


SYSTEMATIC REVIEW/META-ANALYSIS

Education

# Emergency medicine research in the Philippines: A scoping review

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## Abstract

**Objectives:** In this review, we aim to synthesize the current emergency medicine literature in the Philippines in order to determine the depth of research available in the country while delineating the gaps, helping to provide focus to future research in the field.

**Methods:** A literature review was done using 4 databases to identify emergency medicine studies in the Philippines. To explore the research trends among eligible studies, data on study type, countries, and institutions involved as well as study themes were collected and described.

**Results:** A total of 845 studies were screened, and 43 were included in this review. Results show that only 25% of emergency medicine studies were published before 2015. Most studies were observational (37.2%) or descriptive (37.2%) in nature with the University of the Philippines/Philippine General Hospital being the most common contributing institution (17.4%). Metro Manila was the most common study site with more than half of studies conducted in the area. Lastly, among the variety of study disciplines, disaster medicine was the most frequent topic comprising 30.2% of studies reviewed.

**Conclusions:** Compared to the global scene, Philippine emergency medicine research still has a long way to go. This study was able to provide a landscape of the current literature and highlight the study trends. Further, the findings here emphasize the need to expand the scope of emergency medicine studies in the country as it is still a young and growing field with studies tending to cluster around just a small number of institutions and regions.

## KEYWORDS

emergency medicine, Philippines, research, trends

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## 1 | INTRODUCTION

### 1.1 | Background

Emergency medicine is a relatively new field of medicine<sup>1</sup> and in the Philippines, it was only recognized as a specialty in 1988.<sup>2</sup> Before its formalization as a specialty, the emergency department (ED) comprised nurses and physicians who were called on an as-needed basis.<sup>1</sup> Eventually, calls for more specialized first aid training led to the formation of the first emergency medicine curriculum.<sup>1</sup> From there, emergency medicine in the Philippines has evolved throughout the years. It has helped the health care system function efficiently, safely, and cost-effectively.<sup>1</sup> Furthermore, it has adapted systems that would enable the provision of health care both in the community and in hospitals.<sup>1</sup> However, despite progress in this field, further development is still needed in order for emergency medicine in the Philippines to be at par with those in other countries.

In 2016, it was reported that the ratio of ED doctors and nurses to patients in the Philippines paled in comparison to that of its neighbors such as Taiwan and Japan.<sup>1</sup> Moreover, waiting times for inpatient beds were also longer compared to countries like India.<sup>1</sup>

### 1.2 | Importance

The gap in emergency medicine services is not only felt by the patients and staff but is also apparent in terms of literature. However, this is not limited to the Philippines as global trends show emergency medicine research is limited.<sup>3,4</sup> In fact, it is only in the past 2 decades that there was a noted annual research growth rate of 13.8% in Europe and 7.9% in the United States and compared to other specialties, there is a lower percentage of collaborative research between specialties and among countries in emergency medicine.<sup>4</sup> In the Philippines, collaborative research networks around resuscitation science and trauma care systems have emerged in recent years allowing Philippine emergency physicians to participate. Still, in lower- and middle-income countries (LMICs), several factors can contribute to research limitations such as lack of personnel, time constraints, insufficient funds, non-standardized data collection, and difficulty in obtaining informed consent.<sup>5,6</sup> The scarcity of updated research may lead to outdated practices and guidelines that may be applied to emergency care locally.<sup>6</sup> It is imperative that those in the field continually adapt to modern advances in practices and technology through the production and implementation of research to provide optimal patient care.

### 1.3 | Goals of this investigation

This scoping review aims to consolidate information on current emergency medicine research in the Philippines while identifying possible gaps to help guide future research in the field. Results of the study shall be communicated to the research committee of the Philippine College of Emergency Medicine for information and use.

## 2 | METHODS

**Study Design and Registration.** This scoping review was conducted following the guidelines found in the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist.<sup>7</sup> The review protocol (<https://osf.io/ztc9a>) may be accessed in the Open Science Framework.

