




Health service delivery models for elderly people: A systematic review

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Abstract

Background: Current Health care delivery systems are not effective for the elderly. Countries with high elderly populations are expected to design special models to serve their elderly population. The aim of this study is to investigate the models of health care delivery to the elderly in different countries.

Methods: The present study is a systematic review based on PRISMA standard guidelines. The search for related studies was conducted in electronic databases (Cochran Library, Scopus, PubMed, Embase, Web of Science) and the Google Scholar search engine without time limits until May 2019. Keywords were extracted based on MeSH strategies. At first, 16243 articles were found. After the screening phase (elimination of duplicated articles, title screening, abstract screening, and full-text screening) 19 articles remained. Two articles deleted after text appraisal using the CASP checklist. In the next stage, after reviewing the gray literature and reviewing the references of remaining articles, three new articles were added (Included studies = 20).

Results: Twenty articles (models) corresponding to the study objectives were finally extracted. These models are limited to nine countries and most have local scopes. These models mainly use a case manager, an intra- or inter-disciplinary team, and an elderly assessment tool in their structure. In addition to the use of an information system, these models provide a wide range of services to the elderly.

Conclusion: Most of the models mentioned are local models. Smaller models to become applicable at the national level, they need to be reviewed and evaluated by policymakers and experts. Given the inefficiency of current systems in providing services to the elderly, it is recommended that countries use an integrated model of health care provision for the elderly.

Keywords: Aging, Elderly, Integrated care, Health care delivery, Financing

Conflicts of Interest: None declared

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Introduction

Increase in the quality of health services along with the increasing access to services has led to an increase in the quality of life and life expectancy of people. This, along with declining birth rates, has led to the aging of the world population. According to the World Health Organization in 2000, there were 600 million elderly people in the world, which is estimated to increase two times by 2025 and is projected to more than three times by 2050 (1). Currently,

various countries including Japan, the United States, Sweden, Canada, and Germany are facing the problem of aging, and the population of other countries is aging as well (2). This subject can be a major threat to the future of any country as it can lead to a decrease in the young workforce and an increase in the elderly and the infirm.

Elderly people suffer from age-related problems in different functional dimensions such as in physical, mental,

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↑What is “already known” in this topic:

The elderly population of the world is increasing. Countries with high elderly populations are likely to use special models to deliver services to the elderly.

→What this article adds:

This study collected and compared different Health service delivery models for elderly people. Comparing this information gives researchers and policymakers a comprehensive view of service delivery models for the elderly people.

and social domains, and may be exposed to serious problems such as falls, hospitalizations, disability, and death in the future (3). Among elderly patients, weakness, functional and cognitive decline, loss of independence, use of multiple medications, and coexistence of morbidities are common (4). As these diseases and complications are rarely treated and are the cause of many disabilities and reduced quality of life in the elderly, they play an important role in the use of care and health services (5, 6). Increase in the use of services leads to an increase in health services expenditures for the elderly. In addition, the quality of treatment for this population has often been sub-optimal, which can lead to poor outcomes in their health and welfare (7, 8).

Overall, the current healthcare delivery system for the elderly is unsuitable due to disintegration and weak coordination among different healthcare specialists. In addition, advanced health information technologies that are facilitators for Health service delivery for elderly people are not widely used (9, 10). Moreover, due to regress in the functional dimension and also the existing social disorders in the elderly such as loss of social support, pecuniary constraints, and lack of proper housing, providing traditional medical services is no longer sufficient (11, 12). In addition to adequate health care, the elderly need an extensive range of supportive and community services.

Given the importance of quality and comprehensiveness of services as well as the high cost of providing services to the elderly, countries with high elderly populations are expected to have designed unique systems and models for delivery of services to the elderly. Examining these systems is of utmost importance as it can provide other countries with useful experience in this respect. Considering the importance of this issue, the aim of this study is the examination and comparison of health care delivery models for the elderly in different countries.

Methods

The present study is a systematic review based on the PRISMA standard guidelines. In order to find the answers to the study questions, articles published on the subject of "Health service delivery models for elderly people" were searched in accredited English-language databases without date limits up to 2019.

Search strategy

The search for related studies was conducted in international electronic databases (Cochran Library, Scopus, PubMed, Embase, and Web of Sciences) without any time limit until May 2019. Keywords were extracted based on MeSH strategies. In this study, three groups of keywords were used:

1. Aging, aged, old, senior, geriatric, frail elderly, older adult, elder. 2. Model, framework, mechanism, theory, pattern, structure, platform. 3. Delivery of health care, health care delivery, healthcare delivery, health service provision.

In order to conduct a comprehensive search, using the operators of the mentioned databases, the combination of the above three groups was searched in the titles, keywords, and abstracts of articles. The search strategy used in the databases was as follows: (aging OR aged OR old OR senior

OR Geriatric OR "frail elderly" OR "older adult" OR elder) AND (model OR framework OR mechanism OR theory OR pattern OR structure OR platform) AND ("delivery of health care" OR "health care delivery" OR "healthcare delivery" OR "health service provision")

In order to improve the quality of the search and to find more studies, the references of the selected articles were also examined.

In order to improve the quality of the search and to find more studies, the Google, Google Scholar search engine and the references of the selected articles were also examined (Fig. 1).

