



JOURNAL OF THE PHILIPPINE MEDICAL ASSOCIATION

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The JPMA is a peer-review journal designed to meet the continuing education requirements of PMA members and the medical community. It adheres to the guidelines established by the International Community of Medical Journal Editors (ICMJE); however, for purposes of this issue, the previously circulated JPMA Instructions for Authors, although with some modifications, are still being followed.

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In the conduct and reporting of research, the JPMA adheres to the ethical considerations set forth by the ICMJE with respect to authorship and contributorship, editorship, peer review, conflicts of interest, right to privacy and confidentiality of patients, study participants as well as authors and reviewers; and, the protection of human subjects and animals in research.

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This section is primarily based on the previous and existing JPMA Instructions to Contributors but with some modifications based on the ICMJE recommendations. A completely revised version based on the guidelines of the ICMJE will be published in the next issue.

Accompanied by a cover letter from the principal author, the manuscripts, figures, tables, photographs, and references should be submitted in duplicate (an original and a copy) and typed double-space (including legends and footnotes) on one side of a white bond paper, 8.5 and 11 inches properly numbered consecutively on the upper right-hand corner of each page beginning with the title page. Illustrations must also be in duplicates. An electronic copy of the articles in a CD must be submitted.

The first page should contain the title, subtitle (if any), all authors' full names and highest earned academic degrees, and hospital or institutional affiliations. It must also include disclaimer, if any.

For the original article, an abstract must be type at the beginning of each paper after the title. It must contain, in structured format, the following: background or context of the study, objectives, methods, results and conclusions of the study, as appropriate. It must not be more than 300 words. No footnotes/ references must be in the abstract. For other articles, an unstructured abstract may be preferred. Below the abstract, identify three to ten keywords or short phrases that will assist in indexers in cross-indexing the article.

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Editor's Note:

The Medical Association of Southeast Asian Nations (MASEAN) is composed of the 10 Medical Associations. During these cooperation meetings, the MASEAN Group of Journals (GoJ) was born. This also paved the way for reviewers across the different journals. It is hoped that more cooperations like this will happen for the future issued of this journal.

During this time, we are looking forward to receiving submissions for scientific papers, both from our young researchers as well as from our more seasoned researchers. The Journal of the Philippine Medical Association is open to all members of the organization to improve our publication. We look forward to receiving yours, soon.

Maria Christina H. Ventura, MD, FPPS

Editor-in -Chief

A Mixed Methods Study Exploring Business Leaders Perspectives on Mental Health and Related Services in an Urban Workplace Setting*

Mitz S. Serofia, MD¹

ABSTRACT

There is a growing recognition among business leaders of the impact of mental health issues on business outcomes. This improved awareness, however, has not been accompanied by a proportional increase in investment and implementation of related programs. This research aimed to explore the context and perspectives of business leaders on mental health and related services in the workplace from private industries in Iloilo City. The study utilized a convergent mixed methods design. Fifty-three business leaders, chosen through convenience sampling, answered an online, three-part questionnaire. For the qualitative strand, seven purposively sampled leaders took part as key informant interviewees. Results showed that majority has been operational for 2–5 years (43%), were classified as micro (40%) and small (43%) enterprises, and came from the food and beverage (28%) industry. Both strands of the study revealed positive results in terms of the leaders' awareness on and attitude towards mental health in the workplace. While participants had differing experiences of mental health concerns, they similarly agreed that related services were costly and difficult to access. Respondents were indecisive about providing mental health services as evidenced by a lack of institutionalized programs, although they had high perceived acceptability, appropriateness, and feasibility scores to the prospect of having an employee assistance program regardless of the age, type, and financial position of their business. The context where and when practices or services for workplace mental health occur played a crucial role, such as leadership style, employee characteristics, and company culture. In conclusion, business leaders demonstrated positive awareness around mental health and were open to looking for ways to support their employees, although this came with logistical and financial reservations. The results may inform businesses and relevant agencies in contextualizing the role of mental health in the workplace and understanding the factors that affect program design and implementation.

Keywords: mental health services

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

***1st Place, 30th Philippine Medical Association Residents' Research Presentation Original Paper, May 18, 2024**

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INTRODUCTION

Mental health-related issues in the workplace affect employee morale adversely and have a direct impact on a range of business outcomes such as productivity.¹ However, while the awareness of industries on this matter has improved, investment in mental well-being and implementation of related programs has not kept pace.² In a survey of 122 employers in the country, only 52% of employers said that they have an organization-wide mental health strategy or action plan.³

These efforts should be in keeping with mandates from government agencies such as the Department of Labor and Employment that require private businesses to implement mental health programs and policies.⁴ However, in the absence of specific strategies outlined in relevant laws, their implementation in the private sector remains unclear and employers are left to rely on their own initiatives. On the other hand, while attention has been paid to improving mental health literacy among leaders through training programs and other interventions, little attention has been paid to understanding contextual factors that may help or hinder a leader's ability to provide mental health support to employees.⁵

In order to understand how workplace mental health interventions are conceived and implemented in organizations, a mixed-methods approach is necessary to explore the context and perspectives of business leaders on mental health and related services in the workplace from private industries in an urban setting. Specifically, this study sought to describe the awareness, attitude and concerns of business leaders in Iloilo City regarding mental health in the workplace, as well as determine their actions or measures in response to such concerns. Finally, this study also sought to ascertain the business leaders' perceptions on providing a workplace mental health service (*i.e.*, employee assistance program) for their employees

in terms of its feasibility, acceptability, and appropriateness.

MATERIALS AND METHODS

This research utilized a convergent mixed methods study design. The study population included leaders from private businesses in Iloilo City. Data collection for both quantitative and qualitative methods was done mostly online which took place from January to May 2023.

Inclusion Criteria

- **For the business organization**
 - Business establishments in Iloilo City
 - Registered in the Business Permits and Licensing Office of Iloilo City Hall
 - Operational for at least two years
- **For the business leader**
 - Has reliable internet connection and adept in using online resources
 - Has been in the organization for at least a year

Exclusion Criteria

- **For the business organization**
 - Those engaged on purely online businesses or e-commerce
 - Those with less than three employees
- **For the business leader**
 - Age 18 years old and below

This study utilized convenience sampling for the quantitative method. The researcher subjectively selected 53 business leaders within his network who were willing to become part of the research study. Purposive sampling was done in the selection of seven study participants for the qualitative method.

Data Collection Methods and Tools

This study used convergent mixed methods approach. For its quantitative strand, 53 conveniently sampled business organizations were selected by the researcher. A link to a Google survey form, online Informed Consent Form, and

the research instruments was then sent to their official company email.

For the qualitative strand, seven leaders of business organizations were selected through purposive sampling. Data saturation was achieved from this sample. The participants with the highest (4 participants) and lowest (3 participants) summated scores on the domain "Action Steps" in the researcher-made questionnaire were invited as key informant interviewees.

The research instrument for the quantitative method was a three-part self-administered questionnaire. The first part was the Personal and Business Profile Sheet. The second part was a 23-item self-administered questionnaire developed by the investigator. The instrument underwent content validation and pilot-testing. After subsequent iteration, Fleiss' kappa coefficient ($K=0.64$) was computed which indicated substantial agreement among the validators. In the pilot-test, all items had a Cronbach alpha of at least 0.7 and were deemed reliable.

The third part of the research instrument was the Acceptability of Intervention Measure, Intervention Appropriateness Measure, and Feasibility of Intervention Measure Questionnaire. Developed by Weiner et al, this standardized tool is a four-item measure of implementation outcomes.^{6,7}

For the qualitative method, a list of researcher-made, open-ended questions was prepared to parallel and complement the questions of the quantitative surveys and to understand contextual factors affecting perception towards workplace mental health and the implementation of related services. With the participant's consent, the interview was audio-recorded and the audio output was transcribed thereafter.

Ethical Considerations

The study was duly reviewed and approved by the hospital's Technical Research Committee and the Unified Research Ethics Review Committee.

Data Processing and Analysis

The researcher analyzed the two data sets separately and independently from each other using quantitative and qualitative analytic procedures.

Analysis of quantitative data began with descriptive statistics relating to the personal and business profile of the participants. The gathered data on personal and business profile were presented and analyzed using frequency and percentage. Mean scores were obtained for the age of the business leaders and for the operating years of the organization.

The results of the researcher-made survey were presented and analyzed using frequency and percentage. A mean score per item and per domain was obtained. The results were analyzed based on the mean score and interpreted as to the level of agreement or disagreement of a certain item or domain using a range of statistically derived values.

The Intervention Measure surveys were presented and analyzed using mean and standard deviation. According to its authors, cut-off scores for interpretation are not yet available; however, higher scores would indicate greater feasibility, acceptability, or appropriateness.⁸

Using Kruskal-Wallis test, the mean scores of feasibility, acceptability and appropriateness were compared to determine if significant differences existed among business profiles. All acquired data were analyzed using SPSS version 25.

Qualitative data were obtained from the key-informant interviews to shed light on contextual factors. The interviews were done online (5 participants) and face-to-face (2 participants). The voice recordings were transcribed and uploaded to NVivo 14 for coding. Meaningful and holistic categories were combined to form themes. The themes were then reviewed, named, and defined.

Finally, the researcher interpreted to what extent and in what ways the quantitative and qualitative datasets converged or diverged from each other, related to each other, and/or combined to create a better understanding in response to the study's overall purpose. The integration of both datasets was done in the form of a narrative using the weaving approach where the findings were written together on a theme-by-theme or concept-by-concept basis.

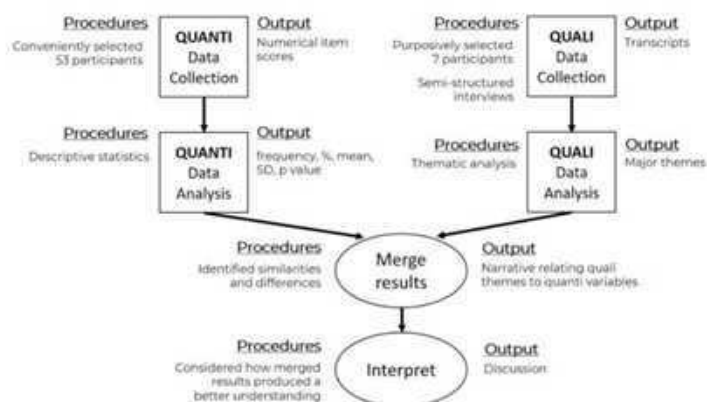


Fig. 1. Diagram of Convergent Mixed Methods Design

RESULTS

Table 1 shows the participants' personal and business profile. Majority of the businesses were micro (40%) and small (43%) enterprises, and came from the food and beverage (28%) and commerce (23%) industry. Notably, 77 percent of the participants have not yet implemented any workplace mental health service in their organization.

Table 1. Personal and business profile of study participants (n = 53)

Profile	Category	n (%)
Sex	Male	22 (42)
	Female	31 (58)
Age	19-27 (Gen Z)	7 (13)
	28-42 (Millennial)	33 (63)
	43-57 (Gen X)	8 (15)
	58-76 (Baby Boomer)	5 (9)
Years of Operation	2-5 years	23 (43)
	6-10 years	9 (17)
	>10 years	21 (40)
Enterprise Type	Micro	21 (40)
	Small	23 (43)
	Medium	2 (4)
	Large	7 (13)
Industry Type	Food and Beverage	15 (28)
	Commerce	12 (23)
	Advertising and Marketing	4 (8)
	Other Services	4 (8)
	Health and Wellness	3 (6)
	Information Technology	2 (4)
	Pharmaceutical	2 (4)
	Transportation and Storage	2 (4)
	Others	9 (18)
Financial Position	With enough capital	41 (77)
	Need to take loan	9 (17)
	Barely enough capital	3 (6)
Status of Workplace Mental Health Service Implementation	Not Yet Started	41 (77)
	Ongoing Implementation	10 (19)
	Finished Implementation	2 (4)

Table 2 shows the mean scores of domains examined in the Researcher-made Questionnaire. The mean scores were interpreted according to their level of agreement or disagreement, categorized within a range of values. The range was obtained by getting the difference of the maximum value (5) and minimum value (1), and dividing the result to the maximum score of 5.

1.00 – 1.80	Strongly Disagree
1.81 – 2.60	Disagree
2.61 – 3.40	Neutral
3.41 – 4.20	Agree
4.21 – 5.00	Strongly Agree

Table 2. Mean scores on awareness, attitude, concerns and action steps of business leaders regarding workplace mental health and related services

Question	Mean	Interpretation
Mental health (MH) is a crucial factor to business outcomes	4.47	Strongly Agree
MH is related to productivity	4.51	Strongly Agree
MH services help maintain good health status	4.42	Strongly Agree
Well-being is a business-critical skill	4.30	Strongly Agree
Aware of mandated laws on establishing a MH program	3.77	Agree
MH is a top business priority	4.08	Agree
Prepared to deal with mental health issues	3.74	Agree
Culture is accepting of MH challenges	4.04	Agree
Company is open and inclusive	3.92	Agree
Willing to invest for MH of employees	3.57	Agree
Employees had MH issues in past year	2.70	Neutral
Covid-19 crisis affected MH of the workforce	3.25	Neutral
Covid-19 increased expectations for MH benefits	3.19	Neutral
Strain on MH creates financial impact to company	3.04	Neutral
MH services are difficult to access	3.42	Agree
MH services are costly	3.74	Agree
Provides adequate general health benefits	3.91	Agree
Provides adequate MH benefits	3.38	Neutral
Offers various MH programs	3.13	Neutral
Has made improvements on MH services	3.19	Neutral
Has continued or expanded MH services	3.36	Neutral
Has made benefit enhancements for MH	3.15	Neutral
Has made enhancements on general health benefits	3.49	Agree

Attitude towards Mental Health in the Workplace

The overall mean score on this area was 3.87, which indicated agreement to the items asked. Analysis of the interviews revealed three themes: perceived self-efficacy, finding mental health important, and willingness to change systems and practices.

The participants' belief in their capacity to execute behaviors necessary to produce specific performance outcomes, or self-efficacy, seems to affect how they think, feel and act in a particular way towards mental health concerns in the workplace. P1 stated, "I don't think I am equipped to even respond to those, especially that some of them are very personal."

The salience they attribute to workplace mental health also shapes their attitude towards it. P6 affirmed, "It is really top of mind, both for me personally and for the company." This also makes them more willing to create systematic changes in the organization. P2 stated, "We are actually now thinking what to prioritize as we plan to change our systems."

Concerns around Mental Health and Related Services

This domain recorded an overall mean of 3.22, which revealed a neutral stance to the survey items. However, some concerns in this area ranged from behavioral issues at work and actual lived experiences. In addition, participants agreed that access to mental health services is difficult and costly.

There were different experiences on the effects of the pandemic to the participants, showing a neutral finding in the survey. However, while two interviewees said that the pandemic did not have much of an impact on their workforce, the rest stated observing increased levels of stress primarily from the employee or their family members being sick.

Compatible with the quantitative findings, the participants also relayed apprehensions on availing workplace mental health services. These apprehensions included a lack of access to experts, such as human resource practitioners and mental health professionals, and third-party services like seminars or trainings from the private and government sector. Two participants, who have been in the business for more than 30 years, concurred saying, "It seems like DOH or DOLE does not have any labor campaigns related to mental health."

The actual and potential cost of implementing a mental health service or program in the organization was another important consideration for five participants. P2 stated, "My hesitations for the private sector is the corresponding fees, like food, travel and accommodation. Our revenues exist from commissions only and they go to salaries of the staff."

Action Steps in Response to COVID-19 and Mental Health Concerns

This domain recorded an overall mean score of 3.37, which also indicated a neutral stance. While businesses acknowledged the need to provide or enhance the general health benefits of their employees like life insurance and sick leaves, they were quite indecisive about providing mental health benefits or services. This was comparable to the results of the qualitative study, wherein six of seven organizations did not have an institutionalized mental health program. Nonetheless, all participants were noted to have organizational practices responsive to workplace well-being, either directly or indirectly.

Implementation Outcomes

Table 3 shows the participants' average Perceived Acceptability, Appropriateness, and Feasibility scores to the prospect of having an employee assistance program (EAP) in their organization. The results revealed mean scores of

3.65, 3.79 and 3.75, respectively, which are relatively high for a scale with a maximum score of 5. Of the three implementation outcomes, feasibility scored the lowest probably due to the associated cost of EAP's implementation, which was a recurring apprehension of business leaders.

Table 3. Level of acceptability, appropriateness and feasibility of providing a workplace mental health service (i.e., employee assistance program) for employees

	Mean	SD
Acceptability	3.79	0.85
EAP meets my approval	3.74	0.86
I welcome EAP	3.83	0.91
I like EAP	3.79	0.95
EAP is appealing	3.79	0.91
Appropriateness	3.75	0.83
EAP is suitable	3.75	0.85
EAP is fitting	3.81	0.90
EAP is applicable	3.75	0.87
EAP is a good match	3.70	0.95
Feasibility	3.65	0.78
EAP is possible	3.72	0.91
EAP is doable	3.68	0.87
EAP is implementable	3.62	0.99
EAP is easy to use	3.57	0.82

On further analysis, the results revealed the absence of significant difference in the Perceived Acceptability, Appropriateness, and Feasibility scores of participants when their organization was grouped according to years of operation, enterprise type, and financial state. This means that, regardless of the above variables, business leaders similarly found value in EAP in terms of its acceptability, appropriateness, and feasibility. However, it was interesting to note that a company's financial position had no significant effect, which was not congruent with the fiscal concerns reported by respondents in the researcher-made survey and interviews. This could mean that, for organizations with enough capital

(77%), cost may not be the only driving force affecting the implementation of non-EAP workplace mental health interventions.

DISCUSSION

Awareness on Mental Health in the Workplace

The participants' significant level of awareness regarding mental health is likely attributed to a substantial portion of them belonging to younger generations, such as Millennials (1980-1994) and Gen Z (1995-2012). Numerous studies have indicated that younger generations tend to possess higher levels of mental health literacy.^{8,9}

The participants' limited awareness of government-mandated laws, such as the Mental Health Workplace Policy and Program by DOLE, can be due to inadequate dissemination of information to companies regarding these laws, which P5 and P7 mentioned.

As shown in this study, there is a growing recognition of the impact of mental health issues on workforce productivity. For instance, a survey of senior human resources executives revealed that mental health is now acknowledged as the primary driver of indirect business expenses, including lost productivity and employee absences. This creates a compelling business case for establishing a healthy work environment, as it plays a vital role in achieving long-term objectives related to containing healthcare costs and maximizing work productivity.^{10,11}

However, the stigma associated with mental health problems continues to persist in the workplace. As observed in this study, it is not uncommon for business leaders to have negative views about mental health. As a result, they may not provide adequate support to employees with mental illnesses, especially if they hold stigmatizing attitudes.⁵

Attitude towards Mental Health in the Workplace

The participants' overall agreement that workplace mental health is a priority is promising. The present study revealed that business leaders in the qualitative phase are willing to adopt positive changes in their system and practices. According to Weiner (2009), organizational readiness for change serves as a fundamental factor in the successful implementation of organizational interventions.¹² However, the investment dilemma surrounding mental health resources creates conflicting sentiments among firms.¹³ Although quantitative findings from this study indicate a willingness to invest in employees' mental health, participants in the qualitative analysis expressed reservations due to the associated expenses even when majority of them have good financial standing.

On the other hand, the participants in the quantitative and qualitative strands had varying levels of self-efficacy in dealing with mental health concerns. Mondal et al. (2022) highlighted that, despite the increased awareness surrounding mental health, managers who desire to address this issue often find themselves in unfamiliar territory.²

Concerns around Mental Health and Related Services

The study's findings indicated a neutral perspective regarding the occurrence of mental health issues in the workplace in general. The possible reason could be the reluctance of employees with mental health symptoms to report their condition in the workplace due to the attached stigma. Another factor is the variation in workplace stress across different industries. The study participants were predominantly from the food and beverage industry (28%). Participant 5 mentioned that their industry is comparatively less stressful than others due to the repetitive nature of the work and sufficient rest periods.

Likewise, the study revealed a neutral perspective on the COVID-19 pandemic having significant effects on the mental health of the workforce. This is in contrast to a global survey conducted by Greenwood et al. (2020) which revealed that more than 40 percent of individuals have experienced a deterioration in their mental health since the onset of the pandemic.¹⁴ This neutral observation can be attributed to individual differences on how employees perceive and react to the pandemic's effects on their personal circumstances.

Moreover, the study's findings confirmed the hypothesis that businesses perceive mental health services as costly and/or inaccessible. Cited in workplace studies, challenges include providing access to a diverse pool of mental health providers and offering comprehensive coverage for mental health benefits.¹⁵ Additionally, a study involving public health workers revealed difficulties in accessing their employee assistance program (EAP). The EAP was described as hard to access, inadequate, or unavailable, and financial reasons made it inaccessible.¹⁶

Action Steps in Response to COVID-19 and Mental Health Concerns

Participants in this study acknowledged the need to provide or enhance the general health benefits of their employees like life insurance and sick leaves, but they were quite indecisive about providing mental health benefits or services. A news release from the U.S. Bureau of Labor Statistics supports this finding. The agency reported that 70 percent of workers had access to medical care. In comparison, wellness programs were available to only 43 percent of private industry workers, while EAP was available to 57 percent. The availability of these quality-of-life benefits varied based on establishment size, with significantly reduced access for companies with fewer than 100 employees.¹⁷

This is consistent with our present findings wherein most organizations, which were micro to small enterprises, do not have workplace mental health benefits or services. According to a Well-being Diagnostic Survey that gathered responses from 122 employers in the Philippines, only 53 percent of employers reported having an organization-wide mental health strategy or action plan.⁶ Additionally, a study highlighted that small and medium-sized enterprises (SMEs) often struggle to implement effective occupational safety and health prevention programs because they often lack a strategic vision for managing and developing their workforce.¹⁸

One of the common, formal organizational practices implemented by the study participants is flexible working. The American Psychological Association (APA) considers this as part of work-life balance, which is an undertaking of a psychologically healthy workplace.¹⁹ Another formal organizational practice is the provision of well-being breaks for employees who experience either physical- or mental-health related symptoms.

The present study also took account of informal organizational practices that have a relation to employee well-being. Examples of such practices include promoting open and deliberate communication, establishing safe spaces, and offering psychological/emotional support. This observation is notable in the present study and it seems to be a good work-around on the lack of formal well-being programs because the collective identity so central to the Filipino psyche operates through the informal, fluid, and interdependent personal networks within the larger organizational and social systems.²⁰

Implementation Outcomes

Irrespective of the age, type, and financial position of businesses, EAP was perceived favorably by business leaders in terms of its potential acceptability, appropriateness, and

feasibility. The favorable result signals either optimism from the business community here or it can be a reflection of their naivety to the program. It should be noted that, to the best of the researcher's knowledge, this service is not yet provided or fully implemented in the locality. Additionally, the absence of significant differences in the research findings contrasts with a study by Sorensen et al. (2016), which emphasized that organizational characteristics, such as industry sector and size, can impact the implementation of organizational interventions.²¹

Context of Implementing Workplace Mental Health Services or Practices

The context under which organization-based interventions among the participants were carried out can be analyzed from these levels: business leader, employee, and organizational perspective.

Leaders possess workplace resources that include their leadership characteristics, leadership style, and their interactions with employees. The manner in which people are managed in the workplace significantly impacts their well-being.²² As highlighted by P6, the foundation for a culture of psychological ownership and engagement is established when leaders cultivate a psychologically safe workplace.²³ One study highlighted that supportive bosses play a critical role in promoting health and wellness, while toxic bosses contribute to reduced engagement, increased disability and workers' compensation claims, and a negative impact on productivity.²⁴

However, despite the participants' intentional efforts, it is debatable whether their intrinsic motivation truly aligns with a mental health perspective. Some participants mentioned that their well-being practices were driven primarily by productivity concerns rather than a focus on mental health. This finding is supported by a study that suggests worker attitudes and behaviors are often seen as a means to enhance

performance rather than being valued for their own sake.²⁵

As reported in this present investigation, the personal characteristics of employees serve as an essential contextual factor. These characteristics can either align certain mental health activities well with the organization or have a detrimental impact on the workplace environment.

From an organizational perspective, the results of the qualitative study further affirmed the role of company goals, structure, strategy, and culture, as well as work design, in building a psychologically healthy workplace. Riba et al (2019) stated that the characteristics of the business such as number of employees and organizational culture influence workplace behavioral health strategy and its success.²⁶

Enablers of Workplace Mental Health Services or Practices

Several enabling factors were identified in this study for the successful implementation of workplace mental health interventions. These factors include the organization's prioritization of mental health, the personal experiences and practices of leaders, leadership style, and effective communication between management and employees.

The present study found that majority of the participants seemed to employ transformational leadership practices. This leadership style has been shown to have positive employee outcomes in terms of workplace well-being. In Filipino workplace culture, maintaining harmonious relationships is highly valued, and conflict avoidance is crucial. Business leaders are expected to cultivate and sustain reciprocal relationships, display compassion, act humbly, and prioritize harmony. Personal contact is often necessary before progress can be made.¹⁹

Barriers to Workplace Mental Health Services or Practices

Several factors identified in this study that hindered the organization's ability to implement desired or planned well-being interventions include low organizational priority, time limitations, conflicting interests, restricted manpower, and insufficient information.

The findings of this study is supported by Day et al (2014), which said that many organizations view employee health and well-being as the personal responsibility of workers or solely related to meeting health and safety regulations.¹³

Another barrier identified in this study was the misalignment or tension between prioritizing workplace mental health and business interests. Prioritizing organizational outcomes over employee well-being may yield short-term benefits for the organization but can have long-term negative consequences. Conversely, prioritizing employee outcomes at the expense of organizational effectiveness can also lead to negative consequences in the long run.¹⁹

CONCLUSIONS

Business leaders demonstrated positive awareness around mental health at work and were open to looking for ways to support their employees, although this came with certain logistical and financial reservations. Despite lacking institutionalized mental health programs, businesses used internal organizational practices to promote well-being. The context where and when practices or services for workplace mental health occur played a crucial and dynamic role.

RECOMMENDATIONS

This study suggests that businesses can enhance workplace well-being through interventions at three levels: individual employee, business leader, and organizational. Interventions at multiple levels may have synergistic effects.

At the individual employee level, tailoring work demands and programs to individual needs is advised to support well-being. Attention should be given to employees facing significant stressors or mental health issues. In addition, business leaders should develop transformational leadership skills, appoint effective leaders, and obtain or provide mental health training. Leader well-being should also be considered. At the organizational level, institutionalizing a mental health policy or program can provide clarity and consistency. Informal practices, like open communication and safe spaces, should also be encouraged. A proactive approach is essential, adapting to evolving needs.

Further recommendations include government and nongovernment organizations using concise business case materials to justify well-being promotion, increasing understanding of the cost-effectiveness of preventive approaches, recognizing exemplary workplace well-being programs, and developing quantitative metrics for a healthy workplace.

The researcher further suggests conducting a similar study from the employee perspective and a longitudinal study to examine the predictors of change in workplace mental health perspectives and interventions over time.

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Epidemiological Profile and Management Outcome of Sodium Hypochlorite (NaOCl) Ingestion admitted at Northern Mindanao Medical Center from January 2015 to December 2018*

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ABSTRACT

Background: Caustic ingestion is a major public health problem worldwide [1]. It imposes huge economic burden in terms of medical cost to poorly resourced health system of developing countries [2]. Household cleaning products, such as sodium hypochlorite (NaOCl), are the most common cause of caustic exposure [3]. NaOCl ingestion consistently ranks second in caustic ingestion cases in Northern Mindanao Medical Center (NMMC) based on toxicology census from 2015 to 2018. The aim of this study is to determine the epidemiologic profile, clinical findings and outcome of admitted patients who ingested NaOCl.

Methods: This a single-center descriptive, cross-sectional study of 40 cases of sodium hypochlorite ingestion admitted at NMMC from January 2015 to December 2018.

Results: There were a total of 17 males and 23 females. Majority of patients were 0-5 years of age (46.5%; mean age of 2), followed by age range of 18-64 years old (40.0%; mean age of 35). Twenty-nine cases (72.5%) cases of NaOCl ingestion were accidental and the remaining 11 (27.5%) were non-accidental. The non-accidental cases belong to the 12-17 (mean age 15.3) and 18-64 (mean age 31) years old age groups at 33.3% and 66.7%, respectively, with prevalence in females at 81.8%. Non-accidental cases increase with age, and among females. Majority of all ingested less than 50 mL of NaOCl. Two non-accidental cases (18.2%) ingested more than 100 mL of NaOCl were observed to have more than 2 signs and symptoms. Majority of patients presented with vomiting. Greater portion of non-accidental cases complained of abdominal or epigastric pain (54.5% vs 10%), oropharyngeal erythema (9.1 % vs 6.9), and odynophagia (45.5% vs 0). None of the patients had serious signs and symptoms. All patients were discharged improved and without sequelae.

Conclusion: Most NaOCl cases were accidental especially in children. Non-accidental cases increase significantly with age, with most cases found among adolescents and young adults, with higher prevalence among females. Majority of patients only ingested less than 50 mL, and that ingestion of 100 mL or more of NaOCl is associated with more than 2 signs and symptoms. The most predominant symptom is vomiting. Greater portion of non-accidental cases complained of abdominal or epigastric pain and odynophagia. None of the patients exhibit severe signs and symptoms. This study showed that all 40 cases of sodium hypochlorite ingestion did not have sequelae upon discharge.

