Frequency Distribution of Pediatric Primary Care Cases in a Rural Site in The Philippines: A Cross-Sectional Study

Jonah Mikka B. Dorado, MD,[1] Leonila F. Dans, MD,[1,2] Carol Stephanie C. Tan-Lim, MD,[3] Cara Lois T. Galingana,[2] Janelle Micaela S. Panganiban,[2] Mia P. Rey, PhD,[2] Josephine T. Sanchez, RN,[2] Herbert S. Zabala,[2] Maria Rhodora N. Aquino, RN[2] and Antonio L. Dans, MD, MSc[2,4]

[1]*Department of Pediatrics, Philippine General Hospital, University of the Philippines Manila*
[2]*Philippine Primary Care Studies, Center for Integrative and Development Studies, University of the Philippines Diliman*
[3]*Department of Clinical Epidemiology, College of Medicine, University of the Philippines Manila*
[4]*Institute of Clinical Epidemiology, National Institutes of Health, University of the Philippines Manila*

ABSTRACT

Background. Primary care for pediatric patients focuses on providing comprehensive, accessible, and coordinated healthcare from the neonatal period to adolescence. The implementation and use of electronic medical records (EMR) in pediatric primary care facilities is an efficient strategy to gather necessary information on the epidemiology of common pediatric diseases in the Philippines.

Objectives. This study aimed to determine the frequency distribution of pediatric diseases in a rural primary healthcare facility in the Philippines.

Methods. This cross-sectional study reviewed the EMR of all pediatric patients who consulted in a primary care facility in Samal, Bataan from April 2019 to March 2021. Data gathered include sex, age in years, chief complaint, diagnosis, and month of consultation. Data was summarized using descriptive statistics.

Results. A total of 14,462 pediatric consults were recorded from April 2019 to March 2021. There were slightly more male patients (52.1%). The mean age of the patients was 6.5 years (standard deviation 5.22). The highest number of consults came from the 1- to 4-year-old age group (41.5%). The most common chief complaints were cough (45.9%), fever (25.5%), and colds (24.9%). The most frequent diagnoses were upper respiratory tract infections (47.4%), followed by lower respiratory tract infections (6.9%), and skin and soft tissue infections (5.3%). Majority of the consults for respiratory tract infections, skin and soft tissue infections, gastroenteritis, asthma, and dermatitis were in the 1- to 4-year-old age group. Urinary tract infections and otitis media or externa were recorded more frequently in the 5- to 9-year-old age group.

Conclusions. Respiratory tract infections, followed by skin and soft tissue infections, were the most frequently identified diseases in children consulting a primary care facility at a rural site in the Philippines. The most common chief complaints, defined as the primary reason for seeking consult, were cough, fever, and colds. Data was gathered through EMR review, which may aid in the planning of programs and policies to improve primary care service delivery.

Keywords: pediatric primary care cases, electronic medical record, rural site

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Corresponding author: Carol Stephanie C. Tan-Lim, MD
Department of Clinical Epidemiology
College of Medicine
University of the Philippines Manila
Pedro Gil St., Ermita, Manila 1000, Philippines
Email: cctan7@up.edu.ph
ORCiD: https://orcid.org/0000-0001-8815-4191

INTRODUCTION

Children, especially those belonging to the 1- to 4-year-old age group, are vulnerable to infectious diseases such as pneumonia, diarrhea, and malaria.[1] In the Philippines' Department of Health (DOH) 2019 data, the leading cause of mortality is pneumonia for children 1-4 years old, arthropod-borne viral fevers and viral hemorrhagic fevers for children 5-9 years old, and diseases of the nervous system for adolescents 10-14 years old. Mortality among infants is nearly three times higher at 3.5% compared to the mortality among children 1-4 years, with respiratory distress of the newborn as the leading cause.[2] In a prevalence study conducted by Dorey et al. in three Asian countries in 2015, the top three diagnoses in pediatric cases in the Philippines from humanitarian missions conducted in four 4th class municipalities in Antique Province are: (1) upper respiratory tract infection, (2) asthma, and (3) otitis media.[3] The rates of infections may exhibit seasonal variation, with respiratory tract infections, gastroenteritis, measles, dengue fever and leptospirosis demonstrating increased incidence during the rainy season in tropical countries.[4-6]

Primary care for pediatric patients focuses on providing comprehensive, accessible, and coordinated healthcare from the neonatal period to adolescence. Primary care should be patient- and family-centered to meet the goal of reducing childhood morbidity and mortality.[7] In several studies conducted in North America and Asia, the common conditions seen in pediatric primary care facilities are respiratory illnesses, gastrointestinal diseases, and dermatologic conditions.[8,9] Several interventions have been proposed to improve the quality of pediatric primary care services, including: (1) analyzing the demographic data of the patients being catered, (2) identifying the roles of different healthcare providers, (3) recognizing different settings suitable for healthcare provision such as clinics, schools or even homes, (4) utilizing appropriate screening and diagnostic tools to come up with accurate diagnosis, and (5) using electronic medical records (EMR).[10]

