



Heart failure and social determinants of health in Thailand: An integrative review

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ABSTRACT

Background: Heart failure is a highly burdensome syndrome and is rapidly increasing in prevalence in low and middle-income countries and outcomes are influenced at the level of the patient, provider and health system. Understanding heart failure beyond a biomedical perspective and the relationship between health outcomes and social determinants of health is critical for informing policy development and improving health outcomes.

Aim: To identify the social determinants of health for improving health outcomes for individuals with heart failure in Thailand.

Method: This integrative review included studies published between January 1, 2008, and March 31, 2016 in both the Thai and English language identified through searching Scopus, PubMed, and CINAHL.

Results: Six experimental, eight descriptive and two qualitative studies were identified met the inclusion and exclusion criteria. The majority of study participants were elderly, female, had low-education and income levels, were participating in a universal coverage scheme and living in a rural setting. All interventions were delivered at the level of the individual, focusing on education to improve knowledge, self-care, and functional status. Findings showed an improvement in health outcomes which were moderated by social determinants of health such as gender and income.

Conclusion: As the burden of heart failure increases in Thailand and other emerging economies, developing culturally appropriate, affordable and acceptable models of intervention considering social determinants of health is necessary.

1. Introduction

The challenges facing global health over the next decade will occur as a result of the emerging burden of non-communicable diseases and the need to contain costs [1]. Leveraging the capabilities of the health care system to meet the challenges of non-communicable disease and population aging is an ambitious issue on the global agenda. This requires considering factors, beyond a biomedical model, and considering attributes such as culture, gender, socio-economic and political factors, commonly described as social determinants of health [2].

Heart failure (HF) is the terminal stage of many cardiovascular conditions. HF affects an estimated 5.7 million Americans with more than 915,000 new cases each year. Projections show that the prevalence of HF will increase 46% from 2012 to 2030 [3]. In addition, cardiovascular

diseases are the leading cause of death in low, middle and high-income countries. Sub-Saharan Africa, South and Southeast Asia are particularly challenged to address the increasing burden of HF due to limitations of knowledge, technology, and resources. Of note, studies demonstrate that participants from Africa and Asia were younger, had lower literacy levels, and were less likely to have health or medication insurance but were most likely to be in The New York Heart Association (NYHA) class IV [4].

Thailand is a country located in Southeast Asia; the region is notable for its unique history, sociocultural heterogeneity and is home to a rapidly growing population of >600 million people. Thailand is categorized as a middle-income country [5]. In Thailand, there has been no readily accessible epidemiologic HF data from administrative sources. However, the Thai Acute Decompensated Heart Failure Registry (Thai ADHERE)

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demonstrated that Thai patients hospitalized for HF were younger and sicker than European and American patients. There is also a higher prevalence of HF with preserved ejection fraction in Thailand [6]. In this study, coronary artery disease (CAD) was the most common cause of HF while hypertension found to be the most common comorbidity in Thai patients with HF. Recent globalization and development have led to a rapid epidemiological transition in the region. Although high quality treatment and modern clinical practice guidelines have been developed, the outcomes of HF patients are not optimal. In addition, advanced treatments and HF specialists are usually available only in urban areas. As a result, HF continues to be associated with high mortality, readmission rates and a poor quality of life. Moreover, HF is responsible for considerable functional disability and health decline, even in those with mild to moderate symptoms [7]. Understanding the factors that are associated with poor outcomes of patients with HF is very important to develop appropriate interventions and approaches for informing policy development in the future.

1.1. Theoretical framework

The social determinants of health are the conditions in which people are born, grow, live, work and age [8]. These circumstances are shaped by the distribution of money, power and resources at global, national and local levels. The social determinants of health are mostly responsible for health inequities - the unfair and avoidable differences in health status seen within and between countries.

The social determinants of health framework (Fig. 1) has been developed with the specific consideration of social-ecological theory, social production of disease, psychosocial approaches and the political economy of health [8, 9]. Each of these approaches marks an important departure from a traditional biomedical approach in considering the management of HF.

