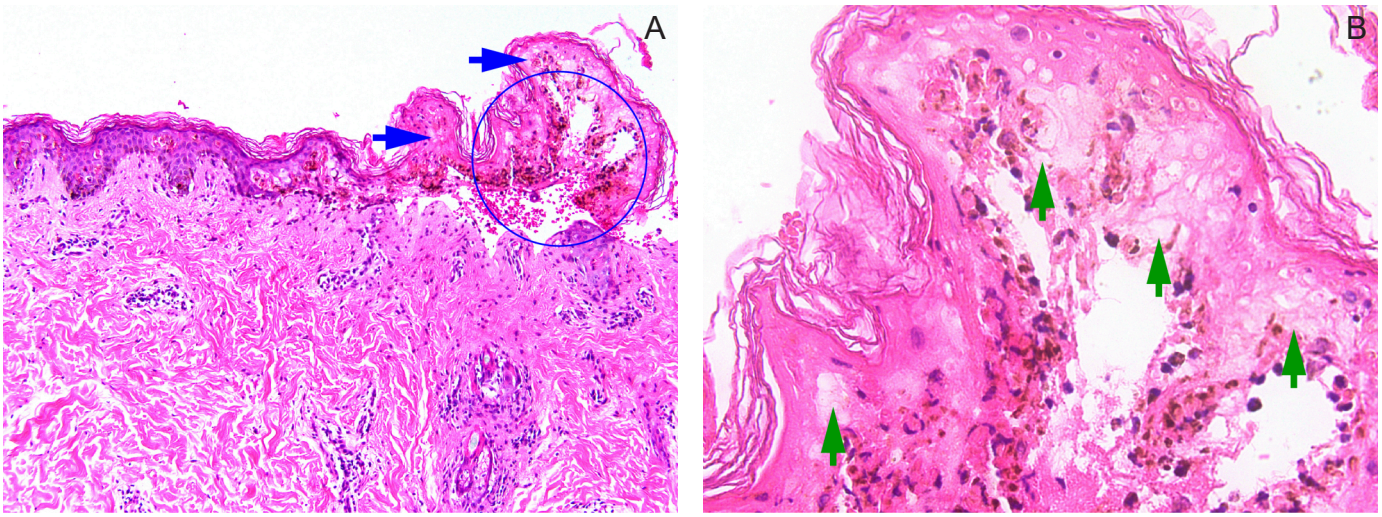

Figure 2 Histopathology of the skin lesion showing an atrophic epidermis with full-thickness necrosis, basal layer liquefaction (blue arrows), and separation of the epidermis from the dermis at the dermoepidermal junction, producing a subepidermal split (blue ring). The dermis exhibits mild edema with mild interstitial and superficial perivascular inflammatory infiltrates composed of lymphocytes, histiocytes, and eosinophils (A: hematoxylin-eosin stain, x40). At higher magnification, confluent keratinocyte necrosis and basal layer hydropic degeneration (green arrows) are present (B: hematoxylin-eosin stain, x400).

Figure 3 Appearance of the patient's skin on the 14th hospital day. There is complete re-epithelialization with some areas of postinflammatory hyperpigmentation.

Contributors
NSM, and MJKSB contributed to the diagnostic and therapeutic care of the patient in this report. Both of them acquired relevant patient data, and searched for and reviewed relevant medical literature used in this report. NSM wrote the original draft, performed the subsequent revisions. Both authors approved the final version, and agreed to be accountable for all aspects of this report.

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INFOGRAPHIC

Implementation of trauma protocols in Southern Philippines Medical Center in 2024

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Clinical protocols, pathways, and algorithms are not just guidelines, but life-saving tools in the management of trauma.[1] By standardizing care, reducing variability, and improving patient outcomes, they provide health care professionals with evidence-based guidelines to ensure timely and effective treatment.[2 3] In the fast-paced and high-stakes environment of trauma care, these structured approaches have been shown to decrease mortality rates and complications, leading to better overall patient recovery.