Various studies have demonstrated the benefits of using EMR in the primary care setting.[11] In a systematic review in 2010, the use of EMRs in primary care facilities resulted in decreased issues in legibility, improved completeness of patient information, and increased accessibility to data.[12] In the Philippines, a study on the perceived benefits of EMR in Tarlac Province reported improvement in encoding and retrieval of information, faster location of patient record, reduced average time of patient consultation, and more accurate health data recording and reporting.[13] Several Philippine studies describing clinical profiles of patients with specific diseases were completed in a short period of time due to the ease in data gathering using EMR.[14-16] The implementation and use of EMR in pediatric primary care facilities is an efficient strategy to gather necessary information on the epidemiology of common pediatric diseases in the Philippines.[13]

The Philippine Primary Care Studies (PPCS), a research project which proposed to expand the primary care package of PhilHealth, was launched in 2016 with goals to: (1) develop the tools and essential methods in capacity building, community preparation, use of EMR, and financing; (2) implement the pilot primary care PhilHealth benefits; and (3) evaluate the outcomes with the goal of improving the primary care delivery system in the country. The studies were conducted in 3 pilot sites, namely, an urban site in the University of the Philippines Diliman, a rural site in Samal, Bataan, and a remote site in Bulusan, Sorsogon. The rural site, Samal is a 4th class municipality in Bataan. The service delivery network comprises 14 Barangay Health Stations and 1 Rural Health Unit (RHU) that cater to an average of 150 to 200 patients per day for five days a week. As part of the PPCS program, an EMR was established in the rural site starting April 2019.

Data regarding the epidemiology of common illnesses among Filipino children, particularly in rural sites, are still lacking. Knowledge of the frequency distribution of various pediatric health conditions is vital for the development and implementation of relevant pediatric healthcare programs, training of healthcare providers, and proper allocation of funds for equipment and medication. The objectives of this study were: (1) to determine the most common pediatric disease conditions among patients consulting in a primary healthcare center of a 4th class municipality in the Philippines; (2) to determine the most common chief complaints of pediatric patients, and the frequency distribution of diseases per month of the year; and (3) to demonstrate how the EMR can be used to gather relevant epidemiologic data in a rural primary care facility.

METHODS

Study Design and Population

This is a cross-sectional study using data from the EMR of a primary care facility in the rural site of the PPCS. All pediatric patients less than 19 years old who sought consult in any of the Barangay Health Stations or RHUs in Samal, Bataan from April 2019 to March 2021 were included in this study.

Data Collection, Encoding, and Processing

Data from each pediatric consult was encoded real time in the EMR by the healthcare workers. Data was extracted from the EMR by the PPCS data management team and encoded into Microsoft Excel per consult. In case of missing data, this was to be encoded as "not reported". The filter function of Microsoft Excel was utilized to extract the data, which included sex, age in years, chief complaint as reported by the caregiver, diagnosis, and month of consultation. Age was further subdivided in stages defined by the National Institute of Child Health and Human Development.[17] For consults with multiple chief complaints, all symptoms listed

were counted. Diagnoses were grouped into categories using the classification developed by Alessandrini et al. for acute medical problems.[18]

Data Analysis

Data extracted from the EMR were presented using descriptive statistics, specifically frequency and percentage. Microsoft Excel was used to analyze the data and create line graphs.

Ethical Considerations

This study was done as one of the performance indicators of health outcomes covered by the PPCS. The PPCS was reviewed and approved by the University of the Philippines Manila Research Ethics Board (UPMREB) under study protocol code UPMREB 20-15-489-01. Consults were labeled using numbers to ensure anonymity. Data privacy and confidentiality were assured by removing all patient identifiers and reporting the results in aggregate form. A password protected laptop, accessible only to the principal investigator, was used to store data. Data will be destroyed after two years.

RESULTS

A total of 14,462 pediatric consults was recorded from April 2019 to March 2021 in the rural primary care facility. There were slightly more male (52.1%) than female patients (47.9%). The mean age of the patients was 6.5 years (standard deviation [SD] 5.22). The highest number of consults came from the 1- to 4-year-old age group (41.5%) followed by the 5- to 9-year-old age group (26.9%). The study participants flow diagram is displayed in Figure 1. The age and sex distribution of patients is shown in Table 1. There was no missing data since the information obtained from the EMR were all 'required' fields—meaning the people inputting the data need to fill up these fields prior to closing the record.

Table 2 shows the top 10 common chief complaints among the pediatric consults, with cough being the most common (45.9%).