Data Collection

The selected articles were imported into EndNote software. After removing duplicate titles, the remaining titles, abstracts, and fulltext of the articles were independently reviewed and screened by two of the authors (AR.K and MH.MH). Another author (R.D) also reviewed the results, and instances of difference between the two reviews were resolved through discussion. The process used to identify relevant articles is shown in Figure 1.

Inclusion and exclusion criteria

In order to achieve the research goal, only articles, including health service delivery models for the elderly, were examined. Therefore, the inclusion criteria were: 1. Articles in English language 2. Articles published until May 2019 (in order to examine the most recent studies, the researchers searched the mentioned databases again on April 6, 2020). 3. Original articles and conference reports. Exclusion criteria included: 1. Models designed for a specific disease. 2. Models designed for the emergency department. 3. Models designed for nursing homes, systematic review articles, letters to the editors, and editorials were also eliminated from the study.

Quality assessment

The critical appraisal skills program (CASP) checklist will be used to evaluate the quality of the included article. The CASP checklist comprises 10 questions that can be answered: yes/can't tell/no ('yes' indicates a positive score) (13). The maximum score was 10, and the minimum acceptable score was 7. Two authors will evaluate the quality of the articles separately. Disagreements between the two authors were resolved by conversation. If necessary, the third author (R.D) were asked to judge.

Data extraction

The authors reviewed the final articles line-by-line and extracted key points of the models.

At first, it was tried to extract the main contents of the models (findings) based on the health system functions. No model was clearly built on these functions; therefore, the authors tried to extract key points of the models in accordance with the health system functions. Team/team members, case manager and information system (equivalent to resource generation function), services and setting (equivalent to service delivery function), financing (financing

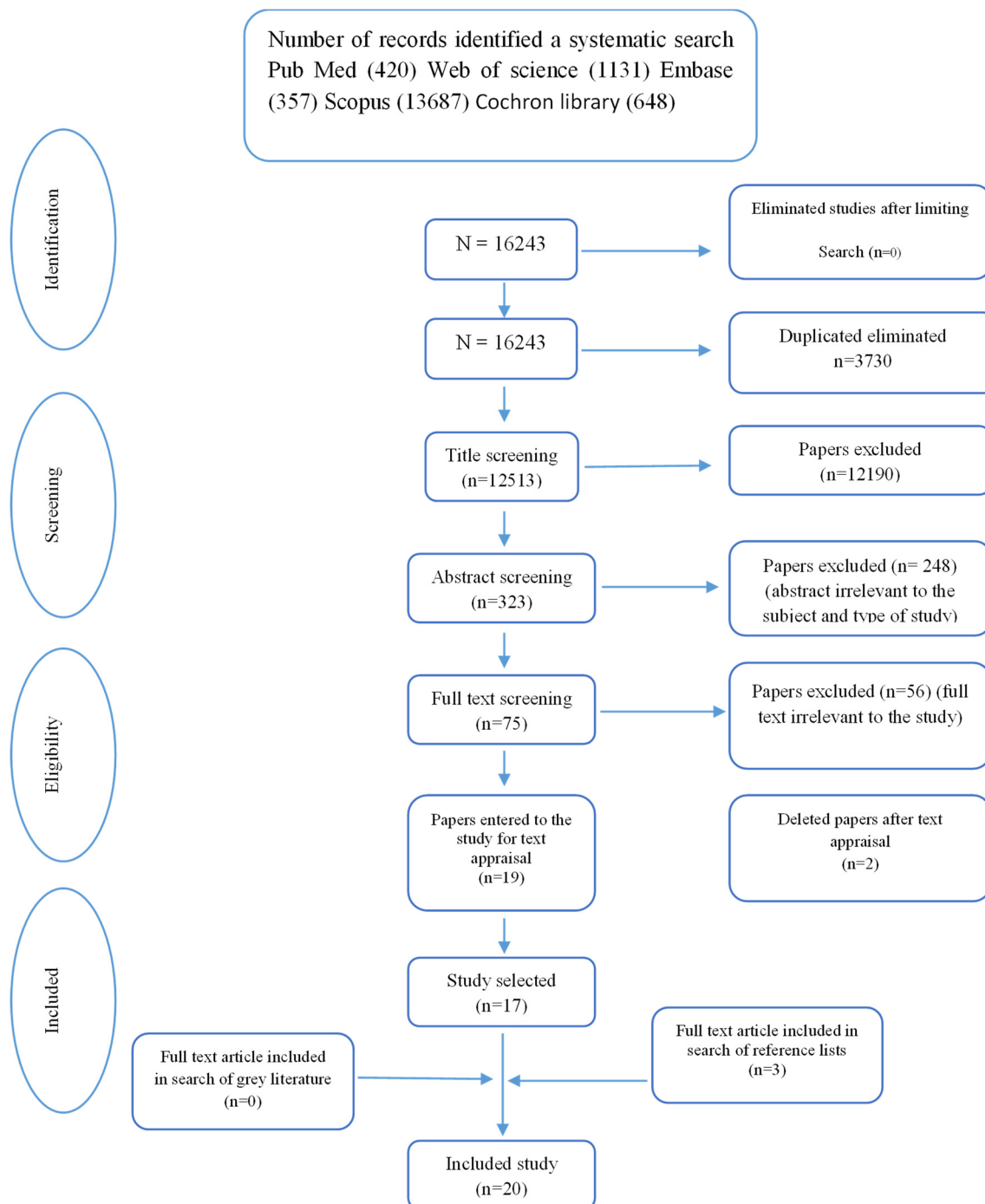


Fig. 1. PRISMA chart

function), level and patient assessment (equivalent to stewardship function) were extracted (Table 1).