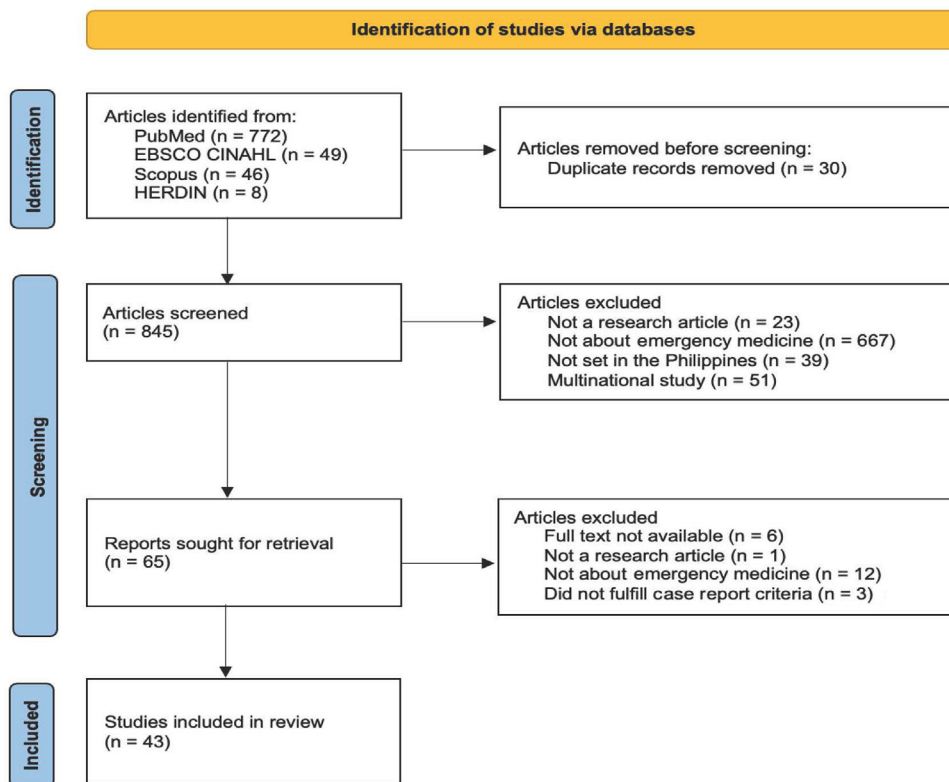
**Eligibility Criteria.** Studies that discuss topics related to emergency medicine as a field of medicine in the Philippines were sought. Specifically, the criteria for inclusion were as follows: (1) any study that was conducted in the Philippines and is within the context of the emergency medicine specialty or in the setting of an ED in the Philippines; (2) published in English; (3) conducted from inception until November 30, 2022; (4) the study population consisted of ED patients or emergency clinicians; and (5) the study or management occurred in the ED. The criteria for exclusion were as follows: (1) publications not in English; (2) unpublished ED studies; (3) studies that are not focused on emergency medicine in the Philippines nor set in EDs in the Philippines; (4) publications that mention emergency medicine in the Philippines within the context of a multinational or global analysis; (5) publications that mention emergency medicine only in the context of public health or policymaking; (6) duplicate articles of another publication, commentaries, editorials, news reports, abstract-only papers, letters to editors, and position papers; and (7) studies with unavailable full text. No studies were excluded due to methodology or risk of bias, in the spirit of effectively assessing the range of emergency medicine research in the Philippines.

For case reports, the following criteria were used: case reports were included if they had (1) patients who presented to the emergency room with life-threatening or limb-threatening conditions; (2) patients with unstable vital signs; (3) patients who required immediate medical or surgical intervention; or (4) patients whose cases were primarily managed in the ED or ICU. They were excluded if (1) patients presented at the ED but were primarily managed in a non-intensive care setting or on an outpatient basis; (2) the patient's area of admission was not specified.