Within the context of Thailand, social determinants of health, influencing HF outcomes, are defined as the health outcomes influenced by health inequalities that arise from aspects of social cohesion as well as psychosocial and biological factors, and functional aspects of the health care system [8]. The experience of these factors will likely vary systematically according to social position, categorized by education, occupation, income, ethnicity, race and gender.

The aim of this integrative review was to identify the social determinants of health for improving health outcomes for individuals with heart failure in Thailand.

2. Methods

The integrative review is a form of research that summarizes, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are

generated [10]. This review was conducted using PRISMA guidelines to identify the association between determinants of health, the health care system, and health care outcomes in Thai patients with HF [11]. Synthesis of the results methodological quality of the studies was undertaken using the quality appraisal instruments for experimental, descriptive, and qualitative research studies.

Three electronic databases (Scopus, PubMed, and CINAHL) were searched to identify studies published between January 1, 2008, and March 31, 2016. The Medical Subject Headings (MeSH) were used to create the search keywords. The search was supervised by a health librarian to create the data base of research. The elements of the PICO model (P, population/patient; I, intervention/indicator; C, comparator/control; and O, outcome) were applied. Data were extracted using a standardized data tool. The keywords and MeSH terms are noted in Table 1.

The inclusion criteria were [1] primary studies of social determinants of health in Thai patients with HF [2], published in peer-reviewed journals in English and Thai, and [3] published between 2008 and 2016. The exclusion criteria were master and doctoral dissertations without publication.

The initial search identified 272 articles (Scopus = 158, PubMed = 56, CINAHL = 46, and manual search = 12) which were reduced to 210 after removing duplicates. First, the titles and abstracts were reviewed for relevancy by inclusion criteria, resulting in reducing the number of articles to 77 articles for full text review. Finally, after full text review, 16 articles which met all inclusion and exclusion criteria were selected for data synthesis. The 194 articles were excluded because [1] they were not studied in Thai population (n = 178) and [1] were master and doctoral dissertation and were not published (n = 15). The process used for data extraction and evaluation were independently extracted and evaluated by two reviewers for inclusion or exclusion. Any differences between the appraisals were discussed among the two researchers until a mutual agreement was formed. Details of the search process are illustrated in the PRISMA diagram in Fig. 2. The final sample consisted of 14 quantitative [6, 7, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23] and 2 qualitative studies [24, 25] exploring social determinants of health related to outcome of Thai patients with HF.

3. Results

3.1. Characteristics of the included studies

Table 2 summarizes the characteristics of the included studies. Three randomized controlled trials, three quasi-experimental, six cross-sectional, two retrospective cohort, and two qualitative studies were included. Fourteen studies were primary research and two were secondary data analysis. The majority of study settings were in the rural areas of Thailand. The outcomes mostly focused on self-care, self-management and health status. The independent variables of all studies were categorized by the social determinants of health concept which were individual, behavior, psychosocial and society factors found that most studies examined behavior factors. However, only two studies examined

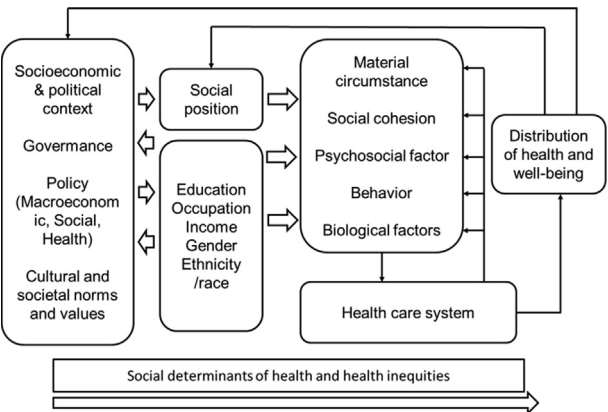


Fig. 1. Social determinants of health framework from WHO book [8].