Results

20 models related to health service delivery for the elderly were extracted from the articles. These models are shown in Table 1.

1. Program of All-inclusive Care for the Elderly (PACE)

PACE is a creative model for financing and long-term care

delivery in the United States. This model was launched in 1971 in San Francisco and was further developed until 1995. Its main purpose is the prevention of the use of unnecessary care in hospitals and nursing homes. This model provides services in clinics, daycare centers, hospitals, nursing homes, and patients' own homes. To enroll in this program, the applicant must be at least 55 years old, be approved by the state authorities as eligible, and live in the designated geographical area.

Health service delivery models for elderly people

Table 1. The key points of Health service delivery models for elderly people

Model	Country/year	Target population	Case manager	Team / members	Entry (patient) assessment	Services	Setting	Information system	Financing	Level
PACE	USA/1971-1995	+55	Team	interdisciplinary team / primary care physicians, nurse practitioners, clinic nurses, home health nurses, social workers, occupational and physical therapists, dietitians, health workers, recreation therapists, and transportation workers	Eligibility according to each state's criteria such as live in the program's defined geographical	Full spectrum of medical, social, and rehabilitative services.	-Hospital -Home care -Skilled Nursing facility care -Hospice -nursing home -Community health center	Electronic record but not system level classification system	Medicare and Medicaid (Monthly capitation payments)	Local
WPP	USA/2000	+65	Team	Interdisciplinary care management team/ nurse, social worker, and nurse practitioner	-	Like PACE services	Like PACE Setting	-	Medicaid and Medicare	Local
High Intensity care management model	USA/2002(publish)	+60	Yes but not clear	Periodic team meetings	Client assessment and care planning	Acute and Long-Term Care Services	Home care	Information system is unclear	Without waivers or financing packages, and no state or federal government support. It relied on agency and community professional commitment	Local
GRACE	USA/2002-2003	+65	-	Interdisciplinary team /geriatrician, pharmacist, physical therapist, mental health social worker, and community-based services liaison	Initial comprehensive geriatric assessment by GRACE support team	-Primary care -specialty care -Mental health -Inpatient Geriatric care services - develop an individualized care plan	-Hospital -Home care - Community-based health centers	An electronic medical record and longitudinal tracking system (web-based care management tracking tool)	-grants from The National Institute on Aging and the Nina Mason Puliam Charitable Trust, Indianapolis, Indiana. -Approximately 10% of the total cost of the intervention was covered under current Medicare reimbursement.	Local

Table 1. Ctd

Model	Country/year	Target population	Case manager	Team / members	Entry (patient) assessment	Services	Setting	Information system	Financing	Level
Medicaring models	USA	+65	-	A multidisciplinary team	All individuals over 65 who are living with disabilities (more than one ADL or needing constant supervision) and all those over 85 who opt for coherent care focused upon their priorities	-Long-term services - Supports services such as nutrition, housing, safety, transportation, personal care - Medical and nursing care - Environmental services	-Hospital -Nursing home -Assisted living facility -(Focus on):home care	Locally managed dashboards	The financing model owes much to the collaboration of Dobson Davanzo, Inc., and to Jim Lee of Altarum Institute. This work was supported in part by a grant from the Milbank Fund for Rehabilitation.	Local
SAFECare model	USA/2012-2013	+65	-	Interprofessional team /physician, social worker, pharmacist, primary RN, practice nurse, physical therapy and occupational therapy	SPICES tool	-Post-acute care -Palliative care consultation -PT and OT consult	Hospital	Electronic Health Records	Used existing services	Local
The Illawarra Coordinated Care Trial	Australia/1997-2000	+65	General practitioner	-	A formal assessment of all participants	-Public services -Private services - Medical (GP and Specialist) -Health and social services -Pharmaceutical and hospital services.	- Hospital -Home care - Residential centers	The development of an independent linked information system	Create a pool of funds from four main sources: the Health Insurance Commission (HIC) ; the Illawarra Area Health Service (IAHS); the Home and Community Care (HACC) program; and the Department of Veterans' Affairs (DVA).	Local

Health service delivery models for elderly people

Table 1. Ctd

Model	Country/year	Target population	Case manager	Team / members	Entry (patient) assessment	Services	Setting	Information system	Financing	Level
The British Columbia Continuing Care system	Canada/	+65	Yes but not clear	Quick Response Teams	Standardized, system level (5-level) assessment and care authorization.	A wide range of health and social services such as home care nursing, community rehabilitation, home support services, adult day care services and group homes, mental health, housing, continuing Care, programs (respite care) Adult Day Care programs, Meal Programs	-Hospital -Home Care -Nursing Home - Respite care - Long term care facilities -Residential care - Adult Day Care center	An integrated information system	A single funding envelope	national
SIPA	Canada /1995	-	Nurses or social workers	Interdisciplinary team / Case managers, Community nurses, Social workers, Occupational therapists, Physiotherapists, Homemakers, Staff family physicians, Consultant pharmacists, Community organizers	Functional autonomy Measurement System (SMAF) scale	Primary and secondary medical and social services, prevention, rehabilitation, medication, technical aids and long-term care	-Nursing homes -Home care -Day centers - Hospitals - Long-term care institutions	Electronic Information System	Capitation payment (not implemented in the demonstration project)	Local
PRISMA	Canada/ 1997-2003	+65	Yes but not clear	multidisciplinary team	SMAF scale	-Long term care -hospital and rehabilitation -Nursing care -Social services -The individualized service plan	-Home care -Hospital -Long term care Institutions -Voluntary Agencies (Meals-on-Wheels) -Day Center -Nursing home -...	A computerized clinical chart for communicating between institutions for client monitoring purposes.	The Canadian Health Services Research Foundation and budget negotiations between partner organizations	Local

