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Original Article

Continuous Promotion of Geriatric Emergency Department through Collaboration between Government and Healthcare Professional Organizations in Taiwan

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SUMMARY

Background: Collaboration between the government and healthcare professional organizations demonstrated promising results for developing geriatric emergency departments (GEDs) in Taiwan. This study aimed to evaluate the effectiveness of a continuous promotion model for GEDs.

Methods: The Taiwan Health Promotion Administration collaborated with the Taiwan Society of Emergency Medicine, nine hospitals, and other healthcare professionals to promote GED continuously. We adopted the nine-steps continuous promotion model from June 2, 2022, to December 31, 2022. Key strategies included forming an expert committee, setting goals, providing practical resources, and conducting interdisciplinary training and conferences.

Results: Significant improvements were observed in seven domains of the GED across nine hospitals, including interdisciplinary teams, education, equipment, environment, care protocols, quality indicators and monitor indicators.

Nineteen care protocols were adopted, which included 216,860 eligible patients and successful transitional care in 49,143 patients. Nearly 100% of 176 participants in district co-academic conferences found them beneficial. Future goals were also established, and the Taiwan GED practical manual was revised.

Conclusions: This model demonstrated encouraging outcomes in promoting GED in Taiwan, which could be an essential reference for other nations.

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1. Introduction

Aging is an important and challenging issue worldwide.¹ In the United States, people over 65 years were 16% of the population in 2019 and were projected to be 21.6% by 2040.² In Taiwan, older people (≥ 65 years) represented 16.6% of the total population in 2021 and will rapidly grow to 30.6% in 2040.³ Many older people have multiple comorbidities, geriatric syndromes, and disabilities, which contribute to an increased care burden to the healthcare system and their families.^{4,5} According to the statistics of Taiwan National Health Insurance, the medical expenditure of the older population was 35.6% in 2015 and rapidly increased to 39.8% in 2020.⁶ Increased disability, care needs, and medical expenditure in this population are considerable challenges to Taiwan and many countries worldwide.

The Acute Care for Elders (ACE) model is a patient-centered model designed to improve function and prevent disability.⁷ The ACE model requires interdisciplinary collaboration among the community, emergency department (ED), inpatient, and ambulatory care to provide continuous care for older people.⁸ The ED is the most common place where older people seek help when they need it. Therefore, ED management will greatly affect the prognosis of this popula-

tion.⁴ Since 2008 in the United States, geriatric ED (GED) has been developed to fill the need of older patients based on the ACE model concept.⁴ In 2014, the American College of Emergency Physicians (ACEP) published a GED guideline in cooperation with the American Geriatrics Society, Emergency Nurses Association, and Society for Academic Emergency Medicine.⁴ In 2018, the ACEP further initiated the “Geriatric Emergency Department Accreditation (GEDA)”.⁹ There were 388 EDs accredited by GEDA until December 21, 2022.⁹

In Taiwan, no age-friendly strategies existed in the ED until the Health Promotion Administration (HPA) introduced the ACE model in 2019.¹⁰ Since 2021, the HPA has collaborated with the Taiwan Society of Emergency Medicine (TSEM) to implement GED in 13 hospitals.¹⁰ The 2021 results showed that implementing the collaboration between government and healthcare professional organizations was successful.¹¹ However, the effect of continuous promotion of the Taiwan GED model is unclear. Therefore, we conducted this study to clarify it. In addition, we used the results to develop a revised version of the GED practical manual for future reference.

2. Materials and methods

2.1. Study design, setting, and participants

Because geriatric care requires interdisciplinary collaboration,

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the TSEM invited the Taiwan Association of Gerontology and Geriatrics (TAGG), Taiwan Association of Critical Care Nurses (TACCN), Federation of Taiwan Pharmacists Associations (FTPA), and Taiwan Elderly and Long-Term Care Social Work Association (TELTCSW) to assist this study (Figure 1). Nine hospitals participated in this study from June 2, 2022, to December 31, 2022. Eight hospitals were continuous; one was new, and it was the first time they developed a GED.