The World Health Organization (WHO) has been a global leader in the development of trauma care protocols, aiming to enhance the quality of emergency services on an international scale. Their initiatives, such as the WHO Trauma Care Checklist[4] and the Guidelines for Essential Trauma Care,[5] have provided frameworks for health care systems worldwide to better prepare for and respond to trauma incidents.[6] The implementation of these protocols in various countries has led to significant improvements in patient survival rates and reductions in trauma-related disabilities. Notably, in low-resource settings, adherence to WHO guidelines has resulted in more efficient use of available resources and improved clinical outcomes.[7]

The Southern Philippines Medical Center (SPMC) in Davao City is the leading hospital in Mindanao, renowned for its trauma care and its designation as a Level I trauma center, catering to approximately 1,300 patients monthly. Equipped with cutting-edge facilities and a specialized team, SPMC manages severe trauma cases and offers comprehensive care from initial treatment to surgical intensive care. The hospital also plays a crucial role in training and research, collaborating with various organizations to advance trauma care and maintain its leadership in emergency medical services in the region.

The SPMC Institute of Emergency, Acute, Trauma, and Critical Care (IEATCC) provides rapid, coordinated, and life-saving interventions to enhance patient safety and well-being. It leads efforts to reduce trauma-related mortality and morbidity through comprehensive, evidence-based care from pre-hospital to intensive care. The institutionalization of emergency trauma and critical care in 2022, as recognized by the Society for the Surgery of Trauma under the Philippine College of Surgeons, has led to the establishment of several key initiatives. These include Trauma Team Activation Protocol (TTAP), Massive Transfusion Protocol (MTP), Red Blanket Protocol (RBP), and the Surgical Intensive Care Unit Admission Guidelines (SICUAG). Additionally, the Early Ambulatory Surgical Treatment and Emergency Resuscitation (EASTER) protocol, developed in 2016, has been integrated into these efforts.

These initiatives are designed as a comprehensive bundle rather than standalone systems, significantly enhancing the efficiency of trauma management. Integrating these protocols and guidelines as a cohesive package ensures a more streamlined approach. Emphasizing efficiency monitoring and fostering intercommunication among these functions is crucial for their success.

TRAUMA TEAM ACTIVATION PROTOCOL

The Trauma Team Activation (TTA) strategy has been adopted and formally implemented in January 2024. It mobilizes a multidisciplinary team that ensures a rapid, coordinated response for severely injured patients, improving outcomes through faster time-to-treatment, supported by Davao City's Central 911 EMS partnership and prehospital notifications. Partial trauma team activation involves emergency medicine physicians, trauma surgeons and trauma resuscitation nurses, while full trauma team activation included a multidisciplinary team, consisting of doctors and staff from Emergency Medicine, Orthopedics, Trauma Surgery, Neurosurgery, Interventional Radiology, Internal Medicine, Pediatrics, Anesthesia, and more. The success of the TTAP underscores the critical role of interdisciplinary teams in trauma care. By combining specialized expertise, they ensure holistic management, streamline

Implementation of

TRAUMA PROTOCOLS

in Southern Philippines Medical Center in 2024

Distribution of indications for **MTP** activation from January to April 2024

n = 41

Stab wound	13
Blunt abdominal trauma	6
Penetrating trauma	4
Motor vehicle accident	3
Motorcycle crash	2
Motor vehicle collision	2
Traumatic brain injury	2
AVP	1
Blunt chest trauma	1
Crashing injury	1

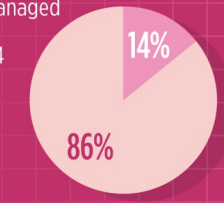
Distribution of indications for **EASTER-P** activation from January to April 2024

n = 1,497

URGENT	Amputation	36
	Chest tube thoracostomy	3
	Closed tube thoracostomy	30
	Disarticulation	7
	Evacuation of hematoma	1
	Incision and drainage	12
	Pinning	1
TIME-CRITICAL AMBULATORY	Burn dressing	24
	Change tracheostomy	4
	Debridement	118
	Decannulation	1
	Femoral catheter insertion	1
	Foreign body removal	14
	Internal jugular catheter insertion	6
	Internal jugular shunt insertion	1
	Nail bed repair	6
	Primary repair	1
	Wound dressing	2
	Wound exploration	31
	Wound suturing	1193
EMERGENT	Burrhole	1
	Escharotomy	2
	Open tube thoracostomy	1

Outcomes of patients managed via the **SICUAG** from January to October 2024

n = 534



- **76** patients expired
- **458** patients were eventually transferred out of the SICU

Massive Transfusion Protocol (MTP)

Ensures timely delivery of blood transfusion therapy for managing severe hemorrhage.