Table 1
Search words and MeSH terms use for literatures search.

Population	Intervention	Control	Outcome	Boolean operator
Thai	Health social determinant	-	Self-care	AND
Heart Failure	Health social determinants		Self-management	OR
Cardiac Failure	Health status		Functional status	
Congestive Heart Failure	Level of health			

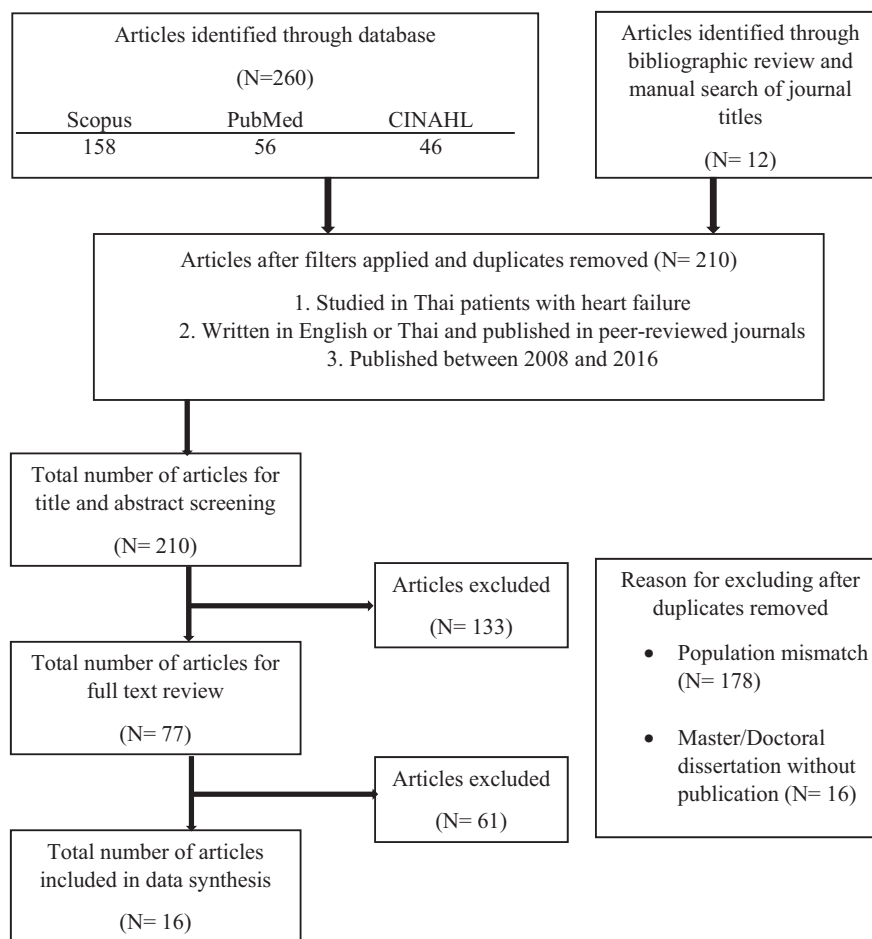


Fig. 2. PRISMA flow chart for literature selection. Adopted from PRISMA Guidelines [46].

psychosocial factors and none of the retrieved studies explored systems level factors influencing health outcomes.

3.2. Characteristics of Thai patients with heart failure

Table 2 summarizes the general characteristics of study participants. The average age of Thai patients with HF was greater than 60 years. The mean duration of HF treatment was from 12 to 45 months, though one study showed mean duration of HF of 92 months [26]. The majority of studies reporting education level showed that $\leq 16\%$ had education at high school level or higher. Moreover, the average income was 57–218 US\$ per month. However, the average household income in Thailand, in 2013 was 719.83 US\$ per month [27]. Therefore, most patients with HF in Thailand were of low-educated, low-income and had a universal coverage scheme (UCS).