2.2. Strategies for the continuous promotion of GED

To support the ongoing implementation of the GED, an expert committee was formed, comprising representatives from professional organizations including emergency physicians (TSEM), geriatricians (TAGG), nurses (TACCN), pharmacists (FTPA), and social workers (TELTCSW) (Figure 2). In 2022, goals were established for nine hospitals, guided by the second edition of Taiwan's GED framework, encompassing seven core domains (Supplementary Table 1).

Key measures included developing a counseling mechanism and a checklist, updated bi-monthly, to monitor GED progress across the hospitals. An instant messaging platform was also set up for real-time communication among hospitals, TSEM, and HPA. A GED manual (1st edition) was provided as a reference, alongside a curated list of educators in geriatric care. Joint meetings, individual sessions, and district conferences were held regularly to address challenges and foster knowledge sharing. Bi-monthly follow-ups assessed progress, and assistance was provided by TSEM as needed. Finally, insights from the checklists, conferences, and expert committees were synthesized to plan future initiatives and revise the GED manual's second edition.

2.3. Ethical statements

This study did not involve human participants or personal data

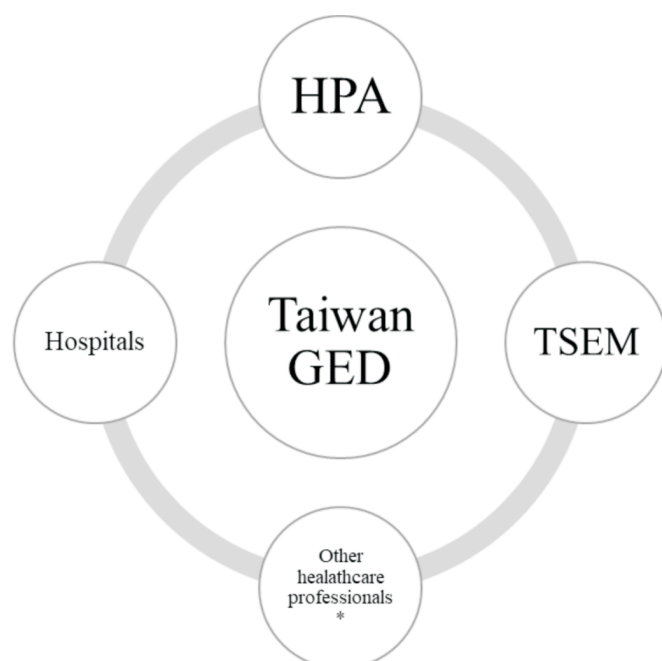


Figure 1. Collaboration among government, healthcare professional organizations, and hospitals for the continuous promotion of the Taiwan GED in 2022. GED, geriatric emergency department; HPA, Health Promotion Administration; TSEM, Taiwan Society of Emergency Medicine. * Taiwan Association of Gerontology and Geriatrics, Taiwan Association of Critical Care Nurses, Federation of Taiwan Pharmacists Associations, and Taiwan Elderly and Long-Term Care Social Work Association.

and was determined to be outside the scope of institutional review board (IRB) oversight. Therefore, IRB approval was not required.

2.4. Statistics

We performed descriptive analysis to compare the increasing rates of items between the start and end of the program. Percentage changes were calculated for each metric, and predefined thresholds were used to indicate statistical significance ($p < 0.05$, $p < 0.01$, and $p < 0.001$) based on the magnitude of the observed increases. All analyses were conducted using SAS Version 9.4 (SAS Institute Inc., Cary, NC, USA).

