ISSN #: 3116-5133

JOURNAL OF PEDIATRICS PHILIPPINES

The Official Publication of the Philippine Pediatric Society

Volume 1 No. 1

January - June 2026

Contents

iii Messages

1 Accuracy of Lancet Consensus Scoring System for the Diagnosis of Tuberculous Meningitis Among Pediatric Patients with Meningitis in a Tertiary Government Hospital

Mary Joy Dimatatac, MD

9 Exploring Determinants of Non-Urgent Visits in a Private Pediatric Emergency Department: A Holistic Investigation Incorporating Measures of Health Literacy and Anxiety Levels as Significant Influencing Factors for Informed Healthcare Decision-Making

Kurt Paul T. Gloriani, MD and Almida A. Reodica, MD

16 Knowledge, Attitudes, and Practices on Pinggang Pinoy Among Filipino Senior High School Students in Cagayan De Oro City and its Correlation with Malnutrition

Mariel Ann C. Waga, MD and John Paul L. Oliveros, MD

22 Effectiveness of the Teddy Bear Hospital Method Pretend Play Intervention in Reducing Anxiety Levels Among Pediatric Patients with Chronic Illnesses Visiting the Outpatient Department: A Quasi-Experimental Pilot Study

Raizel Marie DR. Luciano, MD; Kris Ian B. Mendoza, MD; Anne Margarette Canapi-Acero, MD and Charisse B. Pulmano, MD

33 Factors Influencing Father's Level of Involvement in the Care of a Child with a Neurodevelopmental Disability: A Cross-Sectional Single Center Study

Charlene Kay N. Arenajo-Ynoc, MD and Jocelyn S. Sanchez, MD

Journal of Pediatrics Philippines

A peer-reviewed, semi annual open access journal published by the Philippine Pediatrics Society, Inc.

EDITORIAL BOARD

Philippine Pediatric Society, Inc.
Officers and Board of Trustees

CESAR M. ONG, MD
President

WILFREDO R. SANTOS, MD
Vice President

EDWIN V. RODRIGUEZ, MD
Secretary

ANNA KARENINA V. CAUSAPIN, MD
Asst. Secretary

MICHAEL M. RESURRECCIOM, MD
Treasurer

BEATRIZ PRAXEDES APOLLA M. PAZ, MD
Asst. Treasurer

Board of Trustees
LORNA R. ABAD, MD
ANNA LISA T. ONG-LIM, MD
NEPTHALIE R. ORDOÑEZ, MD
JOSE B. SALAZAR

Chapter Represntatives
MADELEINE GRACE M. SOSA, MD
Luzon

EDNA B. AYASO, MD
Visayas

NINFA J. VILLANUEVA, MD
Mindanao

Council on Research and Publications Directors
MICHAEL M. RESURRECCION, MD
ANNA LISA T. ONG-LIM, MD
MADELEINE GRACE M. SOSA, MD
BEATRIZ PRAXEDES APOLLA M. PAZ, MD

MESSAGE

The Philippine Pediatric Society is proud to welcome revival of the Journal of Pediatrics Philippines now reborn in an accessible and dynamic electronic format. After several years of inactivity, this relaunch represents a pivotal moment for the society and the Filipino pediatric community.

Our mission has always been to advance child health through education, research, and best clinical practices. A robust journal is an essential component of that mission. The transition to an electronic platform is not just a modernization of format; it is a strategic embrace of accessibility and efficiency. This new e-journal will provide instantaneous access to vital research, clinical updates, case studies, and scholarly articles that are directly relevant to the unique healthcare landscape of the Philippines.

In an era of rapid medical advancements and evolving global health challenges, disseminating timely, evidence-based information is more critical than ever. This platform will serve as a vital resource for our members, trainees, and allied health professionals, ensuring that quality, locally generated research reaches the practitioners who need it most.

I extend my deepest gratitude to the Committee on the Philippine Journal of Pediatrics, the editorial board, and contributors who have worked hard to make this revival possible. I urge our members to engage with this new iteration of our journal: submit your research, share your clinical insights, and use this platform to enhance the care you provide and improve the lives of Filipino children.

Mabuhay ang Journal of Pediatrics Philippines!

CESAR M. ONG, MD, FPPS, FPAPP, MHPED
President
Philippine Pediatric Society

MESSAGE

It is with great honor and deep enthusiasm that we present the inaugural issue of the Journal of Pediatrics Philippines, the official research publication of the Philippine Pediatrics Society, Inc.. This first issue represents an important milestone in our enduring commitment to our mission to advance child health through high-quality research, clinical innovation, and the sharing of evidence-based practices.

The establishment of this journal reflects our collective aspiration to foster a scholarly community where rigor, curiosity, and compassion converge. In a time when pediatric medicine continues to evolve with unprecedented speed, the need for a trusted, accessible, and forward-looking platform has never been greater. Our aim is to provide such a platform—one that supports clinicians in refining their practice,
empowers educators in shaping the next generation, and inspires researchers in driving discovery that will shape the future of child health.

Within these pages, readers will find contributions that embody the highest standards of scientific integrity and intellectual engagement. Each article represents the dedication of professionals united by the belief that every child deserves the best that modern medicine and informed advocacy can offer. It is our hope that the insights shared here will not only advance knowledge but also renew our collective commitment
to the children and families we serve.

We extend our sincere gratitude to the authors, reviewers, and editorial team led by Dr. Maria Milagros Magat whose unwavering dedication has brought this vision to reality. Most importantly, we acknowledge our society members and readers, whose pursuit of excellence continues to elevate our field and inspire progress. Your efforts stand as a testament to what can be achieved when expertise is guided by empathy
and purpose.

As we embark on this journey, we invite you to engage actively: share your work, propose ideas, provide feedback, and help shape the journal's evolution. Together, we can build a vibrant, inclusive, and forward- thinking community that supports the next generation of pediatric advancements.

Welcome to the first issue. We are honored to begin this endeavor with you.

Madeleine Grace M. Sosa, MD, FPPS, FPNS, FCNSP,MSCE

Michael M. Resurreccion, MD, FPPS

Anna Lisa T. Ong-Lim, MD, FPPS, FPIDSP

COUNCIL DIRECTORS

Original Article

Accuracy of Lancet Consensus Scoring System for the Diagnosis of Tuberculous Meningitis Among Pediatric Patients with Meningitis in a Tertiary Government Hospital

Mary Joy Dimatatac, MD
Ospital ng Maynila Medical Center, City of Manila

ABSTRACT

Introduction: Meningitis remains a major public health challenge, with different pathogens presenting with similar clinical features. Tuberculous meningitis (TBM) is difficult to diagnose and, despite its rarity, carries high morbidity and mortality due to delayed recognition. This study aimed to determine the diagnostic accuracy of the Lancet Consensus Scoring (LCS) system in identifying childhood TBM.

Methods: This was a retrospective study which involved review of charts of pediatric cases 0 to 18 years old with a diagnosis of meningitis or central nervous system infection admitted between August 2021 to August 2024.

Results: The prevalence of meningitis was 2.05%, with etiologies including bacterial (50.8%), tuberculous (44.1%), viral (3.4%), and fungal (1.7%). There was a male predominance (61%), and most patients were from Manila (71.19%). Median age was 7 years (IQR: 2–14), with a median symptom duration of 7 days (IQR: 2–14). The most common presenting symptoms were fever (81.4%), seizures (57.6%), cough (52.5%), and altered sensorium (37.3%). Hydrocephalus was the most frequent computed tomography (CT) finding (27.1%), suggestive of tuberculous meningitis. Most patients initially received ceftriaxone (74.6%), while anti-tuberculosis therapy was started after diagnostic confirmation. Overall mortality was 28.8%, with most deaths attributed to tuberculous meningitis, which had a case fatality rate of 76.5%. The Lancet Consensus Scoring (LCS) system demonstrated high sensitivity (92.59%; 95% CI: 74.75–98.14) and negative predictive value (91.30%; 95% CI: 71.12–97.82), but moderate specificity (67.74%; 95% CI: 49.72–81.68) and positive predictive value (69.44%; 95% CI: 52.79–82.20). Overall, the LCS showed acceptable discriminatory performance in identifying tuberculous meningitis.

Conclusion: The Lancet Consensus Scoring (LCS) system may be a useful tool in resource-limited settings for the early recognition and diagnosis of tuberculous meningitis in children.

Key words: tuberculous meningitis, clinical manifestations, diagnosis, accuracy, Lancet Consensus Scoring System, Marais Criteria

INTRODUCTION

Meningitis is a neurological emergency associated with significant morbidity and mortality.[1-4] Globally, an estimated 2.8 million cases occur annually,[2] with approximately 100,000 deaths each year.[5] Based on the Philippine Pediatric Society (PPS) registry, meningitis accounts for 0.72% of all reported illnesses in the past decade. Despite its being rare, tuberculous meningitis remains a common etiology of meningitis (24.6%). It is the most severe form of tuberculosis in children, particularly in developing countries such as the Philippines, where tuberculosis remains highly endemic. These infections have a significant mortality rate of 9-19%.[1] In particular, tuberculous (TB) meningitis is elusive to diagnosis due to the paucibacillary nature of infection1 and is associated with significant childhood morbidity and mortality due to delayed recognition.[3,6-9] The mortality rate among children with TB meningitis varies from

Correspondence: Mary Joy Dimatatac, MD
mjdcdimatatac@gmail.com

13% to 70% and only 16% to 20% of children are reported to have survived without any sequelae[3,10-12]. Among survivors, the majority experience residual neurological, cognitive, behavioral, or developmental impairments. Tuberculous meningitis typically presents as a subacute illness, with symptoms that may persist for weeks before diagnosis. Microbiologic confirmation remains challenging, and culture is considered the gold standard for diagnosis. However, in the Philippines, the yield of a positive cerebrospinal fluid culture is less than 10%.[10]

Due to the paucibacillary nature of TB in children and its long culture cycle, delays in diagnosis occur. Certain diagnostic methods require specialized equipment and well-trained personnel, which may not be readily available in many healthcare facilities. Early recognition and prompt treatment of TB meningitis is the cornerstone of management to avoid long-term sequelae and death. Despite neuroimaging not being done routinely in diagnosing meningitis, CT scan is widely used and aids in identifying TB meningitis. Hydrocephalus is the most common finding as reported from both local and international literature[1,3,11]. The characteristic CT findings in tuberculous meningitis include hydrocephalus (sensitivity 57–93%, specificity 69–83%), infarction (sensitivity 18–75%, specificity 82–100%), and basal meningeal enhancement (sensitivity 35–73%, specificity 69–88%). The presence of these findings in combination increases diagnostic specificity.[13-17]. Given the diagnostic challenges of tuberculous meningitis, a high index of suspicion based on clinical, bacteriological, and neuroimaging findings is essential. Although empiric treatment is often justified, the prolonged course and potential adverse effects of therapy emphasize the need for accurate diagnosis

Several scoring systems have been developed to facilitate the diagnosis of tuberculous meningitis (TBM) and reduce delays in management, most notably the Thwaites and Lancet Consensus Scoring (LCS) systems.[3,6-9] The Thwaites score, introduced in 2002, uses clinical and cerebrospinal fluid (CSF) parameters to differentiate TBM from bacterial meningitis and has demonstrated high sensitivity (98.2%) but low specificity (43.6%).[9] The LCS system (Marais criteria), developed in 2010, incorporates clinical features, CSF findings, neuroimaging results, and evidence of tuberculosis elsewhere to improve diagnostic accuracy across age groups.[7,18] It classifies cases as definite, probable, possible, or not TBM. Definite TBM requires clinical criteria plus microbiologic confirmation (acid-fast bacilli on CSF smear, positive CSF culture, histopathologic evidence, or a positive nucleic acid amplification test). Probable TBM is defined by a score >10 without imaging or >12 with imaging, while possible TBM corresponds to scores of 6–9 without imaging or 6–11 with imaging. Studies have reported good diagnostic performance of the LCS system, with sensitivity ranging from 83–97% and specificity from 56–86%, demonstrating its utility in distinguishing TBM from other etiologies.[10,16-18] However, its application in routine clinical practice remains limited, particularly in resource-limited settings.

The LCS system, while used in western settings, has not been utilized locally to establish the accuracy of the clinical scoring system in the diagnosis of TB meningitis. Hence, this study was done to estimate the prevalence of TB meningitis among pediatric patients, to characterize cases of childhood TB meningitis, and to determine the accuracy of the Lancet Consensus Scoring System in diagnosing TB meningitis and differentiating it from other etiologies.

METHODS

This was a retrospective cross-sectional analytical study designed to validate the diagnostic performance of the Lancet Consensus Scoring (LCS) system, conducted in a tertiary government hospital. All pediatric patients aged 0–18 years admitted from August 2021 to August 2024 with a diagnosis of meningitis (bacterial, viral, tuberculous, or fungal) were included. Patients initially diagnosed with meningitis but subsequently discharged with a final diagnosis of febrile seizures were excluded. Medical records, including clinical data, laboratory results, and neuroimaging findings, were reviewed for eligible cases of central nervous system infection during the study period.

Sample size was estimated using an AUROC-based method, assuming an expected AUC of 0.93 (95% CI: 0.89–0.97) as reported in one study.[18] The minimum required sample size at a 95% confidence level was 155.

Data were encoded in Microsoft Excel and analyzed using R statistical software (version 4.3.3). Descriptive statistics were used to summarize demographic and clinical characteristics. Normality was assessed using the Kolmogorov–Smirnov or Shapiro–Wilk tests. Continuous variables were

expressed as mean ± standard deviation for normally distributed data and as median with interquartile range for non-normally distributed data. Categorical variables were presented as frequencies and percentages. LCS scores were calculated for all cases. An initial cutoff score of ≥6 was used to classify cases as suggestive of possible or probable tuberculous meningitis, while scores <6 were considered not suggestive.[18] Sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic odds ratio were reported with 95% confidence intervals. Receiver operating characteristic (ROC) curves were generated and the area under the curve (AUC) was calculated to assess overall diagnostic accuracy. Statistical significance was set at $p < 0.05$. Analyses were performed using the mada and meta packages in R (version 4.3.3).

RESULTS

A total of 59 patients with meningitis (2.05%) were included in the study. The majority were male (61%), with a median age of 7 years (IQR: 2–14). Most patients were from Manila (71.19%) and had a median symptom duration of 7 days (IQR: 2–14) prior to consultation. Tuberculous meningitis accounted for 44.1% of cases, second only to bacterial etiology (50.8%). Viral (3.4%) and fungal (1.7%) causes were less common. The most frequent presenting symptoms were fever (81.4%), seizures (57.6%), cough (52.5%), and altered sensorium (37.3%) (Table 1).The overall mortality rate was 28.8%. The majority of deaths were attributed to tuberculous meningitis, which had a case fatality rate of 76.5%. Most children with tuberculous meningitis (53.8%) were diagnosed at an advanced stage (Stage III). In contrast, bacterial meningitis had a markedly lower case fatality rate of 3.33% (Table 1).

Majority of cases of pediatric meningitis were initially treated with Ceftriaxone (74.6%), or Penicillin G (16.9%) or Ampicillin (6.77%). Standard first-line anti-tuberculosis therapy consisting of isoniazid, rifampicin, pyrazinamide, and ethambutol (HRZE), along with dexamethasone and mannitol, was initiated after cerebrospinal fluid and CT findings were suggestive of tuberculous meningitis (Table 2).

CSF was commonly clear (61.2%) with low glucose (83.7%), elevated protein (59.2%), and lymphocytic predominance (51%) (Table 3). CT was not routinely performed; among those imaged,

Table 1. Clinico-demographic profile of pediatric patients diagnosed with meningitis (N=59), (Median (Quartile 1-Quartile 3) OR Frequency (%).

Parameter	Total	Percentage (%)
Sex		
Male	36	61
Female	23	31
Age	Md= 7 (2-14)	
0-12mos	6	10.16
1-5 years	34	57.62
6-10 years	6	10.16
11-15 years	6	10.16
16-18 years	7	11.86
Place of Residence		
Manila	42	71.19
Non-Manila	17	28.81
Duration of Symptoms	Md= 7 (2-14)	
0-7 days	26	44
<7 days	33	56
Signs and Symptoms		
Fever	52	88.13
Seizure	35	59.3
Cough	35	59.3
Altered sensorium	24	40.67
Weight loss	11	15.3
Vomiting	9	15.3
Headache	7	11.9
Weakness	5	8.5
Colds	5	8.5
Blurring of vision	4	6.8
Unsteady gait/difficulty ambulating	3	5.1
Increase somnolence	2	3.4
Difficulty of breathing	2	3.4
Outcome		
Sent home	42	71.2
Demised	17	28.8

hydrocephalus (27.1%) was the most frequent finding, followed by infarction, tuberculoma, and basal meningeal enhancement suggestive of tuberculous meningitis. Most chest radiographs showed pneumonia (57.6%), while 18.6% were suggestive of tuberculosis; the remainder were normal (Table 4).