3.3. Social determinants of health in Thai patients with heart failure

The results showed a strong relationship between health status and age, gender, income, functional class, comorbidity, self-care, health perception and duration of HF treatment. Self-care was strongly associated with age, education, income, duration, functional class and comorbidity. Quality of life was related to social support, symptom status, health status, and health perception. Lastly, health promotion behaviors were related with knowledge about health promoting behaviors, perceived benefits in health promoting behavior, perceived self-efficacy and perceived barriers to health promoting behavior.

3.4. Interventions to improve behavior and outcome in Thai patients with heart failure

Table 3 summarizes interventions to improve behavior and health outcomes as assessed in experimental studies. All interventions were delivered at the individual level and aimed to improve knowledge, self-care, and functional status. In additions most interventions aimed to control heart failure symptoms such as dyspnea. These studies tested strategies including a patient education program, coaching and home-based care. Each of these interventions were effective in increasing patients' knowledge, self-care, and functional status compare to the control groups.

3.5. Cultural issues related to health for Thai patients with heart failure

Table 4 summarizes the qualitative studies undertaken to obtain a deeper understanding of the experience of Thai patients living with HF [24, 25]. Both studies reported similar results with findings suggesting that the transition through three stages of adaptation after diagnosis with HF. The first stage, immediately after diagnosis, was challenging for patients as they focused on coping and adjusting to their condition and were confronted with the reality of living with a chronic condition. Initially individuals were overwhelmed by symptoms severity, the number of healthcare recommendations and the need for behavior change. The next stage of adaptation was characterized as a time of becoming familiar with the treatment recommendations and receiving support from their peers to encourage them. In this process, individuals became more dependent on others, influencing their perception of

Table 2
Description of the characteristics of the included studies.

Source	Study type	Data source/ Study period	Setting	Patients (n)	Study outcome/ (tool)	Determinant of health				Age Mean (SD)	Female (%)	Income (US\$ per month) Mean (SD)	Educated at a high school level or above (%)	Duration of heart failure in months Mean (SD)
						Individual	Behavior	Psychosocial	Society					
Kiatsee-sakul et al 2008	Quasi-experimental research	Self-report, medical record (2006–2007)	Bangkok	60 (30 each group)	Knowledge (Own-developed) Severity (NYHA)	×	✓	×	×	C: 67.79 (13.03) I: 62.57 (10.06)	C: 67 I: 67	C: 57.14 (-) I: 85.71 (-)	-	C:92 (-) I:92 (-)
Krethong et al 2008	Cross-sectional study	Self-report, medical record (2007)	5 regions of Thailand including Bangkok	422	Health related quality of life (MLHFQ)	✓	✓	✓	×	58.47 (-)	-	-	-	-
Wongpiri-yayothar et al 2008	Randomized control trial	Self-report, medical record (not given)	Northern Thailand	93 (45 control group)	Symptom severity (CHFSSS) Health status (SF-36)	×	✓	×	×	C: 59.68 (10.92) I: 60.69 (10.25)	C: 57.8 I: 56.3	-	C: 11.9 I: 10.5	-
Lee et al 2009	Cross-sectional study	Secondary analysis (not given)	Southern Thailand	400	Health status (SF-36)	×	✓	×	×	64.72 (13.83)	48	-	-	26.89 (33.99)
Phonphet et al 2009	Cross-sectional study	Secondary analysis (not given)	Southern Thailand	400	Health status (SF-36)	✓	✓	×	×	64.72 (13.83)	48	-	-	-
Rerkluenrit et al 2009	Grounded theory	In-depth interviews (not given)	Central & Eastern Thailand	35	Self-care management	×	✓	×	×	-	-	-	-	-
Suwanno et al 2009 [7]	Cross-sectional study	Self-report, medical record (not given)	Southern Thailand	400	Health status (SF-36)	✓	✓	×	×	64.72 (13.83)	48	213.57 (-)	9.2	26.89 (33.99)
Suwanno et al 2009 [19]	Cross-sectional study	Self-report, medical record (2005–2006)	Southern Thailand	301	Self-Care of Heart Failure Index (SCHFI)	✓	✓	×	×	64.40 (13.90)	50.2	218.48 (212.48)	16.3	35.4 (35.3)
Tummark et al 2009	Cross-sectional study	Self-report, medical record (2008)	Bangkok	100	Health Promoting Behaviors (Investigator-developed)	×	✓	×	×	66.04 (13.58)	64	-	-	12.5 (-)
Laothavorn et al 2010	Retrospective cohort study	medical record (2006–2007)	5 regions of Thailand	1,612	Thai-ADHERE	✓	✓	×	×	67 (14)	50.4	-	-	-
Wongpiri-yayothar et al 2011	Randomized control trial	Self-report, medical record (not given)	Northern Thailand	22 (11 each group)	Dyspnea (Dyspnea Scale) Physical Functioning (PFS)	×	✓	×	×	C: 63.64 (14) I: 60.08 (9.6)	C: 63.6 I: 54.5	C: 86.19 (116.23) I: 70.13 (14.93)	C: 9.09 I: 0	C: 34.2 (27.96) I: 45.12 (40.44)
Yindesuk et al 2011	Quasi-experimental research	Self-report, medical record (not given)	Northeast Thailand	30	Knowledge Bodyweight Severity of heart failure Nurses' satisfactory (Own-developed)	×	✓	×	×	65 (-)	100	-	-	-