3. Results

Significant improvements were noted across the seven GED domains by the program's end (Table 1, Table 2). Some items, such as interdisciplinary team participation, courtesy glasses, mobility

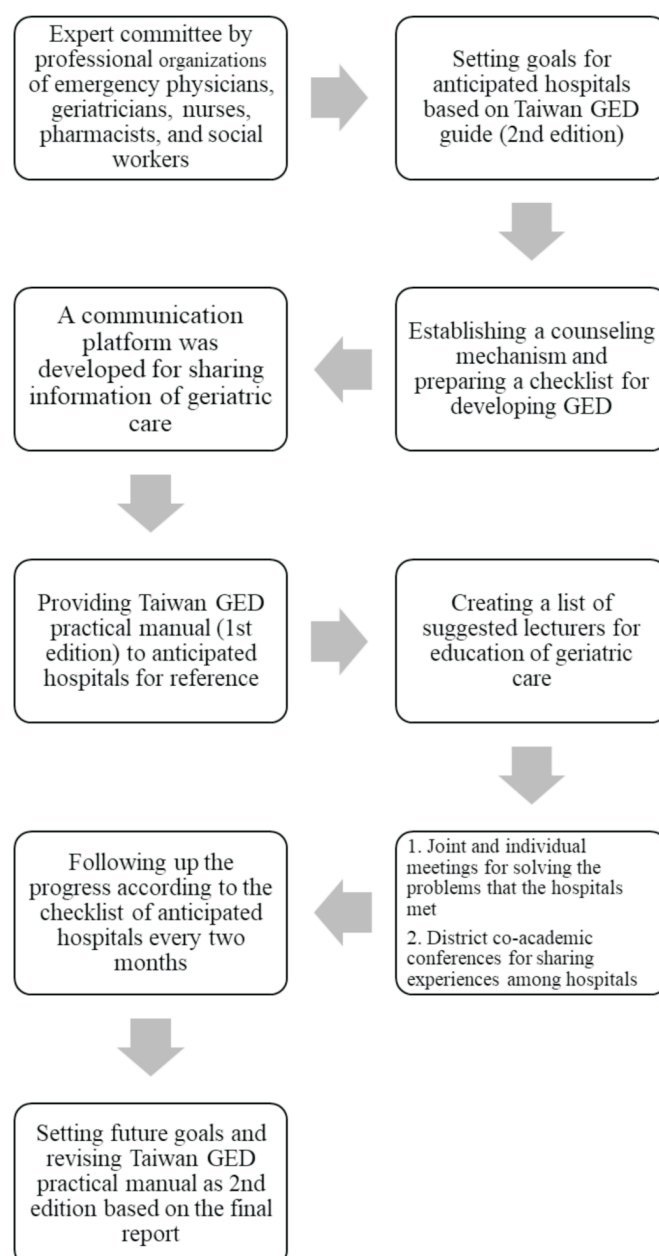


Figure 2. Flowchart of this study. GED, geriatric emergency department.

Table 1

Comparisons of the achievements of the interdisciplinary team, education, equipment and supplies, and environment before and after implementation of the 2022 GED program in the nine hospitals from June 2, 2022, to December 31, 2022.