Diagnostic Accuracy of Lancet Consensus Scoring System

Table 5 presents the diagnostic accuracy of the LCS (cutoff ≥6) for predicting tuberculous meningitis. The LCS demonstrated high sensitivity (92.59%; 95% CI: 74.75–98.14) and negative predictive value (91.30%; 95% CI: 71.12–97.82), but moderate specificity (67.74%; 95% CI: 49.72–81.68) and positive predictive value (69.44%; 95% CI: 52.79–82.20). Overall discriminatory performance was good, with a diagnostic odds ratio of 23.86 (95% CI: 4.75–119.92) and an AUC of 0.895 (Figure 1). Based on established thresholds, this AUC indicates excellent diagnostic accuracy, and the DOR exceeds the minimum benchmark of 10 for a strong diagnostic test.[19,20]

Table 2. Pharmacologic treatment (N=59)

Treatment	Total	Percentage (%)
Ceftriaxone	44	74.6
Penicillin G	10	16.9
Ampicillin	4	6.77
Acyclovir	1	1.69

Table 3. Cerebrospinal fluid of patients (N=49)

Characteristics	Total	Percentage (%)
Clear	30	61.2
Turbid	17	34.7
Hazy	2	4.1
Colorless	25	51
Straw	20	40.8
Red	3	6.1
Yellow	1	2.1
CSF Glucose		
Low	41	83.7
High	8	16.3
CSF Protein		
High	29	59.2
Normal	10	20.4
Low	10	20.4
CSF WBC Predominance		
Lymphocyte	25	51
Neutrophil	4	8.2
No WBC	20	40.8
CSF Analysis Not Done	10	16.9

Table 4. CT scan and chest radiograph findings of patients

CT scan findings	Total	Percentage %
Not done	28	47.5
Normal	5	8.5
Hydrocephalus	16	27.1
Hydrocephalus, Infarction	5	8.5
Infarction	1	1.7
Infarction, Tuberculoma	1	1.7
Basal enhancement	1	1.7
Osteolytic calvarial mass, Osteolytic Gibbus & Deformity	1	1.7
Chest radiograph findings	**Total**	**Percentage %**
Pneumonia	37	62.7
Normal chest	12	20.3
Perihilar lymphadenopathies, suggestive of TB	11	18.6

Table 5. Diagnostic accuracy of LCS (≥6) to predict TB meningitis

Diagnostic accuracy measures	Point Estimate (95% CI)
Sensitivity	92.59 (74.75; 98.14)
Specificity	67.74 (49.72; 81.68)
Positive Predictive Value	69.44 (52.79; 82.20)
Negative Predictive Value	91.30 (71.12; 97.82)
Diagnostic Odds Ratio	23.86 (4.75; 119.92)
Area under the Curve	0.895

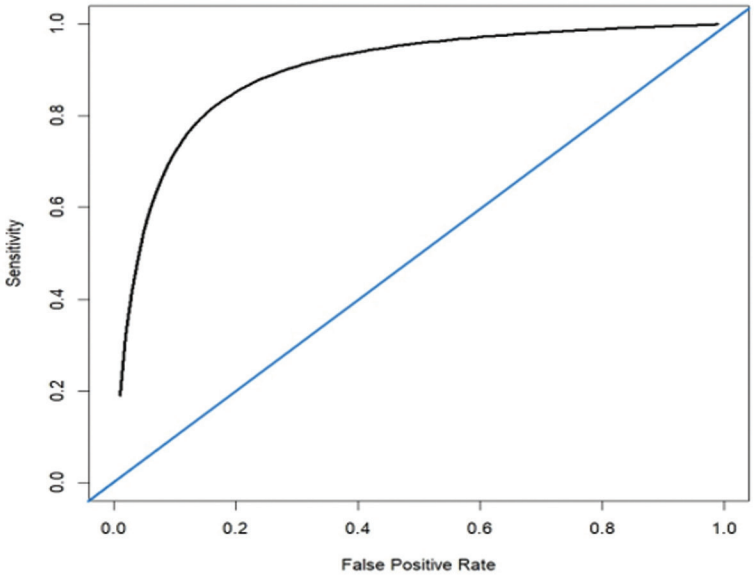

Figure 1. Area under the curve (AUC =0.895) of LCS (≥6) to predict TB meningitis. Blue line represents AUC = 0.5, which represents a worthless test

DISCUSSION

In this study, conducted over a three-year period in a tertiary hospital, meningitis accounted for 2.05% of all reported illnesses, which is higher than the 10-year prevalence reported in the Philippine Pediatric Society (PPS) national registry (0.72%).[1] Bacterial etiology remains to be the most prevalent, but it may be observed that through the years, TB meningitis has slowly gained traction [1,11]. This may be explained by the rising prevalence of TB, with the Philippines ranking fourth in worldwide incidence. Previous studies, both local and international, have demonstrated a male predominance among patients with meningitis, consistent with the findings of this study.[1,12,21] A similar pattern has been reported in India, where tuberculosis remains prevalent, with a male-to-female ratio of approximately 1.5:1.[11,21] Consistent with prior local and international studies, meningitis predominantly affects children under 10 years of age.[1,12,21] This age distribution was similarly observed in the present study. There is increased susceptibility of younger children likely attributable to immunologic immaturity. Notably, the widespread implementation of vaccination programs has altered the epidemiologic profile of meningitis in many settings, with a gradual shift in disease burden toward older age groups.[2,3]

Local studies have identified fever as the most common presenting symptom of meningitis, similarly observed in the present study.[1] Fever tended to have a longer duration in cases of tuberculous meningitis.[1-4] Most patients were initially treated with ceftriaxone, while other antimicrobial agents used included penicillin G and ampicillin, consistent with previously reported treatment patterns.[1] Despite their relatively lower prevalence compared with other pediatric illnesses, these infections continue to be associated with disproportionately high mortality rates.[11,12,15] Tuberculous meningitis is frequently

diagnosed at a late stage, often after significant neurological damage has occurred. Advanced disease at presentation has been reported as the strongest predictor of poor outcome.[11] In the present cohort, mortality was observed exclusively among patients presenting at advanced stage. These findings highlight the need for early recognition and prompt treatment to improve prognosis.

In this study, cerebrospinal fluid (CSF) findings were characterized by elevated protein concentrations and lymphocytic predominance among other abnormalities. Among patients with tuberculous meningitis, higher CSF protein levels and lymphocytic predominance were specifically associated with increased mortality, consistent with previous reports.[11] Although lumbar puncture is invasive, CSF analysis remains essential for diagnosis and may provide prognostic information. However, CSF parameters alone are insufficient to definitively determine etiology and should be interpreted alongside clinical and microbiologic findings. In this study, only 52.5% underwent CT scan since it is not routine to do neuroimaging in diagnosis of meningitis. CT scan plays a major role in the early and prompt detection of TB meningitis, and in turn ensures a better patient prognosis.[1,3,11,15,16] Findings of hydrocephalus alone (51.6%), hydrocephalus with infarcts (16%), tuberculoma with infarcts (3.2%), infarct alone (3.2%), and basal enhancements (3.2%) were all suggestive of TB etiology. Although these alone cannot ascertain meningitis[11,15], presence of neuroimaging enhances confidence in clinical diagnosis[10,16].

Pneumococcal disease may present as localized pulmonary infection or as invasive disease, with meningitis representing its most severe manifestation.[22] This was reflected in the present study, in which 73% of patients with bacterial meningitis had concomitant pneumonia. Similarly, 70% of patients with tuberculous meningitis had associated comorbid conditions, including pneumonia and malnutrition.[23] Children are at greater risk of progression from primary pulmonary tuberculosis to tuberculous meningitis due to their immature immune response. In this study, chest radiographic findings included perihilar lymphadenopathy suggestive of pulmonary tuberculosis in 18.6% of cases and radiographic evidence of pneumonia in 62.7%. Children are at increased risk of progression from primary pulmonary tuberculosis to tuberculous meningitis due to their immature immune response. In the present study, chest radiographs commonly demonstrated perihilar lymphadenopathy suggestive of pulmonary tuberculosis and radiographic evidence of pneumonia. In contrast, an Indian study reported that most patients with tuberculous meningitis had normal chest radiographs, with only a minority showing pneumonitis, bronchopneumonia, or findings suggestive of pulmonary tuberculosis.[12] Compared with the Indian cohort, the present study demonstrated a higher frequency of radiographic abnormalities. Nonetheless, both studies support the role of chest radiography as a useful screening tool for concomitant pulmonary disease in patients with meningitis.

In this study, the Lancet Consensus Score (LCS) demonstrated high sensitivity and negative predictive value (NPV), but low specificity and positive predictive value (PPV). A highly sensitive test is associated with a high NPV, making it useful for ruling out disease in individuals with negative results. However, NPV is influenced by disease prevalence. Given the high burden of tuberculosis in the Philippines, the observed high NPV suggests that a negative LCS result is reliable for excluding tuberculous meningitis in this setting. The discriminatory performance of the LCS was acceptable, as reflected by a diagnostic odds ratio (DOR) of 23.86 and an area under the receiver operating characteristic curve (AUC) of 0.895. The DOR exceeds the commonly accepted threshold for a strong diagnostic test (DOR $\geq$ 10), further supporting its utility.[19,20] Overall, these findings indicate that the LCS is a valuable screening tool for identifying patients at risk for tuberculous meningitis.

Given the high sensitivity and negative predictive value of the LCS observed in this study, patients who do not meet the scoring threshold are less likely to have tuberculous meningitis. Thus, the LCS may serve as a useful screening tool in clinical practice, helping clinicians identify patients who warrant further evaluation. In those classified as possible or probable TB meningitis, early cerebrospinal fluid analysis and neuroimaging may be pursued to reduce diagnostic delay and facilitate timely initiation of treatment.

Limitations of the Study

Since this is a retrospective study, cases were limited to those seen from 2021 to 2024; thus, the findings may only be applicable to that period,

especially as some variables investigated may vary over time. The study period coincided with the height of the COVID-19 pandemic, during which healthcare resources were redirected to address the ongoing crisis, potentially limiting hospital admissions for other conditions. Moreover, overlapping symptoms between meningitis and COVID-19, along with isolation protocols and social stigma, may have reduced admissions of suspected cases. As a result, the prevalence of meningitis may have been underreported. This may also explain why the study population did not meet the computed sample size. Given the retrospective nature of the study, observer bias is possible, as the researcher may have preconceived expectations when reviewing data. However, the use of established diagnostic criteria for case classification helped minimize this bias. Another limitation is the completeness and accuracy of data, which depended on clinicians' documentation in medical records that were not uniformly consistent in quality. Despite these limitations, the study was conducted in a tertiary government hospital with a high patient volume, which may support the applicability of findings to similar healthcare settings.

CONCLUSION

Tuberculous meningitis remains a significant cause of morbidity and mortality among pediatric patients, particularly when diagnosed at advanced stages. Early recognition is essential to improve outcomes.

In this study, the Lancet Consensus Scoring (LCS) system demonstrated good diagnostic performance, particularly in its ability to identify patients unlikely to have tuberculous meningitis. As a structured and practical tool, the LCS may assist clinicians in raising their index of suspicion, guiding further diagnostic evaluation, and facilitating timely initiation of appropriate therapy.

The LCS system, therefore, shows promise as a useful adjunct in the diagnosis of pediatric tuberculous meningitis, especially in resource-limited settings.

RECOMMENDATIONS

This study is the first in the Philippines to evaluate the diagnostic accuracy of the Lancet Consensus Scoring (LCS) system in pediatric tuberculous meningitis. Further hospital-based studies with larger sample sizes are recommended to validate these findings in different clinical settings.

Future research may include multicenter studies involving additional tertiary government hospitals or extended study periods to increase sample size and statistical power. Such studies may further establish the role of the LCS system in routine clinical practice and strengthen its applicability in resource-limited settings.

REFERENCES

1. Calderon AM, Garcia RD. Childhood meningitis in an urban tertiary medical center: a 20-year review. Pediatr Infect Dis Soc Philipp J 2019;20:26–36.
2. Lee J, Choi A, Kim K, Bin JH, Eom TH, Yoo IH, Yoon DH, Kim S, Kim YH. Changes in the epidemiology and causative pathogens of meningitis in children after the outbreak of coronavirus disease 2019: a multicenter database study. Front Pediatr 2022;10:810616. doi:10.3389/fped.2022.810616
3. Runde TJ, Anjum F, Hafner JW. Bacterial meningitis. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan–. Updated 2023 Aug 8. Available from: https://www.ncbi.nlm.nih.gov/books/NBK470351/
4. Hersi K, Gonzalez FJ, Kondamudi NP. Meningitis. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan–. Updated 2023 Aug 12. Available from: https://www.ncbi.nlm.nih.gov/books/NBK459360/
5. World Health Organization. Meningitis [Internet]. Geneva: World Health Organization; 2023 Apr 17 [cited 2024 Oct 18]. Available from: https://www.who.int/news-room/fact-sheets/detail/meningitis
6. #7 Nakamura T, Cohen AL, Schwartz S, Mwenda J. The global landscape of pediatric bacterial meningitis data reported to the WHO-coordinated invasive bacterial vaccine-preventable disease surveillance network, 2014–2019. J Infect Dis 2021;224(Suppl 12):S161–S173. doi:10.1093/infdis/jiab217
7. #8 Handryastuti S, Latifah D, Bermanshah EK, Gunardi H, Kadim M, Iskandar ATP. Development of clinical-based scoring system to diagnose tuberculous meningitis in children. Arch Dis Child 2023;108(11):884–8. doi:10.1136/archdischild-2023-325607
8. #9 Wang Y, Xie B. Progress on diagnosis of tuberculous meningitis. Methods Mol Biol 2018;1754: 375–86. doi:10.1007/978-1-4939-7717-8_20
9. #10 Karabela SN, Unlu G, Senoglu S. The roles of Thwaites' and Marais' diagnostic scoring indexes and a clinical prediction model in the diagnosis of tuberculous meningitis. Med J Bakirkoy 2021;17(3):221–6.
10. #11 van Well GTJ, Paes BF, Terwee CB, Springer P, Roord JJ, Donald PR, et al. Twenty years of pediatric tuberculous meningitis: a retrospective cohort study in the Western Cape of South Africa. Pediatrics 2009;123(1):e1–e8. doi:10.1542/peds.2008-1353

11. #12 Israni AV, Dave DA, Mandal A, Singh A, Sahi PK, Das RR, et al. Tubercular meningitis in children: clinical, pathological, and radiological profile and factors associated with mortality. J Neurosci Rural Pract 2016;7(3):400–4. doi:10.4103/0976-3147.181475
12. #24 Daniel BD, Grace GA, Natrajan M. Tuberculous meningitis in children: clinical management and outcome. Indian J Med Res 2019;150(2):117–30. doi:10.4103/ijmr.IJMR_786_17
13. Chin JH. Tuberculous meningitis: diagnostic and therapeutic challenges. Neurol Clin Pract 2014;4(3):119–205. doi:10.1212/CPJ.0000000000000023
14. Salonga AM, Raguindin PF, Imperial MH, Ortiz MH, Bolanos ML, Trajano MLM, et al. Neurologic outcome of Filipino children diagnosed with central nervous system infection. Neurol Asia 2019;24(3):235–42.
15. Sharma V, Rajeshwari K, Kumar D, Gupta G. Clinicoepidemiological profile and prognostic factors in neurotuberculosis in children. Ann Child Neurol 2023;32(2):103–112.
16. Andres MM, Uy JA, Reyes-Paguia MP. Tuberculous meningitis: basal cistern enhancement pattern on CT imaging. World Fed Pediatr Imaging TB Corner 2016;2(5):1–9.
17. Faried A, Putra SP, Suradji EW, Trianto, Akbar RR, Nugraheni NK, et al. Characteristics and outcomes of pediatric tuberculous meningitis. Interdiscip Neurosurg 2020;19:100609. doi:10.1016/j.inat.2019.100609
18. Imam YZ, Ahmedullah H, Chandra P, Almaslamani M, Alkhal A, Deleu D. Accuracy of clinical scoring systems for the diagnosis of tuberculosis meningitis in a case mix of meningitides: a retrospective cohort study. J Neurol Sci 2020;416:116979. doi:10.1016/j.jns.2020.116979
19. Mandrekar J. Receiver operating characteristic curve in diagnostic test assessment. J Thorac Oncol 2010;5(9):1315–6. doi:10.1097/JTO.0b013e3181ec173d
20. Blackman NJM. Systematic reviews of evaluations of diagnostic and screening tests: odds ratio is not independent of prevalence. BMJ 2001;323(7322):1188.
21. Dharmarajan L, Salazar L, Hasbun R. Gender differences in community-acquired meningitis in adults: clinical presentations and prognostic factors. J Meningitis 2016;1(1):106.
22. Mook-Kanamori BB, Geldhoff M, van der Poll T, van de Beek D. Pathogenesis and pathophysiology of pneumococcal meningitis. Clin Microbiol Rev 2011; 24(3): 557–91. doi:10.1128/CMR.00008-11
23. Pama CL, Gatchalian SR. Clinical profile of culture-proven tuberculosis cases among Filipino children aged 3 months to 18 years. PIDSP J 2002;6(1):13–23.

Original Article

Exploring Determinants of Non-Urgent Visits in a Private Pediatric Emergency Department: A Holistic Investigation Incorporating Measures of Health Literacy and Anxiety Levels as Significant Influencing Factors for Informed Healthcare Decision-Making

Kurt Paul T. Gloriani, MD and Almida A. Reodica, MD
The Medical City, Pasig City

ABSTRACT

Introduction: Non-urgent visits to pediatric emergency departments (ED) pose challenges to healthcare systems, leading to resource misallocation, increased costs, and delays for critical cases. This study aimed to explore the factors influencing non-urgent visits in a private pediatric emergency department in The Medical City, Pasig, Philippines. Specifically, it investigated the relationships between parental anxiety, health literacy, and reasons for choosing emergency services over outpatient care.

Methods: The study employed an analytical cross-sectional design and included 342 parents and guardians of pediatric patients triaged as non-urgent. Data were collected through structured questionnaires assessing demographics, health literacy, and anxiety levels through the Everyday Health Information Literacy Scale EHILS and Generalized Anxiety Disorder-7 (GAD-7).

Results: Results revealed that the most common reasons for ED visits were trust in the hospital, perceived urgency of the child's condition, and the availability of rapid diagnostic tests. Approximately 78% of participants bypassed outpatient services due to convenience and logistical challenges. Moderate to severe anxiety was significantly associated with heightened perceptions of illness severity, while lower health literacy was linked to difficulties in navigating the healthcare system. These findings underscore the interplay of psychological and systemic factors in driving non-urgent ED utilization.

Conclusion: This study highlights the need for targeted interventions to improve parental health literacy and reduce anxiety, thereby empowering caregivers to make informed healthcare decisions. Enhancing primary care accessibility and communication between healthcare providers and caregivers could also mitigate the burden of non-urgent ED visits. By addressing these issues, healthcare systems can optimize resource allocation and improve patient outcomes in pediatric care settings.

Key words: anxiety; health literacy; non-urgent visit; pediatric care; pediatric emergency department; primary care utilization

INTRODUCTION

Pediatric emergency departments play a crucial role in providing timely and specialized care to children during medical emergencies. In the Philippines, private healthcare facilities were established to cater the needs of pediatric patients, however, the increasing number of non-urgent visits to private pediatric emergency departments has been considered as a growing concern as it leads to the inefficient allocation of resources, increased healthcare costs, and longer waiting times for children with genuine emergencies.[1-2]

From several literature, the common factors that determine non-urgent visits are the lack of awareness of appropriate primary care services[3], the lack of access to well-established primary care providers[4,5], the lack of awareness about when and where to seek medical care, and parental anxiety and perceived severity of a child's illness or injury.[6,7] Moreover,

Correspondence: Kurt Paul T. Gloriani, MD
kurtgloriani@gmail.com

cultural beliefs and societal pressures may also play a role among parents when seeking immediate care for their children, even when unnecessary.[8] In settings where access to well-established primary care providers is limited or perceived as inconvenient, parents may view the emergency department as the most accessible and reliable option for their child's healthcare needs. Institutional trust, availability of diagnostic services, and perceived quality of care further reinforce this preference, particularly in private healthcare settings.