**Search Strategy.** A comprehensive search of 4 electronic databases: PubMed, EBSCO CINAHL, Scopus, and Herdin was done. The following search strategy was used: "(emergency medicine OR emergency department OR emergency medical system OR emergency medical service OR emergency care OR medical emergency service OR medical emergency OR emergency health OR emergency medical OR emergency services OR Prehospital Emergency Care OR ambulance) AND Philippines."

**Selection of Studies.** The results of the initial search strategy were screened by 1 reviewer for duplicates and for articles not in English. The remaining articles underwent title and abstract screening, which was done independently by 3 reviewers. Discrepancies were discussed and resolved by majority consensus. Articles that passed the first screening underwent full-text analysis, which was done similarly by 3 independent reviewers. All irrelevant articles were excluded, with recordkeeping of the reasons for exclusion as seen in Figure 1.

**Data Extraction and Synthesis.** From the papers included after the second round of screening, data were extracted by 2 independent



**FIGURE 1** Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram for study selection.

reviewers using a data extraction tool developed by the reviewers. Data collected from the studies include the following: title, first author, year of publication, study type, country of origin, contributing institutions, study setting, study discipline, and a summary of the findings. These were compiled for analysis in Microsoft Excel version 16.

**Data Analysis.** Descriptive statistics were used to summarize the data with frequencies and percentages reported for nominal data.

### 3 | RESULTS

#### 3.1 | Study selection

The process for study selection is shown in Figure 1.

A total of 845 unique studies were retrieved from 4 databases and were screened for eligibility. After the initial screening, only 65 studies were deemed to be relevant to Philippine emergency medicine. Of these, only 43 were included after the second round of screening (Table 1).

#### 3.2 | Yearly trends in Philippine emergency medicine studies

Based on Figure 2, the number of publications published before 2015 makes up about 25% of the total number of studies with most studies only being published within the last 7 years.

#### 3.3 | Characteristics of Philippine emergency medicine studies

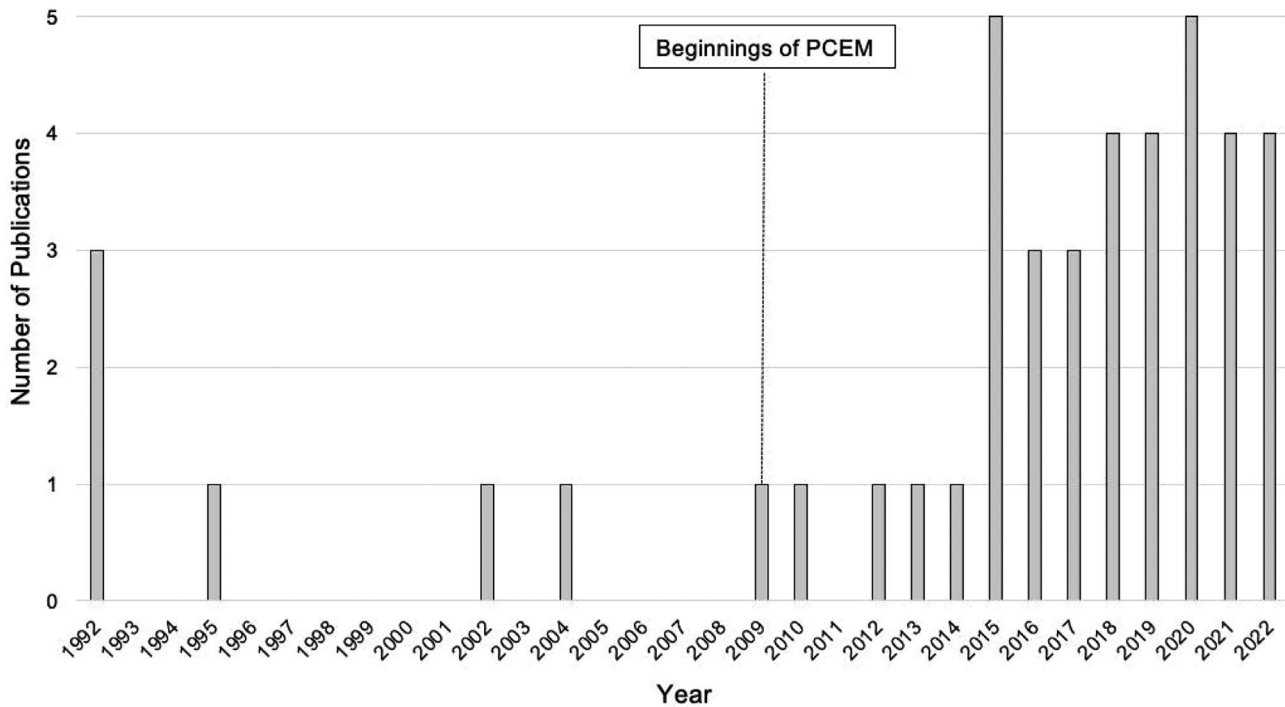
Most studies reviewed were observational studies (39.5%) with descriptive studies (34.9%) being the second most common study type. A majority of study authors came from the Philippines (67.2%) with international collaborating countries led by the United States (8.2%) and Australia (6.6%) (Table 2). In 40% of the studies reviewed, an institution outside of the Philippines was involved. Among local institutions, the University of the Philippines/Philippine General Hospital (17.7%) and Ateneo de Manila University with the partner hospital of its School of Medicine, The Medical City (8.2%) were the top contributors. Most studies were also done in Metro Manila (51.1%) with Eastern Visayas coming in second at 23.4%. Notably, all 11 studies done in Eastern Visayas are on disaster medicine.