Early Ambulatory Surgical Treatment and Emergency Resuscitation Protocol (EASTER-P)

Reduces delays and decongests the main operating room by enabling expedited surgeries to be performed in the Emergency Department (ED).

SICU Admission Guidelines (SICUAG)

Streamlines the transfer of critically ill surgical patients from the ED to the Surgery Intensive Care Unit (SICU).

Trauma Team Activation Protocol (TTAP)

Facilitates rapid and coordinated response for severely injured patients by mobilizing a multidisciplinary team.

Red Blanket Protocol (RBP)

Bypasses standard ED procedures to enable life-saving surgical interventions for patients with critical injuries.

Outcomes of patients managed via the **TTAP** from April to July 2024

Response time		Time to definitive care	Mortality rate
PARTIAL TTA	FULL TTA		
100% Frequency of patients seen within 5 minutes (110/110)	**96%** Frequency of patients seen within 15 minutes (120/125)	**100%** Within 60 minutes (199/199)	**5%** (11/229)

Number of patients managed via the **RBP**

65

patients from January to September 2024

decisions, minimize delays, and enhance patient outcomes. To ensure effective monitoring of this protocol, each TTA is logged in a real-time online database and registry for Emergency Medicine.

Despite challenges like limited resources, an overcrowded emergency department, and inconsistent activation, all patients requiring partial trauma team activation (110/110; 100%) received it within 5 minutes, while nearly all needing full activation (120/125; 96%) received it within 15 minutes from April 2024 to July 2024. During the same period, for all 199 patients with available data on arrival time and time of definitive care, care was provided within 60 minutes of arriving at the ED (100%). The emergency department trauma mortality rate for severe trauma cases was 4.80%.

MASSIVE TRANSFUSION PROTOCOL

The MTP was officially implemented in January 2024. Our partners in the Department of Laboratory and Pathological Sciences, together with the SPMC Blood Bank, supported the IEATCC in implementing the MTP. This protocol is crucial for managing severe hemorrhage in trauma patients, ensuring the timely and effective delivery of balanced transfusion therapy. It aligns with the Universal Health Care's emphasis on comprehensive care and an integral role in reducing preventable deaths within a well-coordinated trauma system.

The MTP was activated for 36 trauma patients from January 2024 to April 2024, with an average time to the first transfusion of 17.24 ± 6.79 minutes (n=17). On average, 104 units of blood were requested per month through the protocol, but only 63 units were actually used. Per patient, an average of 10 units was requested, while only 6 units were used.

EARLY AMBULATORY SURGICAL TREATMENT AND EMERGENCY RESUSCITATION PROTOCOL

The Early Ambulatory Surgical Treatment and Emergency Resuscitation (EASTER) protocol, introduced in 2018, expedites surgeries at the ED, reducing delays, decongesting the main operating room, and minimizing trauma-related morbidities. The EASTER unit comprises two sterile rooms, capable of accommodating 3-4 surgical procedures simultaneously, depending on the case. It is staffed by nurses trained in surgical procedures, supported by a nurse attendant. The unit primarily handles trauma and orthopedic cases, performing procedures such as wound repair, debridement, and closed fracture reductions. It is also equipped for cranial burr-holing, central-line placement, and chest tube insertions. Peripheral nerve blocks and sedation are routinely used for pain management.

From January to April 2024, 1,524 ED patients, with a mean age of 31 years, activated the EASTER protocol. Most of the procedures (1,402/1,497; 93.72%) fell under the category of 'time-critical ambulatory procedures,' such as wound suturing, wound exploration, debridement, foreign body removal. Urgent procedures accounted for 6.02% (90/1,497), while only 0.27% (4/1,497) were emergent procedures. The average time it took from requesting the procedure to the starting of the procedure was 135 ± 399 minutes (n=724), and the average procedure duration was 24 ± 19 minutes (n=364). Since its implementation, the EASTER protocol has improved surgical response times and patient outcomes, but resource and infrastructure constraints, staffing shortages, and inconsistent adherence limit its broader effectiveness.