Keywords: sodium hypochlorite, bleach, caustic ingestion

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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INTRODUCTION

Caustic ingestion is a major public health problem worldwide [1]. Among other causes of acute poisoning referred to the Philippines National Poison Management and Control Center, ingestion of caustic substances is the main reason accounting to 23% of 500 poisoned each year [2]. Caustic ingestion imposes huge economic burden in terms of medical cost to poorly resourced health system of developing countries [1]. Household cleaning products are the most common cause of caustic exposure [3]. According to studies, household bleach, which the active ingredient is sodium hypochlorite (NaOCl), is the most commonly ingested agent in pediatric population [4]. The same is observed in studies involving adult population, and across age groups [1, 3]. Ingestion of NaOCl bleach usually results in benign clinical course [5]. Earlier literature recommends immediate endoscopic evaluation of all patients with alleged caustic ingestion. As of late, this blanket recommendation has been questioned by various investigators [6].

OBJECTIVES

General Objective: To determine the epidemiological profile, clinical presentation, and management outcome of sodium hypochlorite (NaOCl) ingestion cases admitted at NMMC from January 2015 to December 2018.

Specific Objectives:

- 1.) To describe the sociodemographic profile of NaOCl ingestion cases in terms of age, sex, place of origin.
- 2.) To describe the toxicology profile in terms of manner of incident (accidental, non-accidental), place of incidence (house, workplace), volume ingested, and time passed from ingestion to hospital presentation.
- 3.) To identify the presenting symptoms and physical examination following NaOCl ingestion.

- 4.) To describe the clinical outcome of admitted NaOCl ingestion cases prior to hospital discharge.
- 5.) To establish the relationship of toxicology profile and clinical outcome.
- 6.) To establish the relationship of presenting symptoms, physical examination, and clinical outcome.

MATERIALS AND METHODS

Research Design

A single-center descriptive, cross-sectional study was conducted to determine the epidemiologic, clinical profile, and management outcome of NaOCl ingestion cases. Data collection method was done through review of records.

Research Population

All NaOCl ingestion cases referred to Toxicology for co-management from the department of Internal Medicine and Pediatric from January 1, 2015 to December 31, 2018 in NMMC were included in the study.

Inclusion Criteria: All NaOCl ingestion patients' charts documented in the line list of the Hospital Operations and Management Information System (HOMIS) from January 1, 2015 to December 31, 2018 were included. These were patients from Pediatrics, Internal Medicine, and Family Medicine (Toxicology Unit) patients, managed and/or co-managed.

Exclusion Criteria: All NaOCl ingestion patients' data documented with concomitant intake of other substances such as medications, alcohol, and other substances were excluded.

Instrumentation

Data were collected by the primary investigator through review of records using an abstraction form (Appendix A) which is the data collection form.

Data Collection and Management

A letter was sent to the Data Privacy officer and to Health Information Management Service for permission for chart retrieval after obtaining approval from the Research Ethics Board of NMMC. A line list of NaOCl ingestion cases from January 1, 2015 to December 31, 2018 was secured from the Hospital Information Management System (HIMS). In consonance with the Data Privacy Act of 2012, all patients' data were anonymized using generated codes for each patient.

Data Analysis

All data were analyzed using descriptive statistics. Values were expressed as mean, frequency, and percentage, as appropriate. The relationship of demographic profile and toxicology profile was established using the logistic regression utilizing DATAtab statistics calculator [7].

RESULTS

A total of 40 patient records were retrieved from the line list in compliance to the inclusion and exclusion criteria. There were 23 females (57.5%) and 17 males (42.5%) (Appendix B). Majority of patients were 0-5 years of age (19; 46.5%; mean age of 2), followed by age range of 18-64 years old (16; 40.0%; mean age of 35). Most patients (35; 87.5%) were from the province of Misamis Oriental which is the nearest locality served by the hospital.

Almost all of the incidents occurred at home (97.5%), with only 1 case occurred in workplace (2.5%) (Appendix C). Most of the patients (37; 92.5%) came in the emergency room less than 12 hours post ingestion (2.4 hours average time), 3 cases arrived more than 12 hours (22.3 hours average time), and none presented more than 48 hours. Majority of the cases (29; 72.5%) were accidental and the remaining 11 (27.5%) were non-accidental. All children 0-5 years experienced accidental ingestion. The non-accidental cases belong to the 12-17 (mean age 15.3) and 18-64 (mean age 31) years old age groups at 33.3% and 66.7%, respectively, with prevalence in females at

81.8%. Using the DATAtab logistic regression tool [17], non-accidental cases increase significantly with age (Table 1). In addition, among the non-accidental cases, there were more females (Table 2), than males (Table 3).

Twenty-eight of the 29 accidental cases (96.5%) and 8 of the 11 non-accidental cases (2.7%) ingested less than 50 mL of NaOCl (average volumes of 14 mL and 27.5 mL, respectively) (Appendix C). One accidental (3.4%) and one non-accidental (9.1%) ingested approximately 50 mL. Two non-accidental cases (18.2%) ingested more than 100 mL of NaOCl (162.5 mL average volume) and were observed to have more than 2 signs and symptoms (Appendix D). Majority of the accidental (23; 79.3%) and non-accidental (9; 81.8%) cases presented with vomiting (Appendix E). Greater portion of non-accidental cases complained of abdominal or epigastric pain (6; 54.5%), and oropharyngeal erythema (1; 9.1%) compared to accidental cases (abdominal or epigastric pain: 3 (10%), and oropharyngeal erythema 2 (6.9%)). Odynophagia was reported in 5 cases of accidental ingestion and none non-accidental case. All 4 asymptomatic cases were accidental. None of the patients had serious signs and symptoms such as retrosternal pain, spitting of blood, hematemesis, oropharyngeal lesions or abdominal tenderness. All patients were discharged improved and without sequelae (Tables F-H).

Among all the patients, only one went through EGD. This is a non-accidental case of 16-year-old female, who arrived at the emergency 2 hours after ingesting about 125 mL of NaOCl, and presented with symptoms of vomiting and odynophagia. EGD showed normal mucosa (Zargar Grade 0) of the esophagus and duodenum but there was a diffuse erythema and edema of the stomach (Zargar Grade I). The patient was discharged uneventfully.

Table 1. Output of the regression model in non-accidental cases in age.

	Coefficient B	Standard error	z	95% conf. interval
Constant	-2.23	0.66	3.38	0.03 – 0.39
Age (year)	0.07	0.03	2.71	1.02 – 1.13

Notes: dependent variable: manner of incident (accidental, non-accidental); independent variable: age; model for the prediction: non-accidental cases

Table 2. Output of the regression model in non-accidental cases in females.

	Coefficient B	Standard error	z	95% conf. interval
Constant	-2.59	0.83	3.13	0.01 – 0.38
Sex Female	0.87	0.98	0.89	0.35 – 16.34
Age (year)	0.06	0.03	2.07	1 – 1.12

Notes: dependent variable: manner of incident (accidental, non-accidental); independent variable: sex, age; reference category: male; model for the prediction: non-accidental cases

Table 3. Output of the regression model in non-accidental cases in males.

	Coefficient B	Standard error	z	95% conf. interval
Constant	-1.72	0.83	2.06	0.04 – 0.92
Sex Male	-0.87	0.98	0.89	0.06 – 2.87
Age (year)	0.06	0.03	2.07	1 – 1.12

Notes: dependent variable: manner of incident (accidental, non-accidental); independent variable: sex, age; reference category: female; model for the prediction: non-accidental cases

DISCUSSION

Caustic ingestion is a public health problem worldwide [1]. It is more common in the developing countries, but still observed in the developing countries. Recent medical literature shows that caustic ingestion is seen in every age group, and may be either accidental or intentional. In a 4-year retrospective study by Khorasani A.G., et al (2017) [5], majority (89.2%) of their 65 patients accidentally ingested NaOCl and only 10.5%

intended to suicide. The same scenario was observed in our case where majority of the cases were accidental. Study done by of Batac-Dizon, et al (2013) [8] in the Philippine General Hospital of 320 cases of caustic ingestion among patients less than 19 years old showed that majority of the accidental cases (130 patients, 84%) were below 6 years old, which is in accordance to our results. Non-accidental corrosive substance ingestion was shown to be more prevalent in females at 56.2% in a study by Akkuzu M. Z., et al (2019) [3]. The same trend was observed in our study. The most common reported symptom after NaOCl ingestion according to Khorasani A.G., et al (2017) was dysphagia (27 patients, 41.5%) followed by nausea and vomiting (20 patients, 30.8%) in 65 samples. In a 4-year retrospective study by Nikpour S., et al (2017), 54 cases of NaOCl ingestion were identified. About 33% (18) of patients were asymptomatic and the rest presented with mouth burning, drooling, dysphagia, dyspnea, and retrosternal pain. In our case, the most common symptom was vomiting and abdominal or epigastric pain and odynophagia were more common in accidental cases, and none presented with severe signs and symptoms.

Ingestion of caustic substances induce damage to the esophagus and stomach that widely vary from mild esophagitis and gastritis to necrosis and perforation [9]. Esophagogastroduodenoscopy (EGD) is the most efficient tool for evaluating the mucosal integrity of the upper gastrointestinal tract after caustic ingestion [6]. The severeness of injury depends several aspects such as concentration of the substance, amount ingested, duration of contact with the mucosa, and the pH of the agent. Substances with pH of less than 2 or greater than 12 are extremely corrosive and can cause severe injury and burns in the upper gastrointestinal tract. Household bleach is a solution containing 1-6% NaOCl and when ingested rarely penetrate deep enough to damage the submucosa or muscularis

propria and usually results in benign clinical course [4, 5]. Study by Lamireau, et al (1995) [10] in 85 children who accidentally ingested caustic ingestion showed ingestion of NaOCl rarely resulted to severe lesions on EGD. Similarly, in 54 studied cases in the study by Nikpour, et al (2017) [8] showed NaOCl ingestion only resulted to normal or low-grade lesions in EGD: 51 (94.4%) had normal findings, 2 (3.7%) had Zargar I lesion (edema and erythema of the mucosa), and 1 (1.8%) Zargar IIA lesion (blisters, superficial ulcers) in the esophagus; 34 (63%) had normal findings and 20 had Zargar I lesion in the stomach; and 53 (98.1%) had normal findings and 1 (1.9%) had Zargar I lesion in the duodenum. They concluded that ingestion of NaOCl is not associated with high-grade lesions and that decision for endoscopy is based on severe signs and symptoms such as dysphonia, dyspnea, abdominal guarding, drooling, and mouth burns. Likewise, study by Akkuzu, et al (2019) [3] on corrosive ingestion showed that among 25 patients who ingested NaOCl only 4 patients (16%) had lesions limited to mucosal folds and no larger than 5mm in the esophagus, while others had normal EGD findings. The study concluded that endoscopic evaluation is not necessary in asymptomatic or mild cases of NaOCl ingestion. In our case, the one patient who underwent EGD had low-grade lesions and was discharged without sequelae.

CONCLUSION

Almost all sodium hypochlorite ingestion occurred at home (97.5%). Most of the cases (72.5%) were accidental especially in children. Non-accidental cases increase significantly with age, with most cases found in the adolescents and young adults 33.3% and 66.7%, respectively, with higher prevalence among females. Most of the patients arrived at the hospital less than 12 hours post ingestion (2.4 hours average time). Majority of patients only ingested less than 50 mL, and that ingestion of 100 mL or more of NaOCl is associated with more than 2 signs and symptoms. The most

frequent symptom is vomiting. Large part of the non-accidental cases complained of abdominal or epigastric pain (54.5% vs 10%), oropharyngeal erythema (9.1% vs 6.9), and odynophagia (45.5% vs 0). All 4 asymptomatic were accidental cases. None of the patients presented with severe signs and symptoms such as retrosternal pain, spitting of blood, hematemesis, oropharyngeal lesions or abdominal tenderness. All patients were discharged improved and without sequelae regardless of the manner of incident (accidental or non-accidental), volume ingested, or time elapsed from time of ingestion to arrival at the hospital. The extent of tissue damage depends upon the chemical nature of the caustic agent, with pH less than 2 and more than 12 being extremely corrosive and cause severe tissue damage. Household NaOCl is a stable base with pH of approximately 11 which may explain the favorable outcome. Nikpour, et al (2017) [8] suggested that further diagnostic examinations, including endoscopy, should be considered on the development of severe clinical manifestations such as dyspnea, drooling, abdominal guarding, and mouth ulcers.

LIMITATIONS

Relationship between signs and symptoms and EGD findings were not included in this research due to inadequate population sample who underwent EGD in the specified study time frame.

RECOMMENDATION

The researcher recommends to include in future studies adequate number of endoscopic findings in order to correlate it substantially to the clinical manifestation. Since most cases of NaOCl ingestion were accidental, it is suggested to include in the chart documentation the container of the chemical such as if it is in its original container or inside a water bottle, and the storage area namely in the toilet, sink, or laundry area in the promotion of safety awareness in handling and keeping of caustic chemicals.

For the improvement of the conduct of research, the following are the recommendations:

- 1.) Better research designs such as cross-sectional analytic, a case-control study design or a prospective cohort may be done in establishing the relationship of exposure to outcome variable.
- 2.) Longer study duration to establish a database of caustic ingestion cases can be established.
- 3.) For data collection concerns in the hospital, it is recommended by the proponents of this study that dedicated personnel be assigned in the retrieval of patients' charts ensuring that the identified line list of patients is included in the study.

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Knowledge, Attitude and Practices about Nutrition among Resident Physicians in a Tertiary Hospital: A Cross-Sectional Study*

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ABSTRACT

In the Philippines, the escalating double burden of malnutrition necessitates an exploration of healthcare professionals' nutrition proficiency. This study aims to evaluate the nutrition knowledge, attitudes, and practices of resident physicians, providing insights into areas that may require enhancement in their nutrition-related competencies. This study aims to assess Resident Physician's knowledge, attitude, and practices regarding nutrition. Employing a descriptive, cross-sectional prospective design, the study surveyed resident physicians working at a tertiary government hospital from January 2021 to March 2023. Data collection utilized self-administered questionnaires, incorporating structured and open-ended questions. Data were subjected to descriptive analysis, with frequencies, percentages, and means presented. The Kruskal-Wallis test, chi-square test and Correlation Phi Coefficient were employed for statistical comparisons. This pioneering exploration among 97 resident physicians underscores their strong recognition of fundamental nutritional aspects. Knowledge levels varied from moderate (61.9%) to excellent (32.9%), with a minority having poor knowledge (5.2%). A significant relationship between years of residency and knowledge (p value= 0.01 Kruskal Wallis, 0.029 Chi square), along with a strong relationship correlation was observed. The connection between attitude and practice to years of residency was less pronounced. Findings reveal knowledge gaps and potential disparities between attitudes and practices across different year levels, offering insights for tailored educational interventions and future research. The study underscores the imperative for targeted interventions to strengthen nutrition education among resident physicians. It signifies bolstering nutrition education to advance better patient care.

Keywords: Nutrition, residency, malnutrition

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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INTRODUCTION

Nutrition and related lifestyle factors have been well established to be of importance in the management of diseases and in the promotion of well-being in health. Better nutrition is related to improved infant, child and maternal health, stronger immune systems, safer pregnancy and childbirth, lower risk of non-communicable diseases, and longevity¹. However, we are still grappling with the double burden of the disease of both over and under nutrition². Recent data from the Centers for Disease Control and Prevention (CDC) has reported a notable increase in obesity rates, with a rise of 35% or more³. This finding aligns with various recent research studies indicating that individuals have experienced significant weight gain since the onset of the COVID-19 pandemic. This increase in weight gain is likely attributable to factors such as a surge in sedentary behavior, heightened stress levels, and various challenges such as job loss and income reduction, which can make it more difficult for people to maintain healthy eating habits⁴. Moreover, recognizing the growing concerns related to nutrition and food security, the National Unified Health Research Agenda for 2023 has been launched, underscoring the importance of research priorities in this area⁵. These developments emphasize the urgency of addressing and enhancing nutrition-related knowledge and practices among healthcare professionals.

In problems in nutrition, highest regard by general public for consult and advise would come from doctors and health related workers. However historically, knowledge and trainings in nutrition for the health professions has been problematic and selective^{6,7}. This has been the driving force for increasing need to improve nutrition knowledge such that is crucial for encouraging healthy eating habits for individuals⁸. Nevertheless, knowledge of nutrition alone may not be sufficient to improve dietary behaviors; there is also a need to promote a positive attitude towards healthy eating habits where personal perceptions will be a useful tool⁹.

Even though there are specialization in the medical field, patients always expect to receive a totality in treatment including nutritional counseling, however these expectations are not always met¹⁰. Several factors have been implicated in that, and some of these barriers include lack of time, lack of nutritional information, lack of payment and lack of patient compliance to diet¹¹. Identifying weaknesses in nutrition knowledge, attitudes, and practices among physicians may provide guidance for improving their understanding of nutrition in the future as they may realize that health education can be more effective when medical practitioners receive sufficient information and updates, and if they had made necessary dietary changes themselves, it could directly relate as a personal motivation and behavior to the patient. In an innovative approach to tackle these challenges, this study aims to bridge knowledge gaps while exploring the attitudes and practices of resident physicians. Residents, as they are more commonly called, have a dual role in the health care system in that they are simultaneously learners and medical care providers, acting as both. The overarching goal is to promote a holistic approach to patient care, ultimately leading to improved health outcomes, reduced prevalence of nutrition-related diseases, and enhanced overall well-being. By doing so, it aims to provide insights that can enhance understanding of nutrition and contribute to more effective patient care strategies.

The objective of this study is to evaluate Resident Physician's knowledge, attitude and practices regarding nutrition at a tertiary government hospital. Specifically, it aims to; 1) describe the demographic characteristics of the Resident Physicians 2) determine if there is significant difference between knowledge, attitude, and practices of different year levels of the Resident Physicians, 3) determine if there is correlation between level of knowledge and attitude to practice of the Resident Physicians.

Materials and Methods

Research Design and Setting

The research employed a descriptive, cross-sectional prospective study design done at a tertiary government hospital.

Population

Inclusion criteria involves all resident physicians working at a tertiary government hospital from January 2021 to March 2023. Exclusion criteria are as follows: 1) Resident Physicians who are on Leave of Absence at the time of distribution of questionnaire, 2) Resident Physicians who works at the tertiary government hospital but rotating outside the hospital (i.e. lateral entry), 3) Resident Physician enrolled as the only fifth year resident, 4) The primary researcher.

Sampling Method and Data Collection

The study employed total population sampling utilizing a self-administered modified questionnaire on knowledge, attitudes, and practices with structured and open-ended questions from previous studies. Validation was done by the Institutional Review Board of the Research Bureau. Each participant was assigned a control code number that signify anonymity. The researcher was the primary floater of questionnaires. Collection of data was done from March 2022 to March 2023. The data was encoded and analyzed using the Microsoft Excel 2018 and SPSS Version 28.

Data Analysis

Descriptive data analysis was reported as frequencies and percentages. The attitude survey consisted of negative and positive nutrition statements with a five-scale degree of agreement (strongly agree, agree, undecided, disagree and strongly disagree) then all questions were merged to obtain one variable. Coding of practice used a five-scale degree of agreement (strongly agree,

agree, undecided, disagree and strongly disagree) then all questions were merged to obtain one variable. Kruskal-Wallis test was used to compare the score of nutrition knowledge between different levels in training and chi-square test (χ^2) and Correlation Phi Coefficient compared the categorical variables of attitude and practice for nutrition among different year levels of physicians. $P \leq 0.05$ was considered statistically significant and the level of confidence was 95%.

Ethical Consideration

The researcher followed the consent process in this study. All the participants were knowledgeable about the study intentions and were required to consent before the enrollment. It was explained that the participation is voluntary and confidential. No data was divulged in public as per Republic Act 10173 – Data Privacy Act of 2012. The Institutional Review Board has reviewed this study.

Results

The demographic characteristics of Resident Physicians included a total of 97 participants as shown in Table 1, out of which 57.7% ($n=56$) were female and 42.3% ($n=41$) were male. The age distribution of participants was as follows: 44.3% ($n=43$) aged between 25 and 29 years, 50.5% ($n=49$) aged between 30 and 34 years, and 5.2% ($n=5$) aged between 35 and 39 years. Participants were distributed across different year levels in training and distribution was as follows: 40.2% ($n=39$) were in their first year, 29.9% ($n=29$) were in their second year, 15.5% ($n=15$) were in their third year, and 14.4% ($n=14$) were in their fourth year. Participants' Body Mass Index (BMI) was categorized into different groups of which 2.1% ($n=2$) were underweight, 19.6% ($n=19$) had a normal BMI, 35.1% ($n=34$) were overweight, and 43.3% ($n=42$) were classified as obese.

Table 1. Distribution of participants based on sociodemographic factors and BMI

N=97	Number (n)	Percentage (n%)
Gender		
Male	41	42.3%
Female	56	57.7%
Age		
25-29	43	44.3%
30-34	49	50.5%
35-39	5	5.2%
Length of Years of Experience		
<1-2	48	49.5%
3-5	39	40.2%
≥6	10	10.3%
Year Level in Training		
1	39	40.2%
2	29	29.9%
3	15	15.5%
4	14	14.4%
BMI		
Underweight	2	2.1%
Normal	19	19.6%
Overweight	34	35.1%
Obese	42	43.3%

The nutrition-related knowledge assessment results among Resident Physicians exhibited varying levels of understanding and awareness concerning key nutritional concepts. Notably, 100% of participants accurately linked anemia to iron deficiency, while 96.9% correctly associated vitamin A deficiency with night blindness. This signified a strong grasp of fundamental nutritional aspects^{1, 12}. However, only 49.6% accurately recognized that fruits and vegetables provide "All of the above" nutrients, encompassing carbohydrates, vitamins, minerals, and protein. Similarly, just 19.6% correctly identified

the caloric content of carbohydrates, fats, and proteins as 4, 9, and 4 kcal per gram, respectively, suggesting insufficient physician knowledge about nutritional content¹³.

Several questions highlighted participants' awareness of specific nutrients' roles in health. For instance, 45.3% accurately identified potassium as a nutrient protective against hypertension. Moreover, over half (58.8%) recognized vitamin B9 (folate)'s importance in preventing neural tube defects. The findings also revealed areas necessitating further attention. For instance, identifying cardinal signs of malnutrition (e.g., bilateral pitting edema for kwashiorkor) was correct for 56.7% of participants, while criteria for severe acute malnutrition were correctly identified by 42.3%, indicating the need for reinforcing knowledge in these clinical markers. Likewise, while 88.7% knew the recommended exclusive breastfeeding duration was 6 months, understanding regarding the impact of protein on calcium loss (28.9%) and optimal pregnancy weight gain (50.5%) might benefit from more comprehensive education.

The examination of Resident Physicians' performance across different year levels in residency training reveals distinct variations as shown in Table 2. Participants were categorized as moderate, excellent, or poor based on their responses. Among them, 61.9% fell within the Moderate category, indicating a satisfactory foundational understanding. Notably, 32.9% exhibited an excellent grasp, demonstrating proficient knowledge absorption. Conversely, a smaller group, 5.2%, demonstrated poor nutrition knowledge.

Table 2. Classification of Nutritional Knowledge

Level Classification	Year level in Residency Training				Total	p-Value
	1	2	3	4		
Poor ^(a)	3 (3.1%)		2 (2.1%)		5 (5.2%)	<0.0001
Moderate ^(b)	26 (26.8%)	15 (15.5%)	12 (12.4%)	7 (7.2%)	60 (61.9%)	
Excellent ^(c)	10 (10.3%)	14 (14.4%)	1 (1.0%)	7 (7.2%)	32 (32.9%)	

^(a)Knowledge score is less than <6 (25th Percentile)

^(b)Knowledge score is 6 - <10 (25th - 75th percentiles)

^(c)Knowledge score is ≥ 10 (75th percentile)

In this study, participants' perceptions regarding the impact of various training types on their current nutrition competency were examined. Data was categorized into four levels: poor, minimal, moderate, and maximal. Notably, medical curriculum, and conferences/continuing medical education stood out, receiving higher ratings in the "moderate" and "maximal" categories. This indicates that these approaches were perceived as beneficial for improving nutrition competency. Residency program, clinical practice and reading and self-directed learning were generally seen as valuable but slightly less influential compared to medical curriculum and conferences. Conversely, undergraduate training garnered more "minimal" ratings, suggesting a relatively lower perceived impact.

The study delved into participants' attitudes revealing that positive attitudes were particularly prevalent in domains related to discussing nutrition, recognizing the importance of nutrition

assessment, and acknowledging severe malnutrition needing specialized care. Importantly, a positive attitude is observed regarding patient motivation as impact for dietary change. Notably, participants across all training years displayed a shared positive attitude toward engaging in discussions about physical activity and nutrition with patients, indicating a collective sense of responsibility in this aspect.

The survey's results shed light on medical professionals' comfort levels across different residency training years regarding various nutrition practices. Participants displayed confidence in tasks like BMI calculation, recommending dietary patterns for diabetes, and explaining dietary cholesterol and saturated fat roles, discussing with lactating mothers its breastfeeding benefits and challenges. However, discussing their own dietary patterns showed higher comfort in early residency years, diminishing in later stages.

Table 3. Summary of the KAP variables using Kruskal-Wallis, Chi square and Correlation Chi Coefficient

Comparison	Test Statistic using Kruskal-Wallis	p-value	Test Statistic Using Chi square	p-value	Test Statistic Using Correlation phi coefficient	Remarks
Knowledge vs Year of residency	13.294*	0.010	17.125*	0.029	0.380	Very strong relationship
Attitude vs Year of residency	4.744	0.314	6.614	0.579	0.248	Strong relationship
Practice vs Year of residency	8.370	0.079	14.725	0.257	0.365	Very strong relationship

* significant at 0.05

Discussion

Knowledge

The study underscored the importance of tailored continuous nutrition education for Resident Physicians' specific needs. Variations in response rates stressed the necessity of targeted interventions to address gaps in nutrition knowledge. Participants' diverse perspectives on training methods' effectiveness were highlighted, with "Moderate" and "Maximal" ratings for Medical Curriculum, and Conferences/continuing Medical Education signifying their crucial roles. Residency program, clinical practice and reading and self-directed learning were seen as valuable aspects as well. This accentuates structured curricula, practical training, and hands-on experience in fostering nutrition competency and that self-directed learning complement formal training for comprehensive education^{14, 15}. In contrast, varied ratings for Undergraduate education suggest potential for improvement. These differences might relate to perceptions from previous studies, implying a need to enhance undergraduate nutrition curriculum^{16, 17}.

Attitudes

The study revealed diverse attitudes among participants, particularly regarding the effectiveness of nutrition counseling and perceptions about eating pleasures versus health benefits. These disparities seemed rooted in differences in training, personal beliefs, and nutrition education exposure. To foster cohesion, targeted interventions could emphasize nutrition education's significance, promote evidence-based practices, and encourage open dialogues on contentious topics such as what was described in a previous study¹⁸. Positive attitudes towards holistic care, as indicated by discussions on physical activity and nutrition, underscore the integration of nutrition in medical education. Addressing the varying perspectives through a standardized curriculum might establish a uniform foundation. Likewise, ongoing education and

dialogue within the medical community are vital to cultivate a shared understanding of nutrition's role¹⁹. By addressing diverse attitudes and refining education strategies, a consistent and effective approach to nutrition care can be achieved. Negative responses were evident concerning perceptions of nutrition counseling as a good use of professional time and the significance of diet's impact on extending life. These viewpoints shed light on differing perspectives, also strengthening resident's belief on the importance on nutrition education to patients as recommended by Food and Agriculture Organization of the United Nations to improve food security and in prevention and treatment of all forms of malnutrition²⁰.

Practices

The study's findings revealed varying comfort levels in nutrition practices associated with different stages of residency training. As training advances, a decrease in comfort is observed in specific tasks, likely due to their growing complexity. This underscores the continuous requirement for ongoing education and training to bolster competence and confidence across all dimensions of nutrition care²¹. In certain areas, neutral responses emerged, notably in managing severely malnourished children, discussing omega-3 and omega-6 fatty acids, and addressing topics like calories per gram and metabolic roles. These neutral responses indicate potential areas that warrant more focused training to alleviate uncertainties and enhance comprehension.

KAP Variables

The study's outcomes affirmed a strong knowledge-year of residency connection, pointing to the benefits of experience and professional growth during residency in which as it becomes harder through training still its fundamental goal of training is education²². The mixed findings regarding attitude suggest that attitude dynamics are more intricate than solely reliant on years of residency. External factors, like evolving medical

practices and institutional culture, could contribute to residents' attitudes.

Regarding practice-year of residency, the inconclusive results underscore the multifaceted nature of this relationship, potentially influenced by both residency experience and external factors. A parallel investigation scrutinized the relationship between the number of years engaged in professional practice and the KAP scores, which yielded similar results by failing to identify a statistically significant effect¹⁹.

The implications of these findings suggests that the years spent in residency practice might not be a sole determinant in predicting the variable under investigation. Secondly, the lack of a statistically significant effect in both studies prompts a reconsideration of the assumptions that underlie the connection between practice experience and the targeted variable. This, in turn, necessitates a more nuanced approach to understanding how medical professionals' practice years interact with various factors to influence the outcome.