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Table 2 (continued)

Source	Study type	Data source/ Study period	Setting	Patients (n)	Study outcome/ (tool)	Determinant of health			Age Mean (SD)	Female (%)	Income (US\$ per month) Mean (SD)	Educated at a high school level or above (%)	Duration of heart failure in months Mean (SD)
						Individual	Behavior	Psychosocial					
Rerkluenrit et al 2012	Quasi- experimental research	Self-report, medical record (2009–2010)	Central Thailand	66 (33 each group)	Functional Status (HFPSI) Self-care (SCHFI) Thai-ADHERE	x	✓	x	C: 65.15 (5.72) I: 64.76 (6.58)	C: 51.5 I: 51.5	C: 165.71 (217.85) I: 133.77 (89.46)	C: 42.4 I: 33.3	C: 19.97 (9.95) I: 24.15 (13.74)
Kobkue- chaiyapong 2013	Retrospective cohort study	Medical record (2010–2012)	Central Thailand	52	✓	✓	✓	x					
Chiaranai 2014	Phenomenological approach	In-depth interviews (not given)	Northern Thailand	15	x	x	✓	x					
Ritklar 2014	Randomized control trial	Self-report, medical record (2012–1013)	Bangkok	34 (17 each group)	Health related quality of life (MLHFQ) Dyspnea (Borg's score)	x	✓	x	64.44 (14.05)	29.4			

AbbreviationMLHFQ = The Minnesota Living with Heart Failure questionnaire, SF-36 = The 36-Item Short Form Health Survey, SCHFI = The Self-care of Heart Failure Index, CHFSSS = The Chronic Heart Failure Symptom Severity Scale, PFS = Physical Functioning Scale, NYHA = The New York Heart Association, HFPSI = Heart Failure Functional Status Inventory, Thai ADHERE = Thai Acute Decompensated Heart Failure Registry, RCS = The Role Conflict Scale, GBS = The Global Role Strain Scale, HRQoL = Health-related quality of life, C=Control, I=Intervention.

Table 3
Interventions to improve outcome in Thai patients with heart failure.