#### 3.4 | Study disciplines in Philippine emergency medicine studies

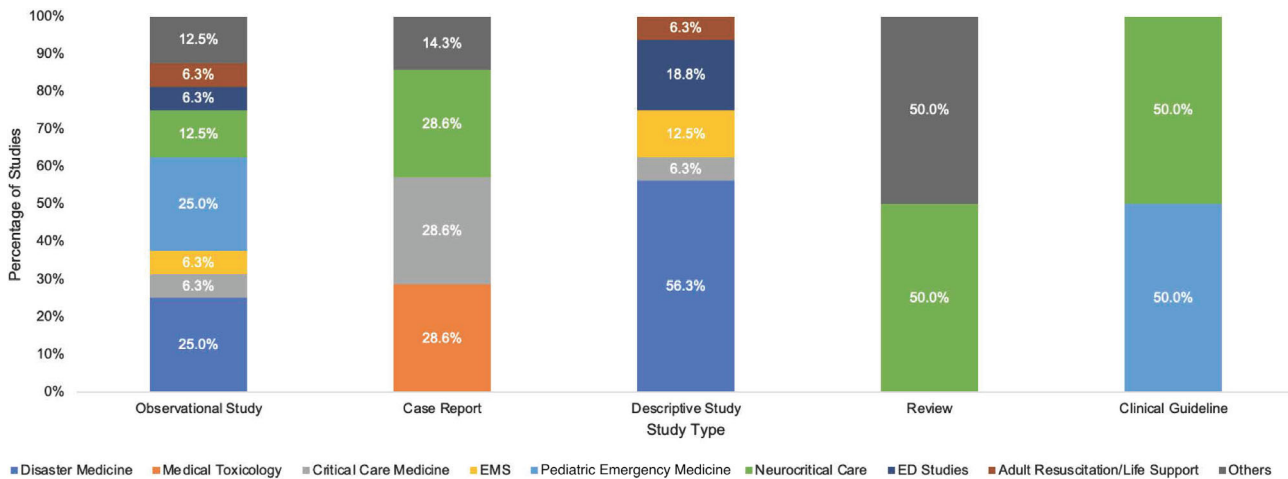
The variety of study disciplines for each study type was also explored (Figure 3). The study type with the most varied topics was observational studies with disaster medicine and pediatric emergency medicine each contributing 4 studies (23.5%). There was also a mix of topics for case reports with 2 studies each (28.6%) for medical toxicology, critical care medicine, and neurocritical care. Descriptive studies were mainly about disaster medicine (60%) whereas reviews and