SURGICAL INTENSIVE CARE UNIT ADMISSION GUIDELINES

Admission to the Surgical Intensive Care Unit (SICU) is indicated for critically-ill surgical patients, including preoperative, postoperative cases, and non-operative cases. The SICUAG, introduced in early 2024, aims to provide evidence-based, optimal care to critically injured patients. Transitioning to a semi-open SICU model introduced a dedicated trauma and critical care physician, ensuring 24/7 presence and streamlined patient management. This shift improved subspecialty coordination, prioritized admissions based on clinical need, and enabled integrated, timely care through a multidisciplinary team approach.

From January 2024 to October 2024, the protocol was applied to 534 patients, averaging 53 admissions monthly. Of these, 76 (14.23%) patients expired during their ICU stay, while the remaining 458 (85.77%) were eventually transferred out of the SICU. Preliminary observations indicate increased direct admissions from the ED and reduced morbidity and

mortality, although comprehensive data analysis is ongoing. A key challenge in implementing the SICU admission guidelines is adapting from a traditional open ICU model to a semi-open ICU model, which poses a learning curve for other departments, particularly in centralizing patient care within the SICU. However, prioritizing evidence-based practices and best-practice implementation is essential to achieving a more seamless and coordinated approach to managing critically ill patients.

RED BLANKET PROTOCOL

The RBP, introduced in 2022, aims to expedite life-saving surgical interventions for critically injured patients by bypassing standard ED procedures. This direct-to-operating-room strategy significantly reduces delays for patients with life-threatening conditions, such as those with major hemorrhages from blunt or penetrating injuries, improving survival rates and minimizing complications. From January to September 2024, the protocol was activated for 65 patients, averaging 7 cases per month, mean ED to OR time of 75 minutes and mortality rate of 9.2%, often attributed to severity of injury.

Since the implementation of the RBP, there has been a notable improvement in mortality and morbidity trends, as well as a reduction in the turnaround time for transporting trauma patients to the operating room for definitive care. Successful implementation relies on seamless coordination among trauma teams, surgical staff, and operating room preparedness. Challenges include resource limitations and ensuring strict adherence to activation criteria. Addressing these barriers can enhance the protocol's effectiveness.

The implementation of trauma protocols at SPMC offers several gains and opportunities for improvement. We aspire for our efforts to be recognized for exemplifying practices aligned with the principles espoused by the WHO for effective trauma care systems. These efforts improve patient outcomes and position SPMC as a model for adopting evidence-based practices in local and global health care. Documenting and publishing our system provides a useful resource for other hospitals with similar patient volumes, enabling adaptation to their specific contexts. It also opens avenues for international, national and local practitioners to rotate through SPMC and learn from its approach, fostering training, education, and professional linkages. Expanding EASTER services to include additional procedures enhances patient care offerings. Nurses' involvement in the trauma system fosters workforce development and underscores the collaboration of physicians, nurses, paramedics, and support staff, ensuring effective care. Lastly, follow-up review studies and related research are planned after this publication to further expand insights and ensure continuous improvement.

In the future, the SPMC IEATCC plans to integrate these trauma protocols bundle with rehabilitation systems to ensure seamless patient reintegration to the community. Specific strategies to overcome identified challenges include establishing partnerships with the community, rehabilitation centers, leveraging telemedicine for follow-up care, and training health care providers in holistic, post-discharge management. Additionally, the 'bundles of trauma care' will be developed into a structured learning curriculum, while data from our experience will support efforts in standardizing trauma prevention initiatives.

Future research directions will focus on evaluating long-term impact of these protocols on patient outcomes, identifying gaps in care, and exploring innovative approaches to trauma management. Moreover, regular training workshops will be implemented to refine the skills of health care professionals, fostering a culture of continuous learning and quality improvement.

The SPMC IEATCC strives to redefine trauma care standards, aligning with the commitment of SPMC to high-quality, equitable, and comprehensive patient care. Through advanced trauma protocols and continuous staff development, SPMC seeks to improve patient outcomes, reduce mortality rates, and minimize trauma-related complications, solidifying its role as a premier health care provider for Mindanao.

Contributors
KGRS and BEPV conceptualized the article. KGRS, and BEPV wrote the original draft, while CXDL rendered the original draft of the infographic. All authors performed the subsequent revisions, approved the final version, and agreed to be accountable for all aspects of this article and its corresponding infographic.