Conclusion

The study's insights illuminated the knowledge, attitudes, and practices of Resident Physicians concerning nutrition, underscoring the importance of targeted educational interventions across different year levels. Tailored strategies can enrich nutrition-related knowledge, cultivate evidence-based practices, and facilitate comprehensive patient care. Moreover, the study underscores the adaptability of educational approaches to meet evolving needs in the medical profession. By bridging knowledge gaps and promoting evidence-based practices, healthcare providers are equipped to deliver effective holistic patient care. Furthermore, the research revealed the diverse impacts of training methods on perceptions of nutrition competency. The incorporation of comprehensive curricula, hands-on experiences, and effective continuing education

assumes critical roles in nurturing nutrition skills. Recognizing the diverse attitudes towards nutrition within the medical community becomes crucial for a cohesive delivery of nutrition care. Addressing uncertainties and challenging negative beliefs through education contributes to a well-rounded healthcare workforce.

Future research could delve into the long-term effects of educational interventions on enhancing nutrition competency among Resident Physicians, offering insights into sustained impacts and effective methodologies. Expanding the scope to other healthcare facilities and incorporating a wider array of healthcare workers could provide a more comprehensive understanding. Additionally, ensuring an equal representation of years in practice within the sample could offer a nuanced perspective on the relationship between practice duration and nutrition competency. It is recommended to establish ongoing professional development programs that enhance healthcare professionals' understanding of nutrition, ensuring alignment with current guidelines and practices.

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The Price of Transformation: The Startling Consequences of Excessive Estrogen on Transgender Health*

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ABSTRACT

Cerebral venous sinus thrombosis (CVST) results from occlusion of cerebral venous sinuses, usually resulting in hemorrhagic infarction. It is a rare type of stroke affecting 3-5 per million people, often due to hypercoagulable states from clotting factor abnormalities or diseases like cancers, autoimmune and collagen vascular disease. Headache, visual changes, changes in sensorium, focal neurologic signs, seizures, and coma are some of the symptoms.

The role of exogenous estrogen in developing CVST among transgenders has not been reported frequently in literature. We report a 26-year-old transgender female who presented with throbbing headache after four years of exogenous high dose parenteral and oral estrogen. Magnetic resonance venography findings showed dural sinus thrombosis involving the left internal jugular vein, left sigmoid sinus, left transverse sinus, straight sinus, torcula and posterior aspect of the superior sagittal sinus. Patient was treated with topiramate, steroids and anticoagulants. Patient symptoms improved and was subsequently sent with home medications edoxaban. This case underscores the importance of monitoring the use of hormonal therapy in transgender individuals.

This report is an example of a rare cause of thrombosis secondary to self-administration of parenteral and oral estrogen. Prompt diagnosis in this patient resulted in the prevention of a catastrophic event like a major stroke, highlighting the importance of vigilance in managing hormone therapy. Increasing awareness about transgender issues can improve health and reduce inequities in this population. Cerebral venous sinus thrombosis (CVST) results from occlusion of cerebral venous sinuses, usually resulting in hemorrhagic infarction. It is a rare type of stroke affecting 3-5 per million people, often due to hypercoagulable states from clotting factor abnormalities or diseases like cancers, autoimmune and collagen vascular disease. Headache, visual changes, changes in sensorium, focal neurologic signs, seizures, and coma are some of the symptoms.

The role of exogenous estrogen in developing CVST among transgenders has not been reported frequently in literature. We report a 26-year-old transgender female who presented with headache after 4 years of exogenous high dose parenteral and oral estrogen. Magnetic resonance venography findings showed dural sinus thrombosis involving the left internal jugular vein, left sigmoid sinus, left transverse sinus, straight sinus, torcula and posterior aspect of the superior sagittal sinus. Patient was treated with topiramate, steroids and anticoagulants. Patient symptoms improved and was subsequently sent home on edoxaban. This case underscores the importance of monitoring hormonal therapy in transgender individuals.

This report is an example of a rare cause of thrombosis secondary to self-administration of parenteral and oral estrogen. Prompt diagnosis in this patient resulted in the prevention of a catastrophic event like a major stroke, highlighting the importance of vigilance in managing hormone therapy. Increasing awareness about transgender issues can improve health and reduce inequities in this population.

Keywords: Cerebral Venous Sinus Thrombosis, Estrogens, Transgender Persons, Venous System, Cerebral Sinuses, Thrombosis

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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INTRODUCTION

Cerebral venous sinus thrombosis (CVST) is a rare disease with an estimated incidence of 3–5 cases per million population per year and accounts for a small proportion (1%) of all strokes ^(1–4). CVST is three times more common in women than men and affects the younger population (age <50 years) ⁽²⁾. Significant disability leading to dependency has been reported in about 5–10% of patients, and mortality rates range from 3 to 15% ⁽⁵⁾. The clinical presentation of CVST is divided into three distinct clinical syndromes: isolated intracranial hypertension (headache, papilledema, and visual disturbances), focal syndrome like seizures (39.3% cases), and paresis (37.2% cases) and encephalopathy in the form of altered mental status and coma ⁽⁶⁾. MR venography and CT venography have very high sensitivity and specificity to diagnose CVST.

Risk factors for CVST include inherited or acquired hypercoagulable states such as thrombophilias, neoplasms, autoimmune conditions and transient situations (such as pregnancy, post-partum period, surgery, trauma, dehydration, CNS infections) ⁽²⁾. Hormonal medications including oral contraceptive pills (OCP), hormone replacement therapy (HRT), cross-sex hormone replacement therapy (CSHT), and other hormonal therapy have also been associated with venous thromboembolic events (VTE). Use of OCP has been shown in multiple observational studies to increase the odds of CVST by 5- to 22-fold ⁽⁷⁾. Data are insufficient to make conclusions about duration of use and other forms of hormonal contraceptives ⁽⁷⁾.

Transgender individuals have a gender identity that differs from the sex they were assigned at birth. Estimates of the number of transgender adults significantly increased over the past decade, with a current best estimate of 390 per 100 000 adults ⁽⁸⁾. That is about 1 in every 250 adults, or almost 1 million Americans ⁽⁸⁾. In the Philippines, recent data estimates it to be at

500,000 but challenges are still up to confirm this number ⁽⁹⁾.

Gender affirming healthcare is effective and medically necessary for those transgender individuals who seek it. Psychological, hormonal and surgical care for appropriately selected individuals has been unambiguously associated with improvements in gender dysphoria and decreased rates of psychiatric comorbidities. Hormone therapy describes the use of either steroid agonists, steroid antagonists and/or gonadotropin therapy to “masculinize” or “feminize” a patient. Adverse effects vary and depend on specific medication but include metabolic, electrolyte, renal, bone density effects, with possible cardiac events.

Structural inequities, refusal by providers, economic barriers, and non-access to hormone therapy has led many transgender individuals to pursue treatments through the internet or black market. The dangers and adverse effects of this misuse and non-medical or non-provider-mediated therapies are vast and include anaphylaxis, thrombosis, pulmonary hemorrhage, amputation, pneumonitis, and even death ⁽¹⁰⁾.

In the Philippines, where information on the health of transgender people is scarce, we aim to contribute and increase awareness of such issues by presenting this case to help address the inequities in this population

Objectives

- 1.) To present a case of cerebral venous sinus thrombosis in a transgender female with exogenous estrogen use.
- 2.) To increase awareness of the effects of exogenous estrogen use among transgender individuals.

CASE

J.D.V. 26-year-old transgender female, single, call center agent came in with a chief complaint of headache.

1 month prior to admission, patient had throbbing headache, 8/10 in severity, recurrent, relieved with intake of ibuprofen and paracetamol. No associated blurring of vision, dizziness, weakness nor fever. No consult was done.

1 week prior to admission, patient had increased frequency of headache, same intensity now occurring almost everyday. Patient was seen by an ophthalmologist and was told to have unremarkable findings. Patient then experienced photophobia and double vision thus was rushed to the hospital for admission.

Past medical history was unremarkable. She has hypertension and diabetes in the maternal side. No coagulation disorder in the family. Pertinent review of systems revealed alopecia, occasional oral ulcers, no joint pains, no rash. No history of head trauma.

For the personal and social history, she is an occasional alcoholic beverage drinker, non-smoker. Four years ago (2019), she started taking oral contraceptive pills and intramuscular injection of progesterone 50 mg plus estradiol benzoate 5 mg every 5 days. Two months prior to admission, she also started intramuscular injection of medroxyprogesterone acetate 50 mg plus estradiol cypionate 10 mg every 18 days.

Upon admission, physical examination revealed stable vital signs with blood pressure of 110/80 mmHg, a heart rate of 84 beats per minute, a respiratory rate of 20 cycles per minute, and an oxygen saturation of 97% in room air. Neurologic examination revealed no nuchal rigidity, no meningeal irritation. Extraocular muscle examination revealed L lateral rectus palsy. The

rest of the physical examination were unremarkable.

Initial impression was Idiopathic intracranial hypertension versus craniopathy cranial nerve VI, rule out central nervous system (CNS) infection. Patient was started on topiramate 50 mg/tab 1 tab OD, tramadol + paracetamol 1 tab TID as needed for headache and ceftriaxone 2 g IV OD. Laboratories were done and lumbar puncture was scheduled. Urinalysis, Covid 19 antigen rapid test and chest xray were all normal.

Table 1. Summary of blood tests

Blood test	Result	Reference range
White cell count	14.3	4.0-10.0
Hemoglobin	155	130-180
Hematocrit	0.48	0.40-0.54
Neutrophils	87.7	55.0-65.0
Lymphocytes	7.6	25.0-35.0
Eosinophils	0.3	2.0-4.0
Monocytes	4.2	3.0-6.0
Basophils	0.2	0.0-1.0
Platelets	515	150-450
SGPT	40	0-49
SGOT	24	0-46
Sodium	128.7	135.00-148.00 mmol/L
Potassium	4.26	3.50-5.30 mmol/L
Ionized Calcium	1.24	1.13-1.32 mmol/L
Creatinine	71.43	61.89-123.79 umol/L
Chloride	105.90	98.00-107.00
ESR	20	0-15 mm/hr
C-reactive protein	3	<1.0 mg/L
FT4	1.09	0.70-1.48 ng/dL
FT3	1.76	1.71-3.71 pg/nL

On the 2nd hospital day, lumbar puncture was done. Opening pressure was 9-10 cm and closing pressure was 9cm. Cerebrospinal fluid analysis revealed clear, colorless fluid, absence of any microorganism, negative for AFB, 0 WBC and RBC count. CSF glucose and protein were normal at 79.6 mg/dL and 12.12 mg/dL respectively. CSF India ink was likewise negative for encapsulated *Cryptococcus neoformans*. She was started on prednisone 20 mg/tab 1 tablet TID.

On the 3rd hospital day, patient still had headache. Topiramate increased to 100 mg/tab 1 tab OD. Patient was scheduled for MRI with contrast and MRA.

On the 5th hospital day, MRI and MRA with contrast were done which revealed dural sinus thrombosis involving the left internal jugular vein, left sigmoid sinus, left transverse sinus, straight sinus, torcula and posterior aspect of the superior sagittal sinus. She was started on enoxaparin 0.6 cc subcutaneously every 12 hours. Coagulation assay was requested. Patient was referred to rheumatology and infectious disease services.



Figure 1. Left transverse sinus thrombosis

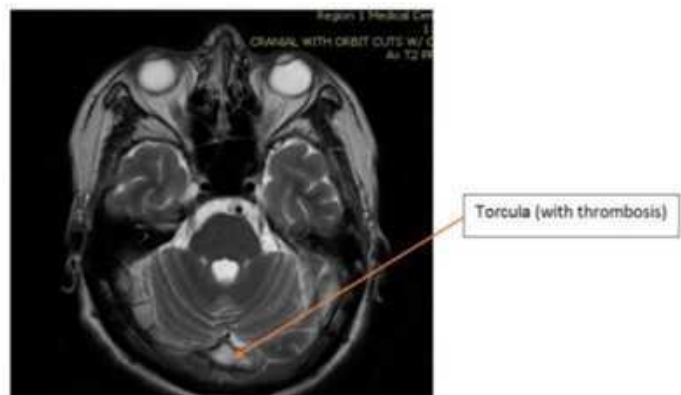


Figure 2. Torcula with thrombosis

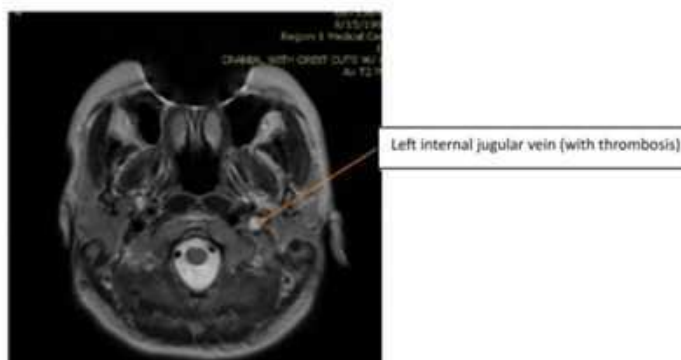


Figure 3. Left internal jugular vein with thrombosis

Normal right internal jugular vein, transverse and sigmoid

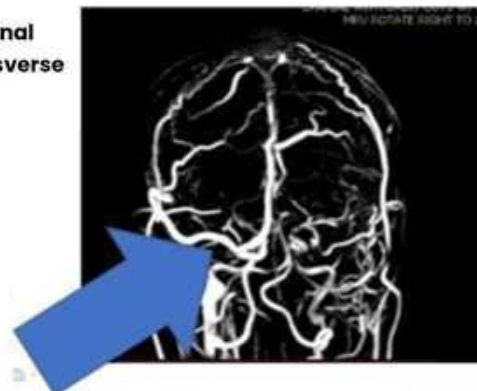


Figure 4. Normal right internal jugular vein, transverse sinus and sigmoid sinus on magnetic resonance venography

On the 6th hospital day additional tests like antinuclear antibody- immunofluorescence (ANA-IF), antiphospholipid antibody syndrome (APAS) panel, C3, anticardiolipin antibody IgG and IgM, anti- β 2 glycoprotein, human immunodeficiency virus (HIV) screening and rapid plasma regain (RPR) were requested and were all negative.

On the 7th hospital; day, severity of his headache decreased to 3/10. No new focal deficit elicited.

On the 8th hospital, started on oral anticoagulant (edoxaban 60 mg/tab 1 tab OD) to overlap with the enoxaparin.

On the 10th hospital day, headache was resolved. There was noted improvement of the left lateral gaze and decreased diplopia.

On the 11th hospital day, patient was discharged with improved symptoms and no headache. Advised to follow up with results of pending laboratories.

DISCUSSION

CVST is a particular type of cerebrovascular disease caused by complete or partial occlusion of the major cerebral venous sinuses ⁽¹¹⁾. The incidence of CVST has been rising with the advent of diagnostic techniques.

CVST can affect superficial cerebral veins, deep cerebral veins or dural venous sinuses. The isolated thrombosis of superficial cerebral veins is rare. The involvement of superficial veins is caused by the thrombosis of dural venous sinuses. About 60% of patients with CVST involve multiple dural venous sinuses, with the superior sagittal sinus the most frequently affected ⁽¹²⁾. These findings were consistent with the MRI venography of our patient except for the involvement of the internal jugular vein which is less common.

The International Study on Cerebral Vein and Dural Sinus Thrombosis (ISCVT) described the following as the most common presenting symptoms: headache (88.8%), seizures (39.3%), paresis (37.2%), papilledema (28.3%), and mental status changes (22%) ⁽¹³⁾. Similar to our patient, headache and paresis accompanied by diplopia were the presenting symptoms which prompted consult. Headache can be a feature of any site of cerebral venous occlusion, but is most prominent with larger sinus thromboses, such as sagittal sinus or straight sinus thromboses. Involvement of cranial nerve VI is usually bilateral and is secondary to the increased pressure within the cavernous sinus that compress the adjacent nerve, resulting in palsy or paralysis ⁽¹⁴⁻¹⁵⁾. The unilateral involvement in our patient further marks the rarity of this case which as of writing is the 7th case of such occurrence ⁽¹⁶⁾.

For the management, long-term anticoagulation is advised with the aim to prevent cerebral vein and sinus thrombosis (CVT) recurrence, which affects 2-7% of patients, and to prevent extracerebral venous thrombosis, which occurs in up to 5% of patients with CVT. In our patient, she is still on oral anticoagulant and was advised for repeat MRA.

The risk factor of our patient which led to CVST is the use of high dose parenteral and oral estrogen. Cross-sex hormone replacement therapy (CSHT) pursued by many transgender patients, allows individuals to develop secondary sex characteristics that conform to their gender identity. CSHT has been shown to improve transformation satisfaction, psychological profile, cognitive function, emotional repercussions, and quality of life in these patients and is typically continued lifelong ⁽¹⁰⁾. In the Philippines, we have yet to establish programs to address the needs of transgender individuals. Thus, most resort to treatments through the internet or by mere recommendations of friends and not by healthcare workers.

In a meta- analysis by Amoozeegar et. al, odds of developing CVST in women aged 15–50 years taking OCPs was 7.59 times higher compared to women not taking OCPs. Data are insufficient to make conclusions about duration of use and other forms of hormonal contraceptives. Oral contraceptive use and hormone replacement therapy were associated with an increased risk of stroke, especially during the first year of use, possibly due to immediate changes in hemostatic balance ⁽¹⁷⁾.

Third-generation oral contraceptives are combined pills developed to reduce risk of cardiovascular disease due to their reduced androgenic activity. There is controversy as to whether third generation OCPs are associated with increased risk of venous thrombosis when compared to second generation OCPs. No definite recommendations can be made in favor of the safety of third generation OCPs when compared to previous generation OCPs in women with risk factors for developing CVST.

The increasing use of hormone therapy among transgender individuals without professional help will bring about more challenges in providing the best care for these individuals. In our patient, if diagnosis was delayed, catastrophic event like major stroke might not have been prevented.

CONCLUSION

This report is an example of a rare cause of thrombosis secondary to self-administration of parenteral and oral estrogen in a transgender female. The lack of data on transgender health limits knowledge about mechanisms for improving health and reducing inequities in these populations. Implementing policies that target the unique health needs of this population will create a more diversified research portfolio that will help illuminate the path toward health equity.

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Drug Repurposing Beta-blocker: A Safe and Effective Treatment for High Risk Ulcerated Intergluteal Infantile Hemangioma – A Case Report*

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Abstract

Infantile hemangiomas are known to be the most common tumors of childhood. These vascular tumors have a distinctive clinical course characterized by a proliferation phase (early and late), followed by a plateau phase and lastly the involution phase. Despite the ability to involute, certain complications, ulcerations being the most common, indicate prompt treatment. Early intervention during the proliferative phase with oral propranolol has been emphasized to achieve an optimum outcome. In this case, a 7-month-old infant presented with a 4.4cm by 3.2cm infantile hemangioma (IH) with ulceration on the left intergluteal area during the late proliferative phase. Prior to propranolol treatment, routine laboratory work-up, 21-lead electrocardiogram and ultrasound of the kidneys, ureter and bladder were done, revealing unremarkable results. The patient was referred to a Pediatric Cardiologist and assessment deemed no contraindications for beta-blocker treatment. That patient was placed on a 12-hour day admission for the initiation of oral propranolol at a starting dose of 1.0mg/kg/dose and was later discharged, stable, at 1.5mg/kg/dose. Escalation of doses were done by 0.5 every 2 weeks under close supervision on subsequent follow-ups via telemedicine. Four months following the initiation of propranolol treatment regression of the size of the lesion with residual fibrosis were observed. Oral propranolol appears to be an effective and safe therapeutic approach for ulcerated infantile hemangiomas, even during the late proliferative phase. Results achieved significant contraction and resolution of the ulceration and rapid involution of the lesion.

Keywords: Hemangioma, Ulcerated, Propranolol

INTRODUCTION

Infantile hemangiomas are known to be the most common vascular tumors of childhood. A majority of these cases are not visible at birth but start to appear at 2-3 weeks of life. Infantile hemangiomas have a distinctive clinical course characterized by a proliferation phase, followed by a plateau phase and lastly the involution phase.¹ However, despite the ability of these vascular

tumors to spontaneously involute, several infantile hemangiomas can develop complications, with ulceration being the most common. Ulcerations usually occur during the proliferative phase and are usually present in sites such as the perioral, perianal and intertriginous areas where there is moisture and friction. These complications may be associated with pain, bleeding, infection and

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scarring, hence early diagnosis and prompt treatment are essential to achieve a good clinical outcome.^{2,3}

Amongst various treatment modalities that could be given for infantile hemangiomas, oral propranolol has been considered as the current standard of care. Conventionally, literatures state that an early initiation of these non-selective beta blockers is paramount to obtain the best outcome, mainly before 3 months of age.^{4,5}

We report a case of a 7-month-old infant from the Philippines diagnosed with Infantile Hemangioma during the late proliferation phase. The patient was treated with oral propranolol which provided marked improvement.

CASE REPORT

This is a case of a 7-month-old female infant, born at term, presenting with a superficial infantile hemangioma over the left intergluteal cleft during the global COVID-19 Pandemic. The lesion appeared 2 weeks after birth starting as a solitary erythematous patch that has slowly progressed in thickness and size which later developed a central ulceration. On physical examination there was a solitary, bright red plaque (4.4cm by 3.2cm) with a central ulceration (3.5cm by 3.1cm), with erythema and telangiectasias at the surrounding border at the left intergluteal cleft (Figure 1). Patient appeared irritable and showed extreme discomfort that was aggravated upon urination and defecation. Prenatal history and family history were noncontributory.



Figure 1. Solitary, bright red plaque (4.4cm by 3.2cm) with a central ulceration (3.5cm by 3.1cm), with erythema and telangiectasias at surrounding border at the left intergluteal cleft.

Prior to the commencement of oral propranolol treatment, routine laboratory work-up (complete blood count, blood chemistry, kidney and liver profile) were done, revealing no signs of bacterial infection and organ involvement. Infantile hemangiomas located in the perineal or lumbosacral regions can be at risk for LUMBAR syndrome, which includes an associated collection of disorders including bony deformities and renal anomalies, ergo, ancillary imagings (radiographic imaging of the sacrum and coccyx and ultrasound of the kidneys, ureter and bladder) were requested and proved to be unremarkable. Lastly, a 21-lead electrocardiogram was carried out showing sinus tachycardia and was referred to a Pediatric Cardiologist for further evaluation and clearance preceding therapy. Final assessment showed no contraindications for beta-blocker treatment hence the patient was scheduled for a 12-hour day admission at the outpatient department for close-supervision upon oral propranolol administration, with a starting dose of 1.0mg/kg/dose. Vital signs during the period of the admission were normal and was discharged at 1.5mg/kg/dose of Propranolol. Due to the current surge of the Covid-19 cases in the hospital, the mother was advised to continue the Propranolol treatment at home and have regular follow-up visits done via telemedicine using Facebook Messenger every 2 weeks. The parent was properly instructed on the clinical cues of adverse events, such as decrease in activity, wheezing or hypotension and was instructed to immediately contact us should any arise. This new protocol would allow a decrease in the number of OPD visits hence minimizing exposure to Covid-19. Escalation of oral propranolol dose was done by 0.5 every 2 weeks.

Four months following the initiation of propranolol treatment and through continued follow-up visits, regression of the size of the lesion with residual fibrosis were observed (Figure 2).



Figure 2. Comparison photos (A and B) on the day of consultation and (C and D) after initiation of oral propranolol for 4 months. There is notable complete resolution of ulceration and involution of the hemangioma leaving residual fibrosis.

DISCUSSION

Infantile Hemangiomas, in comparison to other vascular tumors, present with a unique evolution characterized by 3 phases: the proliferative phase (early and late), plateau phase and involution phase. The early proliferative phase is associated with rapid nonlinear growth and by 5 months of age, infantile hemangiomas would have completed all growth. The late proliferative stage is attributed to an ongoing slower growth that occurs after rapid growth and typically ends by 9 months of age.⁷

Infants with infantile hemangiomas located on the lower body (perineum or lumbosacral area) are at risk for LUMBAR syndrome which describes a constellation of features involving lower body hemangioma, urogenital abnormalities, myelopathy, bony deformities, anorectal malformations and renal anomalies. This syndrome should be considered on any infants with hemangiomas presenting in the perineal or lumbosacral areas. Thorough physical examination

and further radiologic imagings are warranted to rule out any presence of anomalies.⁴

Ulceration is known to be the most common complication, occurring mainly in the proliferative phase, as seen in our patient. This complication can be followed by intense pain and discomfort along with secondary infection and functional compromise. Lesions found in the intergluteal areas are difficult to manage as these regions are continuously exposed to urine and feces during infancy.^{2,3}

Early intervention during the rapid proliferative phase with oral propranolol has been emphasized in order to achieve an optimum aesthetic and functional improvement.⁵

In our clinical case, the infant came to us with a 4.4cm by 3.2cm lesion with an associated ulceration during the late proliferative phase. This warranted prompt treatment with oral propranolol, however, even with its high safety profile, literatures have reported untoward adverse events of non-selective beta-blockers, namely, hypotension, bronchospasm and hypoglycemia.⁶

This required our patient to be placed on a 12-hour day admission at the out-patient department, despite the decrease in access to public hospitals during the Covid-19 pandemic, in order to provide close supervision during the first day of administration and was monitored via telemedicine on subsequent follow-ups.

In conclusion, oral propranolol appears to be an effective and safe therapeutic approach for ulcerated infantile hemangiomas, even during the late proliferative phase. Results achieved significant contraction and resolution of the ulceration and rapid involution of the lesion. No adverse effects were observed during the first initiation and subsequent follow-up visits done via telemedicine.

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Paraneoplastic Dermatomyositis in a 34-Year-Old Filipino Female with Stage IV Invasive Breast Cancer: A Case Report*

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Abstract

Dermatomyositis (DM) is a rare autoimmune myopathy characterized by progressive muscle weakness that typically affects the shoulder and hip girdle first. It is a multisystem disorder characterized by symmetric proximal, extensor, inflammatory myopathy, vascular involvement and a constellation of pathognomonic (Gottron papules, Gottron Sign, Heliotrope rash) and characteristic cutaneous eruptions, which frequently presents in the fifth and sixth decades. As adult DM presents as a paraneoplastic syndrome in up to 30% of cases, metastatic workups appropriate for age are warranted.

Keywords: Dermatomyositis, Paraneoplastic Dermatomyositis, Breast Cancer, Paraneoplastic Syndrome

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INTRODUCTION

Dermatomyositis is an autoimmune disease belonging to the spectrum of idiopathic inflammatory myopathies. It is a rare disease with a worldwide occurrence, with an incidence ranging from 2 to 9 per million across various populations and affects women more than men. High index of suspicion must be maintained for malignancies, especially in treatment resistant patients due to its association with dermatomyositis. Successful treatment of an associated neoplasm is often followed by improvement/resolution of Dermatomyositis.

CASE REPORT

This is a case of a 34-year-old female with 2 months history of asymptomatic, erythematous patches on the malar area after prolonged sun

exposure. The patient noted progression in number and size of the lesions, eventually involving the scalp, forehead, neck, chest and extremities, with associated pruritus and proximal muscle weakness. She was managed with oral and topical corticosteroids and sun protection showing only moderate response.

Histopathological analysis revealed epidermal atrophy, basal layer vacuolization, basement membrane thickening, superficial perivascular infiltrates of primarily lymphocytes, and mucin deposition in the dermis. Tissue Direct Immunofluorescence (DIF) was done revealing deposits of +1 C3 and +1 IgM in a linear pattern at the basement membrane zone.

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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Patient was also noted with an incidental finding of firm, movable, non-tender mass on the left breast measuring 3x3 cm, and excruciating lower back pain which were extensively worked up, and was diagnosed as a case of Paraneoplastic DM; Invasive Breast Cancer, Stage VI with Bone Metastasis; Compound Fracture C6 secondary to consider Bone Metastasis.

While there is no consensus metastatic workup in patients with dermatomyositis, diagnostics appropriate for age is deemed sufficient. Of note, this patient presented with advanced stage breast cancer in an unusually young age.



Figure 1. Photographs showing A) Heliotrope rash, Periorbital and facial edema, and scalp involvement, B) Shawl sign and V Sign C) Gottron sign and Gottron papules, D) Mechanic's hands, E) Holster sign and F) Nailfold changes,

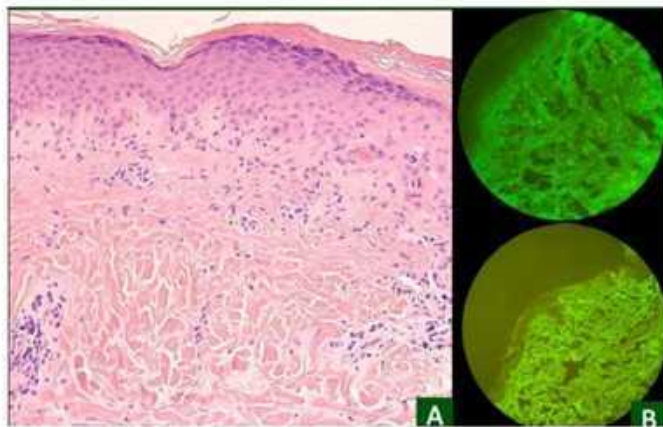


Figure 2. A) Histopathologic report shows; epidermal atrophy, Basal layer vacuolization, Basement membrane thickening, Superficial perivascular infiltrates of primarily lymphocytes, Dermal mucin deposition, while, B) DIF shows deposits of +1 C3 and +1 IgM in a linear pattern at the basement membrane zone.