Source	Sampling N(C/I) Duration F/ U	Intervention	Result
Kiatsee- sakul et al 2008	Purposive 30/30 4–6 weeks	Supportive educational program on knowledge, self-care behavior, and the level of severity of heart failure	Experimental group had significantly higher knowledge and self-care behavior to prevent water and sodium retention than control
Wongpiri- yayothar et al 2008	Random 45/ 48 12 weeks	Home-based care program on the alleviation of symptoms and improvement of well- being of patients with heart failure.	Experimental group had significantly lower overall symptom severity scores and higher overall well- being than control.
Wongpiri- yayothar et al 2011	Random 11/ 11 4 weeks	Telephone coaching on dyspnea and physical functioning among persons with heart failure	Experimental group had significantly decreased dyspnea severity and greater mean change in physical functioning score than control.
Yindesuk et al 2011	None -/30 5 weeks	New clinical pathway for promoting self- management improving self- management among persons with heart failure.	Experimental group had significantly increased knowledge and self-management and decreased severity level and re-admission.
Rerkluenrit et al 2012	Purposive 33/33 4–6 weeks	Supportive educational program on functional status and self-care of persons with heart failure.	Experimental group had significantly higher self-care ability and functional status than control.
Ritklar 2014	Random 17/ 17 12 weeks	Self-management program on dyspnea, quality of life of persons with heart failure.	Experimental group had significantly decreased dyspnea level and increased quality of life.

self-worth. Over time, individuals regained their confidence by learning from their experience and adjusted the medical treatment regimens to suit their lives [24, 25].

4. Discussion

4.1. Social determinants of health in Thai patients with heart failure comparing with developing countries

The prevalence of HF is increasing in Thailand in parallel with global trends [28]. This review has found that individuals with HF in Thailand were ten years younger, had lower literacy levels, were less likely to have health or medication insurance, and more likely to be in NYHA class IV than developed countries [4]. Treatment modalities in Thailand showed less access to more technical therapies such s left ventricular assist device (LVAD) and heart transplantation [29].

The higher prevalence of HF at a younger age may indicates the poor control of metabolic disorders and coronary artery disease. For instance, Thai ADHERE study [6] found HF was caused by heart disease and poor health behavior such as poor medication adherence and symptoms management. Moreover, when comparing self-care ability among four countries (United States of America (USA), Australia, Thailand and Mexico), Thailand had the lowest mean self-care ability score in all three domains which are self-care maintenance, self-care management, and self-care confidence [30].

Individuals in Thailand were found to have more severe HF symptoms including dyspnea, fatigue, reduced ability to exercise, legs swelling

Table 4
Qualitative studies exploring heart failure in Thai individuals.

Source	Theme	Detail
Rerkluenrit et al 2009	The process of self-care management to live with heart failure. Phase 1 – Before becoming a person with heart failure Phase 2 – Becoming a person with heart failure Phase 3 - Living with heart failure.	Individuals abandoned adhering to the medical treatment regimens when they no longer experienced symptoms. Moreover, they sought assistance both from complementary therapies and modern medical treatments. Over time, they became more dependent on others, which made their self-worth decrease. However, support from family and friends encouraged them to live with heart failure. The participants adjusted the medical treatment regimens to suit their lives and found out how they could reconstruct their self-worth.
Chiaranai 2014	Identifying losses or changes in their lives Accepting the losses Regaining some control.	All participants reported having limitations in physical functioning. They all complained of symptom burden coupled with their comorbid conditions particularly decreased energy, lack of power, shortness of breath, and fatigue. These limitations restricted their ability to perform activities of daily living. The participants described how they learned to accept physical limitations and changes in their lives and how to shift their emotions to accept the losses. Control may be adjusted to avoid meeting the need to make a decision and may be part of the adjustment process. As they regain control, the participants were in touch with the reality of the illness but wanted to be free from the symptoms of heart failure.

[31], and more use of healthcare resources such as intravenous inotropes and mechanical ventilation.. In addition, many standard medications that benefit the reduction of HF mortality and morbidity are used at a significantly lower rate at hospital discharge compared with developed countries [32].

The progressive disability of HF and the impact on the individual, their family and society is a critical issue. There are limited published data in Thailand and most of the studies in this review were focused on individual level factors with limited or no consideration of interpersonal, health system, or societal factors. As in many other chronic conditions, addressing factors at the level of the patient, providers and the health care system, as well as social and environmental factors, is important [9, 33].