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SPMC JHCS

HEALTH CARE FOCUS

Addressing the persistent challenge of emergency department overcrowding

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Emergency department (ED) overcrowding has become a significant global health concern, as recognized by the International Federation of Emergency Medicine.[1] This issue impacts not only critical care but also the emotional well-being of patients and, in extreme cases, leads to breaches of patient privacy.[2] The COVID-19 pandemic has further exacerbated the problem, adding complexity to an already challenging problem.[3] ED overcrowding occurs when (1) the number of patients in the ED exceeds the capacity of the hospital's inpatient services (i.e., wards and ICU),[4 5] and (2) the ratio of physicians to waiting patients is insufficient, leading to increased patient wait times.

In the Philippines, overcrowding is a long-standing issue, affecting both government and private hospitals.[6] The Southern Philippines Medical Center (SPMC) exemplifies this, with its current ED occupancy rate surging to 193%, far beyond its designed capacity of 80 beds. ED boarding, which refers to holding admitted patients in the ED after they have been admitted or classified under observation status,[7] is 150%. In addition, the occupancy rate of adult medical/surgical patients in the ED is 198%, while the volume of the critically ill is 106%. ED overcrowding in SPMC impacts operational efficiency, causing delays in assessment and treatment, an increased risk of cross-infection between patients, and longer radiology and laboratory turnaround times. This problem also leads to reduced patient satisfaction resulting in discharges against medical advice and prompting patients to seek services at other hospitals. However, these patients often return to SPMC shortly thereafter due to the high cost of health services in private hospitals, further contributing to delays in intervention.

This raises the pressing question: why does this preventable issue persist, even in top health care facilities?

Several underlying factors contribute to chronic ED congestion in the Philippines and elsewhere. Insufficient resources—such as limited staff, medical supplies, and equipment—lead to delays in patient care and longer wait times, exacerbating congestion. High patient volumes, particularly during peak times or in areas with limited health care facilities, can quickly overwhelm the ED.[8] Furthermore, the lack of access to primary care forces many individuals to seek non-emergency care in EDs, further straining resources. Inefficient patient flow, due to ineffective triage systems, poor coordination between departments, and delays in test results, also plays a significant role in overcrowding.

Limited hospital bed capacity compounds the problem. When there are insufficient beds to admit patients from the ED, it creates backlogs. Complex patient cases requiring extensive evaluation and treatment further tie up resources. External factors, such as natural disasters, disease outbreaks, or mass casualty incidents, can also overwhelm EDs.

Systemic issues, including fragmented health care funding and the regional sharing of specialists, worsen these challenges. Often, health care systems are provider-centered rather than patient-centered, leading to inefficiencies in care delivery.[9] The lack of an integrated care and health management system results in fragmented care, hindering effective disease management of diseases and patient outcomes.

Several strategies have been implemented to address overcrowding, particularly in hospitals like SPMC. Efforts to streamline patient referrals within the ED have aimed at facilitating timely and efficient care transfers. Regular resuscitation training and simulation exercises help staff manage emergencies more effectively. Newer emergency medicine specialists benefit from mentorship programs, while continuous quality improvement initiatives focus on optimizing ED processes through staff feedback and performance metrics. Additionally, teamwork and collaboration among health care professionals are promoted, and investments in technology, such as electronic health records and telemedicine platforms, have been made to improve workflow and

communication.

The development of unified trauma care teams in EDs has significantly improved admission and turnaround times, even in crowded settings. Collaboration between emergency medicine and surgical teams enables quicker assessments and interventions, improving patient care and reducing delays.

However, these initiatives alone have not fully resolved the overcrowding problem. Standardized referral processes often falter due to inconsistent implementation across departments. Resuscitation and simulation training, while invaluable, focus primarily on emergency response, not the root causes of overcrowding. In response, SPMC launched the Early Ambulatory Surgery for Trauma at the Emergency Room (EASTER), later expanded to include Resuscitation. This initiative alleviates the burden on the main operating room by providing timely trauma interventions, improving patient flow and resource utilization. The EASTER project includes minor operative procedures (e.g., central line placement, wound suturing, nerve block placement, debridement, etc.) that must be performed within 30 minutes to one hour of referral.