Parental anxiety and perceived severity of a child's illness also play a critical role in healthcare-seeking behavior.[6,8] Parents may struggle to accurately assess the urgency of their child's symptoms, leading to overestimation of illness severity and unnecessary ED visits.[9] Psychological factors such as heightened anxiety can influence decision-making, especially when parents are uncertain or dissatisfied following outpatient consultations. Cultural beliefs and societal expectations may further contribute to the tendency to seek immediate emergency care for pediatric concerns.

Health literacy is another important determinant of healthcare utilization. Caregivers with limited health literacy may encounter difficulties understanding medical information, navigating healthcare systems, and accessing appropriate outpatient care.[10] As a result, they may rely more heavily on emergency departments for non-urgent concerns due to perceived ease of access and immediate availability of services.[11] Conversely, higher health literacy has been associated with more appropriate use of healthcare resources and improved decision-making.

Hence, the goal of this research was to investigate the factors that contribute to non-urgent pediatric ED visits and explore the relationship of parental anxiety and health literacy in relation to non-urgent pediatric emergency department visits. It also aimed to shed light on various factors to inform targeted interventions which may improve healthcare delivery, resource allocation, and patient outcomes. Results of this study may help in the development of strategies to reduce the number of non-urgent ED visits and improve the quality of care provided for children while identifying areas for improvement which can lead to better patient education and satisfaction leading to the reduction of non-urgent visits among private pediatric emergency departments in the Philippines. This study was only limited among parents or legal guardians who visited The Medical City Children's Emergency Department for non-urgent cases from May to June 2024.

METHODS

Population and Sample

The study used purposive sampling involving 342 parents and legal guardians of pediatric patients brought to the Medical City Children's Emergency Department who were categorized by the triage nurse as non-urgent from May to June 2024 based on the hospital's triage protocol. Parents or legal guardians of children classified as urgent, emergent, or trauma cases, as well as those who were unable or unwilling to participate in the study fully, were excluded.

This study was reviewed and approved by the Institutional Review Board of The Medical City under registry number GCS PED 2023-153. All procedures performed were in accordance with ethical standards for research involving human participants. Informed consent was obtained from all respondents after a thorough explanation of the study's objectives, procedures, and potential benefits before participation in the study.

This study employed an analytical cross-sectional design to explore the factors influencing non-urgent visits to a private pediatric emergency department. It was conducted at the Medical City Children's Emergency Department in Pasig, Philippines, from May to June 2024. Data were collected using a structured questionnaire administered after the child's treatment session to reduce potential emotional discomfort among respondents. The questionnaire comprised three sections: (1) demographic characteristics, (2) caregiver health literacy assessed using the Everyday Health Information Literacy Scale (EHILS), and (3) caregiver anxiety measured using the Generalized Anxiety Disorder-7 (GAD-7). Participants received standardized instructions and were given 15–30 minutes to complete the forms, with the researcher present to answer questions and ensure procedural consistency. Caregivers who scored in the severe range on the GAD-7 were provided with instructions and guidance regarding a psychiatric consult.

Health literacy was assessed using the EHILS, previously used in Filipino populations[12] and was checked for internal consistency (Cronbach's α = 0.869). Caregiver anxiety was measured using the

GAD-7, a validated screening tool also applied in Filipino populations which showed excellent internal consistency in this study (Cronbach's $\alpha = 0.911$).[13] Both instruments were administered in English, consistent with routine clinical communication in the Philippine healthcare setting and appropriate for the study population.

Key variables included in this study are demographic characteristics (e.g., age, sex, marital status, education, and income), parental anxiety levels (GAD-7), and health literacy levels (EHILS). Reasons for ED visits were also recorded, focusing on factors such as trust in the hospital, perceived urgency, and logistical considerations like convenience and access.

Analysis

The gathered information was treated using the Statistical Package for the Social Sciences (SPSS version 28). Descriptive statistics were utilized, specifically, the frequency, percentage, mean, and standard deviation to summarize participant demographics, anxiety levels, and health literacy. Associations between categorized anxiety/health literacy levels and reasons for ED visits were analyzed using the chi-square test of association. Statistical significance was set at $p < .05$.

RESULTS

The mean age of the participants was 38.3 years (±2.36), with the majority being female (68.7%) and married (77.6%). Most participants had at least a college degree (86.6%), with a smaller number holding postgraduate qualifications (11.7%). The patients' mean age was 6.2 years (±4.74), and most families reported having an average of two children (IQR = 1) (Table 1).

The most common reason cited for visiting the emergency department (ED) was trust in the hospital's reputation (74.6%), followed by the perceived immediate need for medical attention (70.6%) and the availability of rapid diagnostic tests (58.9%). (Table 2)

Interestingly, majority of the participants bypassed outpatient services, with 78.4% directly visiting the ED without prior consultation in an outpatient department (Table 3). Additionally, 21.3% of respondents admitted using the ED to bypass waiting lists for specialized care (Table 4).

Table 1. Demographic characteristics of the participants

CHARACTERISTICS	VALUES
Age, Mean ± SD	38.3 ± 2.36
Sex	
Male	107 (31.3%)
Female	235 (68.7%)
Marital Status	
Single	72 (21.0%)
Married	266 (77.6%)
Widowed	2 (0.6%)
Separated	3 (0.9%)
Educational Attainment	
Elementary	1 (0.3%)
High school	5 (1.5%)
College	297 (86.6%)
Post-graduate	40 (11.7%)
Monthly Family Income	
PHP 10,957 and below	5 (1.5 %)
PHP 10,957 - PHP 21,914	22 (6.4 %)
PHP 21,914 - PHP 43,328	66 (19.2 %)
PHP 43,828 - PHP 76,669	84 (24.5 %)
PHP 76,669 - PHP 131,484	71 (20.7 %)
PHP 131,484 - PHP 219,140	65 (19.0 %)
PHP 219,140 and above	30 (8.7 %)
Age of the Patient, Mean ± SD	6.20 ± 4.74
Number of Children, Median (IQR)	2 (1.00)
Relationship with the Patient	
Father	97 (28.3 %)
Mother	245 (71.4 %)
Grandmother	1 (0.3 %)

The study also explored the levels of parental anxiety and health literacy. Most participants exhibited minimal to mild anxiety (75.2%), while 24.8% experienced moderate to severe anxiety based on the Generalized Anxiety Disorder-7 (GAD-7) scale (Table 5).

In terms of health literacy, 62.7% of participants demonstrated medium to high literacy levels, while 23.0% had medium to low levels. A smaller number exhibited high literacy (13.7%), and only 0.6% were classified as having low health literacy (Table 6).

The correlation between anxiety and reasons for ED visits (Table 7) and health literacy and reasons for ED visits were identified (Table 8). Parents with moderate to severe anxiety were significantly more likely to report perceived worsening of their child's condition or a need for urgent care, even when unnecessary. Similarly, participants with lower health literacy were more likely to cite challenges in contacting their regular physician as a reason for seeking emergency services.

Table 2. Reason for the emergency department visits

REASONS	Values
1. Availability of rapid medical tests.	202 (58.9%)
2. Deterioration of child's clinical condition after seeing their doctor.	31 (9.0%)
3. Child requires immediate medical treatment.	242 (70.6%)
4. Unable to contact his/her doctor.	34 (9.9%)
5. Doctor suggested going to the Emergency Room.	54 (15.7%)
6. Doctor did not consider it appropriate to see the child urgently.	5 (1.5%)
7. Skip the waiting list to receive specialistic care.	73 (21.3%)
8. Unresolved health issue.	51 (14.9%)
9. Foreign patients or on vacation.	7 (2.0%)
10. Trust in the hospital.	256 (74.6%)
11. Convenience for my working hours.	90 (26.2%)
12. Unable to access outpatient clinic due to COVID symptoms.	4 (1.2%)

Table 3. Visits to outpatient department prior to emergency department visit

RESPONSES	VALUES
No	269 (78.4%)
Yes	74 (21.6%)

Table 4. Main reason for choosing TMC ER

REASONS	VALUES
1. It is the closest emergency room to my home.	28 (8.2 %)
2. I think I can solve my child's problem faster here.	41 (12.0 %)
3. Trustworthiness/reputation of this hospital.	109 (31.8 %)
4. Previous positive experience on this emergency room.	40 (11.7 %)
5. My doctor is affiliated in this hospital.	42 (12.2 %)
6. HMO coverage to this hospital.	83 (24.2 %)

Table 5. Level of anxietya of the participants

LEVEL OF ANXIETY	VALUES
Minimal Anxiety	148 (43.1%)
Mild Anxiety	110 (32.1%)
Moderate Anxiety	59 (17.2%)
Severe Anxiety[b]	26 (7.6%)

[a] Measured using GAD-7

[b] Participants who were found to have severe anxiety based on GAD-7 scores were given referrals to a psychiatrist for consultation.

Table 6. Level of health literacy of the participants

LEVEL OF HEALTH LITERACY	VALUES
High	47 (13.7 %)
Medium High	215 (62.7 %)
Medium Low	79 (23.0 %)
Low	2 (0.6 %)

[a] Measured using EHILS

Table 7. Association of GAD-7 scores with the participants' reason for ER visits.

REASONS	$\chi 2$	p-value[b]
Availability of rapid medical tests.	2.75	0.600
Deterioration of a child's clinical condition after seeing their doctor.	11.7	0.020
Child requires immediate medical treatment.	11.1	0.026
Unable to contact his/her doctor.	2.42	0.660
Doctor suggested going to the Emergency Room.	4.84	0.303
Doctor did not consider it appropriate to see the child urgently.	2.32	0.676
Skip the waiting list to receive specialistic care.	6.29	0.179
Unresolved health issue.	6.89	0.142
Foreign patients or on vacation.	3.24	0.519
Trust in the hospital.	2.26	0.689
Convenience for my working hours.	3.57	0.467
Unable to access outpatient clinic due to COVID-symptoms.	4.18	0.382

[a]Chi-square test of association.
[b]Significance was set at <.05.

Table 8. Association of EHILS scores with the participants' reason for ER visits.

REASONS	$\chi 2$	p-value[b]
Availability of rapid medical tests.	1.91	0.590
Deterioration of a child's clinical condition after seeing their doctor.	1.76	0.624
Child requires immediate medical treatment.	6.28	0.099
Unable to contact his/her doctor.	19.5	<.001
Doctor suggested going to the Emergency Room.	4.92	0.178
Doctor did not consider it appropriate to see the child urgently.	0.203	0.977
Skip the waiting list to receive specialistic care.	1.69	0.640
Unresolved health issue.	1.17	0.760
Foreign patients or on vacation.	0.174	0.982
Trust in the hospital.	3.71	0.294
Convenience for my working hours.	0.803	0.849
Unable to access outpatient clinic due to COVID-symptoms.	0.511	0.916

[a]Calculated using Chi-square test of association.
[b]Significance was set at <.05

DISCUSSION

The study revealed that trust in the hospital, perceived urgency for immediate care, and availability of rapid diagnostic tests were the most common reasons for non-urgent visits to a private pediatric emergency department. Additionally, parental anxiety and health literacy levels significantly influenced decision-making, with higher anxiety and lower health literacy being associated with increased reliance on emergency services for non-urgent concerns. These findings underscore the multifaceted factors driving healthcare utilization among pediatric emergency settings.

Trust in the hospital is the most common reason for choosing an ED reflecting the strong influence of perceived quality, reputation, and continuity of care on parental decision making. Caregivers were more likely to seek care in an institution where their child's physician was affiliated reinforcing the role of institutional familiarity.[14] Additionally, the perceived need for immediate medical attention and access to rapid diagnostic testing contributed significantly to emergency department utilization, consistent with prior studies showing that parents often seek prompt reassurance and definitive evaluation, even for non-urgent conditions.[15]

A notable proportion of caregivers did not consult an outpatient department prior to presenting to the emergency department. This suggests a tendency to bypass primary care, likely driven by expectations of faster service, difficulties accessing outpatient appointments, and concerns regarding symptom progression. Among those who sought outpatient care before visiting the emergency department, dissatisfaction with prior management or perceived clinical deterioration prompted escalation to emergency services. These findings align with existing literature indicating that barriers to timely primary care access and uncertainty following outpatient consultation contribute to non-urgent emergency department use.

The association between parental anxiety and the perceived need for emergency care highlights the psychological dimensions of healthcare-seeking behavior. Parental anxiety often drives unnecessary emergency visits, particularly in situations where caregivers struggle to assess the severity of their child's condition.[1,6] Parents experiencing moderate to severe anxiety were more likely to view their child's condition as requiring urgent attention, even when it was medically unnecessary. Due to availability of rapid medical tests, parents often seek reassurance through diagnostic testing, even for non-urgent cases.[16] This aligns with studies demonstrating that heightened anxiety can distort perceptions of illness severity, leading to increased healthcare utilization.[17] The association between anxiety and emergency department use underscores the psychological dimension of non-urgent ED visits, suggesting that reassurance-seeking behavior may be a key motivator for seeking emergency care.[18]

Similarly, lower health literacy levels were associated with challenges in navigating primary care, resulting in greater dependence on emergency services. Caregivers with lower health literacy were more likely to report difficulty in contacting their child's physician which leads to increased emergency service reliance. These results are similar to the findings from previous studies. Moreover, it was also noted that lower health literacy levels contribute to one's reliance on emergency departments, specifically among caregivers with limited knowledge of healthcare systems as they may perceive ED visits as the most accessible option.[19,20] In contrast, higher health literacy levels were associated with more appropriate healthcare utilization, reinforcing the importance of caregiver education in promoting effective decision-making.[12] However, not all findings are consistent across all studies since there were discrepancies in the correlation between income levels and ED visits.[7] This may be due to the limited socioeconomic diversity of the sample population, or the specific characteristics present in the private healthcare setting.

Limitations and Recommendations

The study has several limitations. The study was conducted in a single institution with a short period for data collection which may have limited the generalizability of the findings to other healthcare institutions. Second, the study relied on self-reported information on anxiety and health literacy may also be influenced by social desirability bias. Hence, future research should include more hospital settings over a longer period to better capture variations in pediatric emergency department utilization.

Future research should explore the impact of targeted interventions, such as parental education programs and telehealth services, in reducing non-urgent ED visits. Studies investigating the interplay of cultural beliefs, socioeconomic factors, and healthcare access can provide a more comprehensive understanding of this phenomenon.

CONCLUSION

The study highlights the significant role of parental anxiety and health literacy in non-urgent pediatric emergency visits. Interventions aimed at improving health literacy and managing anxiety could empower caregivers to make informed decisions and reduce reliance on emergency services. Additionally, enhancing access to outpatient care and improving communication between healthcare providers and caregivers may help reduce non-urgent emergency department utilization, ultimately improving resource allocation and patient outcomes in pediatric care.

REFERENCES

1. Ravi N, Gitz KM, Burton DR, et al. Pediatric nonurgent emergency department visits and prior care seeking at primary care. BMC Health Serv Res 2021;21:466. doi:10.1186/s12913-021-06480-7.
2. Uscher-Pines L, Pines J, Kellermann A, Gillen E, Mehrotra A. Emergency department visits for nonurgent conditions: systematic literature review. Am J Manag Care 2013;19(1):47–59.
3. Kirby S, Wooten W, Spanier AJ. Pediatric primary care relationships and nonurgent emergency department use in children. Acad Pediatr 2021;21(5):900–6. doi:10.1016/j.acap.2021.03.019.
4. Gizaw Z, Astale T, Kassie GM. What improves access to primary healthcare services in rural communities? A systematic review. BMC Prim Care 2022;23:313. doi:10.1186/s12875-022-01919-0.
5. Dayrit MM. The Philippines health system review. Manila: World Health Organization; 2018.
6. Pehlivanturk-Kizilkan M, Ozsezen B, Batu ED. Factors affecting nonurgent pediatric emergency department visits and parental emergency overestimation. Pediatr Emerg Care 2022;38(6):264–8. doi:10.1097/PEC.0000000000002723.
7. Nicholson E, McDonnell T, De Brún A, Barrett M, Bury G, Collins C, et al. Factors that influence family and parental preferences and decision making for unscheduled paediatric healthcare: a systematic review. BMC Health Serv Res 2020;20:663. doi:10.1186/s12913-020-05527-5.

8. Bartolome MT, Mamat N, Masnan AH. Parental involvement in the Philippines: a review of literatures. Int J Early Child Educ Care 2017;6:41–50.
9. Ashcraft LE, Asato M, Houtrow AJ, Kavalieratos D, Miller E, Ray KN. Parent empowerment in pediatric healthcare settings: a systematic review of observational studies. Patient 2019;12(2):199–212. doi:10.1007/s40271-018-0336-2.
10. Liu C, Wang D, Liu C, Jiang J, Wang X, Chen H, et al. What is the meaning of health literacy? A systematic review and qualitative synthesis. Fam Med Comm Health 2020;8(2):e000351. doi:10.1136/fmch-2020-000351.
11. Balakrishnan MP, Herndon JB, Zhang J, Payton T, Shuster J, Carden DL. The association of health literacy with preventable emergency department visits: a cross-sectional study. Acad Emerg Med 2017;24(9):1042–50. doi:10.1111/acem.13244.
12. Jimenez MLC, Manzanera R, Carascal MB, Figueras MD, Wong JQ, Moya D, et al. Factors affecting nonurgent consultations in the emergency department of a tertiary hospital in the Philippines: a cross-sectional study. Emerg Med Australas 2021;33(2):349–56. doi:10.1111/1742-6723.13725.
13. Garabiles MR, Lao CK, Yip P, Chan EWW, Mordeno I, Hall BJ. Psychometric validation of PHQ-9 and GAD-7 in Filipino migrant domestic workers in Macao (SAR), China. J Pers Assess 2019;101(6):e1–e12. doi:10.1080/00223891.2019.1644343.
14. Coxeter PD, Mar CD, Hoffmann TC. Parents' expectations and experiences of antibiotics for acute respiratory infections in primary care. Ann Fam Med 2017;15(2):149–54. doi:10.1370/afm.2040.
15. Guttmann A, Schull MJ, Vermeulen MJ, Stukel TA. Association between waiting times and short-term mortality and hospital admission after departure from emergency department: population-based cohort study from Ontario, Canada. BMJ 2011;342:d2983.
16. Sustersic M, Tissot M, Tyrant J, Gauchet A. Impact of patient information leaflets on doctor–patient communication in the context of acute conditions: a prospective controlled study in emergency departments. BMJ Open 2019;9:e024184.
17. Shields L, Zhou H, Pratt J, Taylor M. Family-centered care for hospitalized children aged 0–12 years. Cochrane Database Syst Rev 2018;9:CD004811.
18. Stallard P, Velleman R, Langsford J, Baldwin S. Coping and psychological distress in children involved in road traffic accidents. Br J Clin Psychol 2001;40(2):197–208.
19. Paasche-Orlow MK, Wolf MS. The causal pathways linking health literacy to health outcomes. Am J Health Behav 2007;31(Suppl 1):S19–S26.
20. Baker DW, Wolf MS, Feinglass J, Thompson JA. Health literacy, cognitive abilities, and mortality among elderly persons. Arch Intern Med 2006;166(14):1503–9.