There were a total of 62 disease conditions recorded in the EMR which were grouped into 35 categories. The top 10 categories are summarized in Table 3. The most common disease category was upper respiratory tract infections (47.4%, n = 6,862), which include rhinitis, pharyngitis, and tonsillitis. This is followed by lower respiratory tract infections (6.9%, n = 1,010), skin and soft tissue infections (5.3%, n = 770), gastroenteritis (3.3%, n = 481), and urinary tract infections (2.3%, n = 334). There were 250 consults (1.7%) for general examination, and 209 maternal care consults (1.4%). There were only 22 consults for tuberculosis (0.2%), six for dengue fever (0.04%), five for measles (0.03%), and three for malnutrition (0.02%). No malaria consults were recorded. Majority of the consults for respiratory tract infections, skins and soft tissue infections, gastroenteritis, asthma, and dermatitis belonged to the 1- to 4-year-old age group. Urinary tract infections, otitis media or externa, and animal bites were recorded more frequently in the 5- to 9-year-old age group. All pregnant patients belonged to the 15 to <19-year-old group, except for one 14-year-old patient.

Most upper respiratory tract infections were recorded from September to November 2019, while lower respiratory

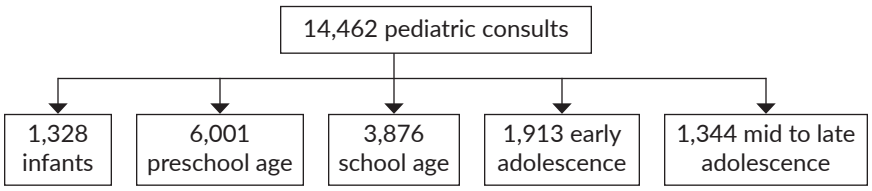

Figure 1. Study participants flow diagram.

Table 1. Age and Sex Distribution of Pediatric Consults from April 2019 to March 2021

Age Group	Male	Female	n (%)
Infancy (0 to <1 year)	773	555	1,328 (9.1)
Toddler – Preschool age (1 to 4 years)	3,183	2,818	6,001 (41.5)
School age (5 to 9 years)	2,069	1,807	3,876 (26.9)
Early adolescence (10 to 14 years)	976	937	1,913 (13.2)
Mid to Late adolescence (15 to <19 years)	537	807	1,344 (9.3)
Total	7,538	6,924	14,462 (100)

Table 2. Top 10 Most Common Chief Complaints of Pediatric Consults

Chief complaint	n (%)
1. Cough	6,638 (45.9)
2. Fever	3,694 (25.5)
3. Colds	3,600 (24.9)
4. Sore throat	583 (4.0)
5. Rash	444 (3.1)
6. Diarrhea	437 (3.0)
7. Wound	357 (2.5)
8. Vomiting	320 (2.2)
9. Ear pain/discharge	314 (2.2)
10. Dyspnea	209 (1.4)

Table 3. List of the Top 10 ICD Codes Registered for Pediatric Consults and Age Distribution

Diseases and ICD codes	0-<1 year (Infancy)	1-4 years (Toddler – Preschool)	5-9 years (School Age)	10-14 years (Early Adolescence)	15-<19 years (Mid-Late Adolescence)	n (%)
1. Upper Respiratory Tract Infections (rhinitis, pharyngitis, tonsillitis) [J00, J03, J06]	733	3,339	1,525	898	367	6,862 (47.4)
2. Lower Respiratory Tract Infections (Pneumonia, Bronchitis) [J16, J17, J18]	114	572	219	69	36	1,010 (6.9)
3. Skin and soft tissue infections (abscess, furuncles, carbuncles, cellulitis, impetigo) [L01, L02]	68	360	206	99	37	770 (5.3)
4. Gastroenteritis (amebiasis, giardiasis) [K52]	86	257	92	27	19	481 (3.3)
5. Urinary Tract Infection [N39]	7	82	109	74	62	334 (2.3)
6. General Examination [Z00]	34	71	57	43	45	250 (1.7)
7. Asthma [J45]	25	94	57	43	19	238 (1.6)
8. Maternal care in pregnancy [O26]	0	0	0	1	208	209 (1.4)
9. Otitis Media/Externa [H60, H65, H66]	5	53	60	24	21	163 (1.1)
10. Dermatitis (atopic, diaper, contact, irritant, seborrheic) [L20, L22, L23, L24, L25]	31	68	33	20	5	157 (1.0)