Table 1. Ctd

Model	Country/year	Target population	Case manager	Team / members	Entry (patient) assessment	Services	Setting	Information system	Financing	Level
COPA	France /2006	+65	Gerontology nurses	multidisciplinary primary care team (Include: case manager, PCP, psychologists and Other professionals)	Inter RAI MDS-HC	- Primary medical care -Specialized care -Long term care -Social services	- Home care -Hospital -Nursing home -....	A shared clinical information system	The regional funding agency	local
Hong Kong Model	Hong Kong /2000	+60	A social worker plus a registered nurse	-	Hong Kong version of the Minimum Data Set- Home Care (MDS-HC)	-Home visits and telephone consultations -Health educational programs - Integrated health and social services -Day rehabilitative program -Community support services	-Home care - Respite hospital Care - Day care center - Day hospital -Clinic	Use of an electronic information system	Used available services and research funds	Local
Rovereto	Italy/ 1995	+65	Two Case managers. For home: general practitioner/ for hospital: Community geriatric evaluation unit	Multidisciplinary team	Standardized assessment and care planning	Integrated social and medical care	-Home care -Day hospital -Hospital in home -Nursing home	Electronic information system	Used available services and research funds	Local
The Silver Network project	Italy/ 1997-1998	-	Geriatric nurses	Interdisciplinary teams	The Minimum Data Set for Home Care (MDS-HC)	All services are provided in an integrated fashion (health and social services)	-Home care -Nursing home -Day hospital	A database including the Minimum Data Set (MDS) and information on all drugs used by each patient.	Pfizer Italy Silver Network Project	Local
DGIP	Netherlands	+70	-	Multidisciplinary Team/ geriatric specialist nurse, GP and a geriatrician	EASYcare instrument	Individualized, community-based integrated treatment plan	-Home care -Nursing home	General Practice's Information System (Huisartsen Informatie System)	Radboud University Nijmegen Medical Center	Local

Health service delivery models for elderly people

Table 1. Ctd

Model	Country/year	Target population	Case manager	Team / members	Entry (patient) assessment	Services	Setting	Information system	Financing	Level
WICM	Netherland	+75	Two case manager. The geriatric nurse practitioner for elderly with single needs / A secondary line geriatric nursing specialist for multiple or complex needs	Multidisciplinary Team/ general practitioner and case manager and other professionals	the Groningen Frailty Indicator (GFI) and EASY care tool	- Health and social services -Community services -Health professional -Other (Care, Cure, Mental health, paramedical, Welfare, housing) -Individualized service plan	-Hospital -Home care -Nursing home - Respite care	- A chain computerization system	The Netherlands Organization for Health Research and Development and health insurer CZ	Local
The Care-Well-primary care program	Netherlands/ 2008	+70	Community nurse or the gerontological social	Multidisciplinary teams / GP, the community nurse, an elderly care physician and a gerontological social worker	The Easy Care-TOS	Primary care	-Residential home - Nursing home -Hospital -Home visit	web-based health and information welfare portal (ZWIP)	The Dutch Organization for Health Research and Development	Local
PoC	Netherlands/ 2008 - 2010	+70	Practice nurse	Interdisciplinary team (including a general practitioner, practice nurse, occupational and physical therapists, a pharmacist or a geriatrician, nurse specialist, expert in technology and researcher	GFI	-Primary care -Disability prevention program -Social support	-Home visit	The Centre for Data and Information Management (MEMIC)	The Dutch National Care for the Elderly Program by the Netherlands Organization for Health Research and Development	National
Embrace model	Netherlands/ 2012-2013	+75	Two case managers (district nurse and social worker)	A multidisciplinary Elderly Care Team / general practitioner, an elderly care physician, and two case managers (district nurse and social	-Annual screening with self-report questionnaire. -The Groningen Frailty Indicator (GFI)	-Comprehensive, Patient centered, proactive, preventive care - Support services	-Hospital -Nursing home -Home health care	An Electronic Elderly Record System(Clinical information systems)	Netherlands Organization for Health Research and Development.	Local

Table 1. Ctd

Model	Country/year	Target population	Case manager	Team / members	Entry (patient) assessment	Services	Setting	Information system	Financing	Level
IHMS	Spain- Austria/ 2018	-	-	-Primary health team -Interagency community team -Chronic disease specialist team	New ICT tool	-Health and social services -Palliative care -Personalize health diagnosis, treatment, prevention, and health promotion	-Person centered health care -Home based care	- local IHMS Data Banks -IHMS National and international IHMS Data Bank	Shared capital resources	National

This program receives monthly per capita payments from Medicare and Medicaid insurances and covers a wider range of benefits than Medicare and Medicaid do. PACE is a comprehensive care model and delivers a full range of medical, social, and rehabilitation services. This model uses an interdisciplinary team to manage treatment and integration of primary and specialized medical care (14).