While mentorship programs aid professional development, they do not directly address operational challenges in overcrowded EDs. Continuous quality improvement efforts are often hindered by resource shortages and overwhelming patient loads. Although interdisciplinary collaboration is crucial, achieving the necessary cultural shift takes time. Technology, while improving efficiency, cannot resolve the underlying issues of resource scarcity and high patient volumes.

To effectively tackle ED overcrowding, a comprehensive and systemic approach is necessary. Improving access to primary care is crucial to reduce the burden on EDs by preventing non-emergency cases from overwhelming the system. Enhancing resource allocation is also critical to ensure that EDs are adequately staffed and equipped. A shift to a patient-centered model is required to provide coordinated and continuous care across all health care levels.

An e-referral system could improve health care infrastructure by enhancing medical direction and facilitating prehospital care. Integrating prehospital, hospital, and critical care services may not completely eliminate congestion but could potentially reduce mortality rates in overcrowded hospitals. Aligning prehospital and hospital systems, particularly regarding severity levels, has significantly improved resource allocation of hospital resources, ensuring experienced nurses and resuscitation equipment are readily available. Furthermore, equipping medical students with public health education can prepare them for future medical practices.

Expanding hospital capacity, particularly in critical care and isolation units, is essential to better accommodate patient surges. Hospital budget allocation should consider not only bed capacity but also the need to expand services, particularly for specializations that can directly help reduce mortality rates.[6] Active bed management is a proactive intervention involving the continuous assessment of hospital services and incoming inpatient flow. It may be carried out by a dedicated bed manager or director who monitors patient admissions, discharges, and patient flow within the hospital.[10 11] This process includes regularly making rounds to check bed availability, facilitating expeditious patient transfers, mobilizing available resources (e.g., personnel, hospital spaces, or medical equipment/supplies), and optimizing ED throughput (the time from patient arrival to departure from the ED). Real-time monitoring of bed availability, enabled by bed management software, allows the bed manager to make quicker decisions, especially in acute settings.[11]

Strengthening public health initiatives to address social determinants of health can reduce the incidence of conditions requiring emergency care. Developing regional health care networks would facilitate better coordination between hospitals, enabling more efficient patient transfers and reducing the strain on any single facility. Outsourcing services is another strategy that hospitals can leverage to reduce patient wait times and improve care delivery.

By adopting these recommendations, we can make significant strides toward resolving ED overcrowding. Focusing on comprehensive solutions and continuous evaluation will help create a more efficient ED system that better serves community needs, improves patient care, and ensures health care facilities can function effectively, even in times of crisis.

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BEPV conceptualized the article. BEPV wrote the original draft. The author performed the subsequent revisions. The author have agreed to be accountable for all aspects of this report.

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Client feedback on Southern Philippines Medical Center health care services in 2023: policy notes