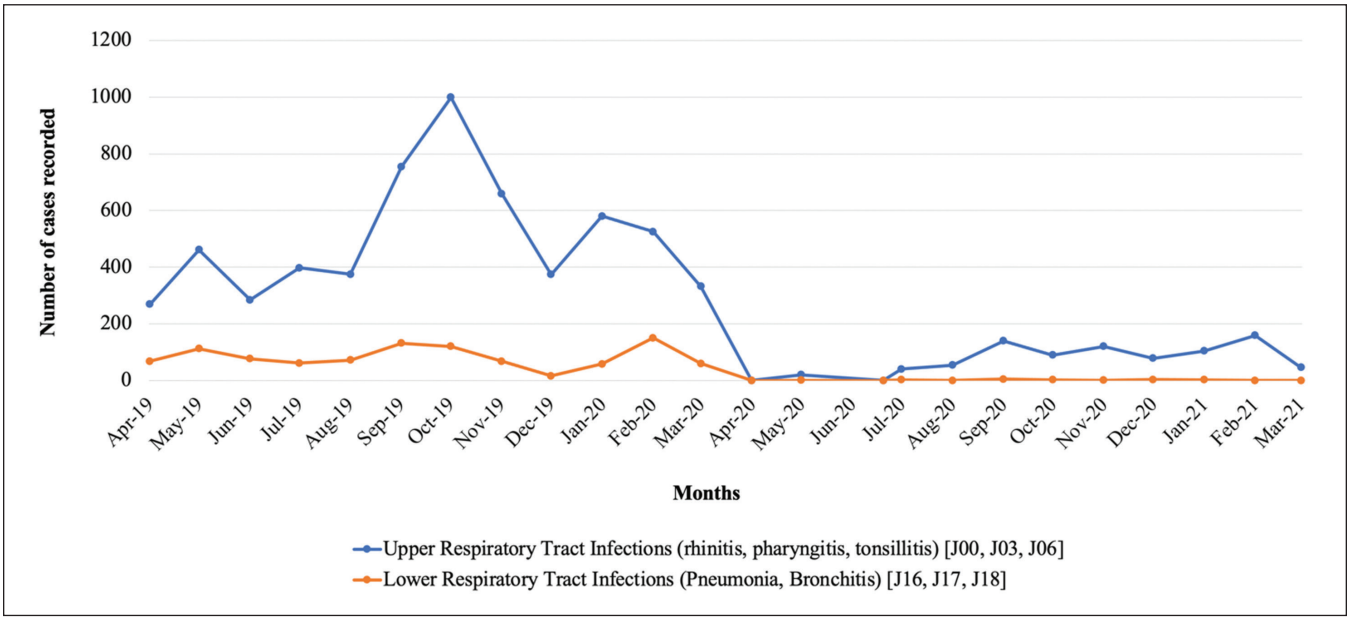

Figure 2. Distribution of upper and lower respiratory tract infection cases from April 2019 to March 2021.

tract infections demonstrated slight increases from September to October 2019 and in February 2020 as seen in Figure 2. The highest number of skin and soft tissue infections was recorded from June to July 2019, while the highest number of gastroenteritis cases was seen in February 2020 (Figure 3).

DISCUSSION

This study showed that most of the pediatric consults were from the 1- to 4-year-old age group; there was an almost equal distribution among males and females. The most common chief complaints, defined as the primary reason for seeking consult, were cough, fever, and colds. Majority of the diseases were respiratory tract infections followed by skin and soft tissue infections.

These findings are consistent with results of other local and international studies.[3,9,19] In a study by Whitburn et al. conducted in several primary care sites in the United Kingdom, respiratory symptoms such as cough was the most common parent-reported symptom in pre-school children, followed by trauma, skin, and gastrointestinal complaints.[20] Despite the common occurrence of respiratory and gastrointestinal symptoms in children, it is worthwhile to note that parents still opt to seek medical advice in a primary care facility for further management. These results suggest that future programs should focus on health education on