Item	Start of program n = 9	End of program n = 9	Increasing rate	p-value
Interdisciplinary team				
1. At least one physician who has received the training specialized in geriatric emergency medicine	8 (89%)	9 (100%)	11%	-
2. At least one nurse who has received the training specialized in geriatric emergency medicine	8 (89%)	9 (100%)	11%	-
3. Team meeting once every 1 month at least	8 (89%)	9 (100%)	11%	-
4. Physician champion/medical director	8 (89%)	9 (100%)	11%	-
5. Case manager (or transitional care nurse) appear ≥ 40 hours a week	6 (67%)	8 (89%)	22%	*
6. Interdisciplinary team members ≥ 4 types	9 (100%)	9 (100%)	0%	-
7. At least one hospital chief (above the deputy superintendent level) supervises the GED	6 (67%)	8 (89%)	22%	*
8. Participation of patients or their family members in quality improvement meetings	1 (11%)	6 (67%)	56%	***
Education (physician, nurse, and case manager/transitional care nurse must have 8 aspects of training)				
1. At least one physician, one nurse, and one case manager meet the training requirements	6 (67%)	9 (100%)	33%	**
2. 50% of team members meet the training requirements	6 (67%)	9 (100%)	33%	**
3. 75% of team members meet the training requirements	2 (22%)	8 (89%)	67%	***
4. 100% of team members meet the training requirements	1 (11%)	6 (67%)	56%	***
Equipment and supplies				
1. Courtesy glasses	9 (100%)	9 (100%)	0%	-
2. Hearing assist devices	8 (89%)	9 (100%)	11%	-
3. Mobility aids (crutches, wheelchair)	9 (100%)	9 (100%)	0%	-
4. Seated or recumbent weight scale	7 (78%)	9 (100%)	22%	*
5. Pressure-ulcer reducing mattresses and pillows	4 (44%)	4 (44%)	0%	-
6. Bedside commodes	7 (78%)	9 (100%)	22%	*
7. Disposable or condom catheters	6 (67%)	6 (67%)	0%	-
8. Low bed	6 (67%)	6 (67%)	0%	-
9. Reclining armchair	2 (22%)	3 (33%)	11%	-
Environment				
1. Available food and drink	7 (78%)	8 (89%)	11%	-
2. Large analog clock	7 (78%)	8 (89%)	11%	-
3. Wheelchair accessible toilet	9 (100%)	9 (100%)	0%	-
4. Adequate handrails (e.g., double handrails)	7 (78%)	8 (89%)	11%	-
5. High quality signage and way-finding	9 (100%)	9 (100%)	0%	-
6. Availability of raised toilet seats	4 (44%)	7 (78%)	34%	**
7. Proper lighting	9 (100%)	9 (100%)	0%	-
8. Efforts at noise reduction	8 (89%)	8 (89%)	0%	-
9. Non-slip floors	7 (78%)	8 (89%)	11%	-
10. Each bed can provide 2 chairs	6 (67%)	7 (78%)	11%	-

Data was presented as n (%). GED, geriatric emergency department.

* Increase rate was more than 5% and was statistically significant; ** Increase rate was more than 10% and was statistically significant; *** Increase rate was more than 15% and was statistically significant.

Table 2

Comparisons for the achievements of care protocol, quality indicator, and monitor indicator before and after implementation of the 2022 GED program in the nine hospitals from June 2, 2022, to December 31, 2022.

Item	Start of program n = 9	End of program n = 9	Increasing rate	p-value
Care protocol				
1. Medication reconciliation	9 (100%)	9 (100%)	0%	-
2. Delirium	5 (56%)	5 (56%)	0%	-
3. Dementia	6 (67%)	6 (67%)	0%	-
4. Acute functional decline	6 (67%)	7 (78%)	11%	-
5. Fall (evaluation, referral, and follow-up of high-risk fall and prevention of fall in the ED)	6 (67%)	7 (78%)	11%	-
6. Hospice and palliative care	5 (56%)	6 (67%)	11%	-
7. Transitional care after ED discharge	4 (44%)	4 (44%)	0%	-
8. Enhancing social support	2 (22%)	3 (33%)	11%	-
Quality indicator				
1. Achievement rate of the above 8 care protocols > 50%	6 (67%)	9 (100%)	33%	**
2. Achievement rate of the above 8 care protocols > 75%	6 (67%)	8 (89%)	22%	*
3. Achievement rate of the above 8 care protocols > 100%	3 (33%)	5 (56%)	23%	*
Monitor indicator				
1. Number and rate of evaluation	7 (78%)	9 (100%)	22%	*
2. Number and rate of eligible referrals after evaluation	6 (67%)	9 (100%)	33%	**
3. Revisit ED < 3 days after successful referral	6 (67%)	9 (100%)	33%	**
4. Rehospitalization < 14 days after successful referral	6 (67%)	9 (100%)	33%	**
5. Mortality < 1 month after successful referral	6 (67%)	9 (100%)	33%	**
6. Number and rate of successful referrals	6 (67%)	8 (89%)	22%	*
7. Number and rate of hospitalizations (including analysis of their main complaints and diagnosis)	6 (67%)	9 (100%)	33%	**
8. Number and rate of ED discharge (including analysis of dispositions for home or long-term care institution, chief complaint, and diagnosis)	6 (67%)	9 (100%)	33%	**
9. Revisit ED < 3 days in all older ED patients	5 (56%)	9 (100%)	44%	**
10. Rehospitalization < 3 days in all older ED patients	5 (56%)	9 (100%)	44%	**
11. Staying in ED for > 8 hours	5 (56%)	9 (100%)	44%	**

Data was presented as n (%). ED, emergency department; GED, geriatric emergency department.