2. The Wisconsin Partnership Program (WPP)

The WPP was designed in the United States in 2000 and is a variation of the PACE model. The WPP is designed to provide more flexibility for dual-eligible older people, enabling them to use primary care physicians instead of physicians employed at PACE. Its purpose is to merge the resources of these programs in order to improve quality services and avoid duplications. In this model, a team of nurses, nurse practitioners, and social workers provides case management (15).

3. High-Intensity Care Management model

This model was designed in the United States, and its target group was 60-year-old and older patients. In this model, very intense care management was used to improve the integration of acute care and long-term care. In this regard, the model attempted to use a case manager supervised by a geriatrician to supplement the management of the existing care at home. The frail elderly (the intervention group) received enhanced clinical service management in addition to traditional care management. This model attempted to create cooperation-based integration without financial or regulatory incentives, so it was not able to bring about adequate change in the care system or better outcomes for the elderly (16).

4. Geriatric Resources for Assessment and Care of Elders (GRACE)

GRACE is a primary care model for poor seniors and their PCPs that was implemented in 2002-2003 in Indiana, USA. The goals of this model were to improve the quality of care for the elderly in order to optimize their health and functional status, reducing excessive use of health care, and preventing long-term care at nursing homes. The GRACE catalyst is a support team. After registration, this team conducts a full assessment of the elderly. This team then meets with the interdisciplinary team to make an individualized care program. The support team then meets with PCPs to discuss and revise the developed program, thus designing the best treatment plan for the elderly (17).

5. Medicaring Model

This is a comprehensive model that was designed in the United States to provide higher-quality services to the frail elderly under Medicare at a lower cost. The Elderly are 65 or older and are either dependent on others in two or more activities, are almost permanently dependent on others due to cognitive disorders, or are people 85 years old and older who are aware of their physiological limitations. The emphasis in this model is on the delivery of cost-effective services at home. After identifying the disabled elderly and the

identification of the priorities of each elderly person by a multidisciplinary team, an individualized long-term care program and support services (such as nutrition, transportation, safety, and housing) is designed for each frail elderly (18).

6. Systems Addressing Frail Elder Care (SAFE care) model

This program was designed and implemented from 2012 to 2013 in a hospital in the USA. The aim of this model was to identify risk among patients 65 years old and older and to use an interdisciplinary approach to treat them. After the patients were screened by a geriatric nurse and the high-risk patients were identified, each team member made an accurate assessment of the high-risk patients according to their specialization. Team members then had a meeting moderated by a physician in order to reach an agreement. After identifying the risks, recommendations were made for each patient to deal with the risks and improve the condition of each elderly person (19).

7. The Illawarra Coordinated Care Trial

This model was one of the nine trials conducted between 1997 and 2000 in Australia. This trial was conducted to coordinate the care of people 65 and older with the risk of falls or multifaceted medical or social difficulties that require several services from more than one provider. Care was coordinated by 16 care coordinators in collaboration with the GP (case manager). He/she controlled different medical aspects of the patients' care, while the care coordinator arranged availability to other services. After a systematic evaluation was made by the coordinator to identify the care programs the patient needed, the tailored patient service package was finally designed. These services were mainly provided by community care service providers who had access to different services (20).

8. The British Columbia Continuing Care system

This model is an integrated delivery system created in British Columbia, Canada. The system has an entry point and includes all the main components of long-term care and home care services for the frail elderly. In this model, a wider range of different services such as home care, rehabilitation, etc., is provided. For most senior citizens, the services are provided in one of two ways. The first way involves the implementation of home or community-based services through an external services provider. The second way is to provide home care by nurses and therapists through the Community Home Care Nursing and Rehabilitation Program. Either Assessors or the Case Manager Places both home and community-based patients in one of five distinct levels of care, and each elderly person receives services according to their needs (21).

9. SIPA: a System of Integrated Care for the Frail Elderly

SIPA is a system based primary care designed in 1995 in Canada. The purpose of designing this model is to resolve the problems of the frail elderly, provide comprehensive care, and ensure its continuity. SIPA uses an integrated case

management model to organize and provide the most community-based services. All eligible seniors are registered in SIPA after evaluation. Treatment is provided by an interdisciplinary team including health and social care professionals including a family physician. The team is responsible for assessing patient needs, planning, and providing services. The interdisciplinary team tries to improve patient performance and minimize the inappropriate acute and long-term use of institutions. This model delivers a full range of health (all levels) and social services (22).

10. The Program of Research to Integrate the Services for the Maintenance of Autonomy (PRISMA) Model

PRISMA is a Canadian creative co-ordination-type Integrated Service Delivery System. The purpose of this model is to improve the continuity and increase the efficiency and effectiveness of services, especially for the elderly and disabled people. Cooperation among institutions forms the core of PRISMA. In this model, a single entry point is used, and the elderly are evaluated using the available tools. The case manager is responsible for conducting a thorough assessment of patient needs and development to provide services to them. The case manager is working with a multidisciplinary team to personalize the treatment plan for each senior. In addition to hospitals and rehabilitation services, long-term service centers, volunteer organizations, home care, and nursing homes are among the centers providing services to the elderly in this model. In addition to hospitals and rehabilitation services, services are also provided to the elderly by long-term service centers, volunteer organizations, home care, and nursing homes (23).