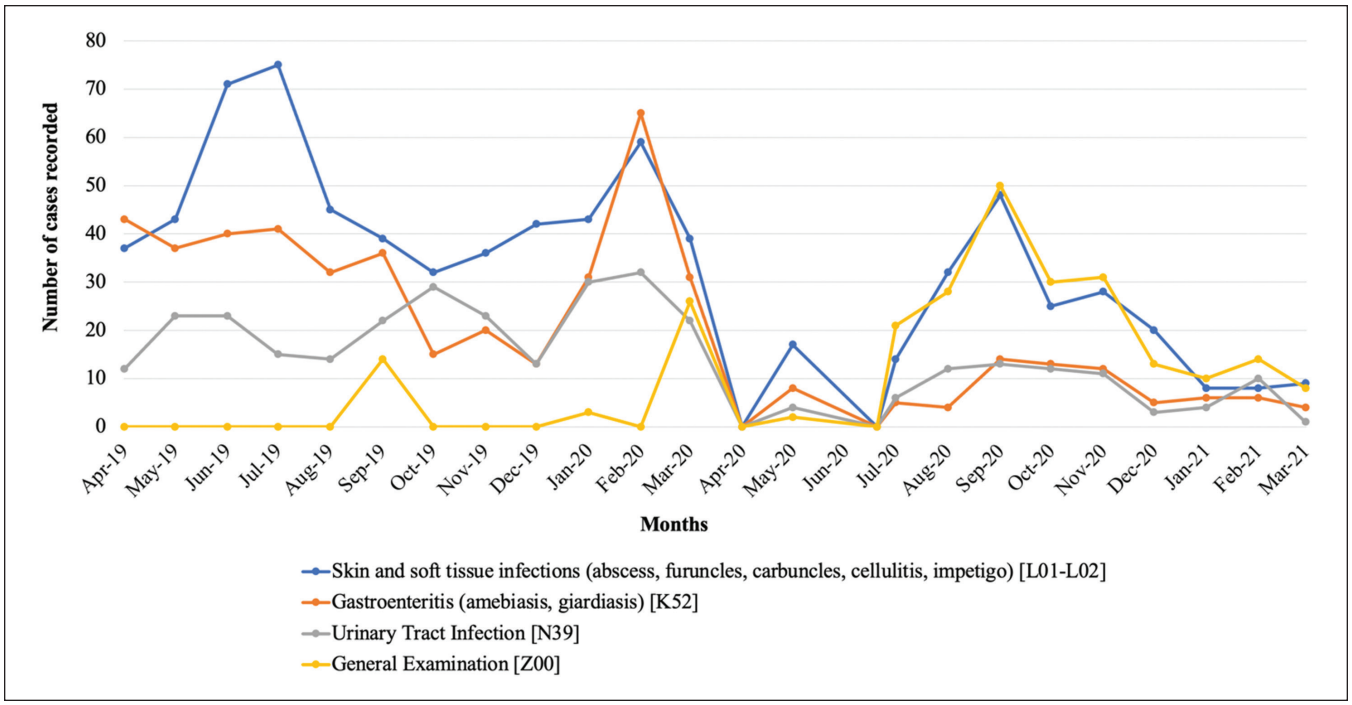

Figure 3. Distribution of skin and soft tissue infection, gastroenteritis, urinary tract infection and general examination cases from April 2019 to March 2021.

these symptoms, particularly the initial management by caregivers, and the warning signs to watch out for which would warrant further medical intervention.

This study included the diagnosis of "general examination" to emphasize that not all patients brought for consultation are sick children. According to the American Academy of Pediatrics, well-child visits should be scheduled at least every two months during infancy and every year thereafter to: (1) receive the scheduled immunizations, (2) track growth and development, and (3) raise any developmental or behavioral concerns that can be addressed in a timely manner.[21]

In this study, 482 consults (3.3%) were follow-up consults where patients did not have any new symptoms. Although "follow-up" was not listed in the top 10 most common chief complaints for consults, this finding is worth noting since studies in high income countries such as United Kingdom and Saudi Arabia do not report "follow-up" as a common reason for consult. In contrast, "follow-up" was one of the top complaints in pediatric consults in a primary care facility in Iran, a low-to-middle income country (LMIC) like the Philippines.[19,22,23] This finding suggests that it is important to include "follow-up" as an outcome to be reported in future studies in order to determine the rate at which patients are reassessed after initial consult and intervention by a primary care provider. The study by Liberman et al. showed a low follow-up rate of 23.6% within seven days in pediatric patients with respiratory symptoms seen in primary care facilities in Washington DC.[24]

Another notable finding is that prenatal care was included in the top 10 conditions for pediatric consult in this study. Pregnant pediatric patients belonged to the 15- to <19-year-old group, except for one 14-year-old patient. This is reflective of our country's latest statistics on teenage pregnancy that majority can be found in the late adolescent stage.[25] There is a high adolescent fertility rate in the Philippines at 55 births per 1000 women belonging in the 15-19 age group.[26] In fact, the Philippines has been reported to rank second in terms of teenage pregnancy rate in East Asia and Pacific.[25] Adolescent pregnancy has several negative effects on the overall well-being of pregnant teenagers.[27] This study demonstrates that the frequency of prenatal care consults should be reported in future studies, particularly in countries with increasing number of teenage pregnancies, since this data has implications on other reportable health outcomes such as maternal and neonatal morbidity and mortality. It is also interesting to note that studies conducted in high income countries do not report prenatal consults in primary care facilities, which may be attributed to the fact that they have separate clinics for pregnant patients. In contrast, the birthing clinic in Samal, Bataan is in the RHU itself; hence, prenatal care is included in the consults.

Respiratory tract infections, gastroenteritis, asthma, and otitis media were the common pediatric diseases seen in this study, similar with other local and international studies.[1,2] Respiratory tract infections and gastroenteritis remain in the top five causes of mortality in the under 5 age group in the Philippines in 2019.[2] Despite several programs by the DOH

to increase vaccination rates among children, the prevalence of communicable and vaccine-preventable diseases continue to be high. Other risk factors for acquiring respiratory tract infections are malnutrition, Vitamin A deficiency, and formula feeding.[28] Hence, health programs should focus on bolstering childhood immunization and improving the nutritional status of children in order to prevent these diseases.

Despite the Philippines being endemic for tuberculosis, there were only 22 consults for tuberculosis. Similarly, this study only recorded a few consults for dengue fever, measles, and malnutrition, and no consult for malaria. This is consistent with the epidemiology of diseases in our country: dengue fever cases are highest in the National Capital Region (NCR); measles outbreaks were recorded in Regions 9 and 11 in 2017 and in NCR last 2018; malaria is now present in only eight provinces with the most number of cases seen is in Palawan, while Bataan has been declared as a malaria-free province.[29-31]

Majority of the diseases, such as respiratory tract infections, skin and soft tissue infections, gastroenteritis, asthma, and dermatitis, was seen in the 1- to 4-year age group, consistent with data from the United Nations Children's Fund (UNICEF).[1] Urinary tract infections (UTI), otitis media or externa, and animal bites, on the other hand, were recorded more frequently in the 5- to 9-year-old age group. Animal bites are more common in the school age group since children have increased mobility rendering them at higher risk for animal bites. School-based programs may be instituted for the prevention of these diseases. Emphasis on accident avoidance can be done in every well-child visit from birth to adolescence.