**TABLE 1** List of emergency medicine studies in the Philippines.

First author	Year of publication	Study design	Discipline
Roces, MC <sup>8</sup>	1992	Observational	Disaster medicine
Yu, RF <sup>9</sup>	2002	Observational	Neurocritical care
Ruiz, JD <sup>10</sup>	2004	Observational	Adult resuscitation/life support
Litzow, JM <sup>11</sup>	2009	Observational	Pediatric emergency medicine
Paras, A <sup>12</sup>	2012	Observational	Emergency medical services
Roca, JB <sup>13</sup>	2015	Observational	Others
Ching, PK <sup>14</sup>	2015	Observational	Disaster medicine
De Vera, MJ <sup>15</sup>	2016	Observational	Pediatric emergency medicine
Agbayani, BEM <sup>16</sup>	2018	Observational	Emergency medical services
Sylwanowicz, L <sup>17</sup>	2018	Observational	Disaster medicine
van Berlaer, G <sup>18</sup>	2019	Observational	Disaster medicine
Robertson, FC <sup>19</sup>	2019	Observational	Neurocritical care
Hayden, D <sup>20</sup>	2020	Observational	Pediatric emergency medicine
De Vera, MJ <sup>21</sup>	2020	Observational	Others
Ong, GJ <sup>22</sup>	2020	Observational	Pediatric emergency medicine
Jimenez, MLCD <sup>23</sup>	2021	Observational	Emergency department studies
Abad, CL <sup>24</sup>	2021	Observational	Critical care medicine
Garingarao, CJ <sup>25</sup>	2013	Case report	Neurocritical care
Abrahan, IV <sup>26</sup>	2017	Case report	Critical care medicine
Chiu, HHC <sup>27</sup>	2018	Case report	Adult emergency medicine cases
Señga, MM <sup>28</sup>	2020	Case report	Medical toxicology
Co, COC <sup>29</sup>	2020	Case report	Neurocritical care
Peralta, PMA <sup>30</sup>	2022	Case report	Critical care medicine
Sarmiento, RJC <sup>31</sup>	2022	Case report	Medical toxicology
Wilkinson, DJ <sup>32</sup>	2019	Clinical guideline	Pediatric emergency medicine
Co, COC <sup>33</sup>	2020	Clinical guideline	Neurocritical care
Barros, F <sup>34</sup>	1992	Descriptive	Emergency department studies
Panopio, RL <sup>35</sup>	1992	Descriptive	Adult resuscitation/life support
Ruiz, R <sup>36</sup>	2010	Descriptive	Emergency department studies
Ling, F <sup>37</sup>	2014	Descriptive	Disaster medicine
Kim, H <sup>38</sup>	2015	Descriptive	Disaster medicine
Noone, M <sup>39</sup>	2015	Descriptive	Disaster medicine
Peiris, S <sup>40</sup>	2015	Descriptive	Disaster medicine
Weintraub, ACA <sup>41</sup>	2016	Descriptive	Disaster medicine
Banwell, N <sup>42</sup>	2016	Descriptive	Disaster medicine
McDermott, KM <sup>43</sup>	2017	Descriptive	Disaster medicine
Shilkofski, N <sup>44</sup>	2017	Descriptive	Disaster medicine
Gundran, CPD <sup>45</sup>	2018	Descriptive	Disaster medicine
Estember, RD <sup>46</sup>	2019	Descriptive	Emergency medical services
Nolasco, MA <sup>47</sup>	2020	Descriptive	Emergency department studies
Jimenez, OB <sup>48</sup>	2022	Descriptive	Critical care medicine
Peralta, PG <sup>2</sup>	1995	Review	Others
Collantes, ME <sup>49</sup>	2022	Review	Neurocritical care



**FIGURE 2** Number of emergency medicine publications in the Philippines per year. Abbreviation: PCEM, Philippine College of Emergency Medicine.