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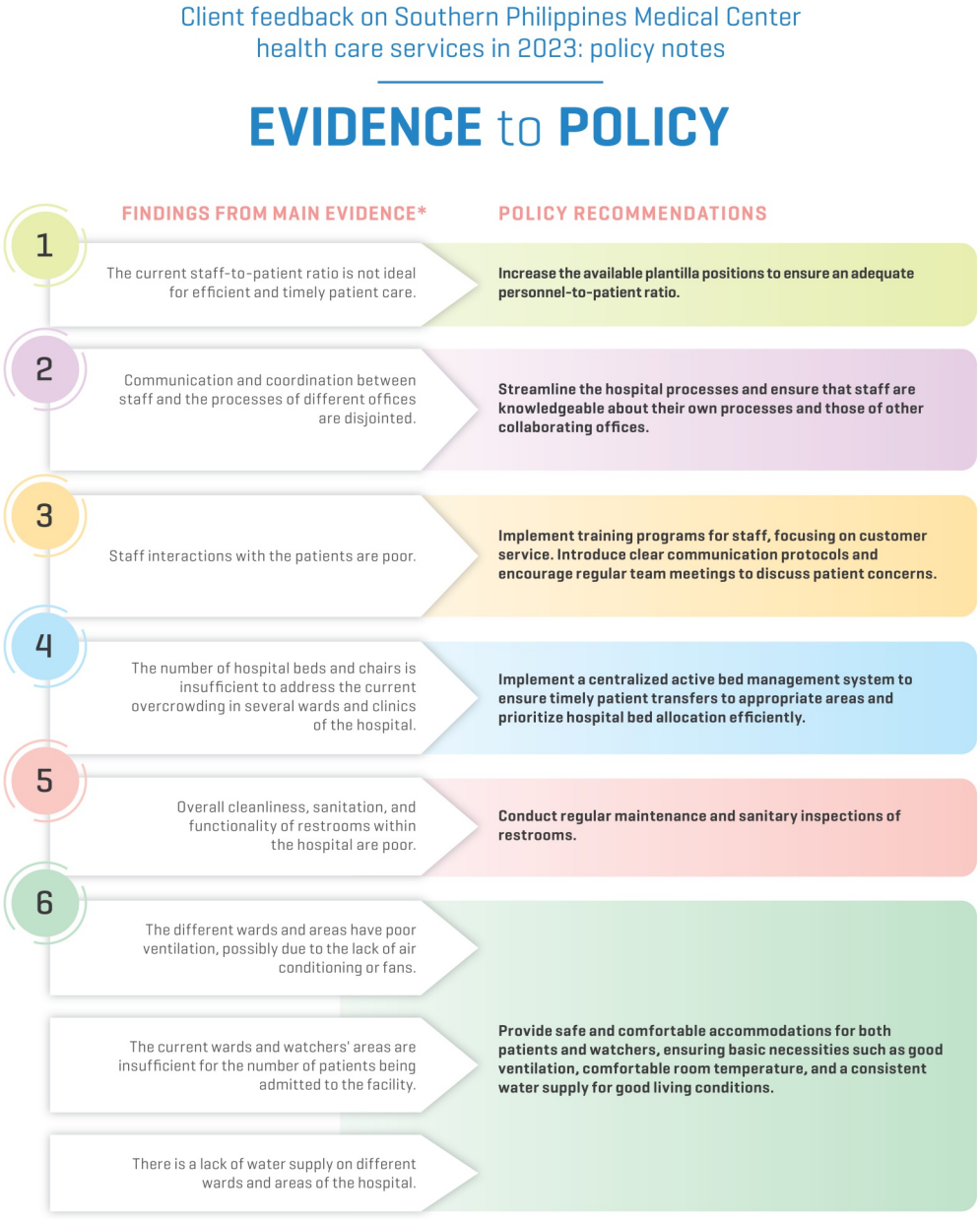

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INTRODUCTION

Client feedback is vital for ensuring high-quality, efficient, and client-centered health care. It drives continuous improvement, enhances transparency and accountability, and informs policy development. By integrating this feedback into decision-making, institutions align services with client needs, strengthen operations, and advance institutional goals. This approach reflects the Department of Health's second 8-point action agenda: "Safe, high-quality, and people-centered services."[1] Prioritizing client perspectives demonstrates a steadfast commitment to delivering quality care and fostering consistent improvement.

This article aims to propose policy recommendations for Southern Philippines Medical Center (SPMC) based on insights derived from its regular client feedback mechanism.

MAIN EVIDENCE

The infographic article of Buano, et al.[2] presents a summary of recommendations given to SPMC by its clients through the Hospital Client Experience Survey (HCES). The article aimed to assess patient feedback focusing on three main domains: personnel, processes, and structures. Data were gathered via monthly surveys conducted by Public Assistance and Complaints Desk (PACD) Officers, who engaged with clients to collect responses about hospital services. These surveys were analyzed quarterly to identify positive and negative feedback, which were then used to shape improvements in the hospital operations.

The most common client recommendations included increasing staff members, improving sanitation and infrastructure, and enhancing service delivery times. The feedback also emphasized the need for better staff-patient interaction, more staff training, and improved communication with hospital departments.

The evidence-to-policy diagram below summarizes client feedback from the Infographic article and our policy recommendations to address the identified issues.

RELATED EVIDENCE

Increasing plantilla positions ensures an adequate health personnel-to-patient ratio, which is critical for patient safety, care quality, and better patient outcomes.[3,4] Plantilla positions, which are permanent government employment roles,[5] provide stable job security and standardized compensation, making them essential for retaining skilled health care workers at SPMC and meeting service demands.