At the health system level, Thailand has ensured access to essential health services for all its citizens since 2000 under the universal health coverage scheme (UCS). Health benefit policies in Thailand were developed to cover different groups of the population. The civil servant medical benefit scheme (CSMBS) for government employees (8% of population) was instigated in 1960 and the social security scheme (SSS) for formal private employees (16% of population) in 1990. This left a substantial portion of Thai people uninsured (76% of population) until 2000 [34]. However, UCS coverage still has limited accessibility to health care and availability of resources that can cause health inequality in the Thai health care system. Moreover, ensuring health care professionals have access to evidence based treatment guidelines and are competent and credentialed is critically important.

The combination of individual factors and health system factors may contribute to the burden of HF in Thailand. Hence, the relationships among individual factors, health system factors and health outcomes

need to be studied and explored in Thai patients with HF to improve the outcome of care in the future.

4.2. The complexity between urban and rural area health care system

The majority of studies were conducted in rural settings, so that the phenomena of HF in urban areas in Thailand is less well known. With a current urbanization rate of 38% of the total population, the urban landscape is clearly changing [35]. The community has changed from agricultural to industrial, and a large proportion of the population has moved to metropolitan areas [36]. Along with urbanization, the family structure in Thailand has changed from an extended to a nuclear family [37]. People have to live alone without family, eat unhealthy food, and are often confronted with stressful and unstable employment and a polluted environment [38].

The rural setting has been associated with inferior health outcomes and decreased utilization of health care. Rural patients with HF may be slower to adopt healthy behaviors and have lower levels of health literacy when compared with urban patients with HF. Interventions aimed to increasing HF - related knowledge in patients with HF may have a favorable impact on re-hospitalization and quality of life [39]. The different factors between urban and rural area is a complex issue impacting the cardiovascular health of Thai population [40]. Therefore, understanding these unique characteristics and differences in health care settings is important in targeting and tailoring health care interventions.

4.3. The complexity of culture

The results from qualitative studies showed important issues in Thai culture that may influence health outcomes. Firstly, when healthcare providers provide recommendation about HF symptoms, treatment and guideline, they are commonly met with tacit acceptance. In Thailand there is a preference for politeness and dislike for direct confrontation which may limit negotiation of goals and treatments. This fear of causing offense may be related to the Thai Buddhist culture teaches that confrontation was wrong. "Seniors," those who are older in age and also those perceived to be in a more authoritative position because of profession or life circumstances, receive much respect; their authority is rarely challenged [24]. Thai patients with HF often expect decisions to be made by healthcare providers and healthcare providers. Hence, HF symptoms may not be successfully controlled due to the mismatch between symptom reporting and the actual symptom experience.

Secondly, studies showed that individuals became more dependent on others, making their self-worth decrease. However, support from family and friends encouraged them to live with HF [41]. The changing in family structure to a more nuclear family as a result of urbanization also may adversely impact patients with HF. Hence, there is a need to explore the relationship between decreasing support from family and health outcomes.

4.4. Need to address social determinants of health and system factors

The impact of health system inequalities in Thailand is important in developing socio-culturally acceptable models of care delivery. The understanding of these phenomena in Thailand is important for developing interventions which are beneficial for patients in the long term. The definition of equity of access in health care is defined as 'equal access to health care for equal need' [42, 43]. Overall theories of access are described consistently as themes of supply and demand [42, 44]. Supply describes provider contexts; the distribution of resources which include variations according to population size, service costs, health care needs, and income where it impacts variation in service use. Demand primarily considers preferences and acceptability of the user; costs, knowledge, information and beliefs [43]. The fit between these provider and user elements is most important for distinguishing between the issues impacting access. Hence, the health system intervention should focus on

the fit between the patients and the health care system by addressing five dimensions of access availability, affordability, accessibility, accommodation and acceptability [45].