**FIGURE 3** Distribution of Philippine emergency medicine studies by study type and discipline. Abbreviations: ED, emergency department; EMS, emergency medical services.

clinical guidelines dealt with neurocritical care and pediatric emergency medicine.

#### 4 | LIMITATIONS

This study is limited by the sources of literature that were used. Only Philippine emergency medicine studies written in English and made available in 4 online databases were included. Studies that were unpublished or were deposited in university or national libraries as physical

copies only were not investigated. The study's applications are also limited to the Philippines with a potential lack of external validity to other nations.

#### 5 | DISCUSSION

In this study, we see an increased frequency and volume of publications since the Philippine College of Emergency Medicine and Acute Care (PCEMAC) and the Philippine Society of Emergency Care

**TABLE 2** Characteristics of emergency medicine publications in the Philippines.

Characteristic	Frequency	Percentage
Study design (N = 43)		
Observational study	16	37.2
Descriptive study	16	37.2
Case report	7	16.3
Review	2	4.7
Clinical guideline	2	4.7
Country of origin (N = 61)		
Philippines	41	67.2
Australia	4	6.6
Belgium	2	3.3
Brazil	1	1.6
China	1	1.6
Korea	1	1.6
Luxembourg	1	1.6
Netherlands	1	1.6
Switzerland	1	1.6
Taiwan	1	1.6
United Kingdom	2	3.3
United States	5	8.2
Contributing institution (N = 85)		
International institutions	34	40.0
UP/PGH	15	17.7
ADMU/TMC	7	8.2
St. Luke's Medical Center	5	5.9
Department of Health	4	4.7
Makati Medical Center	2	2.4
Manila Doctors Hospital	2	2.4
Others	16	18.8
Study setting (N = 47)		
Metro Manila	24	51.1
Eastern Visayas	11	23.4
Nationwide	4	8.5
Central Luzon	2	4.3
CALABARZON	1	2.1
CAR	1	2.1
Ilocos region	1	2.1
Cagayan valley	1	2.1
Bicol region	1	2.1
Western Visayas	1	2.1

Abbreviations: ADMU/TMC, Ateneo de Manila University/The Medical City; CAR, Cordillera Administrative Region; UP/PGH, University of the Philippines/Philippine General Hospital.

Physicians merged to form the PCEM in 2009.<sup>50</sup> This is in line with trends that show growth in emergency medicine literature globally.<sup>51-53</sup> However, the number of published works coming from the Philippines is still significantly behind that of other countries. Despite the proximity, the Philippines is sorely behind on emergency medicine research when compared to its Southeast Asian peers like Hong Kong, Singapore, South Korea, Taiwan, and Thailand, which were identified as leaders in emergency medicine publications in the region.<sup>51</sup>

In terms of study design, more than half of the studies were observational or descriptive in nature and case reports were the third most common. Reviews, clinical guidelines, and experimental studies were seldom published. This is consistent with previous findings that clinical practice guideline development in the Philippines is still lacking in many areas including technical expertise, funds, and dissemination.<sup>54</sup> For countries of origin, the majority of the studies had local contributors but international collaborations were frequent, especially with other member countries of the International Federation for Emergency Medicine.<sup>51</sup> Most studies also came from just a few contributing institutions, which are all located in Metro Manila. This may be due to the concentration of accredited emergency medicine training institutions in this region, making up 14 out of the 21 institutions on the list.<sup>55</sup> The rest of the institutions are distributed across 6 other regions in the country, which means there are 10 regions with no existing emergency medicine training programs as of writing. This highlights the effect on research of existing regional inequities in the Philippines.<sup>56</sup>