Streamlining hospital processes and ensuring staff are well-informed about their own and collaborating offices' workflows can improve patient care and reduce errors.[6] Effective patient flow management enhances care delivery speed and quality, boosts employee satisfaction, and lowers health care costs.[7] Implementing customer service training programs, establishing clear communication protocols, and encouraging regular team meetings are critical for improving staff-client interactions and care quality. Poor staff-client interactions can negatively impact client experiences, but targeted training and effective communication strategies have been shown to enhance satisfaction, reduce complaints, and improve outcomes.[8,9] The hospital's training unit can support these efforts by offering relevant training and incorporating division-specific suggestions, ensuring tailored and impactful staff development.

Implementing a centralized active bed management system in SPMC's wards would address current inefficiencies caused by the lack of real-time tracking and coordination in bed allocation. This system, possibly managed by a dedicated bed manager from the Emergency Department, can utilize electronic bed management software to monitor bed availability, occupancy, and patient movement in real-time. Such a system has been shown to reduce patient wait times, optimize resource utilization, and improve hospital efficiency.[10-12]

Regular maintenance and sanitary inspections of restrooms in hospitals prevent the spread of infections, as these areas are highly exposed to contamination.[13,14] At SPMC, this can be achieved by maintaining sufficient housekeeping staff, implementing consistent cleaning schedules, and leveraging housekeeping supervisors to oversee sanitation conditions. Providing safe and comfortable accommodations with proper ventilation, consistent water supply, and adequate space reduces hospital-acquired infection risks for patients, watchers, and health care staff.[15-17] At SPMC, improving the watchers' area requires collaboration with building administrators to optimize location, design, and functionality.

Client satisfaction surveys help gauge the quality of different health care services in a facility. The feedback collected highlights key concerns that must be addressed to meet client expectations. By addressing interconnected issues—such as staffing, infrastructure, patient flow, and communication—the hospital can create a more efficient, responsive, and compassionate care environment. These improvements not only enhance the experience for patients and their families but also support health care providers in delivering the highest quality of care.

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Authors should follow the CARE Checklist (Table 1) in preparing the manuscript for case report.

Case report submissions should contain the following sections:

1. Title: should state the final diagnosis
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Use 2000 words or less for the main text of the report (excluding title, abstract, tables, figures, references, and acknowledgments).

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Authors should follow the appropriate EQUATOR Network checklist for reporting research. Listed in Table 1 are the common study/article types and their corresponding checklists. Also visit the EQUATOR Network website for a complete list of reporting guidelines and checklists.

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2. Author of the book review and affiliation
3. General contents and scope of the book
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5. (Optional) comparison of the book with other books within the same area or topic
6. References
7. Acknowledgments

Use 2000 words or less for the main text of the review (excluding title and references).

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2. Authors and affiliations
3. Brief clinical description, which should include: patient's age and sex, chief complaint, brief clinical history, physical examination findings, relevant diagnostics, final diagnosis, relevant

Table 1 **Reporting guidelines and checklists** (http://www.equator-network.org/)

Study/article types	Checklists and diagrams
Case report	CARE checklist
Randomized controlled trial	CONSORT checklist; CONSORT flow diagram
Observational studies (cohort, case-control, cross-sectional)	STROBE checklist
Meta-analysis and systematic reviews	PRISMA checklist; PRISMA flow diagram
Diagnostic accuracy studies	STARD checklist; STARD flow diagram
Prediction model for individual prognosis or diagnosis	TRIPOD
Qualitative studies	COREQ
Economic evaluation	CHEERS

therapeutics, outcomes, description of the individual photos
4. Photo/s with description/s
5. Acknowledgments

Use 300 words or less for the brief clinical description.

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A series of unreported, unexpected or unusual physical examination or intraoperative, histopathologic, radiographic or other medical imaging findings may be submitted for publication. When taken together, the images should describe the chronology of clinical events, diagnostic interventions, therapeutic interventions, and/or clinical outcomes in a case. We offer assistance in determining the images to be included in the final version for publication.

Submissions of this type should contain the following sections:

1. Title: should state the final diagnosis
2. Authors and affiliations
3. Brief clinical description, which includes patient's age and sex, chief complaint, brief clinical history, brief physical examination findings, relevant diagnostics and therapeutics, final diagnosis and outcomes, detailed description of images
4. Photos with descriptions
5. Acknowledgement

Use 500 words or less for the brief clinical description.

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