* Increase rate was more than 5% and was statistically significant; ** Increase rate was more than 10% and was statistically significant.

aids, wheelchair-accessible toilets, signage, lighting, and medication reconciliation, had already achieved 100% compliance initially. Notable progress included increased participation of patients or family members in quality improvement meetings (11% to 67%), full training compliance among team members (11% to 67%), and raised toilet seat availability (44% to 78%).

During district co-academic conferences, hospitals shared progress, strategies, and challenges, with experts providing feedback (Figure 3). Nearly all 176 participants reported high satisfaction with these conferences (Figure 4). In total, 19 care protocols were implemented, covering 216,860 eligible patients, with 49,143 receiving successful referrals. Medication reconciliation, acute functional decline, and fall prevention were the most common protocols (Table 3).

Based on outcomes and expert feedback, we proposed future initiatives: (1) online training and certification, (2) board certification inclusion for geriatric emergency medicine, (3) advocating for GED service reimbursement, and (4) hospital evaluation integration (Table 4). We also updated the Taiwan GED manual to guide ongoing development.

4. Discussion

This study demonstrates that collaboration between the government and healthcare organizations is an effective model for promoting GEDs in Taiwan. A critical factor was financial support from the Taiwan HPA, which allowed hospitals to employ case managers who oversee screening, transitional care, and patient-provider communications.^{9,12} These case managers, often nurses or social workers, were essential for GED operations. Evidence suggests full-time case

managers improve outcomes, but Taiwan's National Health Insurance structure limits incentives for hospitals to support these roles.^{4,13} Local studies have highlighted the benefits of hiring full-time case managers, especially for transitional care, which can reduce overall costs and improve patient outcomes.^{14–19}

The support and credibility of HPA and TSEM were also key factors. HPA's commitment to elderly health, demonstrated by its ACE model initiation in 2019, and TSEM's specialization in geriatric care since 2018, provided necessary financial and professional backing.^{16,20–22}

While this program was successful, the final report outlined ongoing challenges for GED development. Even without further HPA support, TSEM plans to promote GEDs by advocating for dedicated training and certification for healthcare professionals, expanding board certification in geriatric emergency medicine, and integrating GED care into hospital evaluations. Successful models for geriatric emergency education include Geri-EM, which offers training for emergency physicians and other healthcare providers.²³ Taiwan could further enhance geriatric emergency training through fellowships, similar to programs at UNC and those led by Dr. Huang, which combine clinical and quality improvement experiences.^{24,25} Evidence-based evaluations and payment models for GED services are crucial for incentivizing hospital investment.²⁶

District co-academic conferences provided anticipated hospitals with valuable feedback and support from peers and experts.²⁶ Online platforms, like the Geriatric Emergency Department Collaborative, offer additional resources and enable ongoing professional development. For Taiwanese audiences, a localized platform could overcome language barriers, providing more accessible support for geriatric care.²⁷