Original Article

Knowledge, Attitudes, and Practices on Pinggang Pinoy Among Filipino Senior High School Students in Cagayan De Oro City and its Correlation with Malnutrition

Mariel Ann C. Waga, MD and John Paul L. Oliveros, MD
Department of Pediatrics, Maria Reyna-Xavier University Hospital, Cagayan de Oro City

ABSTRACT

Introduction: *Pinggang Pinoy* is a food-based dietary guideline developed to promote balanced and healthy eating among Filipinos. Understanding adolescents' knowledge, attitudes, and practices (KAP) regarding *Pinggang Pinoy* is important because dietary behaviors established during this stage may influence long-term nutritional status and health outcomes. This study aimed to assess the knowledge, attitudes, and practices (KAP) regarding *Pinggang Pinoy* among senior high school students, compare the KAP between students in public and private schools, and examine their correlation with malnutrition.
Methods: This was an analytic cross-sectional study. Respondents were senior high school students from selected private and public schools in Cagayan de Oro City enrolled for S.Y. 2024-2025. A modified Knowledge, Attitudes, and Practices (KAP) questionnaire on *Pinggang Pinoy* was used in this study. Spearman Correlation test was used to determine correlation between KAP on *Pinggang Pinoy* and malnutrition.
Results: The respondents mean age was 16.7 years old and most were female (55%). Malnutrition is seen in 24% of respondents (wasting 13%; overweight/obese 11%). Both private and public senior high school students generally exhibited poor knowledge (71.4%), positive attitudes (73.9%), and good practices (62.9%) of *Pinggang Pinoy*. Significantly more respondents from the public schools had poor knowledge (p= 0.022) and neutral attitudes (p= 0.001). Weak positive correlation was found between malnutrition and poor knowledge (r = 0.205) and lack of practice (r = 0.200) of *Pinggang Pinoy*.
Conclusion:Senior high school students demonstrated poor knowledge but generally positive attitudes and good practices regarding *Pinggang Pinoy*. A weak association was observed between malnutrition and knowledge and practice related to *Pinggang Pinoy*; however, causality cannot be inferred.

Key words: *Pinggang Pinoy*, Knowledge, Attitudes, Practices, Malnutrition, Adolescent

INTRODUCTION

Adolescence is a critical period of growth and development marked by rapid physical changes, psychological maturation, and increasing social independence. Adequate nutrition during this stage is essential to support optimal growth, cognitive development, and overall health.[1,3] However, adolescents begin to exercise greater autonomy in food choices, which are influenced by peers, media exposure, and the surrounding environment, increasing their risk for unhealthy dietary behaviors. There are about twenty-one million adolescents in the Philippines.[4] In Cagayan de Oro City, this age group accounts for 18.34% of the total population.[5] Therefore, addressing adolescent nutrition should be of utmost importance at both the national and local levels.

Unhealthy eating patterns among adolescents have become increasingly prevalent and contribute to the growing burden of malnutrition. The frequent consumption of sugar-sweetened beverages and processed, energy-dense foods high in fat, salt,

Correspondence: Mariel Ann C. Waga, MD
email: mariel09annwaga@gmail.com

and sugar has been observed among Filipino adolescents.[6] National data demonstrate a rising prevalence of overweight and obesity alongside a persistent prevalence of wasting.[7] In Cagayan de Oro City, notable proportions of adolescents are affected by either undernutrition or overnutrition, reflecting a dual burden of malnutrition with potential short- and long-term health consequences.[8]

Strategies to improve nutrition and eating habits among adolescents include nutrition education in the school curriculum, improving the quality of school meals, restricting the advertisement and promotion of unhealthy foods, social and behavioral change campaigns, micronutrient supplementation, and deworming.[3] Food-based dietary guidelines (FBDGs) are practical tools that promote healthier dietary practices. The *Pinggang Pinoy* was developed to illustrate the recommended proportions of food groups for Filipinos on a per-meal basis.[9-10] It has been widely promoted through community- and school-based programs.[11-12] However, the effectiveness of the *Pinggang Pinoy* program has yet to be evaluated. This study aimed to assess the knowledge, attitudes, and practices (KAP) regarding *Pinggang Pinoy* among senior high school students in Cagayan de Oro City, compare KAP between public and private school students, and examine their association with malnutrition.

METHODS

This study received ethics approval from the Hospital Ethics Committee. An analytic cross-sectional study design was employed. A questionnaire adapted from a local study was used to assess the knowledge, attitudes, and practices (KAP) on *Pinggang Pinoy*.[13] The modified KAP questionnaire was evaluated for content validity. Pilot testing conducted among 40 senior high school students demonstrated good reliability (Cronbach $\alpha = 0.78$).

The sample size was 397 (95% CI). Participants were high school students aged 16–18 years with assent and parental consent.

Data were encoded and tabulated using Microsoft Excel version 2410 and SPSS Statistics version 20. Quantitative data were analyzed using descriptive statistics and the Spearman correlation test.

Categorical variables were presented as counts (N) and percentages (%), while continuous variables were expressed as means. A comparison of proportions between private and public schools was analyzed using the Chi-square test. A p value ≤ 0.05 was considered statistically significant.

RESULTS

Stratified random sampling was done to select 402 senior high school students from private and public schools. The mean age for respondents was 16.7 years old. The majority were female (55%) with a slight male predominance among public school students (53%). The mean weight, height, and BMI were 50.4kg ,156.4 cm, and 20.48 kg/m^2 respectively. Most respondents had normal nutritional status. Only 24% were malnourished (Table 1).

The respondents' knowledge on *Pinggang Pinoy* were predominantly poor (71.4%). Significantly more respondents coming from the public school had poor knowledge on *Pinggang Pinoy* compared to the private school. Most had incorrect answers on questions pertaining to the recommended proportions and graphic representation of food groups (Table 2).

The overall weighted mean score of attitudes was 3.74 (Likert scale: Agree). Respondents generally had positive attitudes towards *Pinggang Pinoy* (73.1%). Private high school students had significantly more students with positive attitudes towards *Pinggang Pinoy* (80.1%) compared to public high school students (66.2%). Public school students had a more neutral response compared to private school students (Table 3). Items on the questionnaire that garnered neutral responses from the respondents were on reluctance to the use of *Pinggang Pinoy* due to culture/religion, restriction of food choices, and overwhelming information. The willingness to educate other people about Pinggang Pinoy also received a neutral response.

Most of the respondents have good practice on the dietary recommendations of *Pinggang Pinoy* in their household, having a weighted mean score of 3.66 (Likert Scale: Often). The following statements in the questionnaire had a Likert score of <3.5 (Sometimes to never): consumption of whole grains and fatty fish; limiting salty, sugary and fried foods; fruits and vegetables filling half the plate; and the use of *Pinggang Pinoy* as a guide for food consumption (Table 4).

Poor knowledge and the lack of practice on *Pinggang Pinoy* had a very weak positive correlation to malnutrition. There is no correlation between having a negative attitude on *Pinggang Pinoy* and malnutrition (Table 5).

Table 1. Sociodemographic profile of respondents.

Variables	Participants n=402	Public n=201	Private n=201	p-value
Age (years)				
Mean	16.7	16.9	16.6	0.230
Gender				
Male (%)	18 (45)	106 (53)	75 (37)	0.001*
Weight (kg)				
Mean	50.4	49.8	51.0	0.120
Height (cm)				
Mean	56.4	153.9	158.9	0.720
BMI				
Mean	20.48 ± 4.24	20.42 ± 3.77	20.55 ± 4.67	0.760
Nutritional status				
Normal (%)	306 (76)	149 (74)	157 (78)	0.35
Malnourished (%)	96 (24)	52 (26)	44 (22)	0.71
Wasted	52 (13)	27 (13)	25 (12)	0.76
Overweight/Obese	44 (11)	25 (12)	19 (9)	0.33

*$p \leq 0.05$

Table 2. Knowledge on *Pinggang Pinoy*

Criteria	Participants n=402 (%)	Public n=201 (%)	Private n=201 (%)	p-value
Good	74 (18.4)	29 (14.0)	45 (22.4)	0.065
Moderate	41 (10.2)	14 (7.0)	27 (13.4)	0.422
Poor	287 (71.4)	158 (79.0)	129 (64.2)	0.022*

*Statistically significant ($p \leq 0.05$) ; Bloom's cut off points for the total knowledge scores (Bloom,1968)

Table 3. Attitudes on *Pinggang Pinoy*

Criteria	Participants n=402 (%)	Public n=201 (%)	Private n=201 (%)	p-value
Positive Attitudes	294 (73.1)	133 (66.2)	161 (80.1)	0.002*
Neutral	106 (26.4)	67 (33.3)	39 (19.4)	0.001*
Negative Attitudes	2 (0.5)	1 (0.5)	1 (0.5)	1.000

*$p \leq 0.05$

Table 4. Practices of *Pinggang Pinoy*

Criteria	Participants n=402 (%)	Public n=201 (%)	Private n=201 (%)	p-value
Good practice	253 (62.9)	122 (60.7)	131 (65.2)	0.285
Lacking practice	149 (37.1)	79 (39.3)	70 (34.8)	0.285

*$p \leq 0.05$

Table 5. Correlation between Knowledge, Attitudes, and Practices to malnutrition

Variables	Malnourished (n=96) χ^2	Pearson Coefficient	Interpretation
Poor Knowledge	0.508	+0.205	Weak positive relationship
Negative Attitudes	3.735	+0.010	No or negligible relationship
Lack Practices	3.703	+0.200	Weak positive relationship

DISCUSSION

The proportion of malnourished respondents in the present study (24%) were consistent with national prevalence rates reported by the FNRI among adolescents (23.9%).[7-8] The proportions of wasted and overweight/obese respondents were also similar to the FNRI findings.[7-8]

The proportion of adolescents with poor knowledge of *Pinggang Pinoy* was higher than that of Filipino adults and Indonesian adolescents.[14-15] The poor knowledge among Filipino senior high school students may reflect the lack of its inclusion in the existing school nutritional educational programs and low awareness among household meal planners.[11-16] In contrast with an American study showing a higher familiarity with Food based dietary guidelines (MyPlate) among adolescents, possibly due to high school nutrition education programs[17-19]. Modifications in the graphic representations of food groups and their proportions in *Pinggang Pinoy* may improve understanding and recall among adolescents.

The overall weighted mean Likert score for attitudes toward *Pinggang Pinoy* was positive among respondents and comparable to Filipino adults.[13] The proportion of Filipino senior high school students with positive attitudes was slightly lower than that of Indonesian adolescents.[15] Neutral responses were significantly higher among public school students. Reluctance to use *Pinggang Pinoy* due to culture or religion, restrictions of food choices, and overwhelming information can be addressed by incorporating *Pinggang Pinoy* education program in their school curriculum. Their neutral responses could also be due to the misperception in adolescent age group of low risk for diseases with having an unhealthy diet. Nutrition education programs targeting adolescents should emphasize on positive short-term health outcomes on healthy eating and empowering them on food preparation skills.[13] Higher health education plays a role in increasing nutritional knowledge and attitudes among school adolescents.[19]

In the present study, 71% of the respondents had poor knowledge yet 63% had good practice. This contradiction is important but has remained unexplored. Possible explanations or underlying reasons could be parental influence, dietary preferences by the family, presence or absence of school feeding programs, peer group influence and social desirability bias.

The good practice on *Pinggang Pinoy* seen in more than half of respondents, may reflect the influence of parents, peers, and the surrounding environment on the teenagers' health practices.[17] Similar findings were reported among Filipino adults in a local study.[13] Many household meal planners were also found to consume a variety of foods despite having poor knowledge on *Pinggang Pinoy*.[16] However, there is still high prevalence of stunting, wasting, and overweight/obesity among Filipino adolescents.[8] In the present study, nearly 40% of respondents reported inadequate consumption of whole grains, fatty fish, fruits, and vegetables, limiting of salty, sugary, and fried foods, and the use of *Pinggang Pinoy* as a guide for food consumption. Adolescent nutrition programs should emphasize the importance of a balanced diet to prevent malnutrition and its consequences.

Currently, there are no studies correlating knowledge, attitudes, and practices (KAP) on *Pinggang Pinoy* among adolescents with malnutrition. This study is the first to show a weak positive correlation between poor knowledge, and lack of practice on *Pinggang Pinoy* and malnutrition among adolescents. Malnutrition in adolescents may result from nutrient deficiencies already present earlier due to poor eating habits and socio-economic factors. Malnutrition may persist in adulthood and may result in life changing comorbidities if not corrected.

CONCLUSION

There were poor knowledge (71% among respondents), positive attitudes (73%) and good

practice (63%) of *Pinggang Pinoy* among senior high school students. A weak positive correlation of poor knowledge and lack of practice of *Pinggang Pinoy* to malnutrition may suggest a role in the high prevalence of malnutrition among Filipino adolescents.

LIMITATIONS

There were only two schools included in the study. Although the schools were initially considered as representative schools, this may have contributed to the results. The researchers/authors also read the questions out loud to the study participants, so this may have led to increased conformity of responses due to peer group pressure and reduced privacy. The possibility of inflated good practice reporting may also be a limitation of this study.

RECOMMENDATIONS

The authors recommend re-evaluation of the Pinggang Pinoy Nutrition Program regarding implementation and dissemination among senior high school students. Revisions in the graphic representations of food groups and their respective proportions in the *Pinggang Pinoy* may be needed for easier understanding and recall among adolescents. The nutrition program should also emphasize the importance of eating a healthy balanced diet to prevent malnutrition and its consequences. The authors also recommend re-assessment of the knowledge, attitudes and practices of *Pinggang Pinoy* among senior high school students after changes on the Pinggang Pinoy Nutritional Program has been made.

REFERENCES

1. World Health Organization. Overweight and obesity [Internet]. Geneva: World Health Organization; 2021 Jun [cited 2024 Aug 12]. Available from: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
2. World Health Organization. Malnutrition [Internet]. Geneva: World Health Organization; [cited 2024 Aug 12]. Available from: https://www.who.int/news-room/fact-sheets/detail/malnutrition
3. UNICEF. Nutrition in middle childhood and adolescence [Internet]. New York: UNICEF; 2023 [cited 2024 Jun 30]. Available from: https://www.unicef.org/nutrition/middle-childhood-and-adolescence
4. UNICEF. How many children under 18 are there in the Philippines? [Internet]. New York: UNICEF; 2024 Jun [cited 2024 Aug 10]. Available from: https://data.unicef.org/how-many/how-many-children-under-18-are-there-in-the-philippines/
5. CityPopulation.de. Cagayan de Oro City – population statistics, charts, map, location, weather and web information [Internet]. [cited 2024 Aug 10]. Available from: https://www.citypopulation.de/en/philippines/mindanao/admin/misamis_oriental/104305__cagayan_de_oro/
6. UNICEF Philippines. UNICEF: many children and adolescents in the Philippines are not growing healthily [Internet]. Manila: UNICEF Philippines; 2023 Feb 9 [cited 2024 Jun 20]. Available from: https://www.unicef.org/philippines/press-releases/unicef-many-children-and-adolescents-philippines-are-not-growing-healthily
7. Department of Science and Technology–Food and Nutrition Research Institute. Trends in malnutrition among adolescents: 2018–2019 Expanded National Nutrition Survey (ENNS) [Internet]. Taguig City: DOST–FNRI; [cited 2024 Aug 12]. Available from: https://enutrition.fnri.dost.gov.ph/uploads/2018-2019%20ENNS%20FACTS%20AND%20FIGURES_JULY182023.pdf
8. Department of Science and Technology–Food and Nutrition Research Institute. Adolescents: the food, health and nutrition situation of Cagayan de Oro City. Taguig City: DOST–FNRI; 2018.
9. Florentino RF, Tee ES, Hardinsyah R, Ismail MN, Suthutvoravut U, Hop LT. Food-based dietary guidelines of Southeast Asian countries: part 2. Analysis of pictorial food guides. Malays J Nutr 2016;22(Suppl 1):S49–S55.
10. Food and Agriculture Organization of the United Nations. Food-based dietary guidelines [Internet]. Rome: FAO; [cited 2024 Aug 26]. Available from: https://www.fao.org/nutrition/education/food-based-dietary-guidelines
11. Sandoval MJA, Martinez CTS, Tan RCA, Ramos MAF, Capanzana MV. Pinggang Pinoy® community challenge: a precursor to healthy eating [Internet]. Taguig City: Department of Science and Technology–Food and Nutrition Research Institute; 2019 [cited 2024 Aug 12]. Available from: https://www.fnri.dost.gov.ph/images/sources/SeminarSeries/45th/PinggangPinoy.pdf
12. Department of Education. 2015 Nutrition Month celebration (DO 62, s. 2015) [Internet]. Pasig City: Department of Education; 2015 [cited 2024 Aug 10]. Available from: https://www.deped.gov.ph/wp-content/uploads/2015/06/DM_s2015_062.pdf
13. Mandado M. Knowledge, attitudes, and practices on the Pinggang Pinoy and its association with the dietary intake of early-aged adults (20–30 years old) in Plantacion Meridienne, Lipa City, Philippines. Los Baños (Laguna): University of the Philippines Los Baños, College of Human Ecology; 2023.
14. Leyson FR, Moriles KM, Pausanos HM, Quiboyen E, Gugudan E. Awareness on the use of basic nutrition tools among second-year students of Cebu Doctors' University [Internet]. HERDIN; 2016 [cited 2024 Aug 12]. Available from: https://www.herdin.ph/index.php/component/herdin/?view=research&cid=67955
15. Jeslin AJ. The relationship between Indonesian young people's knowledge, attitude and practice (KAP) of MyPlate with sociodemographic, body satisfaction, accessibility, and source of information. Glob Health Promot 2023;30(4):35–44. doi:10.1177/17579759231182472

16. Lopez-Madrid MM, Acuin CCS, Orense CL, Duante CA, Tan RCA, Capanzana MV. Awareness of and adherence to the food-based dietary guidelines among household meal planners in the Philippines. Philipp J Sci 2017;147(3):523–35.
17. Caleyachetty R. Malnutrition among adolescents in low- and middle-income countries. Sight Life 2018;32(2):9.
18. Westfall M, Roth SE, Gill M, Chan-Golston AM, Rice LN, Crespi CM, Prelip ML. Exploring the relationship between MyPlate knowledge, perceived diet quality, and healthy eating behaviors among adolescents. Am J Health Promot 2020;34(7):713–21. doi:10.1177/0890117120901430
19. Liu KSN, Chen JY, Sun KS, Tsang JPY, Ip P, Lam CLK. Adolescent knowledge, attitudes and practices of healthy eating: findings among Hong Kong families. Nutrients 2022;14:2857. doi:10.3390/nu14142857

Original Article

Effectiveness of the Teddy Bear Hospital Method Pretend Play Intervention in Reducing Anxiety Levels Among Pediatric Patients with Chronic Illnesses Visiting the Outpatient Department: A Quasi-Experimental Pilot Study

Raizel Marie DR. Luciano, MD; Kris Ian B. Mendoza, MD; Anne Margarette Canapi-Acero, MD and Charisse B. Pulmano, MD
Ospital ng Maynila Medical Center, City of Manila

ABSTRACT

Introduction: Pediatric patients with chronic illnesses often experience heightened anxiety during outpatient visits, impacting their overall well-being. Theorists have claimed that play in general reduces stress, enhances behavioral regulation, and complements coping mechanisms in young children. These qualities make Teddy Bear Hospital (TBH) a feasible and novel approach to treating anxiety in pediatric outpatient settings, especially for patients with repeated and ongoing exposure to possibly stressful medical environments due to their chronic conditions. This study aimed to assess the effectiveness of the Teddy Bear Hospital (TBH) intervention as a non-pharmacological method to reduce anxiety levels in children aged 3 to 12 years.