DISCUSSION

Dermatomyositis (DM) is an autoimmune disease belonging to the spectrum of idiopathic inflammatory myopathies which also includes inclusion body myositis and polymyositis. It is a rare disease with a worldwide occurrence, with an incidence ranging from 2 to 9 per million across various populations, and affects women more than men (2-3:1). DM has a bimodal age distribution, with juvenile DM (JDM) most commonly diagnosed between 4 and 14 years of age and adult DM diagnosed between 40 and 60 years of age.¹

Local data shows that Dermatomyositis is predominantly seen in 4th to 5th decade of life, and is far more common in females than in males. Our patient is a 34-year-old female and is the second most common demographic for this case.²

In our institution, there has only been 6 new cases of Dermatomyositis since 2020. Of note, according to the PDS-HIS data, there are only 3 reported cases of paraneoplastic dermatomyositis.

The pathogenesis of DM is multifactorial, complex, and incompletely understood. Genetic, environmental, and immune mechanisms, are implicated in dermatomyositis development. Multiple environmental factors may trigger chronic immune activation such as ultraviolet radiation, viral infections, medications, and smoking.²

A diagnosis of cutaneous DM is suggested by the constellation of characteristic cutaneous findings, muscle weakness, and laboratory findings of myositis. However, in patients who present with ambiguous cutaneous findings or cutaneous findings that are suggestive of DM in the clinical absence of muscle involvement, a skin biopsy should be performed.² Traditionally, skin findings have been divided into pathognomonic (Gottron papules, Gottron sign, and heliotrope rash), characteristic, compatible, less common, rare, and nonspecific. Patients may present with one or more DM-related skin changes. Lesions are often pruritic or burning and are usually photosensitive, which can significantly impact patients' quality of life. Cutaneous disease may persist for years. In one systematic review of primarily adult patients with cutaneous DM without myositis, the mean duration of skin disease was 4.5 years²

Approximately 80% of patients with DM have myopathy. The clinical course of DM skin manifestations may precede or follow myositis. The classic muscular manifestation is acute or subacute onset of painless, symmetric, proximal muscle weakness. In the patients with cutaneous presents with manifestations suspicious for DM, investigation for concomitant muscle disease must be done. Muscle examination and serum creatinine kinase, which is the most sensitive muscle enzyme, and aldolase levels are recommended every two to three months.²

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Dysphagia, dysphonia, and aspiration raises suspicion for involvement of striated muscle of the pharynx and esophagus, and are associated with a poor prognosis. However, DM is not associated with sensory loss, ptosis, involvement of the extraocular muscles, or abnormal reflexes, which can help differentiate it from other neuromuscular disorders. Those with DM-consistent skin findings but without myopathy have what is termed Clinically Amyopathic Dermatomyositis (CADM). CADM may be amyopathic, or hypomyopathic, with evidence of subclinical muscle involvement on laboratory testing, biopsy, or imaging. Arthralgias are seen in 30–40% in DM, involving the small joints of the hands with mild to moderate pain. Both muscular and joint symptoms were observed in our case.

Therapy for cutaneous disease is usually indicated due to the severe pruritus and patient distress over the appearance of skin lesions. The management of cutaneous manifestations of DM can be difficult and are often more resistant to therapy than the myositis.

The initial approach for cutaneous DM typically consists of four approaches: 1) Aggressive photoprotection, 2) Antipruritic agents, 3) Topical corticosteroids or topical calcineurin inhibitors, 4) Systemic medications aimed at attaining sustained control.¹ Most patients require systemic

treatment with antimalarial drugs, methotrexate, or other medications.⁴

The long-term survival rate for adults with DM is approximately 65% to 75%, but there are relatively limited data regarding specific organ outcomes such as muscle or skin disease. Major causes of death include malignancy, pulmonary or cardiac disease, and infection. Poor prognosticating factors include older age, male gender, nonwhite race, longer duration of symptoms, and presence of anti-MDA5 antibodies.⁶

DM has variable complications. One of which is the consequences of long-term use of immunosuppressive medications, including opportunistic systemic infections and opportunistic infection-induced lymphoma such (i.e., Epstein-Barr virus infection).³ Adult-onset classic DM is associated with a higher-than-expected risk for internal malignancy, carcinomas being the most common. Individuals 50 years of age or older at the time of onset of classic DM appear to have a definite 20–30% increased risk of malignancy. In patients with malignancy, the myositis and cutaneous manifestations are less responsive to systemic glucocorticoid therapy. Older age, greater extent and severity of skin disease, and elevated CK levels appear to enhance the risk of malignancy in adults with classic DM.

This case highlights the importance of having a high index of suspicion for cancer in patients with DM, especially when resistant to treatments. Paraneoplastic DM typically improves with the treatment of the implicated cancer.

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Association Between Cardiometabolic Risk Factors and Covid-19 Severity in Patients of a Rural Tertiary Hospital*

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ABSTRACT

Background: The COVID-19 pandemic has had a significant impact on the world leading to significant morbidity and mortality. The disease was caused by the SARS-CoV-2 virus and can caused severe respiratory illness, as well as a range of other complications depending on presence of cardiometabolic risks. These factors included a range of conditions such as obesity, high blood pressure, high cholesterol, and states of insulin resistance. People with these risk factors are hypothesized to more likely experience severe COVID-19 symptoms and have worse clinical outcomes.

Objective: To determine the association between cardiometabolic risk factors and the development of severe COVID-19 patients in rural tertiary hospital in Bayombong, Nueva Vizcaya.

Methods: We reviewed the medical records of patients aged 19 years or older with a real-time polymerase chain reaction (RT-PCR)-confirmed COVID-19 hospitalized at the Region II Trauma and Medical Center in Bayombong, Nueva Vizcaya. A retrospective correlation design was utilized for the study, using a review of the medical records of patients from March 2020 to December 2022. Fasting plasma glucose (FPG), Low Density Lipoprotein-Cholesterol (LDL-C) levels, Hypertension, BMI, Waist to hip ratio and demographic characteristics of the patients were recorded. A simple and multiple ordinal logistic regression was done to checked the association between COVID-19 and different independent variables. All analyses were performed using STATA SE 18.0, with a p-value of less than 0.05 as the cut-off to determine statistical significance.

Result: We enrolled 1,582 participants; most were 50 to 59 years old (24.3%), Male (57.7%) and unvaccinated. When we compared our patients' Hyperlipidemia, FBS and Hypertension directly correlate with length of stay while Myocardial Infarction, Atrial Fibrillation and waist to hip ratio inversely correlate with length of stay measured during the pandemic and the pre-pandemic period, we found a statically significant increased (<0.05). Specifically, older patients, with hyperlipidemia, those with confirmed diabetes and elevated BP had a higher probability of staying in the hospital for more than a week while those with MI, AF, and higher WHR tend to stay shorter. In- hospital mortality, COVID patients with Myocardial Infarction 27.3 times (OR: 27.3, $p<0.001$), Atrial Fibrillation 5.8 times (OR: 5, $p<0.001$), and high 2 BP 10.4 times (OR: 10.4, $p=0.007$) odds of dying compared when they don't have these conditions. Crudely, vaccination decreased the odds of having severe COVID-19, while the rest of the predictors, aside from sex, type 1 DM, and obesity increase the odds. On multiple ordinal logistic regression analysis, however, only vaccination status was associated with decreased severity of COVID-19. Specifically, a vaccinated patient has 53% less odds of having severe COVID-19.

Conclusion: This study demonstrates the consequences of Diabetes Mellitus, Hypertension, Hyperlipidemia and Cardiovascular Disease showed significant associations with mortality and Clinical Severity of patients. Moreover, Age, Male, and Co-morbidities were significant confounders for the associations of Cardiometabolic Risk Factors on COVID-19 mortality and clinical severity.

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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INTRODUCTION

The COVID-19 pandemic had a significant impact on the world, affecting millions of people and leading to significant morbidity and mortality. The disease was caused by the SARS-CoV-2 virus and can cause severe respiratory illness, as well as a range of other complications, including cardiometabolic risk factors. Cardiometabolic risk factors included a range of conditions that increase the risk of heart disease, stroke, and diabetes. These risk factors included obesity, high blood pressure, high cholesterol, and insulin resistance. People with these risk factors were more likely to experience severe COVID-19 symptoms and have worse clinical outcomes. Studies have shown that obesity was one of the most significant risk factors for severe COVID-19 illness. Obese individuals have a higher risk of hospitalization, intensive care unit (ICU) admission, and death from COVID-19. Other cardiometabolic risk factors, including high blood pressure, diabetes, and cardiovascular disease, have also been associated with more severe COVID-19 illness and worse clinical outcomes.

Clinical outcomes of COVID-19 patients with cardiometabolic risk factors can vary widely, depending on the severity of the underlying condition and the severity of the COVID-19 illness. Patients with multiple risk factors are at a higher risk of developing severe COVID-19 symptoms, requiring hospitalization and ICU care, and experiencing long-term complications. It was important to note that vaccination against COVID-19 can significantly reduce the risk of severe illness and death from COVID-19, even for individuals with underlying cardiometabolic risk factors. In addition, lifestyle interventions, such as maintaining a healthy weight, exercising regularly, and managing blood pressure and blood sugar levels, can also help reduce the risk of severe illness and improved clinical outcomes for COVID-19 patients with cardiometabolic risk factors.

The prevalence, associated risk factors, and clinical outcomes of cardiometabolic risk factors among COVID-19 patients in Asia vary by country and region. However, several studies have shown that cardiometabolic risk factors prevalent among COVID-19 patients in Asia and associated with worse clinical outcomes. Obesity is a significant risk factor for severe COVID-19 illness in many Asian countries. For example, studies have shown that obese COVID-19 patients in India and Thailand are more likely to require mechanical ventilation and ICU care and have higher mortality rates compared to non-obese patients.

In addition to obesity, other cardiometabolic risk factors, including hypertension, diabetes, and cardiovascular disease, have also been associated with more severe COVID-19 illness and worse clinical outcomes in Asian countries. For example, studies in China have shown that COVID-19 patients with hypertension have a higher risk of severe illness and death compared to patients without hypertension.

Overall, it was clear that cardiometabolic risk factors are an important predictor of severe COVID-19 illness and worse clinical outcomes in Asia, as in other parts of the world. Vaccination against COVID-19, as well as lifestyle interventions to manage cardiometabolic risk factors, are important strategies to reduce the impact of COVID-19 on individuals with these conditions in Asia and elsewhere.

The prevalence, associated risk factors, and clinical outcomes of cardiometabolic risk factors among COVID-19 patients in the Philippines have been a significant concern during the COVID-19 pandemic. The Philippines has one of the highest rates of diabetes in the world, which is a significant risk factor for severe COVID-19 illness. Studies have shown that COVID-19 patients in the Philippines with underlying cardiometabolic risk factors, such as hypertension, diabetes, and obesity, have a

higher risk of severe illness and death compared to patients without these conditions. For example, a study conducted in the Philippines found that patients with diabetes were more likely to require hospitalization, ICU care, and mechanical ventilation.

The Philippine government has recognized the importance of addressing cardiometabolic risk factors as part of its COVID-19 response. The government has implemented measures to promote healthy lifestyles, such as encouraging physical activity and healthy eating. It has prioritized vaccination for individuals with underlying health conditions, including those with cardiometabolic risk factors. Overall, the situation in the Philippines regarding the prevalence, associated risk factors, and clinical outcomes of cardiometabolic risk factors among COVID-19 patients highlights the importance of addressing these risk factors to reduce the impact of COVID-19 in the country.

METHODOLOGY

Study design and population

This was a Retrospective correlational design will be utilized for the study using a review of medical records of enrolled patients from March 2020- December 2022. There will be no direct patient participation, contact, or interaction. The study will be conducted in Region 2 Trauma and Medical Center, a government tertiary hospital in Bayombong, Nueva Vizcaya. The study population will include adult patients 19 years old. A Confirmed cases of COVID-19, as determined by the real-time reverse transcription-polymerase chain reaction (RT-PCR) admitted in the isolation ward and ICU of the Internal Medicine department. Patients with COVID-19 who have moderate, severe, and critical classifications according to the Philippine Society

of Microbiology and Infectious Diseases from March 2020 to December 2022.

Operational Definition:

1. Unite for Diabetes Philippine Clinical Practice Guidelines adapted from the American Diabetes Association (ADA) criteria for Diabetes and dysglycemia are as follows:
 - a. Normal FBS was <100 mg/dL
 - b. Impaired fasting glucose was FBS 100–125 mg/dL and
 - c. Diabetes was FBS > 126 mg/dL
2. The 2001 National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATP III) guidelines on serum lipid level categories were used in this study as follows:
 - a. Total cholesterol (in mg/dL) desirable (<200), borderline high (200–239), high (>240);
 - b. LDL-c (in mg/dL) optimal (<100), near optimal/ above optimal (100–129), borderline high (130–159), high (160–189), very high (>190);
 - c.
 - d. HDL-c (in mg/dL) low (<40), borderline (50–59), desirable (>60);
 - e. Triglycerides (in mg/dL) desirable (<150), borderline (150–199), high (200–399), very high (>400).
3. Asia-Pacific Classification of BMI was adopted for this study:
 - a. Underweight: <18.5 kg/m
 - b. Normal weight: 18.5–22.9 kg/m
 - c. Overweight: 23–24.9 kg/m
 - d. Obese I: 25–29.9 kg/m
 - e. Obese II: >30 kg/m
4. Blood pressure categories in this study are based on the American College of Cardiology/American Heart Association (ACC/AHA) 2017 guidelines on Hypertension:

- a. Normal (systolic BP < 120 and Diastolic BP < 80 mmHg)
 - b. Elevated (systolic BP 120-129 and Diastolic <80 mmHg)
 - c. Stage 1 Hypertension (systolic BP 130-139 or diastolic 80-89 mmHg)
 - d. Stage 2 Hypertension (systolic BP > 140 or Diastolic > 90 mmHg)
5. Metabolic Syndrome is defined by the NCEP-ATP III as fulfilling at least 3 out of 5 of the following criteria:
- a. Waist circumference for males: >90 cm, females: >80 cm
 - b. Triglycerides > 150 mg/dL
 - c. HDL Cholesterol for males: <40 mg/dL, females < 50 mg/dL
 - d. Fasting Blood Sugar > 100 mg/dL
 - e. Blood pressure: 130 mmHg systolic or > 80 mmHg on antihypertensive drug treatment in a patient with hypertension.
6. Severity Classification of COVID-19 is defined by Living Recommendations for the treatment COVID-19 guidelines:
- A. Mild COVID-19
 - No pneumonia or desaturation
 - Acute onset of fever and cough or any three (3) or more of the following:
 - Fever
 - Cough
 - Coryza
 - Sore throat
 - Diarrhea
 - Anorexia/nausea/vomiting
 - Loss of sense of smell or taste
 - Generalized weakness/body malaise/fatigue
 - Headache
 - Myalgia
 - B. Moderate COVID-19
 - With pneumonia ***BUT** no difficulty of breathing or shortness of breath, RR<30

breaths/min, oxygen saturation*>94% at room air.

OR

- Without pneumonia but with risk factors for progression: elderly (60 years old and above) and/or with comorbidities.
- C. Severe COVID-19
- With pneumonia* and **ANY** one of the following:
 - Signs of respiratory distress
 - Oxygen saturation* <94% at room air
 - Respiratory rate of ≥30 breaths/minute
 - Requiring oxygen supplementation
- D. Critical COVID-19
- With pneumonia* and **ANY** of the following:
 - Impending respiratory failure requiring high flow oxygen, non-invasive or invasive ventilation
 - Acute respiratory distress syndrome
 - Sepsis or shock
 - Deteriorating sensorium
 - Multi-organ failure
 - Thrombosis

Statistical Analysis

Baseline parameters were presented as proportions. The association between the different clinical and cardiovascular factors, and outcomes were determined using different regression analyses. Specifically, the association between the length of stay (here defined as a categorical variable) and different predictors was determined using simple and multiple logistic regression analyses. Simple logistic regression analysis was conducted to determine the crude odds ratio per predictor variable. Significant variables were then included in the multiple logistic regression analysis to determine the adjusted odds ratio and to control the possible confounders. The same analyses were conducted to determine the association between mortality and different predictors. Since the severity of COVID 19 was an ordinal variable, a

simple and multiple ordinal logistic regression was done to check the association between COVID 19 and different independent variables. All analyses were performed using STATA SE 18.0, with a p-value of less than 0.05 as the cut off to determine statistical significance.

Ethical Issues

The study will be conducted with adherence to the principles of transparency, legitimate purpose, and proportionality in the collection, retention, and processing of personal information in the Data Privacy Act of 2012, as well as the provisions in the National Ethical Guidelines for Privacy and Health-Related Research of 2017. In the implementation of this study, the anonymity of individuals participating in the research will be ensured with the non-inclusion of the patient's name. Access to the imaging data shall be requested by the investigators from the Region II Trauma and Medical Center Internal Medicine Department, through the Department Chairperson, upon approval of the study, and the waiver of the informed consent by the Region II Trauma and Medical Center Research Ethics Board. All confidential information will be stored within secured database systems. There would be no exposure to other information that would identify participants.

RESULTS

There were 1,590 hospitalized patients with confirmed COVID-19 throughout our time period. 4 cases were excluded due to incomplete key information in the medical records. (Figure 1)

Figure 1

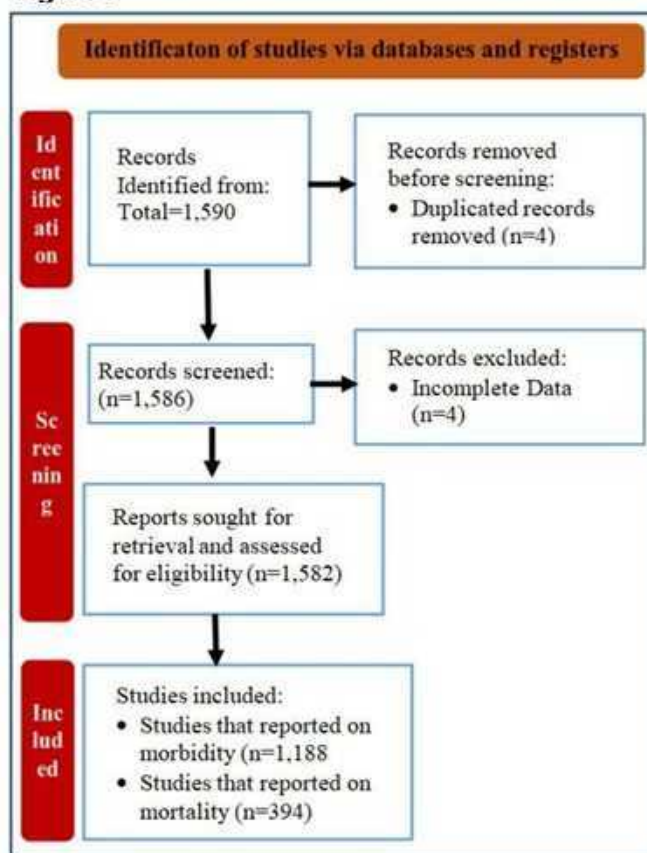


Figure 1: * Reason for exclusion may exist for each paper. *Consist of an overlap of studies reporting on both mortality and morbidity.

Characteristics of COVID-19 with Cardiometabolic risk factors

There were 1582 samples included in this study. Most were 50 to 59 years old (24.3%), male (57.7%) and unvaccinated. Cardiovascular disease (60.7%), presence of hyperlipidemia (62.5%) and hypertension (63.9%) were the most common risk factors. In terms of other ratio factors, most patients have normal BMI (78.3%), moderate WHR (78.2%), at risk LDL-cholesterol (79.0%) and high 1 BP (48.1%). Around 66% stayed more than a week in the hospital and around 25% died during admission. Most patients included had moderate COVID 19 (50%). (See Table 1)

Table 1: Baseline Characteristics of admitted COVID-19 patients (N=1582)

Parameter	Number (%)
Vaccinated	67 (4.23)
Age	
20-29	76 (4.80)
30-39	144 (9.10)
40-49	249 (15.74)
50-59	384 (24.27)
60-69	372 (23.51)
70 and Above	357 (22.57)
Sex (Male)	913 (57.71)
Type 1 DM	16 (1.01)
Type 2 DM	406 (25.66)
Obesity	18 (1.14)
Hypertension	1101 (63.90)
Hyperlipidemia	988 (62.45)
Cardiovascular Disease	961 (60.74)
Myocardial Infarction	128 (8.09)
Atrial Fibrillation	183 (11.57)
BMI	
Underweight	23 (1.45)
Normal	1239 (78.32)
Overweight	319 (20.16)
Obese	1 (0.000001)
Waist Hip Ratio	
Low	114 (7.21)
Moderate	1237 (78.19)
High	231 (14.6)
LDL-Cholesterol	
Healthy	102 (6.44)
At Risk	1250 (79.01)
Dangerous	230 (14.53)
FBS	
Normal	424 (26.80)
Impaired	843 (53.29)
Diabetic	315 (19.91)
BP	
Normal	503 (31.80)
Elevated	309 (19.53)
High1	761 (48.10)
High2	9 (0.00006)
More than a week in the Hospital	1041 (65.80)
Mortality	394 (24.91)
Severity of Covid	
Mild	24 (1.52)
Moderate	791 (50.00)
Severe	475 (30.03)
Critical	292 (18.46)

Association Between Different Outcomes and Cardiovascular Risk Factors in Covid Patients

A. Association Between Length of Stay and Cardiometabolic Risk Factors

Using simple logistic regression analysis, age, sex, type 2 DM, hypertension, hyperlipidemia, cardiovascular disease, myocardial infarction, atrial fibrillation, BMI, waist hip ratio and FBS crudely correlate with length of stay. Nevertheless, upon adjustment of possible confounders, age, presence of hyperlipidemia, FBS and BP directly correlate with length of stay while Myocardial Infarction, AF and WHR inversely correlate with length of stay. Specifically, older patients, hyperlipidemic, those with confirmed diabetes and elevated BP had higher probability of staying in the hospital for more than a week while those with MI, AF, and higher WHR tend to stay shorter. **(See table 2)**

B. Association Between Cardiometabolic Risk Factor and Death

Crudely, vaccination protects a patient with COVID-19 from death by as much as 55%. Increasing age, presence of type 2 DM, hypertension, hyperlipidemia, cardiovascular disease, Myocardial Infarction, Atrial fibrillation, higher FBS and BP on the other hand increase the odds of death. Nevertheless, upon control of confounders, only MI, AF and increasing BP were associated with higher odds of death. Specifically, COVID patients with MI, AF and high 2 BP have 27.3 times, 5.8 times and 10.4 times odds of dying compared when they don't have these condition. **this may explain the shorter length of stay of MI AF patients since they die faster.* **(see Table 3)**

C. Association Between Cardiometabolic Risk Factors and COVID-19 Severity

Crudely, vaccination decreases the odds of having severe covid, while the rest of the predictors, aside from sex, type 1 DM, and obesity increase the odds. On multiple ordinal logistic regression analysis however, only vaccination

status was associated with decreased severity of COVID 19. Specifically, a vaccinated patient has 43% less odds of having severe COVID 19. (see **Table 4**)

DISCUSSION

As seen in the result done at R2TMC, in comparing the age distribution of COVID-19 patients without vaccination and with vaccination, it showed that the majority were 50 to 59 years old (24.3%), male (57.7%) and unvaccinated. This was observed in all age groups. In a study Published in 2024 by Yu et. al, there were 221 incident SARS-CoV-2 infections among those with serologic evidence of vaccination (1.6%). Intermittent hypertension was associated with greater SARS-CoV-2 infections among those with serologic evidence of vaccination risk (adjusted incidence rate ratio=2.07; 95% CI=1.44, 2.96; $p<0.01$) than among participants with consistent normotension based on a multivariable Poisson regression.

A large population-based study conducted in the US showed that men all diagnosed patients, hospitalized patients were more likely to be male, older, and have a higher prevalence of cardiometabolic risk factors due to lifestyle. Based on the outline distribution done at R2TMC according to gender, the majority of the patients were male patients with no vaccination about 57.7%.

The demographic data for age corresponds with the latest report by the Journal of the American Heart Association published in 2021, which showed a much higher proportion of COVID-19 hospitalizations among older adults (aged ≥ 65 years) compared with younger ages. This indicates that among (aged ≥ 40 years) have a higher risk of COVID-19 severity and mortality. In a study published in 2021 by Yasaman et. al, due to the high majority of cardiometabolic risk factors like obesity, hypertension, diabetes, and

dyslipidemia among the population over 60 years old and higher, these cardiometabolic risk factors along with the age of these people could worsen the prognosis of the coronavirus disease of 2019 (COVID-19) and its mortality.

As of December 2022, the total cases of COVID-19 in R2TMC, age, sex, type 2 DM, hypertension, hyperlipidemia, cardiovascular disease, myocardial infarction, atrial fibrillation, BMI, waist-hip ratio and FBS crudely correlate with the length of stay This finding is consistent with the study done by Maryam et. al. (2023) which also noted that in a significant proportion higher prevalence of poor outcomes from COVID-19. The risk of COVID-19 hospitalizations was attributable to the largest proportions of Hypertension (26.2%), a much higher proportion of COVID-19 Hospitalization among older adults (aged ≥ 65 years) compared with younger ages, respectively (Meghan, 2021).

Hyperlipidemia was an extremely common metabolic comorbidity that affects the outcome of COVID-19. A study done by Ru Ying et. al. (2023) found that examining 27 systematic reviews found discordant results on the associations of hyperlipidemia with COVID-19 mortality, although the data trended towards increased mortality. Maryam et. al. (2023) noted that hyperlipidemia was associated with COVID-19 severity and mortality in a meta-analysis of 12, 995 patients as a contributor to more severe COVID-19 infection and prolong the length of hospital stay.

Table 2: Association Between Length of Stay and Cardiometabolic Risk

Factor	Simple Logistic Regression		Multiple Logistic Regression	
	Unadjusted OR	p-value	Adjusted OR	p-value
Vaccination	1.1	0.8		
Age (vs 20-29)	NA			
30-39	2.0	0.025*	2.2	0.02*
40-49	2.3	0.005*	2.4	0.01*
50-59	9.1	<0.0001*	3.5	<0.0001*
60-69	13.7	<0.0001*	3.5	0.001*
70 and Above	8.3	<0.0001*	2.0	0.07*
Being Male	0.8	0.04	0.91	0.5
Type 1 DM	1.6	0.8		
Type 2 DM	2.1	<0.0001*	0.8	0.2
Obesity	2.6	0.1		
Hypertension	6.1	<0.0001*	0.8	0.5
Hyperlipidemia	6.1	<0.0001*	2.6	0.03*
Cardiovascular Disease	5.7	<0.0001*	1.2	0.6
Myocardial Infarction	0.54	0.001*	0.2	<0.0001*
Atrial Fibrillation	1.8	0.001*	0.6	0.024*
BMI (vs UW)				
Underweight	NA			
Normal	0.27	0.04*	0.33	0.113
Overweight	0.34	0.09*	0.3	0.05
Obese	N/A			
Waist-Hip Ratio				
Low	NA			
Moderate	0.57	0.014*	0.3	<0.0001*
High	0.61	0.06*	0.2	<0.0001*
LDL-Cholesterol				
Healthy	NA			
At Risk	0.7	0.06		
Dangerous	0.9	0.62		
FBS				
Normal	NA			
Impaired	3.2	<0.0001*	1.8	0.001*
Diabetic	4.2	<0.0001*	1.7	0.03*
BP				
Normal	NA			
Elevated	10.4	<0.0001*	6.4	<0.0001*
High1	8.06	<0.0001*	4.9	<0.0001*
High2	4.02	0.05	3.0	0.15

Multivariate logistics regression analysis of prognostic factors for length of stay in COVID-19.
Abbreviations: COVID-19 = coronavirus disease 2019, OR = odds ratio, LDL = low-density lipoproteins, BMI = body mass index (calculated as weight in kilograms divided by height in meters squared), UW = underweight, DM = Diabetes Mellitus, NA = not applicable.

Table 3: Association Between Cardiometabolic Risk Factor and Death

Factor	Simple Logistic Regression		Multiple Logistic Regression	
	Unadjusted OR	p-value	Adjusted OR	p-value
Vaccination	0.45	0.03*	0.6	0.2
Age (vs 20–29)				
30–39	1.2	0.8	1.0	0.9
40–49	3.6	0.02*	2.1	0.2
50–59	4.4	0.01*	0.7	0.5
60–69	6.7	<0.0001*	1.0	0.9
70 and Above	15.1	<0.0001*	1.8	0.4
Being Male	0.9	0.2		
Type 1 DM	1.0	0.9		
Type 2 DM	3.0	<0.0001*	1.4	0.05
Obesity	1.06	0.7		
Hypertension	7.4	<0.0001*	4.4	0.001*
Hyperlipidemia	5.7	<0.0001*	0.4	0.02*
Cardiovascular Disease	4.8	<0.0001*	0.8	0.6
Myocardial Infarction	23.6	<0.0001*	27.3	<0.0001*
Atrial Fibrillation	5.6	<0.0001*	5.8	<0.0001*
BMI (vs UW)				
Underweight				
Normal	1.4	0.5		
Overweight	2.2	0.2		
Obese	1			
Waist-Hip Ratio				
Low				
Moderate	0.8	0.3		
High	1.1	0.6		
LDL-Cholesterol				
Healthy				
At Risk	0.8	0.4		
Dangerous	1.6	0.06		
FBS				
Normal				
Impaired	2.7	<0.0001*	1.0	0.9
Diabetic	5.2	<0.0001*	1.4	0.2
BP				
Normal				
Elevated	5.5	<0.0001*	2.8	0.002*
High1	9.6	<0.0001*	4.9	<0.001*
High2	32.7	<0.0001*	10.4	0.007*

Multivariate logistics regression analysis of prognostic factors for mortality in COVID-19.