11. The COPA model

COPA is a model based on scientific evidence implemented in 2006 in Paris, France. The purpose of this model is to balance the available services and the elderly needs in order to reduce the excessive use of health services. COPA focuses on a specific high-risk group (very weak elderly people living in a particular service area) and coordinates treatment at two levels, within primary care and between primary care and specialized care. In this model, the role of primary care physicians is strengthened and includes patient recruitment and developing treatment plans. COPA also uses a multidisciplinary primary care team, including different professionals, especially case managers. This team works with primary care physicians to assess the elderly and provide care for them. COPA organizes integrated primary care and specialized care through geriatricians for visiting the elderly in their homes and direct hospitalization by primary care physicians (24).

12. Hong Kong model

This program was launched in 2000 for the cost-benefit analysis of a case management program. The seniors were classified into two groups: the control and the intervention group. In the control group, the elders received standard services. In the intervention group, the elders were first visited by a case manager at their home and were counseled over the phone. After a comprehensive evaluation, they

were divided into four groups of severe impairment, moderate impairment, mild impairment, and without impairment based on their treatment status and received care plans based on their condition. Health education and support programs were also provided for the elderly in the intervention group, alongside treatment programs (25).

13. Roverto model

In the early 1990s, the health agency of Rovereto, Italy, created a wide range of health services for older people. They included a hospital geriatric evaluation unit, a skilled nursing facility, and a home health agency; nevertheless, these components did not have any cooperation with each other. In 1995, an integrated treatment model composed of a case manager, a multidisciplinary team, a community geriatric evaluation unit, and a general practitioner was created. All persons aged 65 and above were identified. After the initial assessment, the case manager reported the condition of each elderly person to the geriatric evaluation unit, and together they determined the services the senior was eligible for. Finally, with the agreement of the client's general practitioner, suitable medical and social services for each elderly person were provided (26).

14. The Silver Network project

This program was designed and implemented in Italy in 1997 and 1998. This model integrates all services of health agencies or municipalities. It has a community geriatric evaluation unit (CGEU), which plays a key role in the process of determining the qualification of the elderly to use long-term care. Health and social service delivery to the frail elderly is coordinated by a case manager who uses, MDS-HC Assessment Tool. Based on the data derived from this evaluation tool for each patient, researchers find out which of the elderly is eligible for home care (27).

15. The Dutch Geriatric Intervention Program (DGIP)

DGIP is a multidisciplinary community intervention model designed in the Netherlands, which includes nurse home visits for elderly patients. This model uses a multidisciplinary team, including a geriatrics nurse, a GP, and a geriatrician. The Easycare assessment tool is used to assess the condition of patients. The GP refers to elders with cognitive, mood, behavior, mobility, and nutrition impairments. A geriatric specialist nurse implements a guideline-based intervention. During the intervention, the nurse regularly consults the referring treatment physician and a geriatrician. A wide multidimensional assessment is performed for each patient, and an integrated and individualized treatment plan is developed based on each patient's evaluation results (28).

16. The Walcheren Integrated Care Model (WICM)

This model is part of the National Elderly Care Program of the Netherlands. WICM is a comprehensive, integrated model for the identification and assessment of needs and the assignment and evaluation of care for disabled elders who live independently. The patients aged 75 and above are identified by a GP using the GFI tool. Elderly people with

GFI ≥ 4 are recognized as disabled and transfer to a case manager. The case manager then organizes meetings with the elderly to assess their needs using the Easycare instrument. The goals are organized in consultation with the patients and their providers. The case manager then describes the results of the assessments in the form of a proposed individualized care plan. Then the proposal is discussed in a meeting with the presence of various experts and led by a GP. In this meeting, the multidisciplinary care program is approved, care actions and paths are discussed, and agreements are made on the dispatch and tasks of all concerned parties. Finally, an individualized care plan is design for each elderly patient (29).

17. The CareWell-primary care program

This model was designed and implemented in 2008 in the eastern region of the Netherlands. Its purpose is to avoid functional weakness, improve quality of life, and decrease or delay admissions in hospitals and nursing homes. After the necessary assessments, the frail elderly enter the model cycle. General practitioners work with one or two multidisciplinary teams to ensure the integration of treatment, care, and welfare of the elderly. Based on the assessment of the condition of the elderly and their personal needs, a care plan is designed for them. This model uses supportive elements such as consultation with geriatric experts to facilitate and provide care plans (30).

18. Prevention of Care (POC)

POC is an interdisciplinary model that was designed in the years 2008-2010 in the Netherlands for primary care for the frail elderly. The core aim of this model is to prevent the disability of the elderly. The frail elderly receive their personalized care program from the multidisciplinary care team after the initial assessment. A GP and a practice nurse (case manager) comprise the core team, which can be expanded by other professionals such as an occupational and physical therapist. After screening, seniors aged 70 and above (with GFI score ≥ 5) are assessed. After the initial assessment, an initial action plan is designed based on the patient's evaluation results, history, risk factors, and individual needs. After finalization, the action plan, an individualized care plan will be implemented for each elderly person. Finally, the care plans are evaluated and followed up (31).

19. Embrace model

This model was designed and implemented in the Netherlands in 2012 and 2013. Its goal is to provide comprehensive, patient-centered, and preventive services to support all older people (+75). This model is based on the chronic care model and the population health management model. Frail elderly are enrolled in the program by GPs. After necessary assessment, the elderly are divided into three groups of robust, frail, and complex care needs. The robust elderly are asked to follow an independent supportive self-management program focusing on health maintenance for as long as possible. Frail seniors and those with multifaceted care needs receive individual support services (appropriate to their condition) from a case manager. They are advised to

adhere to the self-management and prevention program (32).