Methods: A quasi-experimental pilot study was conducted involving 40 pediatric outpatients. A 30-minute structured play session was done where children were taught the use and function of medical equipment, as well as coping mechanisms when dealing with anxiety during a hospital visit. Short-term state anxiety changes during the outpatient visit were measured using the Hamilton Anxiety Rating Scale (HAM-A) and physiological levels like heart rate and respiratory rate.

Results: The TBH intervention significantly reduced anxiety levels, with mean HAM-A scores decreasing from 18.5 (SD = 4.2) pre-intervention to 11.2 (SD = 3.8) post-intervention ($p < 0.001$). Physiological markers, including heart rate and respiratory rate, also showed statistically significant reductions ($p < 0.05$). Observational data showed reduced nervous behaviors and increased engagement during the intervention.

Conclusion: TBH intervention was associated with short-term reductions in psychological and physiological anxiety markers during the outpatient visit. Since the study employed a single-group pre–post design with immediate post-session measurement, findings reflect transient state anxiety changes rather than sustained reductions in generalized anxiety.

Key words: Teddy Bear Hospital, pediatric anxiety, chronic illness, non-pharmacological intervention, outpatient care

INTRODUCTION

Anxiety is a frequent and clinically significant concern among pediatric patients with chronic illnesses, particularly those who require regular outpatient follow-up and repeated medical procedures. Ongoing exposure to healthcare settings can heighten emotional distress and provoke physiological stress responses such as tachycardia and increased respiratory rate, which may adversely affect treatment adherence, recovery, and overall quality of life.[1] For children living with chronic disease, anxiety is not incidental but an integral part of the illness experience that warrants targeted intervention.

Correspondence: Raizel Marie DR. Luciano, MD
email: raizeluciano@gmail.com

Play-based, non-pharmacological interventions have long been recognized as developmentally appropriate strategies for reducing healthcare-related anxiety in children. Pretend play allows children to make sense of unfamiliar or threatening experiences by placing them within a familiar and controllable framework.[2] The Teddy Bear Hospital (TBH) method applies this principle by encouraging children to role-play as healthcare providers caring for their toys, thereby increasing familiarity with medical procedures and reducing fear toward healthcare environments and personnel.[3-4]

Although TBH has shown effectiveness in perioperative and inpatient settings, its application among pediatric patients with chronic illnesses in outpatient clinics has been less extensively studied. This population is uniquely vulnerable, as repeated and prolonged encounters with healthcare systems may compound anxiety over time.[5] Furthermore, many existing studies assess anxiety using either psychological or physiological indicators alone, limiting insight into how interventions influence the full spectrum of anxiety responses.[6]

This study addressed these gaps by examining the effectiveness of the TBH intervention in a tertiary government hospital outpatient setting, where practical, low-cost strategies are particularly valuable. Anxiety was evaluated using both psychological measures, through the Hamilton Anxiety Rating Scale (HAM-A), and objective physiological markers such as heart rate and respiratory rate. This combined approach allows for a more comprehensive assessment of anxiety reduction and reflects the multidimensional nature of stress responses in children.[7-8]

The primary objective of this study was to determine the effectiveness of the Teddy Bear Hospital pretend play intervention in reducing anxiety among pediatric patients with chronic illnesses attending the outpatient department. Specifically, the study aimed to describe participant characteristics, evaluate changes in psychological and physiological anxiety markers before and after the intervention, and examine whether demographic or clinical factors influenced its effectiveness. By focusing on the outpatient setting, this study provides clinically relevant evidence supporting the integration of play-based, patient-centered interventions into the routine management of chronic pediatric conditions.

METHODS

Study Design

This pilot study employed a quasi-experimental, single-group pretest–posttest design to evaluate changes in anxiety among pediatric patients attending the outpatient department of a tertiary government hospital following participation in the Teddy Bear Hospital (TBH) intervention. Anxiety was measured immediately before and after a structured 30-minute TBH session within the same participants. The TBH intervention used guided pretend play to familiarize children with the medical environment through role-play with teddy bears, including explanations of medical equipment and coping strategies.

The design was selected for feasibility in a real-world outpatient setting and to generate preliminary data for future controlled trials. As no control group was included, findings reflect short-term associations between TBH participation and changes in psychological and physiological anxiety markers.

Study Setting

The study was conducted in the outpatient department of a tertiary government hospital serving a diverse patient population, including individuals from underserved communities. The setting was selected due to its high volume of pediatric patients with chronic conditions and its suitability for implementing low-cost, non-pharmacological interventions such as the TBH program within a resource-limited environment.

Study Population and Sample Size

The study included pediatric patients aged 3–12 years with a confirmed diagnosis of chronic illness who were receiving care at the outpatient department during the study period. Chronic conditions included, but were not limited to, rheumatic heart disease, rheumatic fever, systemic lupus erythematosus, nephrotic syndrome, bronchial asthma, and seizure disorder. Written informed consent was obtained from parents or legal guardians prior to participation. Children who were unable to actively participate in TBH activities due to severe medical, psychiatric, or neurological limitations were excluded from the study.

Sample size estimation assumed a medium effect size (d = 0.5), $\alpha = 0.05$, and 80% power for a two-tailed paired t-test, yielding a minimum required sample of 26 participants. The final sample exceeded this estimate, ensuring adequate power to detect pre–post differences in anxiety scores.

Sampling Procedure

In this pilot study, eligible pediatric OPD patients were systematically sampled by selecting every nth child who met the inclusion criteria until the target sample size was reached.

Socio-Demographic and Clinical Characteristics

Socio-demographic data, including age and sex, were collected through parent or guardian interviews and verified using medical records. Clinical information, including type of chronic illness and frequency of outpatient visits, was extracted from medical records. Visit frequency (e.g., every 21, 30, or 60 days) was recorded to characterize patterns of healthcare utilization. These variables were documented to describe the study population and to explore potential associations with baseline anxiety and response to the intervention.

Pre- and Post-Intervention Anxiety Assessment

To evaluate short-term changes in anxiety during the outpatient visit, pre- and post-intervention assessments were conducted. Anxiety levels were measured using the Hamilton Anxiety Rating Scale (HAM-A), a clinician-administered instrument that evaluates both psychological and somatic manifestations of anxiety.

Although originally developed for adults, the HAM-A was selected for this pilot study because of its structured clinician-rated format and inclusion of observable somatic symptoms (e.g., cardiovascular, respiratory, autonomic signs), which were relevant to the outpatient medical context. In this study, the HAM-A was administered as an observational, interviewer-guided assessment rather than a self-report tool. Items deemed developmentally inappropriate for young children (e.g., sexual or genitourinary function items) were not emphasized in scoring and were interpreted within an age-appropriate clinical context. Each item is rated on a 5-point scale ranging from 0 (not present) to 4 (very severe), yielding a total score between 0 and 56, with higher scores indicating greater anxiety severity. The HAM-A has been widely used in clinical and research settings and demonstrates acceptable reliability and validity for measuring changes in anxiety symptoms over time.

The primary intent was to capture short-term state anxiety changes rather than diagnose generalized anxiety disorder or assess trait anxiety. Baseline HAM-A scores were recorded prior to the intervention, and follow-up scores were collected immediately after the 30-minute TBH session to assess acute changes in anxiety markers.

To enhance measurement consistency, assessments were conducted by trained evaluators using a standardized administration guide. Inter-rater reliability was assessed in a subset of cases and demonstrated acceptable agreement prior to full data collection.

Physiological Markers

In addition to HAM-A scores, physiological markers associated with anxiety—such as heart rate, respiratory rate, blood pressure, temperature, and oxygen saturation—were recorded before and after the TBH intervention. Baseline measurements provided an objective view of each participant's physiological response to anxiety, while post-intervention measurements captured any immediate physical changes related to the intervention. This dual assessment of psychological and physiological indicators offered a comprehensive evaluation of the TBH method's impact on both mental and physical aspects of anxiety.

Behavioral Observations

During the TBH intervention, behavioral responses were observed and documented to capture any immediate changes, such as reductions in visible nervousness or increases in engagement. These behaviors were recorded using a standardized observation checklist, providing qualitative data to complement the quantitative HAM-A and physiological measurements. Behavioral observations added depth to the data, allowing for a fuller understanding of how children interacted with the TBH intervention and how their anxiety manifested through non-verbal cues.

Statistical Analysis

All analyses were performed using Stata version 17 BE, with statistical significance set at $p < 0.05$. Normality of continuous variables was assessed using histograms, Q–Q plots, and the Shapiro–Wilk test. Normally distributed continuous variables were analyzed using paired t-tests; non-normally distributed variables were analyzed using appropriate nonparametric alternatives.

Descriptive statistics were used to summarize socio-demographic and clinical characteristics. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means and standard deviations or medians and interquartile ranges, as appropriate.

Pre- and post-intervention differences in continuous outcomes, including HAM-A scores and physiological parameters (heart rate, respiratory rate, blood pressure, temperature, and oxygen saturation), were evaluated using paired analyses. Changes in categorical anxiety severity levels were assessed using chi-square tests.

To explore potential confounding, linear regression analysis was performed with change in HAM-A score (post–pre difference) as the dependent variable and demographic (age, sex) and clinical variables (type of chronic illness, visit frequency) as independent variables.

Informed Consent and Assent

Ethics committee approval was obtained prior to the conduct of the study. Written informed consent was obtained from the parents or legal guardians of all eligible participants prior to study enrollment. Age-appropriate assent was also obtained from the children to ensure their understanding and voluntary participation. Participation was voluntary, and refusal or withdrawal did not affect the child's medical care. No financial incentives were provided.

RESULTS

Table 1 presents the demographic and clinical characteristics of the study population, consisting of 40 participants. The average age of participants was 9.9 years (± 3.2), with a majority being male (62.5%) compared to females (37.5%). The participants' current grade levels varied, with 37.5% in Grades 1 to 3, 40% in Grades 4 to 7, and 22.5% in Grades 8 to 11.

The distribution of ailments among participants shows that more than half (55%) had chronic or autoimmune conditions, such as seizure disorder, nephrotic syndrome, chronic kidney disease, and systemic lupus erythematosus. Cardiovascular conditions, including rheumatic heart disease, rheumatic fever, and hypertension, were observed in

Table 1. Characteristics of the study population (N=40)

Characteristics	Values
Age, years	9.9 ± 3.2
Sex	
Male	25 (62.50)
Female	15 (37.50)
Current Grade Level	
Grades 1 to 3	15 (37.50)
Grades 4 to 7	16 (40.00)
Grades 8 to 11	9 (22.50)
Ailments	
Respiratory and Infectious Diseases (Pulmonary tuberculosis and Asthma)	3 (7.50)
Cardiovascular Diseases (Rheumatic Heart Disease, Rheumatic fever, and Hypertension)	15 (37.50)
Other Chronic and Autoimmune Diseases (Seizure Disorder, Nephrotic Syndrome, Chronic Kidney Disease, and Systemic Lupus Erythematosus)	22 (55.00)
Frequency of hospital visits, days	
21	16 (40.00)
30	19 (47.50)
60	5 (12.50)

[a] Expressed as either Mean ± Standard Deviation or n (%)

37.5% of participants, while a smaller portion (7.5%) had respiratory or infectious diseases like pulmonary tuberculosis and asthma.

Additionally, the frequency of hospital visits varied: 40% visited every 21 days, 47.5% every 30 days, and 12.5% every 60 days. Values in the table are presented as either the mean ± standard deviation or as percentages, providing a clear overview of the study cohort's demographic and clinical profile.

On the other hand, Table 2 provides a detailed summary of the vital signs among the study participants measured before and after the intervention, revealing significant improvements across several parameters. For heart rate, a key indicator of cardiovascular response, showed a considerable reduction, with the mean dropping from 100.5 ± 16.0 beats per minute (bpm) pre-intervention to 87.1 ± 11.6 bpm post-intervention. Likewise, respiratory rate improved significantly, decreasing from a pre-intervention mean of 21.6 ± 2.2 breaths per minute to 19.1 ± 1.8 breaths per minute post-intervention ($p < 0.001$), indicating better respiratory stability and control among participants following the intervention. Temperature, however, did not show a statistically significant change. Although there was a slight increase from a pre-intervention mean of 35.7 ± 5.7°C to 36.6 ± 0.3°C post-intervention, this difference was not significant ($p = 0.337$). Oxygen saturation levels showed a minor yet significant increase, with a pre-intervention mean of 98.4 ± 0.01% rising to 98.9 ± 0.00% post-intervention ($p = 0.005$). Lastly, systolic and diastolic blood pressure remained stable during the pre- and post-intervention periods. Overall, Table 2 shows short-term physiological changes.

Furthermore, Table 3 provides a comprehensive overview of the Hamilton Anxiety Rating Scale (HAM-A) parameters among study participants before and after the intervention, showing notable improvements across various anxiety-related symptoms. Anxious mood, a primary indicator of anxiety, was significantly alleviated post-intervention, with 37.5% of participants reporting no anxious mood pre-intervention, increasing to 65% post-intervention ($p < 0.001$). Similarly, tension was reduced noticeably; while 37.5% of participants initially reported no tension, this number rose to 70% post-intervention, and there was a complete reduction in those previously reported severe tension ($p = 0.010$).

Fear scores also improved significantly. The proportion of participants reporting no fear increased from 37.5% pre-intervention to 57.5% post-intervention, while those with severe or very severe fear decreased to zero ($p < 0.001$). Similarly, insomnia scores showed significant improvement. The percentage of participants reporting no sleep disturbance increased from 60% pre-intervention to 65% post-intervention, accompanied by a reduction in severe insomnia cases ($p < 0.001$).

Cognitive symptoms, including intellectual difficulties and depressed mood, improved as well. The absence of intellectual difficulties rose from 60% to 75% post-intervention ($p < 0.001$), while the

Table 2. Vital signs of the study participants during pre- and post-intervention (N=40).

Vital Signs	Pre-Intervention	Post-Intervention	p-value
Systolic Blood Pressure, mmHg			
90	6 (15.00)	8 (20.00)	<0.001[a]
100	20 (50.00)	26 (65.00)	<0.001[a]
110	8 (20.00)	6 (15.00)	<0.001[a]
120	6 (15.00)	0 (0.0)	<0.001[a]
Diastolic Blood Pressure, mmHg			
60	15 (37.50)	17 (42.50)	<0.001[a]
70	18 (45.00)	21 (52.50)	<0.001[a]
80	7 (17.50)	2 (5.00)	<0.001[a]
Heart Rate, bpm	100.5 ± 16.0	87.1 ± 11.6	<0.001[b]
Respiratory Rate, breaths/min	21.6 ± 2.2	19.1 ± 1.8	<0.001[b]
Temperature, °C	35.7 ± 5.7	36.6 ± 0.3	0.337[b]
Oxygen Saturation, %	98.4 ± 0.01	98.9 ± 0.01	0.005[b]

[a] Chi-square tests
[b] Paired t-tests

Table 3. Hamilton Anxiety Rating Scale parameters of the study participants during pre- and post-intervention (N=40).