The frequency distribution of cases per month showed a decline in consults starting March 2020, eventually having zero consults for April 2020 due to the COVID-19 pandemic. Upper respiratory tract infections peaked during the months of September to October, which coincides with the rainy season and colder temperatures in the Philippines. Similarly, lower respiratory tract infections were more frequently seen during the months of September, October, and February. Studies show that the seasonality of respiratory tract infections differ per country, depending on the temperature and the virus isolated. Some studies report that respiratory tract infections are negatively associated with temperature, such as those conducted in Brazil, Hawaii, India, and Malaysia. In contrast, a positive association with temperature was documented in studies in Hong Kong, Mexico, Singapore, and Vietnam.[32]

Skin and soft tissue infections were more frequently seen in the months of June and July 2019, which is the beginning of the rainy season in the Philippines. This is in contrast with the studies from USA and Poland where staphylococcal skin infections were highest during summer seasons.[33] However, the lack of data for the summer months in the year 2020 due to the COVID-19 pandemic may have contributed to this difference.

This study made use of the EMR as the source of data. Researches that use data from EMRs are increasingly common. The advantage of using the EMR in the rural primary care facility is that data is encoded real time for every consult, and is readily available for processing, analysis, and interpretation. The chief complaints were recorded in the EMR verbatim, removing the possibility of misinterpretation by the primary care provider. However, some chief complaints were misspelled which may have led to some being missed during data processing. The diagnoses were encoded using ICD codes, making data extraction more accurate, standardized, and efficient.[34]

This main limitation of this study is that data comes from only one primary care site in Samal, Bataan. The findings of this study may not be applicable for other primary care facilities. Moreover, results of this study are dependent on the accuracy of reporting and documentation in the EMR. Social factors and other potential confounding variables that affect the frequency distribution of pediatric conditions were not recorded in the EMR; hence, these could not be accounted for by the study. Lastly, categorization of the consults as initial or follow-up consults was not included in the EMR; thus, the number of consults reported in this study do not equate to the number of patient cases for the disease.

POLICY IMPLICATIONS

Implications on Health Programs

As communicable diseases continue to be the most common reason for seeking primary care consults for pediatric patients, policies and programs should focus on preventing infections. These include strengthening and adding more vaccines in the expanded program on immunization, and improvement in hygiene practices. The importance of regular well-child visits should also be emphasized among parents and caregivers. Furthermore, programs to reduce the incidence of teenage pregnancy should be strengthened.

Implications on Data Management and Research

This study demonstrates that EMRs can be used to gather epidemiologic data in the local setting. Aside from documenting the most frequent pediatric conditions, other potential areas of research include prognosis studies, evaluation of risk factors for harm, quality of care studies, and studies on adherence of primary care services to national and international guidelines. EMRs facilitate the efficient and timely conduct of relevant epidemiologic studies needed locally and internationally. Standardized implementation and use of EMRs in primary care facilities may facilitate acquisition of important data to guide national health policies. Improvement of the EMR to include recording of data on social factors and categorization of consults as initial or follow-up consults may help improve data management and research.

CONCLUSION

This study showed that children 1-4 years old comprised the majority of consults in a primary care facility. These children remain vulnerable to infections, particularly respiratory, skin and soft tissues, and gastrointestinal infections. Other common illnesses include asthma, urinary tract infections, otitis media/externa, and dermatitis. Well-child and maternal care visits are also common in the pediatric population as seen in this study. Data was gathered through EMR review, which may aid in the planning of programs and policies to improve primary care service delivery.

Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

All authors declared no conflicts of interest.