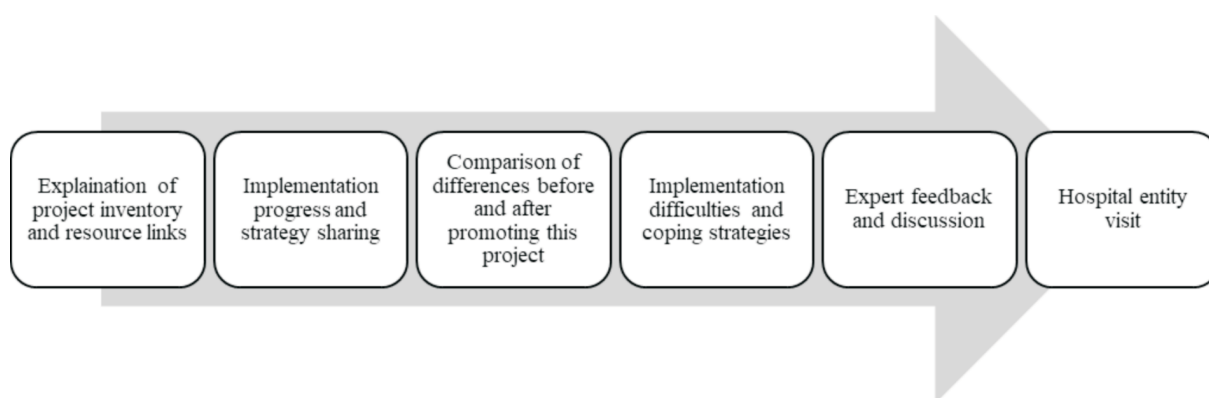


Figure 3. Process in the district co-academic conferences for sharing experiences among hospitals.

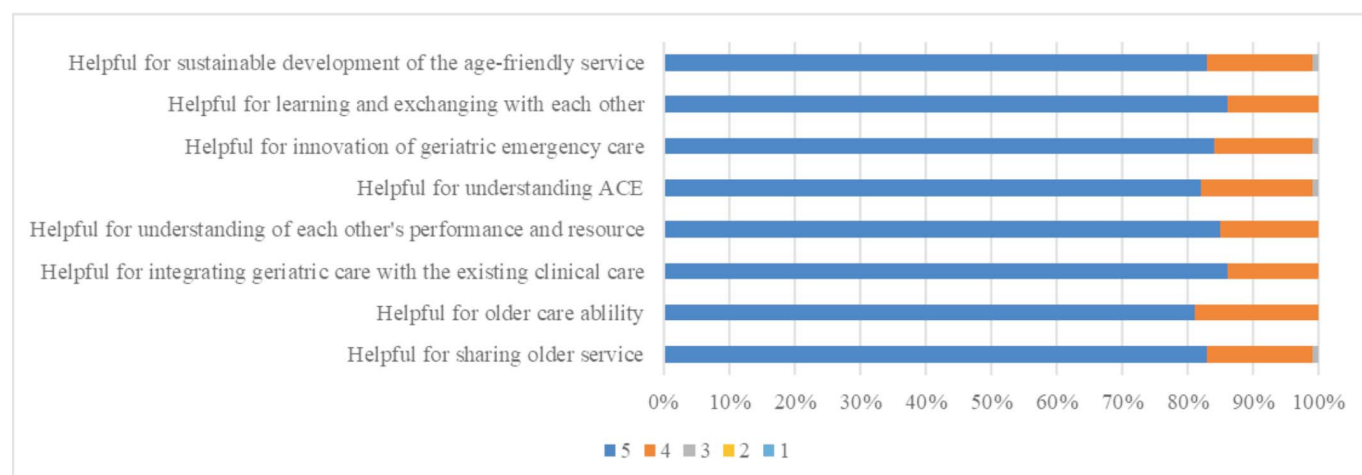


Figure 4. Satisfaction using a 5-point Likert scale from the 176 participants who attended the district co-academic conferences for sharing experiences among hospitals. ACE, acute care for elders.

Table 3

Care protocol, number of hospitals, and case number in nine hospitals anticipated the 2022 GED program from June 2, 2022, to December 31, 2022.