Parameters	Pre-intervention					Post-intervention					*p*-values
	Not present	Mild	Moderate	Severe	Very Severe	Not present	Mild	Moderate	Severe	Very Severe	
Anxious Mood	15 (37.50)	4 (10.00)	6 (15.00)	10 (25.00)	5 (12.50)	26 (65.00)	8 (20.00)	6 (15.00)	0 (0.0)	0 (0.0)	<0.001*
Tension	15 (37.50)	3 (7.50)	10 (25.00)	10 (25.00)	2 (5.00)	28 (70.00)	5 (12.50)	7 (17.50)	0 (0.0)	0 (0.0)	0.010*
Fear	15 (37.50)	2 (5.00)	5 (12.50)	9 (22.50)	9 (22.50)	23 (57.50)	13 (32.50)	4 (10.00)	0 (0.0)	0 (0.0)	<0.001*
Insomnia	24 (60.00)	7 (17.50)	3 (7.50)	4 (10.00)	5 (5.00)	26 (65.00)	9 (22.50)	2 (5.00)	2 (5.00)	1 (2.50)	<0.001*
Intellectual	24 (60.00)	3 (7.50)	5 (12.50)	4 (10.00)	4 (10.00)	30 (75.00)	7 (17.50)	3 (7.50)	0 (0.0)	0 (0.0)	<0.001*
Depressed Mood	25 (62.50)	5 (12.50)	2 (5.00)	5 (12.50)	3 (7.50)	29 (72.50)	9 (22.50)	1 (2.50)	1 (2.50)	0 (0.0)	<0.001*
Somatic Muscular	27 (67.50)	3 (7.50)	4 (10.00)	4 (10.00)	2 (5.00)	30 (75.00)	6 (15.00)	3 (7.50)	1 (2.50)	0 (0.0)	<0.001*
Somatic Sensory	25 (62.50)	8 (20.00)	7 (17.50)	0 (0.0)	0 (0.0)	31 (77.50)	7 (17.50)	2 (5.00)	0 (0.0)	0 (0.0)	0.001*
Cardiovascular Symptoms	20 (50.00)	4 (10.00)	5 (12.50)	9 (22.50)	2 (5.00)	29 (72.50)	7 (17.50)	4 (10.00)	0 (0.0)	0 (0.0)	0.001*
Respiratory Symptoms	26 (65.00)	5 (12.50)	3 (7.50)	6 (15.00)	0 (0.0)	31 (77.50)	6 (15.00)	3 (7.50)	0 (0.0)	0 (0.0)	0.001*
Gastrointestinal Symptoms	29 (72.50)	4 (10.00)	4 (10.00)	1 (2.50)	2 (5.00)	35 (87.50)	4 (10.00)	1 (2.50)	0 (0.0)	0 (0.0)	<0.001*
Genitourinary Symptoms	29 (72.50)	5 (12.50)	4 (10.00)	1 (2.50)	1 (2.50)	38 (95.00)	1 (2.50)	1 (2.50)	0 (0.0)	0 (0.0)	0.296
Autonomic Symptoms	29 (72.50)	3 (7.50)	2 (50.00)	3 (7.50)	3 (7.50)	36 (90.00)	3 (7.50)	1 (2.50)	0 (0.0)	0 (0.0)	<0.001*
Behavior at interview	27 (67.50)	3 (7.50)	5 (12.50)	3 (7.50)	2 (5.00)	32 (80.00)	6 (15.00)	2 (5.00)	0 (0.0)	0 (0.0)	<0.001*

* Significant values

absence of depressed mood increased from 62.5% to 72.5% ($p < 0.001$), accompanied by a complete reduction in the proportion experiencing severe depression ($p < 0.001$).

Physical symptoms also showed significant reductions post-intervention. Somatic muscular symptoms were reported as absent by 67.5% of participants pre-intervention, which increased to 75% post-intervention ($p < 0.001$). Somatic sensory symptoms exhibited a similar trend, with those reporting no symptoms rising from 62.5% pre-intervention to 77.5% post-intervention ($p = 0.001$). Cardiovascular and respiratory symptoms improved as well, with cardiovascular symptoms absent in 72.5% of participants post-intervention, compared to 50% pre-intervention, and respiratory symptoms absent in 77.5% post-intervention, compared to 65% pre-intervention, both statistically significant.

There was a marked improvement in the gastrointestinal symptoms, with 72.5% of participants reporting no symptoms pre-intervention, increasing to 87.5% post-intervention ($p < 0.001$). Genitourinary symptoms also improved, with the absence of symptoms rising from 72.5% pre-intervention to 95% post-intervention; however, this change was not statistically significant ($p = 0.296$). Autonomic symptoms showed significant improvement as well, with the absence of symptoms increasing from 72.5% pre-intervention to 90% post-intervention ($p < 0.001$).

Finally, behavioral observations at the interview reflected overall improvements, with 67.5% showing no signs of behavioral anxiety pre-intervention, increasing to 80% post-intervention. The reduction in observed anxiety behaviors was statistically significant ($p<0.001$). Table 3 underscores significant reductions in anxiety symptoms across a broad spectrum, with marked improvements in mood, tension, fear, somatic symptoms, and observed behavior.

Moreover, Table 4 presents the overall scores and anxiety levels of participants based on the HAM-A before and after the intervention, revealing significant reductions in anxiety severity. The mean total HAM-A score decreased from 13.60 ± 8.82 pre-intervention to 4.68 ± 5.21 post-intervention, indicating a substantial reduction in anxiety symptoms ($p < 0.001$).

In terms of categorical anxiety levels, there was a notable shift towards milder anxiety classifications post-intervention. Prior to the intervention, 72.5% of participants were classified as having mild anxiety, which increased to 95% post-intervention. Moderate anxiety levels decreased from 15% of participants

pre-intervention to 5% post-intervention. Severe anxiety, which affected 12.5% of participants before the intervention, was completely absent post-intervention.

The overall improvement in both total HAM-A scores and categorical anxiety levels, as indicated by the shift from higher to lower severity categories.

Lastly, Table 5 presents the crude regression analysis of factors associated with changes in HAM-A scores, with effect estimates reported at 95% confidence intervals (CIs). The analysis explores demographic and clinical variables, including age, sex, current grade level, ailment type, and frequency of hospital visits, to assess their influence on anxiety score changes.

For age, the effect estimate was close to zero (0.001; 95% CI: -0.51, 0.51), indicating no significant association between age and changes in HAM-A scores. In terms of sex, females showed a slight, non-significant decrease in anxiety score change compared to males, with an effect estimate of -1.40 (95% CI: -4.74, 1.94).

Current grade-level comparisons revealed minimal differences in HAM-A score changes across groups. Participants in Grades 4 to 7 had an effect estimate of 0.071 (95% CI: -3.69, 3.83) compared to Grades 1 to 3, while those in Grades 8 to 11 showed an estimate of 0.800 (95% CI: -3.61, 5.21). These results suggest that grade level did not significantly affect anxiety changes post-intervention.

When examining ailment categories, participants with cardiovascular diseases had an effect estimate of 0.533 (95% CI: -5.77, 6.84) compared to those with respiratory or infectious diseases, showing

Table 4. Hamilton Anxiety Rating Scale scores and levels of the study participants during pre- and post-intervention (N=40).

Parameters	Pre-intervention	Post-intervention	*p*-values
Total Score			
Mean ± Standard Deviation	13.60 ± 8.82	4.68 ± 5.21	<0.001
Anxiety Levels			
Mild	29 (72.50)	38 (95.00)	0.001
Moderate	6 (15.00)	2 (5.00)	
Severe	5 (12.50)	0 (0.0)	

[a] Paired t-tests
[b] Chi-square tests

Table 5. Crude regression analysis of factors associated with change in Hamilton Anxiety Rating Scale (HAM-A) scores measured at 95% Confidence Interval.

Characteristics	Effect Estimates (95% CI)
Age, years	0.001 (-0.51, 0.51)
Sex	
Male	1.00
Female	-1.40 (-4.74, 1.94)
Current Grade Level	
Grades 1 to 3	1.00
Grades 4 to 7	0.071 (-3.69, 3.83)
Grades 8 to 11	0.800 (-3.61, 5.21)
Ailments	
Respiratory and Infectious Diseases (Pulmonary tuberculosis and Asthma)	1.00
Cardiovascular Diseases (Rheumatic Heart Disease, Rheumatic fever, and Hypertension)	0.533 (-5.77, 6.84)
Other Chronic and Autoimmune Diseases (Seizure Disorder, Nephrotic Syndrome, Chronic Kidney Disease, and Systemic Lupus Erythematosus)	-2.652 (-8.79, 3.48)
Frequency of hospital visits, days	
21	1.00
30	-1.776 (-5.26, 1.71)
60	-2.650 (-7.91, 2.61)

no significant association. For those with chronic and autoimmune conditions, the effect estimate was -2.652 (95% CI: -8.79, 3.48), suggesting a non-significant trend toward lower anxiety score changes, though this effect did not reach significance.

The frequency of hospital visits showed participants with a 30-day visit frequency had an effect estimate of -1.776 (95% CI: -5.26, 1.71) compared to those with a 21-day frequency, and those with a 60-day frequency had an estimate of -2.650 (95% CI: -7.91, 2.61). These results indicate no significant association between visit frequency and anxiety score changes, though there was a trend suggesting slightly lower anxiety score changes with less frequent visits.

Table 5 shows that none of the examined factors demonstrated a statistically significant association with changes in HAM-A scores in this crude analysis.

DISCUSSION

The findings of this study indicate that the intervention was associated with significant improvements in both physiological and psychological markers of anxiety among participants, as reflected in reduced Hamilton Anxiety Rating Scale (HAM-A) scores and stabilized vital signs post-intervention. Across multiple metrics, including blood pressure, heart rate, respiratory rate, and oxygen saturation, participants exhibited improvements that suggest a beneficial effect of the intervention on physiological indicators of anxiety. Furthermore, the shift towards milder anxiety categories on the HAM-A scale post-intervention underscores the intervention's potential to reduce overall anxiety levels. These results contribute to the body of knowledge supporting interventions aimed at alleviating both physical and psychological components of anxiety.[9-10]

The decrease in HAM-A scores and corresponding physiological improvements likely reflect the intervention's role in promoting a calming effect, which aligns with theories of stress reduction and the autonomic nervous system's response to anxiety alleviation.[11] The stabilization of blood pressure and reduction in heart rate may suggest reduced sympathetic nervous system activation, a response commonly observed in interventions that foster relaxation and stress relief.[9] This aligns with cognitive and somatic anxiety theories that propose a physiological basis for anxiety symptoms, where interventions mitigate anxiety by reducing bodily arousal and facilitating a relaxation response.[12] As suggested in existing research, such physiological changes are often accompanied by reductions in subjective anxiety, as seen in the significant shift to lower HAM-A scores post-intervention in this study.[13]

The findings here align with existing literature that highlights the dual benefit of anxiety reduction interventions on both mental and physical health. For instance, mindfulness-based interventions, as noted in a study[9] not only reduce psychological distress but also improve vital signs such as heart rate and blood pressure, reinforcing the idea that anxiety interventions can have wide-ranging health benefits. Similarly, a meta-analysis[10] on meditation practices reported reductions in anxiety symptoms alongside improvements in physiological measures, providing further evidence that interventions aimed at reducing anxiety can effectively target both mental and physical dimensions. The positive physiological changes observed in this study's participants add to this growing body of evidence, suggesting that such interventions may support broader health outcomes by addressing anxiety's impact on the body and mind.[9]

The present findings align more closely with literature on medical play and pediatric procedural anxiety rather than mindfulness-based interventions. Medical play interventions, including the TBH model, are grounded in developmental theory, which posits that symbolic role-play allows children to process unfamiliar or threatening experiences in a safe and controlled manner.[14-15] By assuming the role of a healthcare provider and interacting directly with medical equipment, children may experience increased familiarity and perceived control—two factors consistently identified as protective against situational anxiety in pediatric healthcare settings.[16-17]

Previous TBH-based interventions have demonstrated reductions in preoperative anxiety, fear of medical environments, and distress behaviors among children exposed to structured medical play.[17-18] Systematic reviews further support the role of therapeutic play in decreasing healthcare-related anxiety and improving coping among pediatric patients.[19] The short-term reductions in heart rate and respiratory rate observed in the present study may therefore reflect decreased situational arousal secondary to enhanced emotional regulation and environmental familiarity, rather than a generalized relaxation mechanism.[20] Even transient reductions

in state anxiety during outpatient visits may improve procedural cooperation and overall clinical outcomes.[21]

However, while some studies indicate demographic factors such as age and sex may moderate the effects of anxiety interventions, the present study did not find significant associations between these factors and changes in HAM-A scores.[22] This lack of a significant association may be due to the study's small sample size, which limits the statistical power to detect subtle interactions across demographic subgroups. Further research with larger, more diverse populations would be beneficial to explore whether certain groups, based on demographics or baseline anxiety levels, respond differently to the intervention. Understanding these nuances could enhance intervention tailoring, making them more effective across varied populations.[22]

Interestingly, while the trend towards lower anxiety scores in participants with chronic and autoimmune diseases did not reach statistical significance, it suggests that these individuals may experience unique responses to anxiety interventions. Chronic illness often accompanies heightened anxiety due to ongoing health concerns, which may alter the baseline response to interventions Chronic illness is frequently associated with elevated anxiety levels among children and adolescents, potentially influencing baseline symptom severity and responsiveness to interventions.[23] The slight but non-significant trend observed in this study aligns with findings from a study which found that patients with chronic health conditions reported lower initial improvements in anxiety scores compared to healthy individuals.[24] Future studies could further explore the potential of customized interventions tailored to the specific needs of patients with chronic illnesses.

This pilot study's design as an interventional quasi-experiment offers both notable strengths and inherent limitations. One of the primary strengths lies in its exploratory nature, allowing an initial examination of the intervention's effects on both psychological (HAM-A scores) and physiological markers of anxiety, providing a comprehensive view of its potential efficacy. As a pilot study, it effectively identified trends and areas of impact that can inform larger, more definitive studies, particularly in its focus on multiple outcome measures, such as blood pressure, heart rate, and respiratory rate, alongside anxiety levels. This holistic approach provides an in-depth understanding of the intervention's effects on the mind-body connection and demonstrates its feasibility for comprehensively targeting anxiety reduction. Additionally, the quasi-experimental design provides insights into intervention effects without the stringent controls of a randomized trial, thereby offering flexibility in a real-world setting where strict randomization may not be feasible.

The clinical implications of this study suggest that the intervention may be an effective complementary approach for managing anxiety, impacting both mental and physical health indicators. The significant reductions in HAM-A scores and improvements in physiological parameters, such as blood pressure, heart rate, and respiratory rate, underscore the intervention's potential as a holistic strategy in anxiety management. These findings align with the increasing emphasis in clinical practice on integrated mind-body approaches, which address the psychological and physiological components of anxiety rather than focusing on symptomatic relief alone. Implementing such interventions in clinical settings could provide patients with non-pharmacological options to manage anxiety, which may be particularly beneficial for individuals who are unable or unwilling to use medication. Additionally, the observed stabilization in vital signs highlights potential cardiovascular and respiratory benefits, suggesting that this intervention could serve as a valuable adjunct in managing anxiety-related somatic symptoms. This integrative approach could lead to improved patient outcomes, particularly in settings where individualized, multifaceted care is prioritized.

In summary, this study adds to the existing literature on anxiety reduction interventions by demonstrating significant improvements in both HAM-A scores and physiological markers, supporting the intervention's efficacy in mitigating anxiety. These findings suggest that interventions targeting both physical and mental health may provide a comprehensive approach to anxiety management.

Scope and Limitations

This study included children aged 3–12 years with chronic illnesses attending the outpatient department of a tertiary government hospital and evaluated the effectiveness of the Teddy Bear Hospital (TBH) pretend-play intervention in reducing anxiety. The focus on this population reflects the heightened

anxiety commonly experienced by children requiring ongoing medical care.

As a single-center, quasi-experimental pilot study, findings provide context-specific insights but have limited generalizability. The absence of randomization and a control group restricts causal inference. Variability in individual responses—potentially influenced by age, sex, type and severity of illness, and treatment phase—may also have affected outcomes. Although standardized anxiety measures and blinded outcome assessment were used to enhance validity and reduce bias, residual confounding cannot be excluded. These findings should therefore be interpreted cautiously and serve as preliminary data to inform future multi-center studies with larger samples and controlled designs.

CONCLUSIONS

This study aimed to assess the effectiveness of the Teddy Bear Hospital (TBH) intervention in reducing anxiety levels among pediatric patients with chronic illnesses visiting the outpatient department in a tertiary government hospital. By focusing on children aged 3 to 12 years, the study sought to address the heightened anxiety commonly experienced by young patients in medical environments. Utilizing a quasi-experimental design, anxiety levels were measured both psychologically, using HAM-A scores, and physiologically, through indicators such as heart rate, respiratory rate, and blood pressure. Pre- and post-intervention assessments allowed for a comprehensive evaluation of TBH's impact on these children.

The findings demonstrated that the TBH intervention had a significant effect on reducing both psychological and physiological markers of anxiety in the participating children. Notably, there was a marked decrease in HAM-A scores post-intervention, indicating a reduction in subjective anxiety levels. Physiological measures, including heart rate and respiratory rate, also showed favorable changes, suggesting that TBH influenced both the mental and physical aspects of anxiety. Observational data supported these findings, with visible reductions in nervous behaviors and increased engagement in pretend play activities, reinforcing the potential of TBH to create a calming effect for pediatric patients. In conclusion, the TBH intervention appears to be an effective, child-friendly approach to anxiety reduction in a clinical setting. This play-based method addresses the holistic needs of pediatric patients, providing them with a safe, engaging way to become familiar with healthcare environments. The results of this pilot study support the feasibility and potential benefits of implementing TBH or similar play interventions more broadly within pediatric healthcare services, especially in resource-limited settings where non-pharmacological, low-cost interventions are highly valuable. Future studies with larger sample sizes and control groups are recommended to further validate these findings and explore the long-term effects of TBH on pediatric anxiety.

This study contributes to the growing evidence that non-pharmacological interventions like TBH can play an important role in improving the hospital experience for young patients. By reducing anxiety and fostering a sense of comfort in medical settings, TBH has the potential to improve overall patient compliance and satisfaction, making it a promising addition to pediatric care practices.

RECOMMENDATIONS

Future research should consider incorporating follow-up periods to examine the long-term effects of anxiety reduction interventions on both physiological and psychological outcomes. While the current study highlights immediate post-intervention changes, understanding whether these effects are sustained over time would offer a more comprehensive view of the intervention's durability. Additionally, future studies could integrate qualitative data, capturing participants' subjective experiences, to complement quantitative findings and reveal deeper insights into the intervention's impact on anxiety reduction. Such an approach would align with the growing recognition of mixed methods in psychological research, providing a fuller picture of the intervention's impact.[25]

REFERENCES

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Washington (DC): American Psychiatric Publishing; 2013.
2. Thompson RH, Stanford G. The effect of medical play on children's fear and anxiety during hospitalization. Child Health Care 1981; 9(1): 30–4. doi:10.1207/s15326888chc0901_7.
3. Salmela M, Salanterä S, Aronen ET. The Teddy Bear Hospital in reducing children's preoperative anxiety: a case study. J Pediatr Nurs 2010;25(2):154–60. doi:10.1016/j.pedn.2008.11.003.