20. The Integrated Health care Management System (IHMS)

This model was designed by researchers from Austria and Spain in collaboration with a team of experts from different disciplines. This is a united home- and community-based health care management system that uses the latest technologies to personalize services. In this model, different teams, such as a primary health team, interagency community team, and a chronic disease specialist team, are used to provide services to the elderly suffering from chronic diseases. After assessing the condition of the elderly and with the support of information systems and the use of new tools, health services appropriate to the patient's needs are provided. This model delivers a wide range of diagnostic, treatment, palliative, social, and health promotion services, and its focus is mainly on home care (33).

Discussion

Regarding the increasing population of the world's elderly and the need to pay special attention to the medical needs of this group, countries with high elderly populations are expected to use appropriate models to provide services to the elderly, but the models that were found are only limited to the USA (6 models), the Netherlands (5 models), Canada (3 models), Italy (2 models), France (1 model), Australia (1 model), Hong Kong (1 model) and another model (which was Designed by researchers from Austria and Spain). Most of these models have been designed in the past 30 years and mostly at the level of a city or a province, and have differences and similarities that are debatable.

Most models use an evaluation system or evaluation tool to identify frail elderly and enter them into the model process. Due to the complexity of the health problems of the elderly, having multiple chronic diseases, etc. organic structures are used in most models. Therefore, most of them use a case manager who is in cooperation with a multi-disciplinary team in their structure. The case manager is usually a doctor, a nurse, and in some cases, a social worker who is responsible for monitoring and following up treatment of the elderly. Most models have a case manager but Embrace and Roverto uses two case managers. Some models, such as IHMS, Medicare, Grace, SAFE Care, and DGIP, do not mention a case manager.

Most models use an interdisciplinary or multidisciplinary team that depending on the characteristics of each model, the purpose, and services that it provides can include different disciplines such as medicine, nursing, physiotherapy, social work, etc. this team is responsible for planning, treatment, and tending to issues of the elderly. Using data from the Assessment of the elderly, as well as information systems support, team members try to work together in the best possible way and monitor the improvement of the elderly.

These models usually provide integrated care for the elderly, although depending on their purpose and focus, the range of services they provide is different in different cases. For example, GRACE, POCE, and Carewell primary care

focus more on primary care. Models such as SIPA, PACE, and British Columbia provide more comprehensive services such as treatment, rehabilitation, and social services. Also, due to the insufficient potential of hospitals, most models have used alternative methods such as home care to provide services to the elderly.

The found models were using a variety of financing methods. In most models, financing was mainly done by the executive university or a research organization, and they provided services to the elderly using existing resources (manpower and equipment). But the SIPA, PACE, WPP, IHMS, COPA, PRISMA, British Columbia, Illawarra models mainly use stronger and more sustainable financing.

In general, models can be classified into two levels: small models (local level) and large models (national level). Most of the models are small models, but the IHMS, POC, and British Columbia are considered to be large. Small models can be implemented at the national or provincial / state level without any major change in policy or law and generally do not require additional financial resources. As models get larger, they may need to make more changes to community health laws and policies. In larger models, there is a need for more cooperation and coordination between the available elements, which makes them more difficult to implement and monitor.

Conclusion

Due to the complex needs of the elderly and the high cost of their care and treatment, it is necessary to use more community-based models and flexible structure based on case management. Although in local models, the source of funding is mainly the source of research or other available resources and services, these models need sustainable financial resources such as health and social insurance to continue. It seems that most models are not dominant and are not used at the national level. In order for smaller models to become standard models at the national level, they need to be reviewed and evaluated by large-scale policymakers and managers and then be implemented in other areas after the necessary reforms.

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Conflict of Interests

The authors declare that they have no competing interests.