Abbreviations: COVID-19 = coronavirus disease 2019, OR = odds ratio, LDL = low-density lipoproteins, BMI = body mass index (calculated as weight in kilograms divided by height in meters squared), UW = underweight, DM = Diabetes Mellitus, NA = not applicable.

Table 4: Association Between Cardiometabolic Risk Factors and COVID-19

Factor	Simple Ordinal Logistic Regression		Multiple Ordinal Logistic Regression	
	Unadjusted OR	p-value	Adjusted OR	p-value
Vaccination	0.46	0.003*	0.53	0.003*
Age (vs 20-29)				
30-39	1.7	0.1	1.1	0.9
40-49	2.5	0.002*	0.9	0.9
50-59	2.8	<0.0001*	2.3	0.2
60-69	3.8	<0.0001*	3.0	0.1
70 and Above	7.0	<0.0001*	2.9	0.2
Being Male	1.0	0.8		
Type 1 DM	1.0	0.9		
Type 2 DM	1.7	<0.0001*	0.94	0.9
Obesity	1.1	0.6		
Hypertension	3.1	<0.0001*	0.4	0.4
Hyperlipidemia	3.2	<0.0001*	0.34	0.5
Cardiovascular Disease	3.1	<0.0001*	3.8	0.4
Myocardial Infarction	11.6	<0.0001*	0.3	0.2
Atrial Fibrillation	2.8	<0.0001*	0.6	0.4
BMI (vs UW)				
Underweight				
Normal	4.2	0.003*		
Overweight	4.7	0.001*		
Obese	1.2	0.9		
Waist-Hip Ratio				
Low				
Moderate	4.5	<0.0001*		
High	6.1	<0.0001*		
LDL-Cholesterol				
Healthy				
At Risk	4.0	<0.0001*		
Dangerous	4.9	<0.0001*		
FBS				
Normal				
Impaired	2.0	<0.0001*	1.2	0.6
Diabetic	3.5	<0.0001*	2.1	0.2
BP				
Normal				
Elevated	1.5	0.005*	0.5	
High1	4.2	<0.0001*	1.4	0.3
High2	2.5	0.2	-	0.6

Multivariate logistics regression analysis of prognostic factors for Clinical Severity in COVID-19. Abbreviations: COVID-19 = coronavirus disease 2019, OR = odds ratio, LDL = low-density lipoproteins, BMI = body mass index (calculated as weight in kilograms divided by height in meters squared), UW = underweight, DM = Diabetes Mellitus, NA = not applicable.

In another retrospective study done by Barkhordarian et. al. (2022), Diabetes Mellitus is a major mediator of COVID-19 clinical outcomes. A higher prevalence of Diabetes Mellitus was seen among patients with severe COVID-19. The study done by Ru Ying Fong et. al. (2023) found that Diabetes was reported in 24 studies for mortality and was associated with a 2.85-fold significant increase in the risk of mortality compared with patients without diabetes.

The mean duration of hospitalization majority in this study was 8-14 days of hospitalization noted that 996 (63 %) were not vaccinated while 45 (2.8%) were vaccinated which is longer as compared to a single-center study conducted in the US with a mean duration 5-10 days depending on the clinical severity of COVID-19. However, a 2-year single-center study in Jakarta, Indonesia (Arvin et. al, 2022) noted an average hospital stay of 14 days (range: 2 to 30 days). This is of importance because prolonged hospitalization leads to further complications and economic burdens.

Vaccination protects a patient with COVID-19 from death by as much as 55%. Increasing age, presence of type 2 DM, hypertension, hyperlipidemia, cardiovascular disease, MI, AF, higher FBS, and BP on the other hand increase the odds of death. The mortality rate among patients with cardiometabolic risk factors varies from an overall mortality rate of 9.4% in a Singaporean study (Ru et.al, 2023), 14% in a single centered in Jakarta Indonesia (Arvin et. al., 2022), 10.5% from a study in mainland China (Chan et. al., 2021).

Vaccination decreases the odds of having severe COVID-19, while the rest of the predictors, aside from sex, type 1 DM, and obesity increase the odds. On multiple ordinal logistic regression analysis, however, only vaccination status was associated with decreased severity of COVID-19. Specifically, a vaccinated patient has 53% less odds of having severe COVID-19.

Practically, knowledge of the sociodemographic and comorbidities that place COVID-19 patients at severe outcomes may aid clinicians in developing risk stratification workflows to prioritize such patients. This paper suggests that, beyond Cardiometabolic Risk Factors, age, and sex are two of the most important influential factors in mortality in patients with COVID-19. This is not surprising and it is expected that age should have a significant impact on the course of the disease. Measures taken by public health policies to protect this vulnerable group, such as prioritizing the elderly for vaccination and healthcare, were steps taken in the right direction. The health repercussions of COVID-19 aggregated in patients with Cardiometabolic Risk factors veritably remind us of the cornerstone principles in public health prevention and regular management: optimization of glycemic outcomes, management of hypertensive profiles, and adequate anti-thrombotic strategies to circumvent cardiovascular disease, especially in the elderly population.

Strengths and limitations

There were a few restrictions to our study incorporate review assortment of information from electronic and paper records, moderately couple of patients with waist to hip ratio file information accessible, and deficient development of certain patients without a still hospitalized endpoint at the hour of investigation. Additionally, we couldn't recover glycemic control information during hospitalization which related with more regrettable Coronavirus results. A few elements related erroneously glycemic control information are because of Cytokine storm pressure incite hyperglycemia, direct harm to beta cells, stress induced hyperglycemia and corticosteroids induced hyperglycemia. Notwithstanding, HbA1c may be dishonestly raised in patients with intense phase of Coronavirus because of upset hemoglobin energy brought about by SARS-CoV-2 and additionally HPLC discovery of thickly glycosylated S-proteins on the SARS-CoV-2 virion

surface. At long last, we couldn't have appraised insulin obstruction, or substitutes as FBS and LDL, in our populace, which was in many cases considered the normal soil for cardiometabolic conditions. Sadly, because of the observational review plan and the requesting not set in stone by the pandemic, we couldn't gather extra radiological examinations to test biomarkers not regularly estimated in all patients, which may all be associated with the connection between cardiometabolic dismalness and Coronavirus progression.

Qualities of this study incorporate a point by point portrayal of the clinical and biochemical highlights of patients hospitalized for Coronavirus, with and without diabetes, with great generalizability of the outcomes because of the multivariate coordinated operations relapse examination. Besides, to the best information, this was the main review surveying Coronavirus results with regards to cardiometabolic.

CONCLUSION

This study demonstrates the consequences of Diabetes Mellitus, Hypertension, Hyperlipidemia and Cardiovascular Disease showed significant associations with mortality and Clinical Severity of patients. Moreover, Age, Male, and Co-morbidities were significant confounders for the associations of Cardiometabolic Risk Factors on COVID-19 mortality and clinical severity.

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Pre-operative Nutritional Risk Assessment using Malnutrition Universal Screening Tool (MUST) as a Predictor of Postoperative Outcome in Adult Patients Undergoing Abdominopelvic Surgery at a Tertiary Hospital in Iloilo – A Prospective Study*

Catherine Rose P. Dumpit, MD¹; April Esther O. Caguimbay, MD²;
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ABSTRACT

Several studies have shown the serious implications of malnutrition, yet it is still underestimated, understudied and an undertreated problem in hospitalized patients. It remains a challenge for hospitals in the Philippines ^{9,10}. Pre-operative malnutrition is a risk factor of perioperative morbidity and mortality⁸. Malnourished patients have longer hospital stay and have higher risk of complications ⁹. Thus assessing the pre-operative nutritional status is necessary in planning early nutritional interventions and may predict risk of developing postoperative complications.

A prospective cohort study was conducted among adult patients ages 18 to 70 years old admitted for abdominopelvic surgery at St. Paul's Hospital Iloilo from January 2021 to January 2022. Within 24-48 hours of admission, patient demographic and clinical profiles were identified and the presence of nutritional risk was evaluated using the Malnutrition Universal Screening tool (MUST). SPSS version 20 was used to analyze the data. Further statistical analysis was done using Cross Tabulation, Pearson Chi-Square and Logistic Regression.

The study demonstrates that nutritional risk, age, presence of malignancy, smoking and alcoholic beverage drinking are significantly correlated with post-operative complications.

Thus, nutritional risk screening using MUST pre-operatively can predict the outcomes of post-operative patients undergoing abdominopelvic operation.

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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INTRODUCTION

Background of the Study

Malnutrition is a state of nutrition in which a deficiency or excess (or imbalance) of energy, protein and other nutrients causes measurable adverse effects on tissue/body form (body shape, size, composition), body function and clinical outcome. In the 21st Century, protein-energy malnutrition is a major public health problem worldwide¹ especially in the developing countries², affecting approximately 462 million adults³. It is caused by lack of access to adequate nutrient intake and illnesses that alter appetite, digestion, absorption, or nutrient metabolism⁴. According to the World Health Organization (WHO), the global developmental, economic, social and medical burden of malnutrition to individuals, families, communities and countries are serious and lasting³. It is estimated that approximately 31% of all individuals admitted to a hospital for any cause are malnourished, with cancer patients experiencing even higher rates due to the systemic nature of malignancy. Several studies show that malnutrition has a multitude of clinical implications adversely affecting mortality, morbidity and length of hospital stay amongst heterogeneous populations^{5, 6, 7, 8, 9}. Despite the serious implications of malnutrition, it is still underestimated, understudied and an undertreated problem in hospitalized patients. It remains a challenge for hospitals in the Philippines^{9,10}.

Surgery is a form of injury that initiates inflammatory response and immune triggers. This leads to catabolism of glycogen, fat and protein with release of glucose, free fatty acids and amino acids into the circulation for healing, immune response and to re-establish the disturbed equilibrium^{11,12}. Prevalence and severity vary by type and site of surgery¹³.

Pre-operative malnutrition is a risk factor of perioperative morbidity and mortality⁸.

Malnourished patients have longer hospital stay, more likely to be confined for more than 7 days and have higher risk of complications⁹. Thus, assessing the pre-operative nutritional status is necessary in planning early nutritional interventions and may predict risk of developing postoperative complications.

Significance of the Study

This study will provide practical, easy to use and economical nutritional pre-operative evaluation for adult patients scheduled for abdominopelvic surgical procedures. This will help identify patients with nutritional risk or malnutrition and predict possible occurrence of post-operative complications. Clinicians can thus be guided to individualize pre-operative nutritional and medical planning of patients to prevent post-operative morbidity or mortality. The study will also reinforce the use of nutritional screening tools as an essential part of evaluation for each adult patient for surgery.

General Objective

The aim of the study is to identify the risk of malnutrition of adult Filipino patients admitted for abdominopelvic surgery using Malnutrition Universal Screening Tool (MUST) and to validate the use of this tool in predicting pre-operatively the occurrence of post-operative complications.

Specific Objectives

Specifically, this study:

1. Describes the patient's demographic and clinical characteristics in terms of age, sex, BMI, smoker or nonsmoker, alcoholic beverage drinker or nonalcoholic beverage drinker, presence or absence of co-morbidity, presence or absence of malignancy and case (designated if admitted under Surgery or Obstetrics and Gynecology/OB-GYN)
2. Identifies the demographic and clinical profiles that have a significant correlation

with post- operative complications and length of hospital stay

3. Correlates overall risk of malnutrition using MUST (Malnutrition Universal Screening Tool) with post-operative complications and length of hospital stay (counted from day of surgery) in adult Filipino patients admitted for elective abdominopelvic surgery

Operational Definition of Terms:

1. Surgical Outcome can be mortality or non-mortality. Mortality outcome is described as either dead or alive on the other hand, non-mortality outcomes focus on the patient's well-being and possible health deterioration after an intervention (surgery) ¹⁴.

2. Surgical complication is any deviation from the normal postoperative course. The most common complications are infections, postoperative bleeding, anastomotic leakages, pulmonary embolism, myocardial infarction/severe arrhythmia, wound opening, diarrhea and hepatic encephalopathy⁷. In this study the standardized Clavien-Dindo classification was used for grading surgical complication severity. This scale is divided into 7 severity grades including subgroups on grades III and IV illustrated in table 1

Table 1. Clavien-Dindo Classification for Grading Surgical Complications

Classification of Surgical Complications	Definition
Grade I	Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic, and radiological interventions Allowed therapeutic regimens are: drugs as antiemetics, antipyretics, analgesics, diuretics, electrolytes, and physiotherapy. This grade also includes wound infections opened at the bedside.

Grade II	Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included.
Grade III Grade IIIa Grade IIIb	Requiring surgical, endoscopic or radiological intervention Intervention not under general anesthesia Intervention under general anesthesia
Grade IV Grade IVa Grade IVb	Life-threatening complication (including CNS complications)* requiring IC/ICU management Single organ dysfunction (including dialysis) Multiorgan dysfunction
Grade V	Death of a patient
Suffix "d"	If the patient suffers from a complication at the time of discharge (see examples in Table 2), the suffix "d" (for "disability") is added to the respective grade of complication. This label indicates the need for a follow-up to fully evaluate the complication.
*Brain hemorrhage, ischemic stroke, subarachnoid bleeding, but excluding transient ischemic attacks. CNS, central nervous system; IC, intermediate care; ICU, intensive care unit.	

3. Nutritional Risk refers to abnormal nutritional conditions. Based on ESPEN Guidelines on definition and terminology and clinical nutrition, adults should be considered at risk if they have any of the following¹⁶:

- Involuntary loss of 10% or more of usual body weight within 6 months, or involuntary loss of greater than or 5% or more of usual body weight in 1 month
- Involuntary loss or gain of 10 pounds within 6 months

- Body mass index less than 18.5 kg/m² or greater than 25 kg/m²
- Chronic disease
- Increased metabolic requirements
- Altered diets or diet schedules
- Inadequate nutrition intake, including not receiving food or nutrition products for greater than 7 days

4. Malnutrition is "a state resulting from lack of intake or uptake of nutrition that leads to altered body composition (decreased fat free mass) and body cell mass leading to diminished physical and mental function and impaired clinical outcome from disease". Malnutrition can result from starvation, disease or advanced ageing (e.g. >80 years), alone or in combination¹⁶.

5. Malnutrition risk screening is a rapid process performed to identify subjects at nutritional risk, and should be performed using an appropriate validated tool in all subjects that come in contact with healthcare services. Depending on the care setting, screening should be performed within the first 24-48 h after first contact and thereafter at regular intervals¹⁶.

6. Abdominopelvic Surgery is defined as an operation done on organs including the stomach, gallbladder, small and large intestines, liver, pancreas, spleen, appendix, uterus, fallopian tube and ovary.

7. Malnutrition Universal Screening Tool (MUST) is a 5-step validated screening tool designed to identify adults who are underweight and at risk of malnutrition. It was developed by British Association of Parenteral and enteral Nutrition (BAPEN), a multi-professional association with the mission of raising awareness of the prevalence and impact of malnutrition to improve nutritional care standard and developing pathways to prevent malnutrition (BAPEN MANUAL). MUST detects protein-energy malnutrition and the risk of developing malnutrition. Parameters used in screening nutrition includes BMI on admission, unplanned weight loss (%) in the past 3-6 months and acute disease effect score. These three components can reflect the 'journey' of the patient from the past (weight loss), to the present (current BMI) and into the future (effect of disease)¹⁸. Each of the three components can independently predict clinical outcome with the importance of individual components varying with the clinical circumstances¹⁹. Together the three components are better predictors of outcome than the individual components.

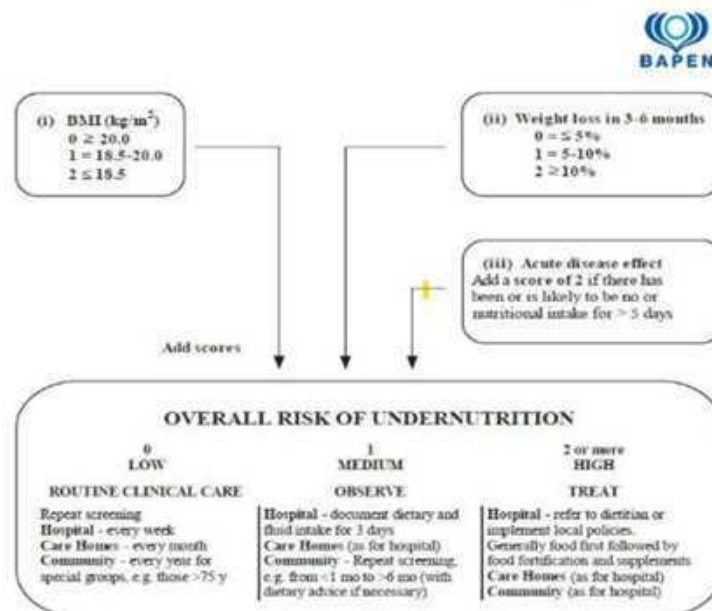


Figure 1.1. Malnutrition Universal Screening Tool

METHODOLOGY

Study Design

This is a prospective cohort study among adult patients aged 18-70 years old who were admitted from January 1, 2021 to January 31, 2022 for abdominopelvic surgery at St. Paul's Hospital Iloilo.

Study Setting

The study was conducted at Saint Paul's Hospital Iloilo.

Study Period

The study enrolment and follow up of admitted patients started from January 1, 2021 to January 31, 2022.

Study Population

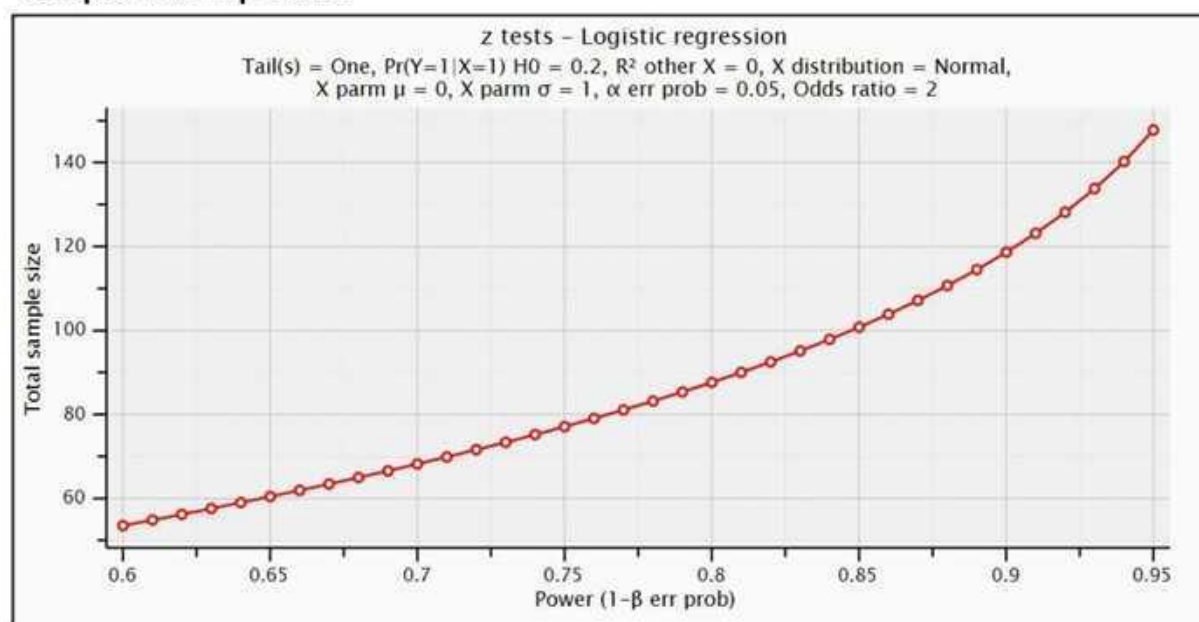
a. Inclusion Criteria

All patients under pay and service accommodations under the Department of Surgery and OB-GYN who were admitted for elective abdominopelvic surgery, ages 18-70 years old, with stable vital signs and stable comorbidities on admission, who were compliant with the recommended management and medications during the course of admission and who gave their consent were included in the study.

b. Exclusion Criteria

Patients who were admitted for emergency operations, opted transfer to another institution, discharged against medical advice and whose surgical interventions were deferred were excluded in the study.

Sample Size Computation



The plot above shows the sample size given the varying Power of the analysis. The Software G*Power was used to determine an adequate sample size given an odds ratio of 2 and a Power of 80%. The results showed that the sample size is 88. In this study, the total sample size is 118.

In a study conducted by Sungurtekin, et al., published in the Journal of the American College of Nutrition, a total of 100 consenting patients were included to assess the influence of nutritional status on complications after major intraabdominal surgery ³⁶.

Henderson et.al. had MUST (Malnutrition Universal Screening Tool) and BNR (Birmingham Nutrition Risk) scores collected from 115 elderly patients and were analyzed if their scores predicted mortality ³⁷.

Data Collection Tools

1. Nutritional screening was done using Malnutrition Universal Screening tool.
2. Clavien-Dindo Classification was used for grading surgical complications.

Steps in Screening Using MUST ²⁶

Step 1: Body mass index (BMI) (kg/m^2)

BMI gives a rapid interpretation of chronic protein-energy status based on an individual's height and weight. Take the subject's height and weight to calculate BMI, or use the BMI chart to establish the subject's BMI score.

Measuring height and weight

A. Height

- Use a height stick (stadiometer) where possible. Make sure it is correctly positioned against the wall.
- Ask subject to remove shoes and to stand upright, feet flat, heels against the height stick or wall (if height stick not used).

- Make sure the subject is looking straight ahead and lower the head plate until it gently touches the top of the head.
- Read and document height.

Alternative measurements Height

If height cannot be measured, use recently documented or self-reported height (if reliable and realistic). If height cannot be measured or the subject does not know or is unable to report their height, the following alternative measurements can be used to calculate height.

(i) Length of forearm (ulna)

- Prefer for bed bound subjects, those with severe disabilities and those with kyphosis or scoliosis.
- Ask subject to bend an arm (left side if possible), palm across chest, fingers pointing to opposite shoulder.
- Using a tape measure, measure the length in centimetres (cm) to the nearest 0.5 cm between the point of the elbow (olecranon) and the mid-point of the prominent bone of the wrist (styloid process). • Use the table on page 12 to convert ulna length (cm) to height (m).

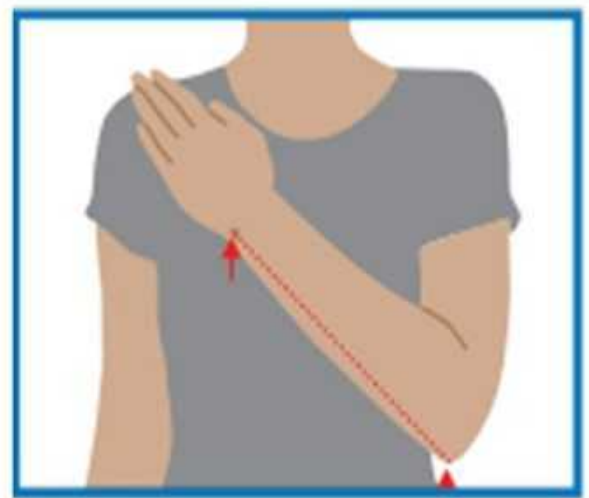


Table 1.1. Estimating height from ulna length

Height (m)	Men (<65 years)	1.94	1.93	1.91	1.89	1.87	1.85	1.84	1.82	1.80	1.78	1.76	1.75	1.73	1.71
	Men (≥65 years)	1.87	1.86	1.84	1.82	1.81	1.79	1.78	1.76	1.75	1.73	1.71	1.70	1.68	1.67
Ulna length (cm)		32.0	31.5	31.0	30.5	30.0	29.5	29.0	28.5	28.0	27.5	27.0	26.5	26.0	25.5
Height (m)	Women (<65 years)	1.84	1.83	1.81	1.80	1.79	1.77	1.76	1.75	1.73	1.72	1.70	1.69	1.68	1.66
	Women (≥65 years)	1.84	1.83	1.81	1.79	1.78	1.76	1.75	1.73	1.71	1.70	1.68	1.66	1.65	1.63
Height (m)	Men (<65 years)	1.69	1.67	1.66	1.64	1.62	1.60	1.58	1.57	1.55	1.53	1.51	1.49	1.48	1.46
	Men (≥65 years)	1.65	1.63	1.62	1.60	1.59	1.57	1.56	1.54	1.52	1.51	1.49	1.48	1.46	1.45
Ulna length (cm)		25.0	24.5	24.0	23.5	23.0	22.5	22.0	21.5	21.0	20.5	20.0	19.5	19.0	18.5
Height (m)	Women (<65 years)	1.65	1.63	1.62	1.61	1.59	1.58	1.56	1.55	1.54	1.52	1.51	1.50	1.48	1.47
	Women (≥65 years)	1.61	1.60	1.58	1.56	1.55	1.53	1.52	1.50	1.48	1.47	1.45	1.44	1.42	1.40

(ii) Knee height

- Measure left leg if possible.
- The subject should sit on a chair, without footwear, with knee at a right angle.
- Hold tape measure between 3rd and 4th fingers with zero reading underneath fingers.
- Place your hand flat across the subject's thigh, about 4 cm (1½ inches) behind the front of the knee.
- Extend the tape measure straight down the side of the leg in line with the bony prominence at the ankle (lateral malleolus) to the base of the heel. Measure to nearest 0.5 cm.
- Note the length and use the table on page 13 to convert knee height (cm) to height (m).

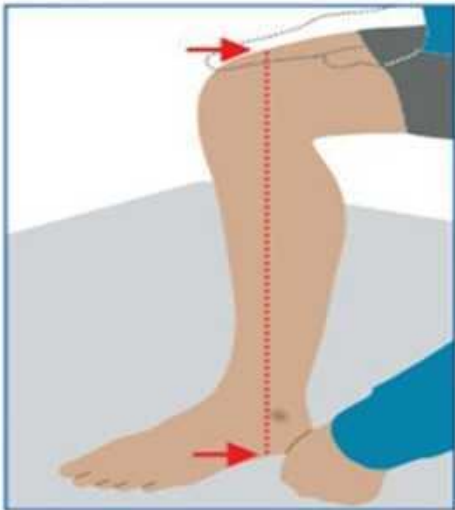


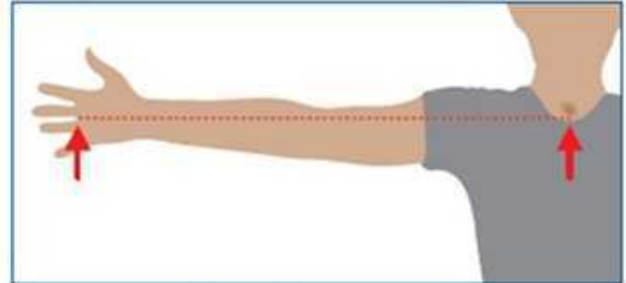
Table 1.2. Estimating height from knee height

Height (m)	Men (18-59 years)	1.94	1.93	1.92	1.91	1.90	1.89	1.88	1.87	1.865	1.86	1.85	1.84	1.83	1.82	1.81
	Men (60-90 years)	1.94	1.93	1.92	1.91	1.90	1.89	1.88	1.87	1.86	1.85	1.84	1.83	1.82	1.81	1.80
Knee height (cm)		65.0	64.5	64.0	63.5	63.0	62.5	62.0	61.5	61.0	60.5	60.0	59.5	59.0	58.5	58.0
Height (m)	Women (18-59 years)	1.89	1.88	1.875	1.87	1.86	1.85	1.84	1.83	1.82	1.81	1.80	1.79	1.78	1.77	1.76
	Women (60-90 years)	1.86	1.85	1.84	1.835	1.83	1.82	1.81	1.80	1.79	1.78	1.77	1.76	1.75	1.74	1.73
Height (m)	Men (18-59 years)	1.80	1.79	1.78	1.77	1.76	1.75	1.74	1.73	1.72	1.71	1.705	1.70	1.69	1.68	1.67
	Men (60-90 years)	1.79	1.78	1.77	1.76	1.74	1.73	1.72	1.71	1.70	1.69	1.68	1.67	1.66	1.65	1.64
Knee height (cm)		57.5	57.0	56.5	56.0	55.5	55.0	54.5	54.0	53.5	53.0	52.5	52.0	51.5	51.0	50.5
Height (m)	Women (18-59 years)	1.75	1.74	1.735	1.73	1.72	1.71	1.70	1.69	1.68	1.67	1.66	1.65	1.64	1.63	1.62
	Women (60-90 years)	1.72	1.71	1.70	1.69	1.68	1.67	1.66	1.65	1.64	1.63	1.625	1.62	1.61	1.60	1.59
Height (m)	Men (18-59 years)	1.66	1.65	1.64	1.63	1.62	1.61	1.60	1.59	1.58	1.57	1.56	1.555	1.55	1.54	1.53
	Men (60-90 years)	1.63	1.62	1.61	1.60	1.59	1.58	1.57	1.56	1.55	1.54	1.53	1.52	1.51	1.49	1.48
Knee height (cm)		50.0	49.5	49.0	48.5	48.0	47.5	47.0	46.5	46.0	45.5	45.0	44.5	44.0	43.5	43.0
Height (m)	Women (18-59 years)	1.61	1.60	1.59	1.585	1.58	1.57	1.56	1.55	1.54	1.53	1.52	1.51	1.50	1.49	1.48
	Women (60-90 years)	1.58	1.57	1.56	1.55	1.54	1.53	1.52	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.44

(iii) Demispan

- Ideally the subject should stand as this makes taking the measurement easier.
- Locate and mark the mid-point of the sternal notch (V at the base of the neck).
- Ask the subject to raise the right arm until it is horizontal with the shoulder (give assistance if necessary, make sure wrist is straight).
- Place a tape measure between the middle and ring finger of the subject's right hand, with zero at the base of the fingers.