4. Rashid AA, Cheong AT, Hisham R, Shamsuddin NH, Roslan D. Effectiveness of pretend medical play in improving children's health outcomes and well-being: a systematic review. BMJ Open 2021;11(1):e041506. doi:10.1136/bmjopen-2020-041506.
5. Salmon P. Effects of physical exercise on anxiety, depression, and sensitivity to stress: a unifying theory. Clin Psychol Rev 2001;21(1):33–61. doi:10.1016/S0272-7358(99)00032-X.
6. Kearns MC, Ressler KJ, Zatzick D, Rothbaum BO. Biobehavioral responses to anxiety interventions: a review. Behav Med 2012;38(3):91–102. doi:10.1080/08964289.2012.695354.
7. Hamilton M. The assessment of anxiety states by rating. Br J Med Psychol 1959;32(1):50–5. doi:10.1111/j.2044-8341.1959.tb00467.x.
8. Thayer JF, Åhs F, Fredrikson M, Sollers JJ 3rd, Wager TD. A meta-analysis of heart rate variability and neuroimaging studies: implications for heart rate variability as a marker of stress and health. Neurosci Biobehav Rev 2012;36(2):747–56. doi:10.1016/j.neubiorev.2011.11.009.
9. Hofmann SG, Sawyer AT, Witt AA, Oh D. The effect of mindfulness-based therapy on anxiety and depression: a meta-analytic review. J Consult Clin Psychol 2010;78(2):169–83. doi:10.1037/a0018555.
10. Chiesa A, Serretti A. Mindfulness-based stress reduction for stress management in healthy people: a review and meta-analysis. J Altern Complement Med 2009;15(5):593–600. doi:10.1089/acm.2008.0495.
11. Benson H, Beary JF, Carol MP. The relaxation response. Psychiatry. 1974;37(1):37–46.
12. Grossman P, Niemann L, Schmidt S, Walach H. Mindfulness-based stress reduction and health benefits: a meta-analysis. J Psychosom Res 2004;57(1):35–43. doi:10.1016/S0022-3999(03)00573-7.
13. Saeed SA, Cunningham K, Bloch RM. Depression and anxiety disorders: benefits of exercise, yoga, and meditation. Am Fam Phys 2019;99(10):620–7.
14. Erel S, Kilic A, Eryilmaz N, Gurkan O. Effect of educational brochures on preprocedural anxiety in pediatric endoscopy: a randomized controlled trial. Turk J Gastroenterol 2025;36(10):680–91. doi:10.5152/tjg.2025.25144.
15. Santapuram P, Stone A, Walden R, Alexander L. Interventions for parental anxiety in preparation for pediatric surgery: a narrative review. Children (Basel) 2021;8(11):1069. doi:10.3390/children8111069.
16. Chua L, Yi L, Foo J, Chen H, Wong K, Lin O, et al. Virtual reality for procedural distraction for children. Asian J Pediatr Dent 2024;2(3):92–8. doi:10.4103/ajpd.ajpd_24_24.
17. Gold JI, Akbar KM, Avila S, Ngo NH, Klein MJ. Exploring relations between unique patient characteristics and virtual reality immersion level on anxiety and pain in patients undergoing venipuncture: secondary analysis of a randomized control trial. J Med Internet Res 2024;26:e53196. doi:10.2196/53196.
18. Wong C, Li C, Chan C, Choi K, Chen J, Yeung M, et al. Virtual reality intervention targeting pain and anxiety among pediatric cancer patients undergoing peripheral intravenous cannulation. Cancer Nurs 2020;44(6):435–42. doi:10.1097/NCC.0000000000000844.
19. Challa R, Moses J. Audio distraction technique in management of anxious pediatric dental patients. Int J Pedod Rehabil 2022;7(1):28–34. doi:10.56501/intjpedorehab.v7i1.182.
20. Wong C, Choi K. Effects of an immersive virtual reality intervention on pain and anxiety among pediatric patients undergoing venipuncture. JAMA Netw Open 2023;6(2):e230001. doi:10.1001/jamanetworkopen.2023.0001.
21. Rukbah W. Virtual reality as a non-pharmacological intervention for pediatric preoperative anxiety: a quality improvement initiative and retrospective analysis [preprint]. medRxiv 2026 Jan 23:2026.01.21.26344597. doi:10.64898/2026.01.21.26344597.
22. Hofmann SG, Asnaani A, Vonk IJ, Sawyer AT, Fang A. The efficacy of cognitive behavioral therapy: a review of meta-analyses. Psychiatr Clin North Am 2012;35(2):427–40. doi:10.1016/j.psc.2012.04.002.
23. Pinquart M, Shen Y. Anxiety in children and adolescents with chronic physical illnesses: a meta-analysis. Acta Paediatr 2011;100(8):1069–76.doi:10.1111/j.1651-2227.2011.02276. x.
24. Carlson LE, Speca M, Patel KD, Goodey E. Mindfulness-based stress reduction in relation to quality of life, mood, symptoms of stress, and neuroendocrine markers in cancer outpatients. Psychoneuroendocrinology 2004;29(4):448–74. doi:10.1016/S0306-4530(03)00054-4.
25. Creswell JW, Plano Clark VL. Designing and Conducting Mixed Methods Research. 3rd ed. Thousand Oaks (CA): SAGE Publications; 2017.

Original Article

Factors Influencing Father's Level of Involvement in the Care of a Child with a Neurodevelopmental Disability: A Cross-Sectional Single Center Study

Charlene Kay N. Arenajo-Ynoc, MD and Jocelyn S. Sanchez, MD
Section of Developmental and Behavioral Pediatrics, Department of Pediatrics, National Children's Hospital, Quezon City

ABSTRACT

Introduction: Father involvement in the care of children with neurodevelopmental disorders (NDDs) has been associated with improved developmental and family outcomes. However, paternal participation remains less studied compared to maternal caregiving, particularly in local settings. This study aimed to identify factors associated with fathers' level of involvement in the care of young children with NDDs.

Methods: A cross-sectional single-center study was conducted among 208 fathers of children aged 3 months to 5 years diagnosed with NDDs at the National Children's Hospital Child Development Center. Participants were recruited while attending therapy sessions or medical consultations. A physician-administered questionnaire collected data on paternal demographics, child characteristics, and involvement across caregiving domains, including activities of daily living, parenting, therapy participation, medical consultations, and social activities. Statistical analyses were performed using appropriate tests, with significance set at $p \leq 0.05$.

Results: Higher paternal involvement was significantly associated with higher educational attainment, greater monthly income, and supportive marital status. Fathers of children with fewer siblings demonstrated greater participation in caregiving activities. Education was the only factor significantly associated with overall involvement.

Conclusion: Paternal involvement in the care of children with NDDs is influenced by socioeconomic and family-related factors. Strengthening father-focused support strategies and inclusive caregiving practices may enhance paternal engagement and contribute to improved developmental and family outcomes.

Key words: Fathers, child care, neurodevelopmental disorders, parent participation, socioeconomic factors, child development

INTRODUCTION

Neurodevelopmental disorders (NDDs), as defined in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), are conditions that typically emerge in childhood and may persist throughout life.[1] These disorders include intellectual disability, attention-deficit/hyperactivity disorder, autism spectrum disorder, communication disorders, specific learning disorder, and motor disorders, among others. Reported prevalence rates vary widely, with estimates ranging from 7.9–9.5% for ADHD[2], 0.7–2.2% for ASD[3], 1.2–24% for specific learning disorder[4], and 1.4–19% for motor coordination disorder.[5] However, many studies do not account for co-occurring conditions, potentially underestimating the true burden of NDDs.[6]

Receiving a diagnosis of a neurodevelopmental disability significantly impacts family life. Both mothers and fathers experience stress, and caregiving demands may strain marital and family relationships. Existing research has largely focused on mothers, who often assume primary caregiving responsibilities, sometimes leaving employment to care for the child.[7-9] Numerous studies have

Correspondence: Charlene Kay N. Arenajo-Ynoc, MD
email: charlenearenajo@gmail.com

documented increased stress, health concerns, and occupational disruptions among mothers of children with disabilities[10-15], while fathers remain comparatively underrepresented in the literature.

Father involvement encompasses various dimensions, including caregiving, guidance, emotional support, and participation in developmental and therapeutic activities.[16,17] Active paternal engagement has been associated with positive cognitive, emotional, and social outcomes in children, as well as strengthened family relationships. Despite these potential benefits, limited research has examined factors influencing fathers' participation in the care of children with neurodevelopmental disabilities, particularly in local settings. In the Philippines, data on paternal involvement in this population remain scarce.

This study is guided by a framework proposing that fathers' level of involvement is shaped by paternal characteristics (age, marital status, income, education, and health status) and child-related factors (age, diagnosis, birth order, and number of siblings). Fathers' perceptions of their caregiving role may further influence their degree of engagement. The present study aims to identify factors associated with fathers' involvement in the care of children aged 3 months to 5 years with neurodevelopmental disabilities seen at the National Children's Hospital Child Development Center by describing paternal and child characteristics and examining participation across key caregiving domains.

METHODS

This study utilized a cross-sectional design using a physician-administered questionnaire given in person to fathers of children diagnosed with a neurodevelopmental disability seen at the National Children's Hospital Child Development Center, ensuring that data collection during therapy sessions did not encroach on the child's treatment and was conducted during the father's free time. Based on a clinic census documenting 2,145 diagnosed neurodevelopmental conditions among children aged 3 months to 5 years, with an estimated 50% accompanied by fathers, the minimum required sample size was calculated to be 208. The computation was performed using a chi-square test with an assumed effect size of 0.25, a significance level of 0.05, and 95% statistical power to detect factors associated with paternal participation. The study included fathers who were primary or secondary caregivers, whether biological, adoptive, or solo parents, regardless of educational level and who voluntarily provided informed consent, while excluding fathers with psychiatric conditions, fathers of children older than five years, fathers not living in the same household, and fathers with more than one child diagnosed with neurodevelopmental disorders, with noncompletion of questionnaires serving as withdrawal criteria, and the Child Development Center providing a suitable environment and clearly defined population for the study conducted over a 2–3 month period.

The study utilized a modified adaptation of the Life Participation Parents (LPP)® 2005 survey instrument, whose items were developed through literature review and stakeholder input, showing evidence of response processes and yielding a two-factor model representing satisfaction with efficiency and effectiveness, accounting for 43.81% of variance.[18] The adaptation focused on descriptive categories of paternal involvement in activities of daily living, parenting, participation during therapy sessions, and provision of social activities, while acknowledging perception of care as a confounding variable and providing psychosocial support when stressors or mental health concerns were identified. The questionnaire was translated into Filipino, back-translated to English, and validated in 10 participants to ensure clarity, with the instrument including fathers' demographic information and survey questions examining involvement in the care of children with neurodevelopmental disorders. Informed consent was obtained in person after explanation of study purposes and risks, with assurance that participation was voluntary and responses could be withheld, and consent forms were translated and back-translated for comprehensibility.

Level of involvement in the care of a child with special needs in this study refers to fathers' participation in activities of daily living, presence during therapy sessions, and involvement in medical consultations, as assessed using the Life Participation for Parents (LPP) instrument. Participation was categorized as Active (responses of strongly agree or agree, indicating involvement most of the time), Partially Active (neutral responses, indicating involvement about half of the time), or Inactive (responses of disagree or strongly disagree, indicating involvement less than the majority of the time).

Ethical approval was obtained from the Institutional Review Board. Participant anonymity was ensured through coding systems, and no recordings were made without consent. Questionnaires were administered face-to-face and completed within 15–20 minutes during fathers' free time while waiting for consultations, without disrupting treatment. Participants were informed that the study aimed to support the development of strategies that may enhance paternal involvement in child development.

Statistical analyses summarized categorical data using frequencies and percentages and continuous data using means and standard deviations, employing Chi-square, Fisher's exact tests, T-tests, or Analysis of Variance as applicable, with p-values less than or equal to 0.05 considered significant and analyses conducted using Stata software.

RESULTS

Two hundred eight (208) fathers of children with neurodevelopmental disabilities were included in the study. The distribution of fathers according to their demographics, social and economic variables is summarized in Table 1. The majority of the fathers as respondents were between 22 to 35 years old (66%), married (47%), had attained a college degree educational level (50%), were formally employed (75%), had an income ranging from 9,100 to 18,200 pesos (51%), and had no known comorbidities (78%).

Table 1. Socio-demographic neurodevelopmental disabilities characteristics of fathers of children with neurodevelopmental disabilities

Variable	Frequency n=208	Percentage (%)
Age		
12-18 years	0	0
19-21 years	5	2
22-35 years	137	66
36-55 years	65	31
More than 55 years	1	0
Marital Status		
Single	91	44
Married	98	47
Widowed	1	0
Separated	18	9
Level of Education		
Elementary	12	6
High School	60	29
College	104	50
Vocational	32	15
Occupation		
Unemployed	20	10
Employed	155	75
Self-Employed	33	16
Monthly Income		
<9,100 PHP	48	23
9,100-18,200 PHP	107	51
18,200-36,400 PHP	39	19
36,000-63,700 PHP	10	5
63,700-109,200 PHP	4	2
Comorbidities		
Hypertension	28	13
Diabetes Mellitus	11	5
Bronchial Asthma	4	2
Poststroke	1	0
Heart disease	1	0
None	163	78

Fathers' age, educational level, and monthly income were significantly associated with involvement in activities of daily living, with higher education and income linked to greater participation. Child-related factors, including number of siblings and neurodevelopmental diagnosis, were also significantly associated, with higher involvement observed among fathers of children with fewer siblings and diagnoses such as Language Disorder, Cerebral Palsy, and Global Developmental Delay. In contrast, fathers of children with Autism Spectrum Disorder Level 3 demonstrated lower levels of active participation.

For parenting involvement, marital status, educational level, and monthly income were significantly associated, with married fathers and those with higher education and income showing greater participation. Neurodevelopmental diagnosis was likewise significantly associated with parenting involvement.

Participation in therapy sessions was significantly associated with monthly income and neurodevelopmental diagnosis, with greater involvement observed among fathers of children with Cerebral Palsy and Global Developmental Delay. No participation in therapy sessions was reported among fathers of children with Intellectual Disability.

Fathers' comorbidities were the only factor significantly associated with involvement in medical consultations, with those having existing health conditions demonstrating higher participation. In contrast, marital status, educational level, monthly income, and neurodevelopmental diagnosis were significantly associated with involvement in social activities, with greater participation observed among fathers of children with Language Disorder and Intellectual Disability.

Overall, 71% of fathers were actively involved in caring for a child with a neurodevelopmental disability. Educational level was the only factor significantly associated with overall involvement, with fathers who had attained a college education demonstrating higher participation compared to those with lower educational attainment.

The distribution of children with disabilities is presented in Table 2. The children with neurodevelopmental disabilities belonged to preschoolers with an age range from 3 to 5 years (69%). The majority were males (79%) and first-borns or had no siblings (33%). The most common neurodevelopmental disability, which comprised almost half of the children, was Autism Spectrum Disorder Level 3 (48%) then followed by Autism Spectrum Disorder Level 2 (24%), and Cerebral Palsy and Global Developmental Delay (13%).

Table 2. Clinical profile of children with neurodevelopmental disabilities.

Variable	Frequency n=208	Percentage (%)
Age		
Infancy (birth-1.11 years)	19	9
Toddler (2-2.11 years)	45	22
Pre-school (3-5.11 years)	144	69
Sex		
Male	165	79
Female	43	21
Number of Siblings		
0	68	33
1	62	30
2	53	25
3	25	12
4 or more		
Birth Order		
Not applicable (first born)	68	33
1st	61	29
2nd	56	27
3rd or higher	23	11
Neurodevelopmental diagnosis		
ASD Level 2	50	24
ASD Level 3	101	48
Cerebral Palsy	27	13
Global Developmental Delay	27	13
Intellectual Disability	2	1
Language Disorder	1	0

The involvement of fathers in caring for their child varied. As shown in Table 3, the majority of fathers were actively involved in activities of daily living (47%). Thirty-two percent of fathers were actively involved in parenting, including the implementation of therapy interventions at home. Twenty-nine percent were present during therapy sessions, while 50% participated in medical consultations. Approximately one-third of fathers (30%) were present during social activities in support of their child. There were 29% of the fathers with no involvement in any activities related to the caring or interventions for their child with neurodevelopmental disabilities, while one for every ten fathers was involved in all the identified activities.

DISCUSSION

This study found that there are several factors that affect the father's level of involvement in the care of their child with a neurodevelopment disability. The study identifies age, education level, income, and number of siblings as significant factors influencing fathers' participation in activities of daily living for children with neurodevelopmental disabilities, with older fathers (aged 36-55) exhibiting higher active participation compared to younger age groups. Age can significantly influence fathers' participation in activities of daily living as older fathers tend to have accumulated more parenting experience, maturity and skills over time, which can positively impact their ability to engage in caregiving tasks effectively[19], and they have also developed more adaptive coping strategies and emotional resilience essential for navigating caregiving challenges. Education also plays a crucial role, with college-educated fathers being highly involved compared to those with lower educational attainment, as higher levels of education often correlate with greater knowledge and understanding of developmental disorders, therapeutic interventions, and strategies for supporting children with disabilities, making fathers more likely to engage in activities that promote their child's development.[20] Income

Table 3. Involvement of father in child activities

Variable	Frequency n=208	Percentage (%)
Activities of daily living		
Active	98	47
Partially Active	76	37
Inactive	34	16
Parenting (home transcendence of therapy interventions)		
Active	67	32
Partially Active	84	40
Inactive	57	27
Presence during therapy interventions		
Present	61	29
Partially Present	58	28
Not Present	17	8
Not applicable	72	35
Involvement with medical consultations		
Involve	105	50
Partially Involve	88	42
Not Involve	15	7
Provision of social activities		
Present	63	30
Partially Present	87	42
Not Present	57	27
Not Applicable	1	0
Overall Involvement		
No involvement	61	29
One Activity	37	18
Two Activities	37	18
Three Activities	29	14
Four Activities	24	12
All Activities	20	10

shows a positive association with involvement, suggesting that financial stability enables fathers to dedicate more time and resources to caregiving responsibilities, as greater economic resources enable parents to purchase necessary material goods and services and provide higher quality child care to improve developmental processes.[21] Fathers of children with one or two siblings showed higher active participation than those with more than two siblings, possibly because smaller family size allows greater time and attention to be devoted to each child.[22] Fathers of children with Language Disorder, Cerebral Palsy, and Global Developmental Delay demonstrated higher active involvement, likely because these conditions often require intensive and continuous support in personal care, communication, and mobility, necessitating greater paternal participation in caregiving activities.[23] Marital status significantly influence fathers' participation in parenting tasks, with married fathers demonstrating higher involvement due to emotional support, shared caregiving responsibilities, and collaborative decision-making that enhance parental well-being and satisfaction in parenting roles.