## 5.1 | Case reports

For case reports, rare adult medicine cases<sup>25-28</sup> and the proper management of patients with possible drug- or disease-disease interactions<sup>29-31</sup> were the main topics. Each of these case reports, although managed in the ED or the ICU, was produced by physicians outside the field of emergency medicine. Primary authors were subspecialty physicians, most commonly from internal medicine.<sup>26,27,30,31</sup> Expertise of the subspecialties endocrinology,<sup>25</sup> cardiology,<sup>26</sup> neurosciences,<sup>29,31</sup> psychiatry,<sup>28,30</sup> and infectious diseases,<sup>27</sup> were featured; one case report was coauthored by a thoracic and cardiovascular surgeon.<sup>26</sup> The lack of published case reports by emergency physicians is an important observation. Resident trainees produce case reports as part of their graduation requirements; however, very few find themselves in publication. It was only in 2016 that the *Philippines Journal of Emergency Medicine* was published, so the lack of a local journal to contribute to may have been an obstacle in previous years. There may also be time constraints and funding limitations.<sup>5,6</sup> The purpose of emergency medicine in stabilizing the patients before handoff to the appropriate departments for management may be another contributory factor. Emergency physicians are rarely responsible for the full management of a patient's disease, and the complexity of the cases may also dictate that a subspecialist is best to author the report. Some avenues for possible collaborative research authored by

emergency physicians may be in the intersection with anesthesia and intensive care medicine in the practice of critical care interventions.<sup>57</sup>

## 5.2 | Descriptive studies

More than half of the descriptive studies fell under the disaster medicine category. Out of 9 disaster medicine articles, 8 were about the Typhoon Haiyan disaster that hit the central Philippines in November 2013.<sup>58</sup> These Typhoon Haiyan articles had the following themes: mental health care,<sup>41</sup> pediatric care during disasters,<sup>44</sup> foreign medical team registration,<sup>40</sup> diabetes care,<sup>43</sup> and documentation of medical needs.<sup>45</sup> There were also 3 field reports and commentaries from the United States, Korea, and China that discussed the aid extended by their respective countries as they sent medical rescue teams.<sup>37-39</sup> One article on disaster medicine detailed disaster risk reduction plans and innovations in the country.<sup>42</sup> This trend toward disaster medicine articles is also present worldwide as this discipline made up 26% of global emergency medicine reports reviewed by one study.<sup>59</sup> There were also 3 studies about the ED, all published in local journals and done in single institutions. This shows that ED studies in the Philippines are still being done on a small scale and have yet to expand to multi-institution studies and to dissemination through channels with a wider audience. In one study, researchers estimated the spacing and staffing needs in their institution.<sup>34</sup> Two other ED studies focused on patient profiling.<sup>36,47</sup> Of the 2 articles about emergency medical services (EMS), one discussed the optimization of emergency ambulance services in one city<sup>46</sup> and another characterized the outcomes of out-of-hospital cardiac arrests and identified possible influencing factors.<sup>12</sup> The remaining articles discussed the success rate of life support services in one institution<sup>35</sup> and the experiences of nurses in the ICU during the COVID-19 pandemic.<sup>48</sup>

## 5.3 | Observational and experimental studies

Observational studies had the greatest variety of study disciplines, but disaster medicine and pediatric emergency medicine studies were the most common. Three disaster medicine articles were about the Typhoon Haiyan disaster.<sup>14,17,18</sup> One article was about injury risk factors during the 7.7 magnitude earthquake that struck Luzon in July 1990.<sup>8</sup> For pediatric emergency medicine, resuscitation was a common theme for 2 articles.<sup>20,22</sup> Other pediatric emergency medicine studies examined the effect of obesity on childhood asthma exacerbations<sup>15</sup> and 1 reported the rates of colonization of multidrug-resistant gram-negative rods in 2 neonatal ICUs.<sup>11</sup> There were 2 articles each for neurocritical care. One article assessed the performance of a task-sharing model on emergency neurosurgery as observed in 2 institutions<sup>19</sup> and the second article identified factors that lead to delayed management of acute stroke patients.<sup>9</sup> Other articles looked into the effect of masculine ideologies on the mental well-being of first responders,<sup>16</sup> factors associated with cardiopulmonary resuscitation as observed in 1 institution,<sup>10</sup> determinants of non-urgent ED consultations,<sup>23</sup> and the

experience and response of 1 institution to COVID-19 in 2020.<sup>24</sup> Two studies did not fall under any specific discipline. These were surveillance on fireworks-related injuries conducted from 2010 to 2014<sup>13</sup> and a report on ED assessment and management of anaphylaxis cases.<sup>21</sup>