- Extend the tape measure along the length of the arm to the mid-point of the sternal notch and note the measurement to the nearest 0.5 cm.

**Table 1.3. Estimating height from Demispan Measurement**

Height (m)	Men (16-54 years)	1.97	1.95	1.94	1.93	1.92	1.90	1.89	1.88	1.86	1.85	1.84	1.82	1.81	1.80	1.78	1.77	1.76
	Men (≥55 years)	1.90	1.89	1.87	1.86	1.85	1.84	1.83	1.81	1.80	1.79	1.78	1.77	1.75	1.74	1.73	1.72	1.71
	Demispan (cm)	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	83
Height (m)	Women (16-54 years)	1.91	1.89	1.88	1.87	1.85	1.84	1.83	1.82	1.80	1.79	1.78	1.76	1.75	1.74	1.72	1.71	1.70
	Women (≥55 years)	1.86	1.85	1.83	1.82	1.81	1.80	1.79	1.77	1.76	1.75	1.74	1.73	1.71	1.70	1.69	1.68	1.67
Height (m)	Men (16-54 years)	1.75	1.73	1.72	1.71	1.69	1.68	1.67	1.65	1.64	1.63	1.62	1.60	1.59	1.58	1.56	1.55	1.54
	Men (≥55 years)	1.69	1.68	1.67	1.66	1.65	1.64	1.62	1.61	1.60	1.59	1.57	1.56	1.55	1.54	1.53	1.51	1.50
	Demispan (cm)	82	81	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66
Height (m)	Women (16-54 years)	1.69	1.67	1.66	1.65	1.63	1.62	1.61	1.59	1.58	1.57	1.56	1.54	1.53	1.52	1.50	1.49	1.48
	Women (≥55 years)	1.65	1.64	1.63	1.62	1.61	1.59	1.58	1.57	1.56	1.55	1.54	1.52	1.51	1.50	1.49	1.47	1.46

Weight

If subject cannot be weighed, use a weight recently documented in their notes or use self-reported weight (if reliable and realistic).

Recent weight loss

If weight measurements are not possible, a history of weight loss may be helpful. Use serial measurements, documented in subject's notes or self-reported weight loss (if reliable and realistic). If it is not possible to obtain any of these measurements, subjective criteria should be used to obtain a clinical impression of an individual's overall nutritional risk category.

Subjective Criteria:

The following criteria which related to the patient can help form a clinical impression of an individual's overall nutritional risk category. The factors listed below can either contribute to or influence the risk of malnutrition. These criteria should be used collectively not separately as alternatives to Steps 1 and 2 of 'MUST' and are not designed to assign an actual score. Mid upper arm circumference (MUAC) may be used to estimate BMI category (see page 16) in order to support your overall impression of the subject's nutritional risk. Estimate a malnutrition risk category (low, medium or high) based on your overall evaluation.

1. BMI

- Clinical impression - thin, acceptable weight, overweight. Obvious wasting (very thin) and obesity (very overweight) can be noted.

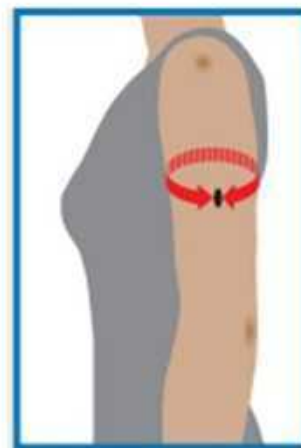
2. Weight loss

- Clothes and/or jewelry have become loose fitting.
- History of decreased food intake, reduced appetite or dysphagia (swallowing problems) over 3 – 6 months and underlying disease or psychosocial/ physical disabilities likely to cause weight loss.

3. Acute disease

- Acutely ill and no nutritional intake or likelihood of no intake for more than 5 days.

- Ask subject to let arm hang loose and with tape measure, measure circumference of arm at the mid point. Do not pull the tape measure tight - it should just fit comfortably round the arm.



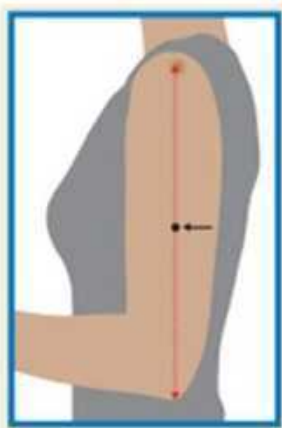
Estimating body mass index (BMI) category

In BMI, if neither height nor weight can be measured, range can be estimated using the mid upper arm circumference (MUAC) which may be used to support an overall impression of the subject's risk category using subjective criteria

If MUAC is less than 23.5 cm, BMI is likely to be less than 20 kg/m², subject is likely to be underweight. If MUAC is more than 32.0 cm, BMI is likely to be more than 30 kg/m², subject is likely to be obese.

Measuring mid upper arm circumference (MUAC)

- The subject should be standing or sitting.
- Use left arm if possible and ask subject to remove clothing so arm is bare.
- Locate the top of the shoulder (acromion) and the point of the elbow (olecranon process).
- Measure the distance between the 2 points, identify the mid point and mark on the arm.



Step 2: Weight loss

Obtain history of unplanned weight loss over 3 – 6 months. It is a more acute risk factor for malnutrition than BMI. To establish the subject's weight loss score, ask if there has been any weight loss in the last 3 – 6 months, and if so how much (or look in their medical records). Deduct current weight from previous weight to calculate amount of weight lost. Use weight loss tables to establish weight loss score. If the subject has not lost weight (or has gained weight) score 0.

Table 1.4. Weight loss table

	SCORE 0	SCORE 1	SCORE 2
	Wt Loss < 5%	Wt Loss 5-10%	Wt Loss > 10%
34 kg	<1.70	1.70 – 3.40	>3.40
36 kg	<1.80	1.80 – 3.60	>3.60
38 kg	<1.90	1.90 – 3.80	>3.80
40 kg	<2.00	2.00 – 4.00	>4.00
42 kg	<2.10	2.10 – 4.20	>4.20
44 kg	<2.20	2.20 – 4.40	>4.40
46 kg	<2.30	2.30 – 4.60	>4.60
48 kg	<2.40	2.40 – 4.80	>4.80
50 kg	<2.50	2.50 – 5.00	>5.00
52 kg	<2.60	2.60 – 5.20	>5.20
54 kg	<2.70	2.70 – 5.40	>5.40
56 kg	<2.80	2.80 – 5.60	>5.60
58 kg	<2.90	2.90 – 5.80	>5.80
60 kg	<3.00	3.00 – 6.00	>6.00
62 kg	<3.10	3.10 – 6.20	>6.20
64 kg	<3.20	3.20 – 6.40	>6.40
66 kg	<3.30	3.30 – 6.60	>6.60
68 kg	<3.40	3.40 – 6.80	>6.80
70 kg	<3.50	3.50 – 7.00	>7.00
72 kg	<3.60	3.60 – 7.20	>7.20
74 kg	<3.70	3.70 – 7.40	>7.40
76 kg	<3.80	3.80 – 7.60	>7.60
78 kg	<3.90	3.90 – 7.80	>7.80
80 kg	<4.00	4.00 – 8.00	>8.00
82 kg	<4.10	4.10 – 8.20	>8.20
84 kg	<4.20	4.20 – 8.40	>8.40
86 kg	<4.30	4.30 – 8.60	>8.60
88 kg	<4.40	4.40 – 8.80	>8.80
90 kg	<4.50	4.50 – 9.00	>9.00
92 kg	<4.60	4.60 – 9.20	>9.20
94 kg	<4.70	4.70 – 9.40	>9.40
96 kg	<4.80	4.80 – 9.60	>9.60
98 kg	<4.90	4.90 – 9.80	>9.80
100 kg	<5.00	5.00 – 10.00	>10.00
102 kg	<5.10	5.10 – 10.20	>10.20
104 kg	<5.20	5.20 – 10.40	>10.40
106 kg	<5.30	5.30 – 10.60	>10.60
108 kg	<5.40	5.40 – 10.80	>10.80
110 kg	<5.50	5.50 – 11.00	>11.00
112 kg	<5.60	5.60 – 11.20	>11.20
114 kg	<5.70	5.70 – 11.40	>11.40
116 kg	<5.80	5.80 – 11.60	>11.60
118 kg	<5.90	5.90 – 11.80	>11.80
120 kg	<6.00	6.00 – 12.00	>12.00
122 kg	<6.10	6.10 – 12.20	>12.20
124 kg	<6.20	6.20 – 12.40	>12.40
126 kg	<6.30	6.30 – 12.60	>12.60

	SCORE 0	SCORE 1	SCORE 2
	Wt Loss < 5%	Wt Loss 5-10%	Wt Loss > 10%
5st 4lb	<4lb	4lb – 7lb	>7lb
5st 7lb	<4lb	4lb – 8lb	>8lb
5st 11lb	<4lb	4lb – 8lb	>8lb
6st	<4lb	4lb – 8lb	>8lb
6st 4lb	<4lb	4lb – 9lb	>9lb
6st 7lb	<5lb	5lb – 9lb	>9lb
6st 11lb	<5lb	5lb – 10lb	>10lb
7st	<5lb	5lb – 10lb	>10lb
7st 4lb	<5lb	5lb – 10lb	>10lb
7st 7lb	<5lb	5lb – 11lb	>11lb
7st 11lb	<5lb	5lb – 11lb	>11lb
8st	<6lb	6lb – 11lb	>11lb
8st 4lb	<6lb	6lb – 12lb	>12lb
8st 7lb	<6lb	6lb – 12lb	>12lb
8st 11lb	<6lb	6lb – 12lb	>12lb
9st	<6lb	6lb – 13lb	>13lb
9st 4lb	<7lb	7lb – 13lb	>13lb
9st 7lb	<7lb	7lb – 13lb	>13lb
9st 11lb	<7lb	7lb – 1st 0lb	>1st 0lb
10st	<7lb	7lb – 1st 0lb	>1st 0lb
10st 4lb	<7lb	7lb – 1st 0lb	>1st 0lb
10st 7lb	<7lb	7lb – 1st 1lb	>1st 1lb
10st 11lb	<8lb	8lb – 1st 1lb	>1st 1lb
11st	<8lb	8lb – 1st 1lb	>1st 1lb
11st 4lb	<8lb	8lb – 1st 2lb	>1st 2lb
11st 7lb	<8lb	8lb – 1st 2lb	>1st 2lb
11st 11lb	<8lb	8lb – 1st 3lb	>1st 3lb
12st	<8lb	8lb – 1st 3lb	>1st 3lb
12st 4lb	<9lb	9lb – 1st 3lb	>1st 3lb
12st 7lb	<9lb	9lb – 1st 4lb	>1st 4lb
12st 11lb	<9lb	9lb – 1st 4lb	>1st 4lb
13st	<9lb	9lb – 1st 4lb	>1st 4lb
13st 4lb	<9lb	9lb – 1st 5lb	>1st 5lb
13st 7lb	<9lb	9lb – 1st 5lb	>1st 5lb
13st 11lb	<10lb	10lb – 1st 5lb	>1st 5lb
14st	<10lb	10lb – 1st 6lb	>1st 6lb
14st 4lb	<10lb	10lb – 1st 6lb	>1st 6lb
14st 7lb	<10lb	10lb – 1st 6lb	>1st 6lb
14st 11lb	<10lb	10lb – 1st 7lb	>1st 7lb
15st	<11lb	11lb – 1st 7lb	>1st 7lb
15st 4lb	<11lb	11lb – 1st 7lb	>1st 7lb
15st 7lb	<11lb	11lb – 1st 8lb	>1st 8lb
15st 11lb	<11lb	11lb – 1st 8lb	>1st 8lb
16st	<11lb	11lb – 1st 8lb	>1st 8lb
16st 4lb	<11lb	11lb – 1st 9lb	>1st 9lb
16st 7lb	<12lb	12lb – 1st 9lb	>1st 9lb

Table 1.5. Weight loss score

Score	Unplanned weight loss in past 3 – 6 months (% body weight)	Significance
2	>10	Clinically significant
1	5 – 10	More than normal intra-individual variation - early indicator of increased risk of undernutrition
0	<5	Within 'normal' intra- individual variation

Step 3: Acute disease can affect risk of malnutrition

If the subject is currently affected by an acute patho-physiological or psychological condition, and there has been no nutritional intake or likelihood of no intake for more than 5 days, they are likely to be at nutritional risk. Such patients include those who are critically ill, those who have swallowing difficulties (e.g. after stroke), or head injuries or are undergoing gastrointestinal surgery. Add 2 to the score if acute disease is present.

Step 4: Overall risk of Malnutrition

Add scores together from Steps 1, 2, and 3 to calculate overall risk of malnutrition after considering all relevant factors obtained from history and measurements needed to calculate BMI obtained.

The 'Malnutrition Universal Screening Tool' ('MUST') is reproduced here with the kind permission of BAPEN (British Association for Parenteral and Enteral Nutrition). For further information on 'MUST' see www.bapen.org.uk.

Collection of Data

Prior to data collection, research proposal was presented to the Medical Research Review Committee of the Department of Internal Medicine, Department Chairmen and Training Officers under the Department of Surgery and OB-GYN and to the SPH- Iloilo Hospital

Administrator. Necessary steps were also followed as per BAPEN rules to grant copyright permission by following MUST Copyright checklist.

Eligible patients were interviewed within 24-48 hours of admission. Height, weight or the alternative ways of measuring BMI were taken at the Emergency room. Nutritional risk screening was then done using MUST. Patients status were followed up after operation and course in the wards, length of stay (starting from the day of surgery) were gathered from the patients chart.

Statistical Analysis

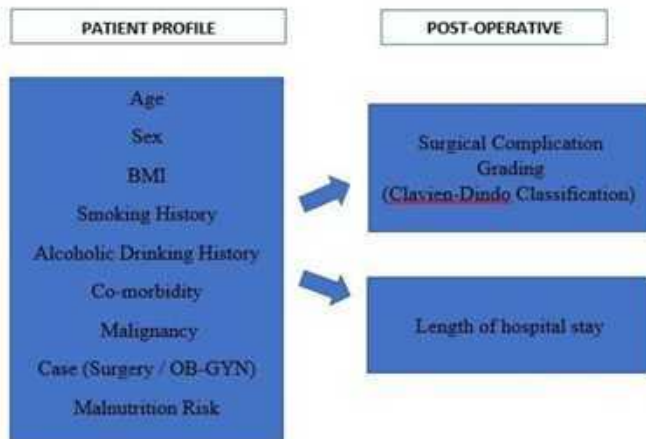
SPSS version 20 was used to analyze the data. The following Statistical Tools will be used:

1. Frequency Count was used to determine the patient's demographic characteristics in terms of age, sex, BMI, smoker or nonsmoker, alcoholic beverage drinker or nonalcoholic beverage drinker, presence or absence of co morbidity, presence or absence of malignancy, patient case , and type of surgical operation.
2. Cross Tabulation was used to determine the distribution of patients with regards to MUST Risks with Presence of Complications and Surgical Complication Grading.
3. Mean and Standard Deviation was used to describe the Complication Counts, Severity, and Length of Stay.
4. Pearson Chi-Square was used to determine association between patient demographic and clinical profiles including Malnutrition Risk using MUST with Presence of Complications and Surgical Complication Grading.

Logistic Regression was used to determine the odds ratio between the Predictor (MUST) with the

presence or absence of post-operative complication and its grading of severity, and length of hospital stay. The level of significance is set to 0.05. Indicating that a p-value less than 0.05 would mean significance.

Concept Map



RESULTS

The results showed that most of the patients were ages 31-50 years old (48%), predominantly females (75%), had normal BMI (56%) had zero (0) score in overall Risk of Malnutrition (75%). Forty eight (41%) of patients had no surgical complication. The most common surgical complication grading was Grade II (38%). Table 1.a shows the patient demographic profile and its relationship with *Surgical Complication Grading*.

The average length of hospital stay of patients was 4.46 days. Only one (1) patient had expired out of 118 patients. See Table 1

Table 1. Surgical Complication Grading

Grading	n	%
None	48	41%
II	45	38%
I	18	15%
IV A	4	3%
III	1	1%
IV B	1	1%
V	1	1%

Only Age ($p=0.041$) and Overall Risk of Malnutrition ($p=0.000$) were found to have a significant correlation with *Surgical Complication Grading*. The proportion of the variables Age and Overall Risk of Malnutrition with *Surgical Complication Grading* were significantly different.

Patients who were younger with ages ranging 20-50 years old (53% & 44%) had significantly higher proportion of having no surgical complications compared to patients 51 years old and above (35% & 29%). Patients who were within 20-50 years old (35% & 28%) were found to have lower proportions of having surgical complications Grading II compared to patients 51 years old and above (45% & 58%). Also, patients with zero (0) score (51%) in Overall Risk of Malnutrition had the highest proportion with no surgical complications. Patients with four (4) score (83%) in Overall Risk of Malnutrition had the highest proportion with having surgical complications grading II. Furthermore, Sex ($p=0.197$) and BMI ($p=0.477$) had no significant relationship with *Surgical Complication Grading*. See Table 1.a

Table 1.a Demographic, Surgical Complication Grading

Profile	Category	Surgical Complication Grading							Total	Sig
		None	I	II	III	IV A	IV B	V		
Age	20-30 yo	9(53)	1(6)	6(35)		1(6)			17(14)	0.041
	31-50 yo	25(44)	15(26)	16(28)			1(2)		57(48)	
	51-60 yo	7(35)	2(10)	9(45)	1(5)	1(5)			20(17)	
	61-70 yo	7(29)		14(58)		2(8)		1(4)	24(20)	
Sex	Female	36(40)	15(17)	35(39)	1(1)	2(2)			89(75)	0.197
	Male	12(41)	3(10)	10(34)		2(7)	1(3)	1(3)	29(25)	
BMI	Underweight		1(13)	6(75)		1(13)			8(7)	0.477
	Normal	24(36)	12(18)	26(39)	1(2)	1(2)	1(2)	1(2)	66(56)	
	Overweight	18(60)	4(13)	7(23)		1(3)			30(25)	
	Obese	6(43)	1(7)	6(43)		1(7)			14(12)	
Over-all Risk of Malnutrition	0	45(51)	17(19)	27(30)					89(75)	0.000
	1	1(14)		5(71)				1(14)	7(6)	
	2	1(8)	1(8)	7(58)	1(8)	1(8)	1(8)		12(10)	
	3	1(25)		1(25)		2(50)			4(3)	
	4			5(83)		1(17)			6(5)	

Note: Surgical Complication Grading III, IVA, IVB, and V were not included in Chi-square Testing since the total counts do not exceed five (5)

Age ($p=0.031$) and Overall Risk of Malnutrition ($p=0.000$) were found to have significant correlation with length of hospital stay. The average length of hospital stay of patients were significantly different across categories of Age and Overall Risk of Malnutrition.

Patients who were aged 51-60 years old (5.00 & 6.17) have significantly higher average length of hospital stay compared to younger patients within 20-50 years old (3.94 & 3.72). Also, the average length of hospital stay of patients with one (1) , two (2) and three (three) scores (8.43, 7.50, 7.00 respectively) in Overall Risk of Malnutrition was significantly higher compared to patients with zero (0) and four (4) scores (3.54, 5.83 respectively). See Table 1.b

Table 1.b Demographic, Length Of Hospital Stay (days)

Profile	Category	Mean	Sig
Age	20-30 yo	3.94	0.031
	31-50 yo	3.72	
	51-60 yo	5.00	
	61-70 yo	6.17	
Sex	Female	4.36	0.573
	Male	4.79	
BMI	Underweight	6.25	0.375
	Normal	4.26	
	Overweight	4.10	
	Obese	5.21	
Over-all Risk of Malnutrition	0	3.54	0.000
	1	8.43	
	2	7.50	
	3	7.00	
	4	5.83	

Table 2.a shows the patients clinical profile and its relationship with *Surgical Complication Grading*. Almost all of the patients were not smoking (97%) and not drinking alcohol (93%). Most patients had existing comorbidities (68%) and had no malignancy (75%). There was almost equal number of cases of patients admitted under OB-GYN (48%) and Surgery (52%)

The most common comorbidity noted was Hypertension at 40% while 32% had no comorbidities. The top two (2) most common abdominopelvic operations were Total Abdominal Hysterectomy and Bilateral Salpingoopherectomy (TAHBSO) (27%) and Laparoscopic cholecystectomy (22%).

Only *Smoking* ($p=0.000$), *Alcoholic Beverage Drinking* ($p=0.006$) and *Presence of Malignancy* ($p=0.001$) were found to have a significant relationship with *Surgical Complication Grading*. The proportion of categories of *Smoking*, *Alcoholic Beverage Drinking* and *Presence of Malignancy* with categories of *Surgical Complication Grading* were significantly different.

Patients who were not smoking (41%), not drinking alcohol (41%) and had no malignancy (49%) had significantly higher proportions with having no surgical complication compared to patients who were smoking (25%), drinking alcohol (38%) and had malignancy (38%). Furthermore, *Presence of Comorbidity* ($p=0.114$) and *patient Case* ($p=0.477$) had no significant relationship with *Surgical Complication Grading*. See Table 2.a

Table 2.a Clinical, Surgical Complication Grading

Profile	Category	Surgical Complication Grading							Total	Sig
		None	I	II	III	IV A	IV B	V		
Smoking	No	47(41)	17(15)	44(39)	1(1)	4(4)	1(1)		114(97)	0.000
	Yes	1(25)	1(25)	1(25)				1(25)	4(3)	
Alcoholic Beverage Drinking	No	45(41)	16(15)	44(40)	1(1)	3(3)	1(1)		110(93)	0.006
	Yes	3(38)	2(25)	1(13)		1(13)		1(13)	8(7)	
Presence of Comorbidity	No	10(26)	10(26)	16(42)		2(5)			38(32)	0.114
	Yes	3 (48)	8(10)	29(36)	1(1)	2(3)	1(1)	1(1)	80(68)	
Presence of Malignancy	No	43(49)	16(18)	26(30)	1(1)	1(1)	1(1)		88(75)	0.001
	Yes	5(17)	2(7)	19(63)		3(10)		1(3)	30(25)	
Case	OB-GYN	25(44)	12(21)	20(35)					57(48)	0.147
	SURGERY	23(38)	6(10)	25(41)	1(2)	4(7)	1(2)	1(2)	61(52)	

Note: *Surgical Complication Grading* III, IV A, IV B, and V were not included in Chi-square Testing since the total counts do not exceed five (5)

Only *Presence of Malignancy* ($p=0.000$) and *Case* ($p=0.041$) were found to have significant relationship with length of hospital stay. The average length of hospital stay of patients were significantly different across categories of *Presence of Malignancy* and *Case*.

Patients who have presence of malignancy (6.87) have significantly higher average length of stay compared to patients who have none (3.65). Also, cases who were admitted under *Surgery* (5.11) have significantly higher average length of hospital stay compared to patients under *OB-GYN* (3.77). See Table 2.b

Table 2.b Clinical, Length of Hospital Stay (days)

Profile	Category	Mean	Sig
Smoking	No	4.47	0.903
	Yes	4.25	
Alcoholic Beverage Drinking	No	4.47	0.941
	Yes	4.38	
Presence of Comorbidity	No	4.37	0.839
	Yes	4.51	
Presence of Malignancy	No	3.65	0.000
	Yes	6.87	
Case	OB-GYN	3.77	0.041
	SURGERY	5.11	

DISCUSSION

It has been known and recognized that malnutrition is a risk factor for post-operative complications, but its prevalence and severity is often underestimated. There are several nutritional risk screening but none is generally accepted as gold standard⁸. The MUST is a tool found to have high predictive validity for the hospital setting and is as good as other validated screening tools²⁴. It has also been developed to establish malnutrition risk in all adult patients even in those whose weight and or height could not be measured in contrast to other screening tools that requires it²⁵.

Malnutrition is highly prevalent among hospitalized patients in northeast and southeast Asia²⁷. In the Philippines, data on prevalence and impact of hospital malnutrition are grossly lacking⁹. Also, initial nutrition risk assessment of surgical patients upon admission is not implemented in most institutions in the country. The practice of nutritional therapy is still at infancy stage²⁹.

To our knowledge this is the first local study that predicts post-operative outcomes of abdominopelvic surgeries using MUST for nutritional risk assessment.

The study showed that malnutrition risk has a significant correlation with post-operative complications. Patients with overall risk of malnutrition scores of zero (51%) significantly have the highest proportion with no surgical complications; patients with scores of 4 (83%) have the highest proportion of surgical complication grading II compared to those with lower scores. This is also consistent with the results of other studies supporting that patients with pre-operative malnutrition have poorer outcomes and have higher risk of developing complications^{5,23,31,32}.

Age has been found to have a correlation with surgical complication grading, with patients below 50 years old having significantly higher proportions with no surgical complications than those more than 50 years old. Older age groups

have poor dentition, poor appetite, cognitive impairment and multiple comorbidities that make them vulnerable to malnutrition ²⁸.

Smoking ($p=0.000$), Alcoholic Beverage Drinking ($p=0.006$) and Presence of Malignancy ($p=0.001$) also have a significant relationship with Surgical Complication Grading. Patients who were not smoking (41%), not drinking (41%) and has no malignancy (49%) had significantly higher proportions of having no surgical complications.

Impaired wound and tissue healing, wound infection, and cardiopulmonary complications are often associated with smokers while post-operative infections, cardiopulmonary complications, and bleeding episodes are common in alcoholic beverage drinkers. Both smoking and hazardous alcohol drinking are lifestyle risk factors that can influence the outcome after surgery ³⁴.

Our results showed that presence of comorbidity had no significant relationship with Surgical Complication Grading. This is in contrast to an existing local study on malnutrition in a tertiary hospital by Dominguez which concluded that presence of comorbidities is significantly associated with malnutrition ⁹.

The difference in results may be due to limited variety of cases during our period of research conduction which is still well into the pandemic. The inclusion criteria of our study include patients who are within 18 to 70 years old. In contrast, the aforementioned study includes a population of inpatients 18 years old and above. These factors might have underestimated the relationship between comorbidities and post-operative surgical complications.

Furthermore, our results revealed that older patients, those with presence of malignancy and admitted under department of surgery have longer average length of stay. Studies have

shown that patients with nutritional risks have longer hospitalizations^{5,9,23}. Scheisser et.al. reports the highest prevalence of nutritional risk are in patients undergoing hepatobiliary surgery (27%) and upper GI surgery (27%), followed by transplantations (22%), and colorectal surgery (21%). Minor surgery such as hernia repair and cholecystectomies have a prevalence of nutritional risk below 10%. In addition, patients admitted for cancer surgery were found to have higher incidence of nutritional risk (40%) than those with benign diseases (8%)⁸.

Our results revealed higher overall malnutrition risk (scores of 4) do not have longer hospitalization than those with lower scores (1,2,3). The correlation between overall malnutrition risk and length of hospital stay might be underestimated due to limited variety of cases in our study population with most admissions consisting of patients who are scheduled for laparoscopic cholecystectomy and total abdominal hysterectomy and bilateral salphingoopherectomy (TAHBSO). The criteria of elective procedural cases include patients who were mostly stable and cleared cardiology or pulmonary wise for operation prior to admission. Also, length of stay post-op could be subjective depending on the attending physician's choice whether to send home patient earlier or later.

Several studies have already highlighted malnutrition as a risk factor for complications, morbidity, mortality, prolonged hospitalization and increased healthcare cost. A nutritional risk scoring that is easy to use and not time consuming like MUST can increase compliance to the practice of nutritional screening. This validated tool can play an important role in predicting and improving post-operative outcomes.

CONCLUSION

Most patients who were admitted in the institution for elective abdominopelvic surgery were ages 31-50 years old (48%), females (75%), had normal BMI (56%) and had zero (0) score in over-all Risk of Malnutrition (75%). Almost all of the patients were not smoking (97%), not drinking alcohol (93%), had existing comorbidities (68%) and had no malignancy (75%). There were almost equal patients admitted under OB-GYN (48%) and Surgery (52%).

The study demonstrates that nutritional risk, age, presence of malignancy, smoking and alcoholic beverage drinking are significantly correlated with post-operative complications.

Thus, nutritional risk screening using MUST pre-operatively can predict the outcomes of post-operative patients undergoing abdominopelvic operation.

RECOMMENDATION

We recommend more research should be conducted with a larger population size and a variety in surgical cases and procedures to further display the trend between the relationship of malnutrition risk severity and surgical complication grading and validate the predictive power of MUST.

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Diet Modification Based on Enhanced Recovery After Surgery in Patients undergoing Elective Abdominal Hysterectomy for Benign Gynecologic Lesions: A Randomized Controlled Trial*

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ABSTRACT

Objective. Enhanced Recovery After Surgery (ERAS) represents an evidenced-based approach to surgical management challenging traditional paradigms with the goal of maintaining normal physiology perioperatively, hence, these benefits were replicated across the spectrum of gynecologic surgeries. The study aims to determine if there is a significant difference in patient's outcome between ERAS and standard diet who will undergo elective abdominal hysterectomies with or without salpingo-oophorectomy for benign gynecologic lesions.