Income was the only factor significantly associated with paternal involvement in therapy sessions, likely because higher income allows greater financial capacity and schedule flexibility to support children's therapeutic interventions.[24] Higher involvement in therapy sessions was also found among fathers of children with Cerebral Palsy, as therapy often focuses on improving motor function, communication skills, and independence in daily activities, prompting fathers to participate more actively because of the direct impact on their child's functional abilities and quality of life.[25] Fathers with health comorbidities demonstrated higher engagement in their children's medical consultations, possibly because firsthand experience navigating healthcare systems enhances their understanding of proactive health management and the importance of regular consultations in preventing complications.[26] With regard to providing social activities, marital status, education, and income play significant roles, with married fathers and those with higher education and income participating more actively due to emotional well-being, shared caregiving responsibilities, and the ability to organize and participate in social engagements that enhance children's social interactions and developmental experiences.[27] Fathers with higher levels of education also possess greater knowledge about their child's condition and needs and have more open attitudes toward participating in beneficial social activities.[21] Overall, 71% of fathers were actively involved in caring for children with neurodevelopmental disabilities, with education level being the only variable consistently associated with higher overall involvement. These findings suggest the potential value of strategies that promote greater father participation in caregiving.

LIMITATIONS

This study has several limitations. First, the cross-sectional design precludes causal inference between identified factors and paternal involvement. Second, participants were recruited from fathers present during clinic visits, which may have introduced selection bias and potentially overestimated levels of engagement. Third, paternal involvement was measured using a modified adaptation of the Life Participation for Parents instrument; although translated and pilot-tested, full psychometric validation was not performed, which may affect measurement reliability. Fourth, the study was conducted in a single tertiary center, which may limit generalizability to other healthcare settings or cultural contexts. Finally, multiple statistical comparisons were performed, which may increase the risk of Type I error. No adjustment for multiple comparisons was applied.

CONCLUSION AND RECOMMENDATIONS

Based on the findings, most fathers of children with neurodevelopmental disabilities are younger, aged 22 to 35 years, married, college-educated, formally employed, and earning above minimum wage, with no known comorbidities, while the children are predominantly preschool-aged males, often firstborn or without siblings, and primarily diagnosed with Autism Spectrum Disorders. Fathers were most actively involved in their children's care during medical consultations, followed by activities of daily living and parenting, especially in implementing therapy interventions at home. The significant factors influencing fathers' active involvement in activities of daily living include the father's age, education level, and monthly income, as well as the child's number of siblings and neurodevelopmental diagnosis. Fathers' marital status, educational level and monthly income,

together with the child's neurodevelopmental diagnosis, were significantly associated with active involvement in parenting, while fathers' monthly income and child's neurodevelopmental diagnosis were significant factors associated with participation in therapy sessions. Fathers' comorbidities were significantly associated with involvement in clinical consultations, while marital status, educational level, monthly income, and child's neurodevelopmental diagnosis were significantly associated with involvement in social activities, and overall active involvement in caring for children with neurodevelopmental disabilities was significantly associated with the father's education.

It is recommended that further local studies on factors influencing paternal involvement be pursued, as most referenced data are based on foreign literature, and that prospective replication studies assess developmental improvements associated with increased paternal involvement. Developmental and Behavioral Pediatrics may introduce educational programs specifically designed for fathers, such as parent training workshops that educate fathers about their roles, address caregiving challenges, and develop practical skills to promote active participation, which may lead to positive developmental outcomes. Training healthcare providers on the importance of paternal involvement may encourage inclusion of fathers in caregiving discussions and decisions, while tailored support programs may create supportive environments that facilitate peer support and coping strategies among fathers of children with neurodevelopmental disabilities. The Department of Health may also intensify programs and campaigns promoting holistic family participation in childcare, and dissemination strategies including seminars, workshops, webinars, and institutional sessions may ensure findings are accessible and actionable, with feedback collection and follow-up activities reinforcing key insights.

REFERENCES

1. Francés L, Quintero J, Fernández A, Ruiz A, Caules J, Fillon G, et al. Current state of knowledge on the prevalence of neurodevelopmental disorders in childhood according to the DSM-5: a systematic review in accordance with the PRISMA criteria. Child Adolesc Psychiatry Ment Health 2022;16(1):27. doi:10.1186/s13034-022-00462-1.
2. Polanczyk GV, Willcutt EG, Salum GA, Kieling C, Rohde LA. ADHD prevalence estimates across three decades: an updated systematic review and meta-regression analysis. Int J Epidemiol 2014;43(2):434–42. doi:10.1093/ije/dyt261.
3. Baio J, Wiggins L, Christensen DL, Maenner MJ, Daniels J, Warren Z, et al. Prevalence of autism spectrum disorder among children aged 8 years — autism and developmental disabilities monitoring network, 11 sites, United States, 2014. MMWR Surveill Summ 2018;67(6):1–23. doi:10.15585/mmwr.ss6706a1.
4. Al-Yagon M, Cavendish W, Cornoldi C, Fawcett AJ, Grünke M, Hung LY, et al. The proposed changes for DSM-5 for SLD and ADHD: international perspectives. J Learn Disabil 2013;46(1):58–72. doi:10.1177/0022219412464353.
5. Tsiotra GD, Flouris AD, Koutedakis Y, Faught BE, Nevill AM, Lane AM, et al. A comparison of developmental coordination disorder prevalence rates in Canadian and Greek children. J Adolesc Health 2006;39(1):125–7. doi:10.1016/j.jadohealth.2005.07.011.
6. Kita Y, Ashizawa F, Inagaki M. Prevalence estimates of neurodevelopmental disorders in Japan: a community sample questionnaire study. Psychiat Clin Neurosci 2020;74(2):118–23. doi:10.1111/pcn.12950.
7. Bourke-Taylor H, Howie L, Law M. Impact of caring for a school-aged child with a disability: understanding mothers' perspectives. Aust Occup Ther J 2010;57:127–36.
8. Tomeny TS. Parenting stress as an indirect pathway to mental health concerns among mothers of children with autism spectrum disorder. Autism 2017;21:907–11.
9. McCann D, Bull R, Winzenberg T. The daily patterns of time use for parents of children with complex needs: a systematic review. J Child Health Care 2012;16:26–52.
10. Bluth K, Roberson PNE, Billen RM, Sams JM, Hill C. A stress model for couples parenting children with autism spectrum disorders and the introduction of a mindfulness intervention. J Fam Theory Rev 2013;5:194–213.
11. Siman-Tov A, Kaniel S. Stress and personal resource as predictors of the adjustment of parents to autistic children: a multivariate model. J Autism Dev Disord 2011;41:879–90.
12. Flouri E, Buchanan A. The role of father involvement in children's later mental health. J Adolesc 2003;26(1):63–78. doi:10.1016/S0140-1971(02)00116-1.
13. Ranehov L, Håkansson C. Mothers' experiences of their work as healthcare assistants for their chronically-disabled child. Scand J Occup Ther 2018;25:1–14.
14. Pelchat D, Levert MJ, Bourgeois-Guérin V. How do mothers and fathers who have a child with a disability describe their adaptation/transformation process? J Child Health Care 2009;13:239–59.
15. Allik H, Larsson JO, Smedje H. Health-related quality of life in parents of school-age children with Asperger syndrome or high-functioning autism. Health Qual Life Outcomes 2006;4:1.
16. Waterman EA, Lefkowitz ES. Are mothers' and fathers' parenting characteristics associated with emerging adults' academic engagement? J Fam Issues 2017;38(9):1239–61. doi:10.1177/0192513X16637101.
17. Prastiyani W. Peran ayah muslim dalam pembentukan identitas gender anak kampung karanganyar. Psikologika 2017;22(2):68–88.
18. Fingerhut PE. Measuring outcomes of family-centered intervention: development of the Life Participation for Parents (LPP). Phys Occup Ther Pediatr 2009;29(2):113–28.

19. Siddiqui A, Ross H. Mediation as a method of parent intervention in children's disputes. J Fam Psychol 2004;18(1):147–59.
20. Davis-Kean PE. The influence of parent education and family income on child achievement: the indirect role of parental expectations and the home environment. J Fam Psychol 2005;19(2):294–304.
21. Carlson MJ, Magnuson KA. Low-income men and fathers' influences on children. Ann Am Acad Pol Soc Sci 2011;635(1):95–116.
22. Blake J. Family size and the quality of children. Demography 1981;18:421–42.
23. López V, Clifford T, Minnes P, Ouellette-Kuntz H. Parental stress and coping in families of children with and without developmental delays. J Dev Disabil 2008;14(2):99–104.
24. Morr Loftus MC, Droser VA. Parent and child experiences of parental work–family conflict and satisfaction with work and family. J Fam Issues 2020;41(9):1649–73. doi:10.1177/0192513X19895043.
25. Chen CC, Heinemann AW, Bode RK, Granger CV, Mallinson T. Impact of pediatric rehabilitation services on children's functional outcomes. Am J Occup Ther 2004;58:44–53.
26. Aarthun A, Øymar KA, Akerjordet K. Parental involvement in decision-making about their child's health care at the hospital. Nurs Open 2018;6(1):50–8.
27. Hartley SL, Seltzer MM, Barker ET, Greenberg JS. Marital quality and families of children with developmental disabilities. Int Rev Res Dev Disabil 2011;41:1–29.

Editorial Policy

Aim and Scope
The Journal of Pediatrics Philippines is a peer-reviewed journal published twice a year by the Philippine Pediatric Society, (PPS) Inc. that follows the "Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals" of the International Committee of Medical Journal Editors. It publishes original articles, reviews, systematic reviews, meta-analyses, case reports and editorials written by the members, trainees, and medical peers of the Sub-specialty Society. Its editors are members and medical peers of the PPS and are committed to be fair and professional in dealing with all aspects of publishing the Journal of Pediatrics Philippines. Their specific affiliations are listed in the editorial page, and they disclose their potential conflicts of interest as necessary. In line with the vision and mission of the PPS, their role is to publish research that will benefit the PPS, the medical community and the community at large while conforming to scientific, ethical and intellectual property standards and guidelines.

Ethics Approval
Studies involving humans, including chart reviews and case reports/series, should have undergone review by a Research Ethics Committee that has been granted a level III accreditation by the Philippine Health Research Ethics Board (PHREB). The approval (or exemption) letter should be submitted together with the manuscript.

Peer Review
Manuscripts that have passed the initial review by the editors will be sent for peer review. The Journal practices a double-blind review process. Manuscripts requiring major revisions will be sent back to the authors.

Style of Papers
All contributions should be written in English. Papers should be written to be intelligible to the professional reader who is not a specialist in the field. The editor and his staff reserve the right to modify manuscripts to eliminate ambiguity and repetitions, and to improve communication between author and reader. If extensive alterations are required, the manuscripts will be returned to the author for revision. Therefore, to minimize delay in publication, manuscripts should be submitted in accordance with the instructions detailed herein. The author may refer to the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals 2020 available at www.icmje.org for additional guidance. The editor will not be held responsible for views expressed in this journal.

Submission of Manuscript
A copy of the manuscript, including tables and figures, should be submitted in Microsoft Word format to the editor at **dr.mmumagat@gmail.com**. The manuscript should be typed in a single column, double-spaced all throughout, using Times New Roman or Arial 12. All pages, starting from the title page should have page numbers on the lower right-hand corner. Tables, figures and illustrations should be in separate sheets (**not embedded in the text**). This should be accompanied by a cover letter containing the following: 1) corresponding author with complete contact details; 2) signed declaration by all authors of their involvement and willingness to take public responsibility for the paper's contents; 3) ethics approval when applicable; 4) declaration that the paper has not been published and is not under consideration for publication in another journal; 5) declaration of support/funding when applicable; and 6) declaration of conflict of interest. To facilitate revision of the manuscript, the editor requires submission of a printed copy aside from the electronic version.

All pages of the typed manuscript should be numbered, including those containing declarations, acknowledgments, and references. The manuscript should be arranged as follows: 1) title and list of authors, 2) corresponding author with contact details, 3) abstract, 4) key words, 5) introduction, 6) methods, 7) results, 8) discussion, 9) acknowledgments, 10) support/funding, 11) conflict of interest

declaration, 12) references, tables and figures. **Tables and figures and their legends should be submitted as a separate Word file. Photographs should be submitted as a separate jpeg file**.

Title, list of authors, corresponding author
The title should be as concise and informative as possible and should contain all key words to facilitate indexing and information retrieval. This should be followed by the list of authors' names to be written as follows: first name, middle initial, family name and academic degrees. The sequence of names should be agreed upon by the authors. The institution of each of the authors should also be provided. Only those qualified based on the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals 2020 should be listed as authors. The contact details (affiliation, address, email address, contact number) of the corresponding author should be provided.

Abstract
This should be a concise structured summary consisting of the Introduction, Methods, Results and Conclusion. It should be no more than 200 words and include the purpose, basic procedures, main findings, and principal conclusions of the investigation. New and important information should be emphasized.

Key Words
Two to six key words or phrases, preferably Medical Subject Headings (MeSH) terms, should be provided. This will assist in cross-indexing the article. The authors may refer to MeSH on Demand at https://meshb.nlm.nih.gov for possible MeSH terms.

Introduction
This should contain a summary of the rationale and objectives of the study and provide an outline of pertinent background material. It should not contain either results or conclusions.

Methods
This should adequately describe the study design, population, selection process, randomization, blinding, study procedures, data collected, and statistical methods used in data analysis.

Results
This should be presented in logical sequence in the text, tables, and figures, avoiding repetitive presentation of the same data. Measurements should be in International System (SI) units. This section should not include material appropriately belonging to the discussion. Results must be statistically analyzed when appropriate.

Discussion
Data mentioned in the results should be explained in relation to any hypothesis advanced in the introduction. This may also include an evaluation of the methodology and the relationship of new information to previously gathered data. Conclusions should be incorporated in the final paragraph and should be commensurate with and completely supported by data gathered in the study.

Acknowledgments
Only persons who have made genuine contributions and who endorse the data and conclusions should be acknowledged. Authors are responsible for obtaining written permission to utilize any copyrighted text and/or illustrations.

References
It is preferred that references and intext citations be in the National Library of Medicine (Vancouver) format, however, authors may choose to use the American Psychological Association (Harvard) format. The format selected by the authors should be used consistently throughout the manuscript.

References in the NLM/Vancouver style cited in the text shall be written as Arabic numerals in superscript at the end of the sentence in the order in which they appear in the text. Use the format in the *Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals* (updated 2020) which is available at www.icmje.org. Titles of journals should be abbreviated in the reference list according to the style used in Index Medicus. Electronic references should include the date that the material was accessed. Unpublished observations and personal communications may not be used as references. Examples of the correct manner of listing references in the NLM/Vancouver format are illustrated below:

Standard journal article
(List all authors when six or less; when seven or more, list only the first three then add "et al".)

Krugman S, Overby LR, Mushahwar IK, et al. Viral hepatitis type B: studies on the natural history and prevention reexamined. N Engl J Med 1979; 300: 101-6.

Rankin J, Tennant PW, Stothard KJ, et al. Maternal body mass index and congenital anomaly risk: A cohort study. Int J Obes 2010; 34(9): 1371-80. Available from: http://ncbi.nlm.nih.gov/pubmed/20368710. [Accessed August 27, 2011].

Books and other monographs, personal authors
Adams RD, Victor M. Principles of Neurology. New York: McGraw-Hill; 1981.

Chapter in a book
Corbett S. Systemic Response to Injury and Metabolic Support. In: Brunicardi FC (editor). Schwartz's Principles of Surgery. 10th ed. New York: McGraw-Hill; 2015: 13-50.

Tables and figures
These should be submitted as a **separate Word or Excel file (NOT AN IMAGE FILE),** numbered with Arabic numerals and accompanied by a title and an explanatory caption at the top. Each table must be referred to in the text and an indication of the preferred position in the text should be given. Other explanatory materials should be placed in footnotes below the tables. All non-standard abbreviations should be explained in the footnotes. Vertical and horizontal rules between entries should be omitted. Each figure (graphs, charts, etc.) should be identified clearly and numbered in Arabic numerals and accompanied by a title and an explanatory caption at the bottom.

Photographs
Photographs and illustrations should be submitted as a separate image file in **jpeg format** with a resolution of at least **800 x 600 dpi**. Each photograph or illustration should be identified as a figure and numbered in Arabic numerals and accompanied by a title and an explanatory caption at the bottom. Specific points of interest in the photograph or illustration should be marked with an arrow or encircled. When symbols, arrows, numbers, and letters are used to identify parts of illustrations, each one should be identified and explained in the legend. Photographs of persons must be retouched to make the subject unidentifiable when possible and be accompanied by written permission from the subject to use the photograph.

Conflict-of-Interest Policy
As part of good publication practices, all editors of the Journal of the (Editor-in-Chief and Associate Editors) are required to disclose on an annual basis, any potential conflict of interest, including current or recent financial relationships with any commercial entity whose products or services may be contained in the journal content. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. This policy follows the recommendations of the International Committee of Medical Journal Editors (ICMJE) and the Committee on Publication Ethics (COPE).

For inquiries and concerns please contact:

Ms. Annaliza Perhis, PPS Building, 52 Kalayaan Ave., Diliman, Quezon City

Mobile number: (+63) 9167732776
E-mail: ppsresearchforum@gmail.com

Editorial Conflict of Interest Disclosure

Editors

As part of good publication practices, all editors of the Journal of Pediatrics Philippines (Editor- in-Chief and Associate Editors) are required to disclose on an annual basis, any potential conflict of interest, including current or recent financial relationships with any commercial entity whose products or services may be contained in the journal content. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. This policy follows the recommendations of the International Committee of Medical Journal Editors (ICMJE) and the Committee on Publication Ethics (COPE).

Reviewers

Reviewers must assess potential conflicts of interest before accepting a manuscript for review and disclose any that may affect their impartiality. If a conflict exists, they should decline the review. Reviewers are expected to follow the Committee on Publication Ethics (COPE) Ethical Guidelines for Peer Reviewers, maintain confidentiality, and avoid using or sharing unpublished data. They must not use the peer review process to advance their own work or require citations to their own publications unless genuinely relevant.

Authors

All authors must disclose any financial, personal, institutional, or intellectual conflicts of interest related to the manuscript. This includes ownership of stocks, consultancy roles, honoraria, travel support, patent rights, or other benefits from products discussed. Non-financial conflicts—such as personal relationships, institutional affiliations, or ideological beliefs—should also be declared. If no conflicts exist, a statement to that effect must be included in the manuscript.

PHILIPPINE PEDIATRIC SOCIETY, INC.

52 Kalayaan Avenue, Brgy. Malaya, Diliman, Quezon City

ppsinc@pps.org.ph