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REFERENCES

1. Child mortality. UNICEF DATA [Internet]. 2022 [cited 2022 Aug]. Available from: https://data.unicef.org/topic/child-survival/under-five-mortality/
2. 2019 Philippine Health Statistics. Epidemiology Bureau. Department of Health Manila [Internet]. 2019 [cited 2022 Aug]. Available from: https://doh.gov.ph/sites/default/files/publications/2019PHS_Final_092121.pdf
3. Dorey HF, Dorey JM, Burman NJ, Zweiback DJ, Hameed JM, Kringel JR, et al. Observations of pediatric disease prevalence from Pacific Partnership 2015. Mil Med. 2018 Mar;183(suppl_1):530-7. doi: 10.1093/milmed/usx179. PMID: 29635585.
4. Shek LP, Lee BW. Epidemiology and seasonality of respiratory tract virus infections in the tropics. Paediatr Respir Rev. 2003 Jun;4(2):105-11. doi: 10.1016/s1526-0542(03)00024-1. PMID: 12758047.
5. San Pedro MC, Walz SE. A comprehensive survey of pediatric diarrhea at a private hospital in Metro Manila. Southeast Asian J Trop Med Public Health. 1991 Jun;22(2):203-10. PMID: 1658949.
6. Sumi A, Telan EFO, Chagan-Yasutan H, Piolo MB, Hattori T, Kobayashi N. Effect of temperature, relative humidity and rainfall on dengue fever and leptospirosis infections in Manila, the Philippines. Epidemiol Infect. 2017 Jan;145(1):78-86. doi: 10.1017/S095026881600203X. PMID: 27608858; PMCID: PMC9507329.
7. Boudreau A, Hamling A, Pont E, Pendergrass TW, Richerson J, Simon HK, et al. Pediatric primary health care: the central role of pediatricians in maintaining children's health in evolving health care models. Pediatrics. 2022 Feb;149(2):e2021055553. doi: 10.1542/peds.2021-055553. PMID: 35104359; PMCID: PMC9645714.
8. Anjum Q, Alam E, Rizvi R, Usman J, Shaikh S, Ahmed Y. Morbidity pattern and utilization of a primary health care center in a low socioeconomic area of Karachi. J Pak Med Assoc. 2006 Jan;56(1):13-6. PMID: 16454128.
9. Fiks AG, Alessandrini EA, Forrest CB, Khan S, Localio AR, Gerber A. Electronic medical record use in pediatric primary care. J Am Med Inform Assoc. 2011 Jan-Feb;18(1):38-44. doi: 10.1136/jamia.2010.004135. PMID: 21134975; PMCID: PMC3005866.
10. Beck AF, Tschudy MM, Coker TR, Mistry KB, Cox JE, Gitterman BA, et al. Determinants of health and pediatric primary care practices. Pediatrics. 2016 Mar;137(3):e20153673. doi: 10.1542/peds.2015-3673. PMID: 26933205.
11. Bates DW, Ebell M, Gotlieb E, Zapp J, Mullins HC. A proposal for electronic medical records in U.S. primary care. J Am Med Inform Assoc. 2003 Jan-Feb;10(1):1-10. doi: 10.1197/jamia.m1097. PMID: 12509352; PMCID: PMC150354.
12. Holroyd-Leduc JM, Lorenzetti D, Straus SE, Sykes L, Quan H. The impact of the electronic medical record on structure, process, and outcomes within primary care: a systematic review of the evidence. J Am Med Inform Assoc. 2011 Nov-Dec;18(6):732-7. doi: 10.1136/amiajnl-2010-000019. PMID: 21659445; PMCID: PMC3197985.
13. Canlas FC, Perez AO, Corciega JO, Ramos RP, Lazatin JA, Zapanta JA. The Perceived Benefits on the Use of an Open-Source e-Health Platform in Tarlac Province, Philippines [Internet]. 2013 [cited 2023 Sep]. Available from: http://sql.wah.ph/files/download/The_Perceived_Benefits_on_the_Use_of_an_Open_Source_eHealth_Platform_in_Tarlac_Province_Philippines.pdf
14. Malundo AFG, Abad CLR, Salamat MSS, Sandejas JCM, Planta JEG, Poblete JB, et al. Clinical characteristics of patients with asymptomatic and symptomatic COVID-19 admitted to a tertiary referral centre in the Philippines. IJID Reg. 2022 Mar;2:204-11. doi: 10.1016/j.ijregi.2022.02.002. PMID: 35721425; PMCID: PMC8818128.
15. De Roxas RC, Bagnas MAC, Baldonado JJAR, Rivera JP, Roxas AA. Clinical profile and outcome of postthymectomy versus non-thymectomy myasthenia gravis patients in the Philippine General Hospital: A 6-year retrospective study. Front Neurol. 2016 Jun;7:96. doi: 10.3389/fneur.2016.00096. PMID: 27445963; PMCID: PMC4914503.
16. Tan CC, Dofitas BL, Frez MLF, Yap CDD, Uy JKK, Ciriaco-Tan CP. Cutaneous manifestations of COVID-19 in a tertiary COVID-19 referral hospital in the Philippines. JAAD Int. 2022 Jun;7:44-51. doi: 10.1016/j.jdin.2022.01.007. PMID: 35128486; PMCID: PMC8808712.
17. Williams K, Thomson D, Seto I, Contopoulos-Ioannidis DG, Ioannidis JPA, Curtis S, et al. Standard 6: age groups for pediatric trials. Pediatrics. 2012 Jun;129 Suppl 3:S153-60. doi: 10.1542/peds.2012-0055I. PMID: 22661762.
18. Alessandrini EA, Alpern ER, Chamberlain JM, Shea JA, Gorelick MH. A new diagnosis grouping system for child emergency department visits. Acad Emerg Med. 2010 Feb;17(2):204-13. doi: 10.1111/j.1553-2712.2009.00635.x. PMID: 20370751.
19. Hay AD, Heron J, Ness A; ALSPAC study team. The prevalence of symptoms and consultations in pre-school children in the Avon Longitudinal Study of Parents and Children (ALSPAC): a prospective cohort study. Fam Pract. 2005 Aug;22(4):367-74. doi: 10.1093/fampra/cmi035. PMID: 15897210.
20. Whitburn S, Costelloe C, Montgomery AA, Redmond NM, Fletcher M, Peters TJ, et al. The frequency distribution of presenting symptoms in children aged six months to six years to primary care. Prim Health Care Res Dev. 2011 Apr;12(2):123-34. doi: 10.1017/S146342361000040X. PMID: 21457597.
21. Recommendations for Preventive Pediatric Health Care. American Academy of Pediatrics [Internet]. 2022 [cited 2022 Aug]. Available from: https://downloads.aap.org/AAP/PDF/periodicity_schedule.pdf
22. Yousef HA, Abdel Wahab MM, Alsheikh S, Alghamdi R, Alghamdi R, Alkanaan N, et al. Characteristics of pediatric primary healthcare visits in a university-based primary healthcare center in Saudi Arabia. Children (Basel). 2022 Nov;9(11):1743. doi: 10.3390/children9111743. PMID: 36421192; PMCID: PMC9688705.
23. Khatami F, Shariati M, Abbasi Z, Muka T, Khedmat L, Saleh N. Health complaints in individual visiting primary health care: population-based national electronic health records of Iran. BMC