Method. This study is a single blind, superiority, randomized controlled trial design. Participants were group as ERAS and standard diet. A total of 15 cases in each study arm was judged sufficient to ensure confidence interval of 95%, 80% power (beta error), 5% margin of error, 50 % of exposed with outcome and 0.5% percent of unexposed with outcome generated from OpenEpi Version 3.01. It utilized descriptive and inferential analysis. Comparative analysis was done using Z-test of proportion for categorical variables and Mann-Whitney test for continuous variable. Two-tailed with values of $P < 0.05$ were concluded statistically significant.

Results: Between January 2021 to December 2021, there were 30 cases participated in this study. ERAS shown better result such as shorter length of hospital stay ($p < 0.019$), early return of bowel function (time to first flatus ($p < 0.006$) time to first defecation ($p < 0.002$), less post-operative complications in terms of post-operative nausea and vomiting with 24 hours ($p < 0.014$) and patient's subjective well-being: hunger ($p < 0.001$) and thirst ($p < 0.001$). Analysis showed BMI, age, ASA score and preoperative diagnosis were not associated with patient's outcome.

Conclusion: The study showed better patient's outcome, postoperative complications and subjective well-being who underwent elective abdominal hysterectomies with or without salpingo-oophorectomy for benign gynecologic lesions under ERAS. Our findings may contribute in the standardization of guidelines for perioperative nutritional care in elective abdominal hysterectomies with or without salpingo-oophorectomy for benign gynecologic conditions.

Keywords: Abdominal Hysterectomy, Enhanced Recovery After Surgery, Fasting, Postoperative complications, Preoperative carbohydrate supplements

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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INTRODUCTION

In the era of evidenced-based medicine, there were no scientific reasons to keep a patient in prolonged preoperative fasting. This routine was questioned and shown to be unnecessary for most patients. As a result, many anesthesia societies have changed their guidelines and currently recommend intake of clear fluids up until 2 hours before surgery and anesthesia. Accordingly, the European Society for Clinical Nutrition and Metabolism (ESPEN) recommended, with grade A of evidence, a carbohydrate-rich drink 2 hours before anesthesia (1). The main reason for the traditional prescription of 6-8 hours of preoperative fasting for either gastroscopy or elective operations was to reduce the volume and acidity of stomach contents, thus decreasing the risk of regurgitation and aspiration recognized as Mendelson's syndrome. In the 1980s, it was already known that gastric emptying of water and other non-caloric fluids followed an extremely fast exponential curve in volunteers.

Conventionally, patients who underwent elective hysterectomy in our institution fasted from midnight the day before surgery. In addition, the postoperative diet starts on general liquid, then after confirming the passage of flatus on soft diet and normal regular diet once with bowel movement. The ERAS program aimed to maximize the recovery of patients by minimizing pre- and postoperative complications and stress. The program recommends providing preoperative carbohydrate (CHO) supplements and an early postoperative diet to reduce the fasting duration (2). It allows patients to eat a light meal up until 6 hours, and consume clear fluids including oral carbohydrate drinks up until 2 hours, before initiation of anesthesia (3). Post-operatively, the program recommends starting a regular diet within 24 hours after surgery (3). In our institutions, majority of gynecologic surgeons used the standard diet. There were no previous studies or

available researches that compared ERAS and standard diet for benign gynecologic hysterectomies.

This study aimed to determine the significant difference in patient's outcome between ERAS and standard diet who underwent elective abdominal hysterectomies with or without salpingo-oophorectomy for benign gynecologic lesions. Specifically, in terms of length of hospital stay, return of bowel function: time to first flatus and defecation, post-operative complications: post-operative nausea and vomiting within 24 hours, post-operative pain and readmission within 30 days and patient's subjective well-being: anxiety states, hunger and thirst. The result of this study was geared towards providing optimum health and cost savings while preserving patient's satisfaction and quality of life.

OBJECTIVES

General Objectives

To determine a significant difference in patient's outcome between ERAS and standard diet who will undergo elective abdominal hysterectomies with or without salpingo-oophorectomy for benign gynecologic lesions

Specific Objectives

1. To compare the following patient's outcome between ERAS and standard diet in terms of:
 - a. Length of hospital stay
 - b. Return of bowel function
 1. Time to first flatus
 2. Time to first defecation
 - c. Post-operative complications in terms of:
 1. Post-operative nausea and vomiting within 24 hours
 2. Post-operative pain
 3. Readmission within 30 days

2. To compare the patient's subjective well-being between ERAS and standard diet in terms of:
 1. Anxiety states
 2. Hunger
 3. Thirst

METHODS OF RESEARCH

This is a single blind, superiority, randomized controlled trial design involving women with benign gynecologic lesions who underwent elective abdominal hysterectomies with or without salpingo-oophorectomy.

Study Population

This study included benign gynecologic surgical patients admitted for elective surgery in this institution from January 2021 to December 2021.

Inclusion criteria:

All women more than 19 years old, American Society of Anesthesiologists (ASA) I-II and scheduled as elective procedure.

Exclusion criteria:

All patients underwent emergency hysterectomies, documented delayed gastric emptying or gastrointestinal motility disorders such as gastroparesis, mechanical obstruction of the gastrointestinal tract, gastro-esophageal reflux, malignant diagnosis, obese (BMI >30 kg/m²), diabetic patients, ASA class >III and pregnant.

Sample Size and Sampling Design

The sample size was based on a previous study which 80 % of patients has less than 25 mL of RGV after either an overnight fast or 2-3 hours after the ingestion of a carbohydrate alone or in addition to peptides enriched drink. (15) A quantity of 15 cases in each study arm was judged to be sufficient to ensure confidence interval of 95%, 80% power (beta error), 5% margin of error, 50 % of exposed with outcome and 0.5% percent of unexposed with outcome generated from OpenEpi Version 3.01. (Figure 1)

This study used a simple random sampling. The population elements were assigned based on the diet modification. Then, they were assigned chronologically from 1 to n in each group. The sample size in each group were taken through a computer program generated random numbers. The patients were randomized to Group A, preoperatively, light meal up until 6 hours before the surgery, and on the day of surgery, consumed oral carbohydrate drink (Gatorade/Powerade 20 oz. (4)) up until 2 hours before initiation of anesthesia; post-operatively, clear liquid diet such as ice chips, jello, immediately after surgery at PACU (4) then on regular diet within 24 hours of surgery. The patients of Group B, preoperatively, fasted from midnight up until initiation of anesthesia; postoperatively, general liquids then soft diet once with flatus, then, diet as tolerated once with bowel movement.

Materials and Procedure

Eligible patients were recruited at Out Patient Department and Emergency room as scheduled by the researcher. Consent was secured by the researcher attested by a third-party co-service surgeon at the time of admission. Patient's participation in this study was entirely voluntary. Once the consent was secured, the participants received the appropriate treatment or intervention of her condition according to national guidelines. The risk and benefits was explained by the surgeon to the participants.

Pre-operatively, patients were given standard antibiotic prophylaxis protocol. The patients under Group A, in the event that the patient was not able to tolerate the carbohydrate drink, it was stopped immediately and put patient into nothing per ore. Hence, patient will be given Ranitidine 50mg 1 ampule intravenously and Metoclopramide 10 mg 1 ampule intravenously prior to operation.

Both groups received Paracetamol 300 mg intravenous every 6 hours and Ketorolac 30 mg

intravenous every 8 hours, unless contraindication exists for postoperative pain. If nausea and vomiting will arise, Metoclopramide 10 mg 1 ampule was given.

After discharged, participants of the study were asked to follow up after 1 week. Follow-up was done pro-actively. All means were exhausted to contact the recruited patients. Patients who were lost to follow-up were documented.

Statistical Analysis

This study utilized both descriptive and inferential analysis. Data was described using median for central tendency and range for dispersion. Comparative analysis was done using Z-test of proportion for categorical variables and Mann-Whitney test for continuous variable. There is a need to set a risk level to test the significance and a 5% level was adopted for significance. Two-tailed with values of $P < 0.05$ were concluded as statistically significant. Data analysis was performed using the SPSS software package version 26.

RESULTS

Between January 2021 to December 2021, a total of 30 patients participated in this study, 15 cases in each group, Group A, ERAS and Group B, standard diet.

Patient Demographics

This shows that there are no significant differences on the characteristics of patients in both groups which implies that there is not a lot of intervening factors to consider in terms of age, BMI, ASA score and preoperative diagnosis that might affect the results of other statistical tests done. (Table C.1.)

Patient Outcome

There is one-day difference on the median length of hospital stay between groups, Group A shows a shorter hospital stay than in Group B.

Group A has a median of 12 hours when the first flatus occurred. The difference between the hours to first flatus between experimental and standard group is highly significant as concluded from the p-value of 0.006.

In terms of the length of time it took for the patient to defecate, both groups have the same minimum (12 hours) and maximum (84 hours' time). However, there is a high significant difference among the two groups with a p-value of 0.002. (Table C.2.)

Post-operative Complications

There is a significant difference in the proportion of patients experiencing post-operative nausea and vomiting based on the p-value of 0.014. There are no patients who experienced nausea and vomiting within 24 hours in the experimental group as compared to five (5) patients who experienced it in the standard group.

On the other hand, there is no significant difference on the postoperative pain among the two groups. There is also no significant difference on the readmission status of patients although there is one patient readmitted in Group A. (Table C.3.)

Subjective Well-Being

There is no significant difference in the experience of anxiety between the two groups. Although there are more patients from Group B who admitted to experiencing anxiety.

There is a significant difference among the experience of both hunger and thirst between both groups with a p-value of less than 0.001. (Table C.4.)

DISCUSSION

ERAS pathways were developed with the goal of maintaining normal physiology in the perioperative period, thus optimizing patient outcomes without increasing complications or

readmissions (5). Herein, we compared the patient's outcome between ERAS and standard diet who underwent elective abdominal hysterectomies with or without salpingo-oophorectomy for benign gynecologic lesions.

Perioperative diet of the patients is an important component of ERAS protocol. Our study showed there was one day difference on the median length of hospital stay, it shows that ERAS resulted to shorter hospital stay. This result was comparable to the study done by Kim et al., wherein patient under pre and post-operative ERAS has a shorter hospital stay (7).

Surgery and anesthesia are both associated with loss of normal bowel function for multiple reasons. The study done by Ezelle, J.K. their study concluded that preoperative carbohydrate drinks were effective in accelerating the return of bowel function (9). This is true in our study in terms of return of bowel function.

Post-operative complications remains the major medical challenge. In this study, there are no patients who experienced nausea and vomiting within 24 hours in the experimental group as compared to five patients who experienced it in the standard group, which is consistent in one randomized controlled trial, which showed less post-operative nausea and vomiting, metoclopramide consumption, and improved patient satisfaction within 24 hours after abdominal myomectomy (5).

A retrospective study done by Jidong Zuo et al., post-operative pain incidence under the ERAS protocol was decreased with 63.7 %, particularly 6.3 % for moderate- to-severe pain (11). However, in our study, there is no significant difference on the postoperative pain among the two groups with a higher number of patients stating that they did not experience any postoperative pain.

Notably, implementation of ERAS program has not been shown to increase readmission rate (12). Of special interest, in our study, there is no significant difference on the readmission status of patients.

In this study, which is consistent with the study done by Asiye Gul et al., there are less of those who experienced anxiety, hunger and thirst among those under ERAS.(14)

Overall, as shown in our study, ERAS presents a better result in patient's outcome measured in terms of length of hospital stay, return of bowel function, post-operative complications in terms of post-operative nausea and vomiting within 24 hours, post-operative pain and readmission within 30 days and patient's subjective well-being: anxiety states, hunger and thirst.

CONCLUSION

This study showed that there is a significant difference in patient's outcome between ERAS and standard diet who underwent elective abdominal hysterectomies with or without salpingo-oophorectomy for benign gynecologic lesions. With this in mind, implementation of ERAS reduced rates in post-operative complications, faster recovery, decreased length of hospital stay, and overall cost savings.

LIMITATIONS OF THE STUDY

The study did not include factors such as delayed in scheduled time of operation and length of operating time that is affected by the skills of the surgeon, degree of surgical difficulty and surgical complications that may affect the result of this study.

RECOMMENDATION

Since the study was done in a single institution, it is recommended that a multi-center study be conducted, enrollment of more patients and external subgroup analyses such as focusing

on evaluations of more patient-related outcomes, such as patients' experience of the process, quality of life aspects and long-term consequences for further improvement of the care of patients undergoing gynecological surgery.

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Table and Illustrations

Figure 1. Sample Size Computation

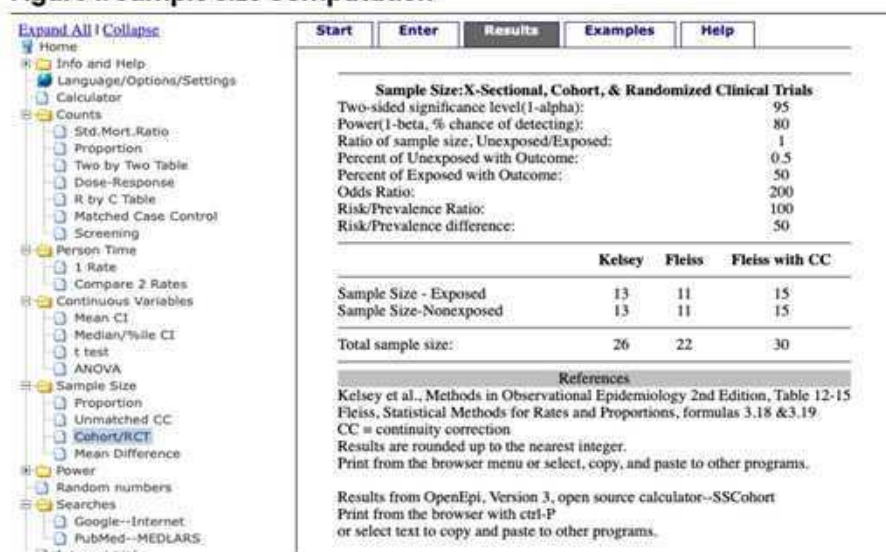


Table C.I: Clinicodemographic Characteristics of the Population

POST-OPERATIVE COMPLICATIONS	GROUP A: EXPERIMENTAL (ERAS) (n =15)	GROUP B: STANDARD (n =15)	MANN-WHITNEY U/ Z-TEST	P-VALUE ^b
A. Age (years)	Median = 47 (37-62)	Median = 48 (41-72)	118.5	0.803 ^{ns}
B. BMI	Median = 23.81 (18.29-29.34)	Median = 23.81 (20.66-29.33)	110	0.917 ^{ns}
C. ASA Score	ASA score II	ASA score II	No statistics computed because ASA score is the same for both groups.	
D. Pre-operative Diagnosis ^(a)	Adenomyosis = 1 _a Leiomyoma = 10 _a Ovarian New Growth = 4 _a	Adenomyosis = 0 _a Leiomyoma = 13 _a Ovarian New Growth = 2 _a	1.435	0.357 ^{ns}

Legend:(a) The same subscript letter denotes that proportions do not differ significantly from each other at the set level of significance (b); ns – not significant at 0.05 level of significance

Table C.2: Patient's Outcome

PATIENT OUTCOME	GROUP A: EXPERIMENTAL (ERAS) (n =15)	GROUP B: STANDARD (n =15)	MANN- WHITNEY U	P-VALUE
A. Length of hospital stay (days)	Median = 4 (3-6)	Median = 5 (4-11)	165.00	0.019*
B. Return of bowel function				
B.1. Time to first flatus (hours)	Median = 12 (8-72)	Median = 24 (11-96)	177.5	0.006**
B.2. Time to first defecation (hours)	Median = 24 (12-96)	Median = 72 (12-96)	186.0	0.002**

Legend: * - significant at 0.05 level of significance

** - Highly significant at 0.01 level of significance

Table C.3: Post Operative Complications

POST-OPERATIVE COMPLICATIONS	GROUP A: EXPERIMENTAL (ERAS) ^ (n =15)		GROUP B: STANDARD ^ (n =15)		Z-TEST	P-VALUE
	No	Yes	No	Yes		
Post-operative nausea and vomiting within 24 hours	15 _a	0 _b	10 _a	5 _b	2.45	0.014*
Post-operative pain	10 _a	5 _a	10 _a	5 _b	0.00	1.000 ^{ns}
Readmission within 30 days	14 _a	1 _b	15 _a	0 _b	1.016	0.309 ^{ns}

Legend:(a) The same subscript letter denotes that proportions do not differ significantly from each other at the set level of significance. Different subscript letter denotes that proportions across that category are statistically different (b); ns – not significant at 0.05 level of significance

* - significant at 0.05 level of significance

Table C.4: Subjective Well Being

SUBJECTIVE WELL BEING	GROUP A: EXPERIMENTAL (ERAS) (n =15)		GROUP A: STANDARD (n =15)		Z-TEST	P-VALUE
	No	Yes	No	Yes		
Anxiety	10 _a	5 _a	5 _a	10 _a	1.824	0.068 ^{ns}
Hunger	14 _a	1 _b	2 _a	13 _b	4.391	<0.001**
Thirst	14 _a	1 _b	2 _a	13 _b	4.391	<0.001**

Legend:(a) The same subscript letter denotes that proportions do not differ significantly from each other at the set level of significance. Different subscript letter denotes that proportions across that category are statistically different (b); ns – not significant at 0.05 level of significance

** - highly significant at 0.01 level of significance

A Randomized Controlled Trial on the Efficacy of Video Assisted Instruction Compared with Classical Prescription Type Instruction in Enhancing Knowledge on the Management of Pediculosis Capitis among Parents and Guardians*

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ABSTRACT

Introduction: Pediculosis capitis is a major health concern in Philippine public schools, with the prevalence rate as high as 54.7% at the primary level affecting more females (66.5%) compared to males (42.3%). Worldwide, head lice infestation is a persistent and growing problem with varying prevalence rates in both developed and developing countries. Despite effective scabicial therapy, there is poor compliance of parents or guardians of patients with Pediculosis capitis, affecting the effectiveness of treatment. Researchers are now focused on eradicating this disease by increasing compliance through video assisted learning.

Objectives: To compare the efficacy of video assisted instruction versus classical prescription type instruction in enhancing the knowledge on the management of Pediculosis capitis.

Methodology: A single-blind randomized clinical trial was performed at Barangay Del Pilar, City of San Fernando, Pampanga. Parents or guardians with children from 4 – 6 years old were randomized to video assisted type instruction or classical prescription type instruction. Pre-test and post-test was done before and after the intervention respectively.

Results At post-test, average scores had significantly improved from pre-test in both types of instruction (60% to 100%, $p < 0.0001$; 80% to 100%, $p < 0.0001$). Average difference between pre- and post-test scores were significantly higher among parents or guardians administered with video assisted instruction (30% vs 10%, $p < 0.0001$). A significantly higher proportion of parents or guardians administered with video assisted instruction improved their level of knowledge from inadequate or moderate to adequate ($p < 0.0001$). Video assisted instruction was effective in improving knowledge on management of Pediculosis capitis.

Conclusion This research supports the efficacy of video assisted instruction in enhancing the knowledge of parents or guardians regarding the management of Pediculosis capitis. A significant increase in the level of knowledge of the participant may serve as a useful tool in providing better understanding on the proper handling and care of such cases.

Keywords: pediculosis capitis, video assisted instruction, educational instruction, enhancing the knowledge

Disclosures: The author has formally acknowledged and signed a disclosure affirming the absence of any financial or other relationships (including personal connections), intellectual biases, political or religious affiliations, and institutional ties that could potentially result in a conflict of interest.

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INTRODUCTION

Pediculosis capitis is caused by a host specific, obligate ectoparasite known as *Pediculus humanus capitis*.¹ It has been a problem in public schools in the Philippines, with no existing government health programs to aid in eradication. In the Philippines alone, the prevalence of the disease is high at 54.7% in primary schools and females are usually more affected (66.5%) than males (42.3%).¹ Worldwide, head lice infestation is a persistent and growing problem with a varying prevalence rates in both developed and developing countries such as 0.-28% in Victoria, Australia, 8.9% in Ghent, Belgium, 0.8% in Afyon, Turkey, 3.8% in Kerman, Iran, 3.8%-13.9% in Bogota, Columbia, 13.3% in Al-Mahweet, Yemen, 16.59% in India 58.9% in Alexandria, Egypt and 81.5% in Argentina.^{2,5}

The *Pediculus humanus capitis* or the head louse can be transmitted through a direct contact with the person infected or by indirect contact with the use of personal materials such as comb, hair brush and head gear from an infected person.⁵

Pediculosis capitis can be a recurrent disease if not treated well. In the Philippines, poverty, poor hygiene and lack of knowledge on proper treatment are the causes of the high prevalence of the disease.² Permethrin 1% shampoo is the first line treatment of head lice as recommended by the American Academy of Pediatrics. It is a synthetic compound derived from pyrethrin that acts on the nerve cell membrane of parasites leading to respiratory muscle paralysis.¹ In several studies, Permethrin is already the drug of choice use as a treatment in comparison to new and upcoming head lice treatment. One study states that 98% of children treated with permethrin are lice free on the 7th day after treatment, and up to the 14th day, 96% of the patients are still lice free.³ Permethrin has been the most studied pediculicide in the United States and is the least toxic to humans. Introduced in 1986 as a prescription-only treatment, 1% permethrin lotion was approved for over the counter use in 1990 and is marketed as a "creme rinse".⁴

The safety profile of permethrin is favorable, with a low risk for mammalian toxicity. Unlike pyrethrin, permethrin does not cause allergic reactions in people with plant allergies. Adverse effects of permethrin include edema, erythema, hypoesthesia, and pruritus. A postmarketing surveillance study designed to assess the safety of 1% permethrin creme rinse evaluated 18,950 patients. Adverse events occurred at a rate of 2.2 per 1000 treatments with permethrin. No serious adverse events were reported. Permethrin is classified and labeled as a pregnancy category B drug, meaning that fetal risk has not been studied in a population of pregnant women and that animal reproduction studies have shown no fetal risk or that adverse events in animal studies have not been confirmed in human studies.⁵

Non-Pharmacologic Management

There are other treatment modalities in Pediculosis capitis. One of the most commonly used non-pharmacologic treatments is the use of fine tooth combing. Removal of nits with fine toothed comb technique is widely used as an adjunctive measure.¹ Manual removal of nits especially the ones within 1 cm of the scalp after treatment with any product is recommended. Fine-toothed "nit combs" are usually used. Studies have suggested that lice removed by combing and brushing are damaged and rarely survive.⁶ Another treatment option is the use of occlusive agents like petroleum jelly, herbal oils, mayonnaise and olive oils. It is thought that the viscous substance obstructs the respiratory system of the adult louse as well as the holes in the eggs and blocks efficient air exchange.⁶

Video Assisted Learning

Video is a potential window that can capture the attention, especially by children, more than the traditional discussion can achieve.⁷ The patient's interest in watching video films can be used in the learning system in an entertaining manner. This allows patients to view actual objects and see realistic scenes in sequential motion, listen to the narration, which can entice learners to use the sense of sight and the sense of hearing.⁸

The video assisted learning could enhance the treatment process of head lice as well as to make the patients remember how the treatment and diagnosis are done. As of the moment, only pictures with caption and shampoo literatures are the available material as the main treatment media for the treatment of lice.

With the video assisted method, patients are provided both visual and auditory cues to enhance understanding of the disease and treatment procedures, which, may increase their compliance to the treatment, thereby increase cure rate.

Moreover, with the use of an instructional video, this study aims to provide knowledge and understanding to people infected with *Pediculosis capitis* on a wider scale. Thus instructional video can be uploaded to a video sharing site which can be shared to a bigger audience worldwide.

Significance of the Study

Although there are many published studies on the efficacy of video assisted learning in instructing individuals on how to manage their conditions, there are no such studies for *pediculosis capitis*. By providing a visual aid for the treatment of this condition, this may provide better understanding among the parents or guardians that could lead to eradication of the condition in schools and barangays, and furthermore on a mass scale in larger communities.

Review of Related Literature

Learning from an electronic medium or e-learning has become an alternative to the traditional learning. It has become one of the fastest-moving trends and aims to provide a variety of learning system that generates learning materials, tools, and other options into a solution to deliver educational content quickly, effectively, and economically.⁷

In the study by Pushpakala et.al, the effectiveness of video assisted teaching on the knowledge and practice of using metered dose inhaler with spacer was done with patients diagnosed with bronchial asthma. The results showed that video assisted teaching is an effective method in increasing

the knowledge and practice of using the metered dose inhaler. The study result showed that in pre-test, 77% of patient had moderate level of knowledge, 23% had inadequate level of knowledge and in post-test, 92% of adequate knowledge and only 8% had moderate knowledge. With regards to practice, the results showed that in pre-test, 60% of patient had poor practice, 40% had moderate practice and in post-test, they improved their practice to 92% of excellent practice and 8% of moderate practice. These findings of the study revealed a significant increase in the post test knowledge and practice scores after administration of video assisted teaching.⁹

In a randomized controlled trial study by Mhalu et.al, an instructional video on proper sputum submission was shown to see if there would be an increase in tuberculosis case detection. The results showed that the instructional video intervention was associated with detection of a higher proportion of microscopically confirmed cases (56%, 95% confidence interval [95% CI] 45.7–65.9%, sputum smear positive patients in the intervention group versus 23%, 95% CI 15.2– 32.5%, in the control group, $p < 0.0001$), an increase in volume of specimen defined as a volume $> 3\text{ml}$ (78%, 95% CI 68.6–85.7%, versus 45%, 95% CI 35.0–55.3%, $p < 0.0001$), and specimens less likely to be salivary (14%, 95% CI 7.9–22.4%, versus 39%, 95% CI 29.4–49.3%, $p = 0.0001$). It was concluded that the instructional video increased the yield of tuberculosis cases through better quality of sputum samples.¹⁰

Another study by Shaw, et al. on pressurised metered dose inhaler spacer technique was investigated in 122 children, aged 2–7 years, with asthma. Eight individual steps of device technique were evaluated before and after viewing an instructional video for correct device technique. The results showed that the device technique improved directly after video instruction at the baseline study visit ($p < 0.001$) but had no immediate effect at subsequent visits. Additionally, pMDI-spacer technique improved with successive visits over one year for the group overall as evidenced by increases in the proportion of children scoring maximal ($p = 0.02$) and near- maximal ($p = 0.04$) scores. The study concluded that repeated video

instruction over time improved inhaler technique in young children.¹¹

Currently, there are no published studies on the use of video assisted instruction in the diagnosis and management of Pediculosis capitis.

Research Question

What is the efficacy of video assisted instruction compared to the classical prescription type instruction in enhancing the knowledge on the management of Pediculosis capitis among parents or guardians with children 4 to 6 years old?

Objective of the Study

General Objective

To compare the efficacy of video assisted instruction versus classical prescription type instruction in enhancing the knowledge on the management of Pediculosis capitis.

Specific Objectives

The specific objectives were:

1. To describe the demographic characteristics of parents or guardians who were administered with video assisted instruction and classical prescription type instruction
2. To compare the knowledge gained between video assisted instruction and classical prescription type instruction
3. To assess the association of gained knowledge with gender, age and educational attainment

METHODOLOGY

Study design and subject selection

This is a randomized controlled trial comparing the efficacy of video assisted treatment instruction with classical prescription type instruction in enhancing knowledge on the management of Pediculosis capitis. The study was conducted in Barangay Del Pilar, City of San Fernando, Pampanga last May to June 2017. Parents or guardians of

children 4 to 6 years old were invited to join the study and informed consent was given.

Participants were included if they fulfill the following criteria: parents or guardians of children 4 to 6 years old, participants who gave their consent, and participants who can comprehend the Filipino language.

They were excluded if they are not residents of Barangay Del Pilar, San Fernando, Pampanga and if they did not consent to the study.

Randomization and Allocation concealment

The parents or guardians were randomized into two groups: the video assisted instruction group and the classical prescription type instruction group, using a computer-generated randomization (www.randomizer.org). The randomization codes were placed in sealed, opaque, sequentially numbered envelopes and were opened separately by the primary investigator per subject as they arrived for the study initiation.

Blinding

The co-investigator is the assigned assessor and was blinded in the study. She administered the pre- and post-test examination on both groups. The primary investigator then administered either the video assisted treatment or the classical prescription type instruction depending into which group the patient was assigned to. The statistician who performed the data analysis was blinded as well as to which group each study arm belongs. Data in both study groups were grouped and labeled either A or B by the primary investigator when submitted to the statistician.

Study Procedure

1. Pilot-testing of the video and questionnaires was done by the primary investigator prior to the study. The validation procedure for the materials was done by administering the video and questionnaires to 10 randomly selected individuals.

2. Parents or guardians of children 4 to 6 years old who fulfilled the criteria were recruited to join the study.
3. A written, informed consent was obtained from the participants.
4. Parents or guardians accomplished a chart for their demographic data (age, gender and educational attainment).
5. The co-investigator administered the 10-item pre-test to the participants.
6. The participants were randomly assigned into two groups: the video assisted instruction group and the classical prescription type instruction group.
7. The primary investigator gave the intervention, depending on the participant's assignment: either the video assisted treatment or the classical prescription type instruction. Same length of time was allotted for both groups.
8. After the session, the co-investigator administered a 10-item post-test to the participants to determine the level of understanding or the knowledge gained.

Outcome Measure

In order to measure the efficacy of the type of instruction given, the difference in the pre- test and post-test scores were determined. These differences were compared depending on the type of intervention given (i.e. video assisted or classical type).

Data Analysis Plan

Justification of Sample Size

A minimum of 172 parents or guardians with children 4-6 years old satisfying the inclusion and exclusion criteria were included in the study based on 5% level of significance and 80% power.