Care protocol*	Number of hospitals	Eligible patient	Successful referral
1. Medication reconciliation	9	24,749	2,368
2. Delirium	5	26,142	218
3. Dementia	6	16,793	2,299
4. Acute functional decline	7	18,478	2,678
5. Fall (evaluation, referral, and follow-up of high-risk fall and prevention of fall in the ED)	7	32,236	30,779
6. Hospice and palliative care	6	25,947	1,187
7. Transitional care after ED discharge	4	17,705	1,256
8. Enhancing social support	2	6,820	3,806
9. Others			
9.1 Poor nutrition	1	1,779	1,070
9.2 Frailty	1	207	76
9.3 Emotion problem	1	207	37
9.4 Screening for hospitalization of integrated medical ward	1	23,244	1,249
9.5 HHC referred from ED	1	12,812	39
9.6 Available food and drink	1	2,446	688
9.7 Access of transportation services for returning residence	1	1,414	27
9.8 Elderly abuse, neglect, and abandonment	1	1,294	102
9.9 Pain control	1	1,592	1,007
9.10 Referral for geriatric clinic	1	2,734	240
9.11 Community-assisted medical follow-up service	1	261	17
Total 19 care protocols		216,860	49,143

* Items 1- 8 were suggested as the priorities in this program (see Table 2). ED, emergency department; HHC, home healthcare.

Table 4

Future works for sustaining promotion of the GED according to the experiences in 2022 program and expert committees.

Number	Future work
1	Online education training and certification
2	Including geriatric emergency medicine in the board certification of emergency physicians
3	Striving for pay of geriatric emergency care by Taiwan National Health Insurance
4	Including geriatric emergency care in the hospital evaluation

GED, geriatric emergency department.

This study is the first of its kind in Taiwan, establishing a collaborative model for GED promotion. Taiwan's experience offers valuable insights into international collaborations between governments and healthcare systems, particularly for countries facing similar demographic and healthcare challenges. The structured partnership between the Health Promotion Administration and the Taiwan Society of Emergency Medicine demonstrates the importance of integrating financial, political, and professional resources to advance geriatric care. Similar models, such as the GEDA program in the United States, emphasize the significance of interdisciplinary collaboration and tailored care protocols.⁹ By comparing Taiwan's approach to international initiatives, key lessons emerge, including the need for flexible adaptation to local healthcare contexts and the integration of culturally relevant training programs. These strategies can serve as a blueprint for nations aiming to enhance their geriatric emergency care frameworks.

5. Conclusions

This study demonstrated the effectiveness of a continuous promotion model for GEDs in Taiwan through a structured collaboration between government and healthcare professional organizations. The significant progress achieved by the anticipated hospitals in seven key domains of the GED provided valuable materials for revising the Taiwan GED practical manual and guiding future implementation efforts. While the results highlight substantial achievements, fu-

ture developments should prioritize integrating online education and certification programs to sustain GED initiatives. Key challenges include addressing resource limitations, ensuring the availability of trained personnel, and overcoming resistance to change within healthcare systems. To advance the field further, both local and international research should explore innovative strategies for implementing GEDs in diverse healthcare settings. Taiwan's experience offers a foundational model that can inspire global efforts to enhance geriatric emergency care.

Ethics approval and consent to participate

Because this study did not involve humans, it was waived for the approval of institutional review board.

Consent for publication

Not applicable.

Availability of data and material

The datasets during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare no conflicts of interest.

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Authors' contributions

Conceptualization, CHL, CJY, and CCH (8th author); methodol-

ogy, CHL, CJY, and CCH (8th author); validation, CHL, CJY, and CCH (8th author); formal analysis, CHL, CJY, and CCH (8th author); investigation, CHL, CJY, and CCH (8th author); resources, CHL, CJY, and CCH (8th author); data curation, CHL, CJY, and CCH (8th author); writing — original draft preparation, CHL, CJY, and CCH (8th author); writing — review and editing, CHL, CJY, THT, CJN, CYW, CCH (6th author), CCW, and CCH (8th author); supervision, CCH (6th author), CCW, CCH (8th author); project administration, THT, CJN, CYW, CCH (6th author), and CCW; funding acquisition, CYW, CCH (6th author), and CCW. All authors have read and agreed to the published version of the manuscript.

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Supplementary materials

Supplementary materials for this article can be found at <http://www.sgecm.org.tw/ijge/journal/view.asp?id=34>.

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