## 5.4 | Clinical guidelines

An article on pediatric emergency medicine described the development of a guideline on the resuscitation of neonates who are approximately 24 to 28 weeks gestation in the Philippines, which reflects the context of resuscitating extremely preterm infants in LMICs.<sup>32</sup> Another guideline on neurocritical care identifies the problem in delivering timely management of patients with acute stroke in the context of the COVID-19 pandemic.<sup>33</sup>

## 5.5 | Reviews

Two reviews are included in this scoping review. One review on neurocritical care was published in 2022 and explores the current shortcomings in the management of stroke care and the subsequent courses of action to augment these gaps.<sup>49</sup> The second review was published in 1995 and gave an overview of the state of Philippine emergency medicine at the time.<sup>2</sup> It provided information regarding the existing emergency medicine training programs, EDs, EMS systems, emergency physicians, and research.<sup>2</sup> Compared to the 21 training institutions in the country today, there were only 3 emergency medicine residency training hospitals at the time.<sup>2</sup> In terms of research funding, it mainly came from hospitals and the principal investigators, but several pharmaceutical companies occasionally provided funding.<sup>2</sup> As of 1995, it was also the PCEMAC that took care of the professional interests of emergency physicians and coordinated emergency medicine education in the country.<sup>2</sup> The review detailed their role politically with the college sponsoring 2 bills including the Emergency Care Act and the Philippine Emergency Medical Services System Act as well as their role academically through the creation of the *Lifeline* journal.<sup>2</sup> Notably, this review discusses similar themes with the present study but it has been more than 25 years since an update was written on the topic. This further emphasizes the importance of the current paper in showcasing how Philippine emergency medicine has evolved throughout the past decades.

## 5.6 | Addressing the gaps

As the national governing body of emergency medicine practice in the country, PCEM along with its accredited training institutions should be at the forefront of addressing the gaps highlighted in this review. First, the value of research work and its implications to emergency medicine practice must be instilled in the country's emergency practitioners. Research is already a part of emergency medicine residency

training, but publication of accomplished research projects should be encouraged. This may be done by providing more research exposure to emergency medicine residents through protected research time and journal club discussions. More funding sources should also be tapped to encourage the conduct and publication of emergency medicine studies. Research training is another avenue that may be explored because the lack of experience and knowledge in conducting research and writing papers may be another obstacle for emergency medicine doctors in the country. The availability of local peer-reviewed journals may also boost publication from the field. Collaborations should be encouraged, especially multicenter studies among training institutions or research projects that analyze data from clinical registries. Another form of collaboration that may boost research productivity is through interdisciplinary work involving other medical specialties and even those from the basic or social sciences.

In summary, research in Philippine emergency medicine is only beginning to grow with the increase in published articles observed just in the last 10 years. This is also seen in the limited types of studies done and disciplines explored thus far. This review also shows that research contributions have been limited to only a few institutions and study settings. Moving forward, this article may serve as a guide to PCEM, emergency medicine training institutions and physicians as they take steps to meaningfully grow the field to be at par with global peers.

#### AUTHOR CONTRIBUTIONS

Fatima Ericka S. Vista, Maria Pauline A. Alibin, and Ma. Patricia Thea N. Arevalo contributed to the conceptualization, methodology, validation, formal analysis, investigation, writing, and visualization. Faith Joan M. Gaerlan contributed to the conceptualization, review and editing, and supervision.

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#### CONFLICT OF INTEREST STATEMENT

F.J.M.G. is a medical consultant for the Department of Medicine in the Philippine General Hospital. All other authors declare that they have no competing interests.

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