Health Serv Res. 2022 Apr;22(1):502. doi: 10.1186/s12913-022-07880-z. PMID: 35421968; PMCID: PMC9008379.
24. Liberman DB, Shelef DQ, He J, McCarter R, Teach SJ. Low rates of follow-up with primary care providers after pediatric emergency department visits for respiratory tract illnesses. Pediatr Emerg Care. 2012 Oct;28(10):956-61. doi: 10.1097/PEC.0b013e31826c6dde. PMID: 23023461.
25. United Nations Population Fund. Sexual and Reproductive Health of Young People in Asia and Pacific: A Review of Issues, Policies and Programmes [Internet]. 2022 [cited 2022 Aug]. Available from: https://asiapacific.unfpa.org/sites/default/files/pub-pdf/UNFPA%20SHR%20YP%20AP_2015%20for%20web-final.pdf
26. World Bank. Adolescent Fertility Rate (Births per 1000 Women) [Internet]. 2022 [cited 2022 Aug]. Available from: https://data.worldbank.org/indicator/SP.ADO.TFRT
27. Leftwich HK, Alves MVO. Adolescent pregnancy. Pediatr Clin North Am. 2017 Apr;64(2):381-8. doi: 10.1016/j.pcl.2016.11.007. PMID: 28292453.
28. Berman S. Epidemiology of acute respiratory infections in children of developing countries. Rev Infect Dis. 1991 May-Jun;13 Suppl 6: S454-62. doi: 10.1093/clinids/13.supplement_6.s454. PMID: 1862276.
29. Bravo L, Roque VG, Brett J, Dizon R, L'Azou M. Epidemiology of dengue disease in the Philippines (2000-2011): a systematic literature review. PLoS Negl Trop Dis. 2014 Nov 6;8(11):e3027. doi: 10.1371/journal.pntd.0003027. PMID: 25375119; PMCID: PMC4222740.
30. Domai FM, Agrupis KA, Han SM, Sayo AR, Ramirez JS, Nepomuceno R, et al. Measles outbreak in the Philippines: epidemiological and clinical characteristics of hospitalized children, 2016-2019. Lancet Reg Health West Pac. 2021 Dec;19:100334. doi: 10.1016/j.lanwpc.2021.100334. PMID: 34977832; PMCID: PMC8686022.
31. National Malaria Control and Elimination Program Manual of operations [Internet] 2018 [cited Sep 2022]. Available from: https://doh.gov.ph/sites/default/files/health_programs/Malaria-Manual-of-Procedures-2018.pdf
32. Althouse BM, Flasche S, Minh LN, Thiem VD, Hashizume M, Ariyoshi K, et al. Seasonality of respiratory viruses causing hospitalizations for acute respiratory infections in children in Nha Trang, Vietnam. Int J Infect Dis. 2018 Oct;75:18-25. doi: 10.1016/j.ijid.2018.08.001. PMID: 30118916; PMCID: PMC7110808.
33. Miller R, Pywell S, Chan J, McCluney S, Halsey T. Seasonal variation in hand and upper limb soft tissue infections. J Hand Surg Asian Pac Vol. 2019 Jun;24(2):189-94. doi: 10.1142/S2424835519500255. PMID: 31035876.
34. Probst JC, Moore CG, Baxley EG, Lammie JJ. Rural-urban differences in visits to primary care physicians. Fam Med. 2002 Sep;34(8): 609-15. PMID: 12269538.