References

- WHO. 10 facts on ageing and the life course. World Health Organization; 2012.
- United Nations. World Population Ageing 2017: Highlights. New York: Department of Economic and Social Affairs, United Nations. 2017.
- Gobbens RJ, Luijckx KG, Wijnen-Sponselee MT, Schols JM. Toward a conceptual definition of frail community dwelling older people. *Nurs Outlook*. 2010;58(2):76-86.
- Van Kan GA, Sinclair A, Andrieu S, Rikkert MO, Gambassi G, Vellas B, et al. The geriatric minimum data set for clinical trials (GMDS). *J Nutr Health Aging*. 2008;12(3):197-200.
- O'Connor C. Visioning the future: health care for the elderly. Arizona State University; 2006.
- Hafez G, Bagchi K, Mahaini R. Caring for the elderly: a report on the status of care for the elderly in the Eastern Mediterranean Region. *East Mediterr Health J*. 2000;6(4):636-42.
- WHO. World report on ageing and health. World Health Organization; 2015.
- Rechel B, Doyle Y, Grundy E, McKee M, World Health Organization. How can health systems respond to population ageing. Copenhagen: WHO Regional Office for Europe; 2009.
- Zon MW. The Netherlands Organisation for Health Research and Development: National programme of care for the elderly. The Hague:Ministry of Health, Welfare and Sports, the Netherlands; 2008:54.
- Boult C, Wieland GD. Comprehensive primary care for older patients with multiple chronic conditions: "Nobody rushes you through". *JAMA*. 2010;304(17):1936-1943.
- Reuben DB. Meeting the needs of disabled older persons: can the fragments be pieced together? *J Gerontol A Biol Sci Med Sci*. 2006;61(4):365-366.
- Clarfield AM, Bergman H, Kane R. Fragmentation of care for frail older people—an international problem: Experience from three countries: israel, canada, and the united states. *J Am Geriatr Soc*. 2001;49(12):1714-1721.
- CASP. Critical Appraisal Skills Programme (CASP). <http://www.casp-uk.net/casp-tools-checklists> (accessed Oct 2017).
- Eng C, Pedulla J, Eleazer GP, McCann R, Fox N. Program of All-inclusive Care for the Elderly (PACE): an innovative model of integrated geriatric care and financing. *J Am Geriatr Soc*. 1997;45(2):223-32.
- Kane RL, Homyak P, Bershadsky B, Lum YS. Consumer responses to the Wisconsin Partnership Program for Elderly Persons: a variation on the PACE Model. *J Gerontol A Biol Sci Med Sci*. 2002;57(4):250-8.
- Applebaum R, Straker J, Mehdizadeh S, Warshaw G, Gothelf E. Using high-intensity care management to integrate acute and long-term care services: substitute for large scale system reform? *Care Manag J*. 2002;3(3):113-9.
- Counsell SR, Callahan CM, Buttar AB, Clark DO, Frank KI. Geriatric Resources for Assessment and Care of Elders (GRACE): A new model of primary care for low-income seniors. *J Am Geriatr Soc*. 2006;54(7):1136-41.
- Montgomery A, Lynn J. The MediCaring™ Model: Best plan for frail elders in the longevity era. *Public Policy Aging Rep*. 2014;24(3):112-7.
- Ansryan LZ, Aronow HU, Borenstein JE, Mena V, Haus F, Palmer K, et al. Systems addressing frail elder care: Description of a successful model. *J Nurs Adm*. 2018;48(1):11-7.
- Perkins D, Owen A, Cromwell D, Adamson L, Eagar K, Quinset K, et al. The Illawarra Coordinated Care Trial: better outcomes with existing resources? *Aust Health Rev*. 2001;24(2):172-8.
- Hollander MJ, Pallan P. The British Columbia continuing care system: service delivery and resource planning. *Aging Clin Exp Res*. 1995;7(2):94-109.
- Béland F, Bergman H, Lebel P, Clarfield AM, Tousignant P, Contandriopoulos AP, et al. A system of integrated care for older persons with disabilities in Canada: results from a randomized controlled trial. *J Gerontol A Biol Sci Med Sci*. 2006;61(4):367-73.
- Hébert R, Durand PJ, Dubuc N, Tourigny A, Group P. PRISMA: a new model of integrated service delivery for the frail older people in Canada. *Int J Integr Care*. 2003;3.
- Vedel I, De Stampa M, Bergman H, Ankrj J, Cassou B, Mauriat C, et al. A novel model of integrated care for the elderly: COPA, Coordination of Professional Care for the Elderly. *Aging Clin Exp Res*. 2009;21(6):414-23.
- Leung AC, Liu CP, Chow NW, Chi I. Cost-benefit analysis of a case management project for the community-dwelling frail elderly in Hong Kong. *J Appl Gerontol*. 2004;23(1):70-85.
- Bernabei R, Landi F, Gambassi G, Sgadari A, Zuccala G, Mor V, et al. Randomised trial of impact of model of integrated care and case management for older people living in the community. *BMJ*. 1998;316(7141):1348.
- Landi F, Gambassi G, Pola R, Tabaccanti S, Cavinato T, Carbonin P, et al. Impact of integrated home care services on hospital use. *J Am*

- Geriatr Soc. 1999;47(12):1430-4
28. Melis RJ, van Eijken MI, Borm GF, Wensing M, Adang E, van de Lisdonk EH, et al. The design of the Dutch EASYcare study: a randomised controlled trial on the effectiveness of a problem-based community intervention model for frail elderly people. *BMC Health Serv Res.* 2005;5(1):65.
 29. Fabbrocetti IN, Janse B, Looman WM, De Kuijper R, Van Wijngaarden JDH, Reiffers A. Integrated care for frail elderly compared to usual care: a study protocol of a quasi-experiment on the effects on the frail elderly, their caregivers, health professionals and health care costs. *BMC Geriatr.* 2013;13(1):31.
 30. Ruikes FG, Meys AR, van de Wetering G, Akkermans RP, van Gaal BG, Zuidema SU, et al. The CareWell-primary care program: design of a cluster controlled trial and process evaluation of a complex intervention targeting community-dwelling frail elderly. *BMC Fam Pract.* 2012;13(1):115.
 31. Daniels R, van Rossum E, Metzelthin S, Sipers W, Habets H, Hobma S, et al. A disability prevention programme for community-dwelling frail older persons. *Clin Rehabil.* 2011;25(11):963-74.
 32. Spoorenberg SL, Uittenbroek RJ, Middel B, Kremer BP, Reijneveld SA, Wynia K. Embrace, a model for integrated elderly care: study protocol of a randomized controlled trial on the effectiveness regarding patient outcomes, service use, costs, and quality of care. *BMC Geriatr.* 2013;13(1):62.
 33. Gandarillas MÁ, Goswami N. Merging current health care trends: innovative perspective in aging care. *Clin Interv Aging.* 2018;13:2083.