Statistical Methods

The collated data were examined and the missing values were accounted for during the statistical analysis. Summary statistics were presented in tables or graphs and reported as median (IQR) for quantitative outcome measures (e.g. age in years, pre- and post-test knowledge scores) or n (%) for qualitative measures (e.g. gender, educational attainment, level of knowledge). Checks for homogeneity of sample population and normality assumptions were performed. Wilcoxon Sum Rank Test was used to compare average difference in pre- and post-test scores between video assisted and classical type instruction groups. Wilcoxon Sum Rank Test test was used to compare pre- and post-test scores. Fisher's exact test was used to compare

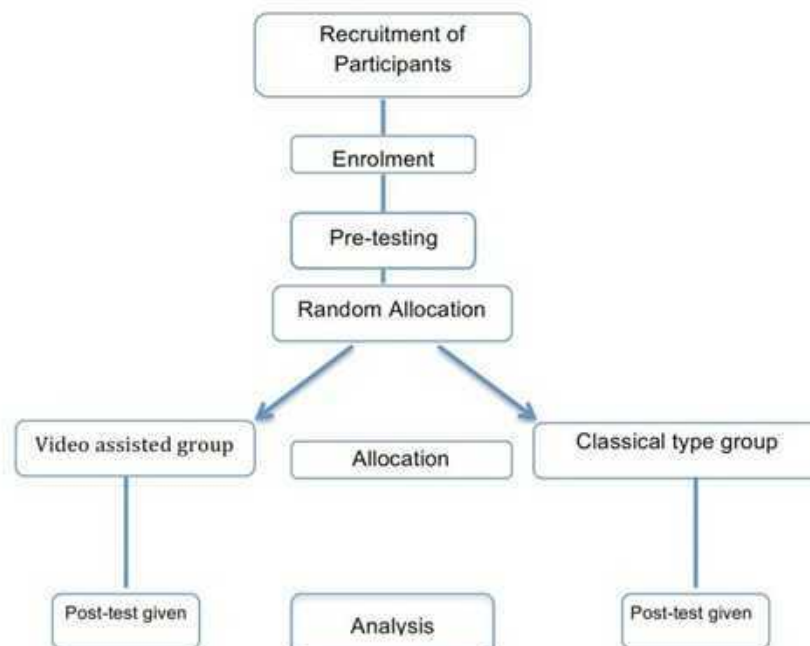


Fig 1. Outline of Study Procedure

proportions. Chi-square test of association was used to determine association between knowledge gained and gender, age and education. Statistical significance was based on $p\text{-value} < 0.05$. Data processing and statistical analyses were performed using STATA v13.

RESULTS AND DISCUSSION

A. Demographics

There were 175 participants, 11 (6.3%) were males and 164 (93.7%) were females. A total of 89 participants were randomly selected for the group who received video assisted instruction while 86 participants received classical type instruction.

The sample size of 175 was composed of the following age brackets with 10-year intervals. There were four age groupings and included: 18-29, 30-39, 40-49, > 50. Sixty one (61) participants belonged to the 18-29, fifty four (54) to the 30-39, thirty eight (38) were in the 40-49, and twenty two (22) to the 50 years old and above age brackets.

The educational background of the participants were classified into elementary, high school and college. Twenty-five (25) of the participants attained elementary, one hundred twenty four (124) were at high school level, and twenty six (26) attained college education level. Table 1 shows the demographic data of the participants.

Table 1: Demographic characteristics of parents or guardians

	All n=175	Video assisted Instruction n=89	Classical type Instruction n=86	p-value
Gender, n (%)				
Male	11 (6.3%)	3 (3.4%)	8 (9.3%)	0.128
Female	164 (93.7%)	86 (96.6%)	78 (90.7%)	
Age in years, mean $\pm$ SD	34 (17)	34 (19)	35 (16)	0.949
Age group in years, n (%)				
18 – 29	61 (34.9%)	32 (36.0%)	29 (33.7%)	0.801
30 – 39	54 (30.9%)	26 (29.2%)	28 (32.6%)	
40 – 49	38 (21.7%)	18 (20.2%)	20 (23.3%)	
$\geq$ 50	22 (12.6%)	13 (14.6%)	9 (10.5%)	
Educational attainment, n (%)				
Elementary	25 (14.3%)	12 (13.5%)	13 (15.1%)	0.275
High school	124 (70.9%)	60 (67.4%)	64 (74.4%)	
College	26 (14.9%)	17 (19.1%)	9 (10.5%)	

B. Knowledge Scores of Parents or guardians

At pre-test, parents or guardians administered with video assisted instruction had significantly lower average test score than those with classical prescription instruction (60% vs 80%, $p < 0.0001$). Levels of knowledge on management of Pediculosis capitis were adequate, moderate or inadequate in 37.1%, 58.4% and 4.5% respectively.

At post-test, average scores had significantly improved from pre-test in both types of instruction (60% to 100%, $p < 0.0001$; 80% to 100%, $p < 0.0001$). Average

difference between pre- and post-test scores were significantly higher among parents or guardians administered with video assisted instruction (30% vs 10%, $p < 0.0001$). A significantly higher proportion of parents or guardians administered with video assisted instruction improved their level of knowledge from inadequate or moderate to adequate ($p < 0.0001$). Video assisted instruction was effective in improving knowledge on management of Pediculosis capitis.

Average knowledge of parents or guardians regarding the prevention and elimination of Pediculosis capitis both improved significantly after administration of video assisted instruction and classical type instruction. However, it was the video assisted instruction group which showed significantly higher test results in the mean difference score between pre- and post test over the classical type instruction.

The video assisted instruction was calculated as statistically significantly effective in improving knowledge with regards to the prevention and elimination of Pediculosis capitis.

There are several studies that support the results of this investigation. In a study by Udyakar et al. on effectiveness of video assisted teaching programme on prevention of swine flu among students, it was concluded that the video assisted teaching was highly effective in increasing knowledge of students regarding prevention of swine flu.¹⁷

Another study by Van Acker, et al. on video education provided effective wound care instruction pre- or post-Mohs Micrographic Surgery. The conclusion stated that using a video education prior to or post-Mohs surgery served as an effective mechanism for patient education and improvement of time management in clinical practice.¹⁸

Lastly in the study by Ozer, et al. on web-based teaching video packages on anatomical education, revealed that web-based video packages were helpful, definitive, easily accessible and affordable which enabled students with different pace of learning to reach information simultaneously in equal conditions and increased the learning activity in crowded group lectures in cadaver labs.¹⁹

Table 2: Knowledge scores of parents or guardians on management of pediculosis capitis

	All n=175	Video assisted instruction n=89	Classical type instruction n=86	p-value
Scores in %, mean $\pm$ SD				
Pre-test	80 (20)	60 (30)	80 (20)	<0.0001*
Post-test	100 (10)	100 (10)	100 (10)	0.134
Mean difference $\pm$ SE	20 (20)	20 (30)	10 (10)	<0.0001*
Level of knowledge, n (%)				
Pre-test				
Adequate (75%-100%)	97 (55.4%)	33 (37.1%)	64 (74.4%)	<0.0001*
Moderate (50%-74%)	72 (41.1%)	52 (58.4%)	20 (23.3%)	
Inadequate (<49%)	6 (3.4%)	4 (4.5%)	2 (2.3%)	
Post-test				
Adequate (75%-100%)	166 (94.9%)	82 (92.1%)	84 (97.7%)	0.169
Moderate (50%-74%)	9 (5.1%)	7 (7.9%)	2 (2.3%)	
Inadequate (<49%)	-	-	-	
Change from pre-test				
Improved	70 (40.0%)	49 (55.1%)	21 (24.4%)	<0.0001*
Same	105 (60.0%)	40 (44.9%)	65 (75.6%)	

C. Comparative Analysis

Out of the 175 participants, 166 were categorized with adequate knowledge on the management of Pediculosis capitis, 92.1% received the video assisted instruction and 97.7% received the classical type instruction ($p=0.169$). Demographic characteristics of both groups were comparable with respect to gender, age and educational attainment. There was insufficient evidence to correlate level of knowledge gained with regards to gender ($p=0.211$), age ($p=0.783$) and education ($p=0.292$).

Likewise, in the study by Victor Mlambo, on the analysis of some factors affecting student academic performance in an introductory biochemistry course at the University of the West Indies concluded that gender, age, learning preferences, and entry qualifications did not cause any significant variation in the academic performance of students.²⁰

Table 3: Parents or guardians with adequate level of knowledge by gender, age and

	All n=166	Video assisted instruction n=82	Classical type instruction n=84	p-value
Gender, n (%)				
Male	11 (6.6%)	3 (3.7%)	8 (9.5%)	0.211
Female	155 (93.4%)	79 (96.3%)	76 (90.5%)	
Age in years, mean $\pm$ SD				
Age group in years, n (%)				
18 – 29	60 (36.1%)	31 (37.8%)	29 (34.5%)	0.783
30 – 39	51 (30.7%)	23 (28.0%)	28 (33.3%)	
40 – 49	36 (21.7%)	17 (20.7%)	19 (22.6%)	
≥ 50	19 (11.4%)	11 (13.4%)	8 (9.5%)	
Educational attainment, n (%)				
Elementary	25 (15.1%)	12 (14.6%)	13 (15.5%)	0.292
High school	116 (69.9%)	54 (65.9%)	62 (73.8%)	
College	25 (15.1%)	16 (19.5%)	9 (10.7%)	

CONCLUSION

Pediculosis capitis remains to be a perennial problem among different communities, especially in children. Many of the treatments are geared over home remedy that oftentimes lead to frustration and difficulty in treating lice.²¹

The research has identified the efficacy of video assisted instruction in enhancing the knowledge on the management of Pediculosis. There was a significant increase in the knowledge of the participants from baseline to

post-intervention. Although both the video assisted instruction and classical type instruction both improved the knowledge of the participants, there was a greater increase in the video assisted instruction group. This finding tells us that video assisted instruction may provide an alternative method of instructing our patients with regards to the treatment of this condition and may affect better understanding on the proper handling and care of such cases.

RECOMMENDATION

Since Pediculosis capitis is highly transferable and contagious, the researcher recommends that even at the barangay level, the video assisted instruction maybe utilized in educating the people in the community concerning hygiene and the alleviation or if possible total eradication of Pediculosis capitis. This will facilitate the information dissemination on the program.

Creating a program using the video assisted instruction by the barangay officials can also increase awareness and education on the treatment of Pediculosis capitis. This can also be extended to schools via the teachers and administrators, since the most commonly affected population are children.

The video assisted instruction can be further improved by adding subtitle in Filipino or dubbing it with Filipino or local dialect. The subtitle will facilitate better understand and enable those with hearing difficulties to understand the instruction in the video. It can also help by providing a sign language add-on in the video for those who are unable to understand the subtitle and audio. The video can be modified based on the setting and population where it will be administered. It has been proven in studies that instructions that have been contextualized provide a higher degree of learning.

Uploading the video over the internet will provide larger audience. With our current technology, the process of uploading the video over the internet can be so easy and the result will exponentially increase viewers. The ease of downloading the video and sharing it is a factor that can multiply the number of people that can be educated.

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A Tale of Scales: Siblings with Lamellar Ichthyosis Treated with Acitretin*

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ABSTRACT

Introduction: Lamellar ichthyosis (LI) is an inherited rare disorder characterized by generalized scaling presenting at birth and persisting throughout life. It presents at birth with a collodion membrane, later developing into large, brown scales across the skin. LI requires ongoing treatment and monitoring due to physical and psychosocial impacts. This study highlights siblings who showed substantial quality-of-life improvements with oral retinoid therapy.

Objective: To present and discuss a detailed case summary, explore management options, and evaluate the treatment outcomes.

Case summary: We report on a pair of siblings, a 24-year-old male and a 19-year-old female, who were born encased in a collodion membrane, and later presented with large, brown, plate-like scales all over the body. Skin changes were accompanied by intermittent heat intolerance and mild ectropion, which subsequently caused impaired quality of life while growing up. Histopathology results were consistent with lamellar ichthyosis. Both siblings responded well to oral Acitretin at 0.5 mg/kg/day, showing significant shedding of thick scales and a reduction of ectropion within the first two weeks of therapy.

Conclusion: Lamellar ichthyosis, a severe, lifelong disorder with psychosocial repercussions, requires long-standing, continual therapy. Maximizing treatment options with oral acitretin, addressing the psychosocial implications of the disease and getting patients actively involved in its management results in better treatment outcomes.

Keywords: lamellar ichthyosis, acitretin

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INTRODUCTION

Lamellar ichthyosis (LI) is a rare autosomal recessive genodermatosis which occurs in 1 in 200,000–300,000 live births. Patients are born encased in a collodion membrane, which is gradually replaced by generalized large, brown plate-like scales with little or no erythema. It is a lifelong condition which requires chronic treatment, monitoring and counseling due to physical disfigurement and psychosocial disabilities that can impair quality of life. In this case, we present siblings who demonstrated an excellent response to oral retinoid therapy, resulting in significant quality-of-life improvements.

CASE REPORT

We report siblings, a 19-year-old female and a 24-year-old male, presenting with generalized scales. They were born full-term at home via normal spontaneous delivery through a traditional birth attendant, with no intrapartum complications noted. The mother denies any exposure to viral exanthems, radiation or intake of illicit drugs or alcohol. At the time of birth, the patients were observed to have been covered by a transparent "cellophane-like" layer (collodion membrane). This was also associated with ectropion, eclabium and slit-like opening of the nostrils. The membrane eventually desquamated and shed off after a few days with no note of blistering of widespread erosions or erythroderma; however, the underlying skin began to progressively thicken. Over the years, they were noted to have generalized thick scales over their body, with resolution of ectropion and eclabium.

The siblings sought consult at the outpatient department, where a skin punch biopsy was performed on the older brother. Biopsy results were consistent with lamellar ichthyosis, though no biopsy was done on the sister. Both were prescribed topical retinoic acid, salicylic acid and

petroleum jelly preparations, which they applied for two years, resulting in a decrease in skin thickness. However, they were unable to continue their medications and were subsequently lost to follow-up.

In the interim, their skin was noted to become progressively drier, with more hyperpigmented plaques and brown scales. There was intermittent pruritus and the presence of a musky odor, most especially during warmer temperatures. The persistence of skin lesions along with their willingness to restart medications, prompted them to follow-up nine years after their initial consult.

The review of systems of both patients was generally unremarkable. They were born to non-consanguineous parents and have no comorbidities. Among their five siblings, they were the only ones diagnosed with this condition, with no known relatives with the disease. Both are non-smokers, non-alcoholic beverage drinkers and deny illicit drug use. Their mental, motor, and physical growth were deemed at par with age and comparable to that of their three unaffected siblings.

Cutaneous examination revealed generalized, well-defined, polygonal-shaped, hyperpigmented, hyperkeratotic plaques with thick, yellowish-brown, plate-like scales that are centrally-attached, with raised borders arranged in a bark-like pattern, over the whole body including the scalp, face, and trunk, with more prominence on the upper and lower extremities. There was also noted hyperkeratosis of the palms and soles, mild ectropion, as well as fine wavy hair with no hair loss or thinning. (Fig.1 and 2). The rest of the physical examination findings were unremarkable.



Fig. 1. 19-year old female presenting with hyperpigmented, hyperkeratotic plaques on the face (A), scalp (I), trunk (B,C) and extremities (D, E, F, G, H) on initial consultation.



Fig. 2. 24-year old male presenting with hyperpigmented, hyperkeratotic plaques on the face (A), trunk (B, C), extremities (D, E, F, G, H), scalp and intra auricular area (I) on initial

The workup for both siblings included a skin punch biopsy for the female patient, which revealed marked compact hyperkeratosis with follicular plugging, irregular acanthosis and normal to slightly thickened granular cell layer in the epidermis. In the upper dermis, a mild superficial perivascular lymphocytic infiltrate was observed. These findings were consistent with lamellar ichthyosis. The male patient's previous biopsy slides were retrieved and also showed the same findings. Chromosomal analysis for the female sibling was also done, which revealed a normal female

karyotype. Other ancillary tests such as complete blood count, liver enzymes, serum triglycerides, and serum cholesterol for both siblings were conducted for both siblings and returned values within the normal range. Urinalysis and chest x-ray results were also unremarkable.

Biopsy of a lesion of the right arm (Fig. 3) was consistent with lamellar ichthyosis. A comparison of the biopsy previously done to the brother showed similar results (Fig. 4).

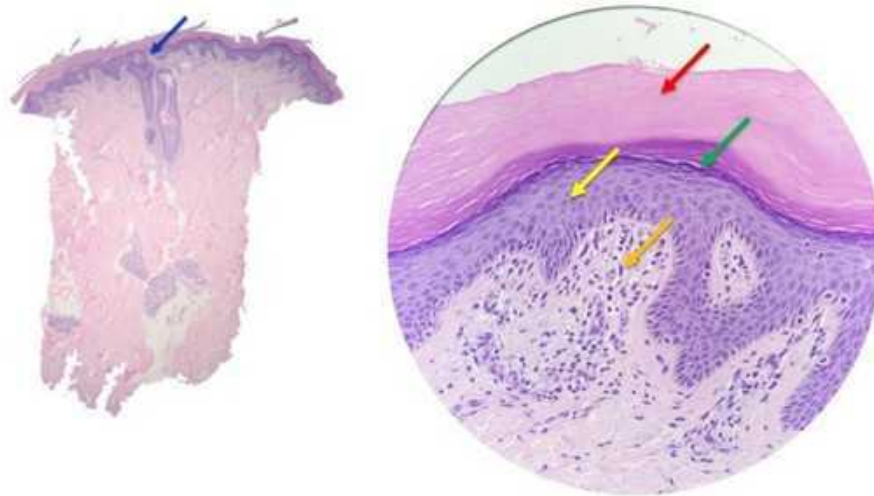


Fig. 3. A 0.4 cm x 0.4 cm x 0.6 cm biopsy was taken from the right arm of the female patient, showing compact hyperkeratosis (red) with areas of follicular plugging (blue), some hypergranulosis (green) and irregular acanthosis (yellow). There is a mild superficial lymphocytic infiltrate in the dermis (orange).

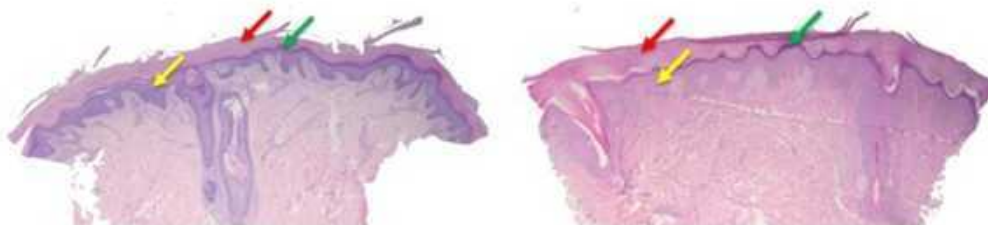


Fig. 4. A comparison of the siblings' biopsy findings, which both showed similar histopathological findings consistent with lamellar ichthyosis.

The patients were initially treated conservatively with topical therapy, including hyaluronic acid lotion, petroleum jelly and sunscreen with SPF 50 for about a month. Mineral oil was recommended for the scalp. However, due to minimal improvement of lesions given the normal laboratory findings after a month of consistent topical treatment, they were then started on Acitretin at a dosage of 0.5 mg/kg/day. Additionally, the female sibling was prescribed cyproterone acetate combined with ethinyl estradiol contraceptive pills after a negative pregnancy test, as advised by her OB-GYN. Polyethylene glycol lubricant eye drops were also provided to address the ectropion, as suggested by their ophthalmologist.

Both patients noted significant improvement after intake of oral acitretin at 0.5 mg/kg/day. They experienced substantial shedding of thick scales and a reduction of ectropion within the first two weeks of therapy (Fig. 5, 6, 7 and 8. B and E.), with further improvement observed after two months of treatment (Fig. 5, 6, 7 and 8. C and F.).



Fig. 5. Significant shedding of thick scales and reduction of ectropion from baseline (A, D), after two weeks (B, E), and after two months (C, F) on Acitretin 0.5 mg/kg/day.



Fig. 6. Reduction of thick scales on the scalp and intra auricular area for both siblings from baseline (A, D), to two weeks (B, E), and two months (C, F) after therapy with Acitretin 0.5 mg/kg/day.



Fig. 7. Reduction of thick scales on the trunk for both siblings from baseline (A, D), to two weeks (B, E), and two months (C, F) after therapy with Acitretin 0.5 mg/kg/day.



Fig. 8. Reduction of thick scales on the legs for both siblings from baseline (A, D), to two weeks (B, E), and two months (C, F) after therapy with Acitretin 0.5 mg/kg/day.

DISCUSSION

Lamellar ichthyosis (LI) is a rare genodermatosis with 30 new cases reported in the Philippines from 2011–2023 (PDS HIS).² It is a form of autosomal recessive congenital ichthyosis (ARCI), is caused by mutations in various genes such as *TGMI*, *CYP4F22*, *CERS3*, *PNPLA1*, and *ABCA12*. 90% of LI cases are associated with mutations in the *TGMI* gene, which provides instructions for the production of transglutaminase I. This enzyme is responsible for the formation of the cornified cell envelope, which helps form a protective barrier between the body and its environment.³

At birth, most affected neonates present with a translucent membrane covering their body, or a collodion membrane. This is eventually replaced by large, brown, plate-like scales forming a mosaic or bark-like pattern with little or no associated erythema.^{1,3} In some areas, these scales are

centrally attached with raised borders and tend to be larger on the lower extremities, where the extensive, plate-like scales are separated by shallow fissures, resembling a "dry riverbed." Intraepidermal constriction of sweat ducts often results in heat intolerance. Tautness of facial skin normally results in ectropion, eclabium, and hypoplasia of nasal and auricular cartilage. The thick stratum corneum of the scalp may tend to encase hairs and together with tautness of the skin, may lead to scarring alopecia usually observed on the periphery of the scalp. Secondary nail dystrophy with thickened nail plates and ridging is common.^{1,3} Emollients, topical keratolytics and oral retinoids are given in the treatment of LI.⁴ Additionally, the disfiguring nature of LI may hinder the psychosocial development of affected children and adolescents, making proper counseling beneficial.⁵

The clinical history and physical examination should be sufficient to suspect ichthyosis. However, doing a skin punch biopsy is helpful in supporting its diagnosis. The histopathology of lamellar ichthyosis are similar with those of other autosomal recessive congenital ichthyoses.⁵ Findings are limited to the stratum corneum, which would show compact hyper- and orthokeratosis, hypergranulosis, acanthosis and psoriasiform hyperplasia.^{6,7,8,9} There could be scant or mild lymphohistiocytic infiltrates in the dermis.^{6,8} These histopathologic features will present as thickened skin with little or no signs of inflammation on the skin, which are consistent with the patients' clinical presentation.

Other ancillary tests include immunohistochemistry procedures, genetic testing and electron microscopy. Genetic testing gives better understanding of the pathophysiology of the disease, while electron microscopy has been reported to be helpful in predicting whether a baby will ultimately have normal skin or ichthyosis. Prenatal diagnosis is possible using sonography, which can detect abnormalities such as ectropion, eclabium, nasal or ear deformities, and limb hypoplasia. However, a definitive diagnosis requires a fetal skin biopsy, typically performed between 20 and 22 weeks of gestation. Prenatal diagnosis is crucial for identifying

genetically inherited lethal conditions. Based on these, the patients should undergo a comprehensive evaluation, and families should be fully informed about the nature of the disease.¹⁰ Referring families to a genetic counselor can provide them with a better understanding of ichthyosis and help reduce anxiety.¹¹

Although other ancillaries, novel and genetic therapies have been suggested to assist clinicians in diagnosing, managing, and predicting the prognosis of LI, the high cost of these procedures as well as the rarity of the condition impedes the progress of research, slowing the development of improved patient care for future generations.

In general, ichthyosis is managed with topical and oral medications that focus in hydrating the skin with the addition of keratolytics and modulators of keratinocyte differentiation depending on scale severity.^{11,12,13} A study by Hernandez-Martin shows that treatment of inherited ichthyosis is currently based on the use of emollients, topical keratolytics and oral retinoids.¹⁴

A study by Vahlquist et al. mentioned that the primary treatment for most types of ichthyosis focuses on improving hydration and lubrication to enhance barrier function and promote desquamation. Creams and ointments containing low concentrations of salt, urea, or glycerol help increase the water-binding capacity of the stratum corneum.¹⁵ Emollients, humectants and occlusives aid in hydrating and forming a barrier on the skin surface. For ichthyoses characterized by extremely thick scales and significantly increased stratum corneum thickness, as seen in our patient, the use of one or more keratolytic agents is necessary to reduce corneocyte cohesion, facilitate desquamation, and dissolve keratins and lipids. Retinoids are particularly favorable due to their additional ability to regulate keratinocyte differentiation. However, the use of keratolytics is often restricted because of potential skin irritation and an increased risk of systemic absorption, particularly in pediatric patients.¹⁶

Topical vitamin D3 derivatives, tazarotene, and formulations containing lactic acid and propylene glycol in a lipophilic cream base have been effective.

A study by Craiglow et al showed improved eye discomfort and degree of ectropion within two weeks application of Tazarotene 0.1% cream¹⁷ while a study by Marulli et al. showed marked overall improvement over treated areas of the body after 4 months application of Tazarotene 0.1% gel with only minimal skin irritations such as mild pruritus and slight burning.¹⁸ These topical medications would work best when applied within two minutes after bathing while skin is still moist.¹³ Additionally, heat intolerance can be ameliorated by frequent moistening of the skin with water or the use of air conditioning and humidifiers.

According to a journal article published by Dunn et al, acitretin is the most effective treatment available for ichthyosis. It is a second-generation aromatic retinoid that is very effective in alleviating hyperkeratosis and scaling, especially for severe cases.^{19,20} The metabolites of acitretin bind to retinoic acid receptors (RARs) that leads to the alteration of gene transcription thus causing anti-inflammatory and anti-proliferative effects.²¹ Response to acitretin is dose dependent, with higher doses yielding greater and rapid improvement. However, adverse effects are also dose dependent, limiting the use of higher doses. It is recommended that oral retinoids be given at the lowest effective dose, as LI is a long term condition. With prolonged use of systemic retinoids, especially in children and adolescents, there is an increased risk of bone abnormalities, ophthalmologic problems, cardiovascular health, lipid and liver dysfunction, psychological impact and contraceptive considerations. Therefore, proper monitoring is essential and lifestyle changes should be discussed.^{15,16}

In our patients, 0.5 mg/kg/day of Acitretin was given, which resulted in a significant reduction in scaling after as early as 2 weeks. The treatment response develops gradually, reaching its peak between 3 to 6 months. Since relapses may occur within 2-6 months after discontinuing acitretin, ongoing maintenance therapy is often necessary, tailored to clinical response and patient tolerance. Acitretin should ideally be taken with a fatty meal to enhance absorption.²²

Due to its teratogenic, hepatotoxic, and hyperlipidemic potential, contraceptives were given, and liver and lipid profiles were monitored monthly, which were all maintained at normal levels throughout the ongoing 3 months of treatment.^{21,22}

Recent advancements in the treatment of ichthyosis have focused on repurposing biologics due to a better understanding of the skin issues associated with the condition. In a study by Binkhonian et al., Dupilumab, a monoclonal antibody that inhibits IL-4 and IL-13, was used as an alternative treatment for a patient with lamellar ichthyosis and concurrent atopic dermatitis, where genetic testing identified a mutation in the CYP4F22 gene. Despite previous treatments with Acitretin and Methotrexate showing minimal improvement, the patient experienced significant improvement in both lamellar ichthyosis and atopic dermatitis after being treated with Dupilumab 300 mg every two weeks for 3 months, also noting improvement in asthma symptoms.^{13,23} Janus kinase (JAK) inhibitors and gene therapy are being considered as other options for therapy, but studies are limited, and results are mixed.²⁴

The use of biological therapies could be beneficial in managing ichthyosis but may vary in response depending on the specific gene mutation. This underscores the importance of genetic testing, though more studies with specific data correlating genetic mutations and immunological profiles are needed.²³

Classic LI is a severe disorder that is apparent at birth and persists throughout life, requiring lifelong therapy and affecting the patient's entire life situation. In addition to managing the skin, it is crucial to address and manage the complications associated with this disease in a supportive manner.

CONCLUSION

This case report outlines the diagnosis and management of siblings with lamellar ichthyosis, as well as significant improvements in their medical condition and quality of life after treatment with acitretin. Acitretin is an oral retinoid, with known risks such as teratogenicity, and must be used with

caution, especially in women of childbearing age. It is important to educate patients on the chronicity of their disease and align their expectations and reality as we aim to make their lives as normal as possible. Recent advancements in ichthyosis treatment has centered on repurposing biologic therapies, driven by an improved understanding of the skin complications linked to the condition. This may be a viable option for those who have access to the medication.

For many patients, skin conditions such as lamellar ichthyosis can cause not only physical discomfort but also significant social and psychological repercussions. In the cases presented here, both patients had lived with the condition for years, previously believing it to be untreatable. This perception had a profound impact on their self-esteem and social interactions, ultimately leading to withdrawal from school and their peers. However, following treatment with acitretin, both patients experienced notable improvements in their skin condition, which, in turn, reduced their insecurities. What were once two individuals marked by shyness have now become more confident, with fewer inhibitions in social interactions. These outcomes highlight the broader impact of dermatological treatments. While the primary goal may be symptom reduction, the benefits extend well beyond the skin, influencing psychological well-being and social functioning.

The case underscores the importance of considering the holistic effects of dermatological care, demonstrating that the impact of treatment can reach far beyond the physical aspects of skin disease.

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