Most of these articles reporting on studies of Thai patients with HF were published in the Thai language which were accessible online and potentially some studies may have not been identified by hand searching. Moreover, heterogeneity of studies design precluded meta-analysis. In spite of these limitations this review has undertaken a broad and inclusive perspective including all study designs and is important in developing culturally appropriate interventions. As the burden of NCDs increase in Thailand, developing culturally appropriate, affordable and acceptable models of health care interventions is increasingly important. Embracing a range of perspectives is important, including considering gender differences. This review has identified important conceptual elements to be considered in study design.

5. Conclusion

This review has identified the importance of considering the circumstances in which people are born and live as well as biomedical characteristics. As the burden of heart failure increases in Thailand and other emerging economies, developing culturally appropriate, affordable and acceptable models of intervention considering social determinants of health is necessary.

Declarations

Author contribution statement

Thitipong Tankumpuan, Reiko Asano, Binu Koirala: Analyzed and interpreted the data; Wrote the paper.

Cheryl Dennison-Himmelfarb, Siriorn Sindhu, Patricia M. Davidson: Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Competing interest statement

The authors declare no conflict of interest.

Additional information

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References

- [1] D.T. Jamison, L.H. Summers, G. Alleyne, K.J. Arrow, S. Berkley, A. Binagwaho, et al., Global health 2035: a world converging within a generation, *Lancet* 382 (9908) (2013) 1898–1955.
- [2] P.M. Davidson, A. Meleis, J. Daly, M.M. Douglas, Globalisation as we enter the 21st century: reflections and directions for nursing education, science, research and clinical practice, *Contemp. Nurse* 15 (3) (2003) 162–174.
- [3] D. Mozaffarian, E.J. Benjamin, A.S. Go, D.K. Arnett, M.J. Blaha, M. Cushman, et al., Executive summary: heart disease and stroke statistics-2016 update: a report from the American heart association, *Circulation* 133 (4) (2016) 447–454.
- [4] H. Dokainish, K. Teo, J. Zhu, A. Roy, K.F. AlHabib, A. ElSayed, et al., Heart failure in Africa, Asia, the Middle East and South America: the INTER-CHF study, *Int. J. Cardiol.* 204 (2016) 133–141.
- [5] C.S.P. Lam, Heart failure in Southeast Asia: facts and numbers, *ESC Heart Failure* 2 (2) (2015) 46–49.
- [6] P. Laothavorn, K. Hengrussamee, R. Kanjanavanit, W. Moleerergpoom, D. Laorakpongse, O. Pachirat, et al., Thai acute decompensated heart failure registry (Thai ADHERE), *CVD Prevention and Control* 5 (3) (2010) 89–95.
- [7] J. Suwann, W. Petpichetchian, B. Riegel, S.A. Issaramalai, A model predicting health status of patients with heart failure, *J. Cardiovasc. Nurs.* 24 (2) (2009) 118–126.
- [8] World Health Organization, A Conceptual Framework for Action on the Social Determinants of Health, World Health Organization, Geneva, 2010.
- [9] E.P. Havranek, M.S. Mujahid, D.A. Barr, I.V. Blair, M.S. Cohen, S. Cruz-Flores, et al., Social determinants of risk and outcomes for cardiovascular disease a scientific statement from the American Heart Association, *Circulation* 132 (9) (2015) 873–898.
- [10] R.J. Torraco, Writing integrative literature reviews: guidelines and examples, *Hum. Resour. Dev. Rev.* 4 (3) (2005) 356–367.
- [11] D. Moher, A. Liberati, J. Tetzlaff, D.G. Altman, Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement, *Ann. Intern. Med.* 151 (4) (2009) 264–269, w64.
- [12] Junjira Kiatseesakul, Supreeda Momkong, Orasa Pankakdee, Tanarat Choon-Ngarm, The effect of A supportive educational program on knowledge self-care behavior, and the level of severity of heart failure, *Thai Journal of Cardio-Thoracic Nursing* 19 (2) (2008) 23–39.
- [13] S. Kobkuechaiyapong, Characteristics of heart failure patients readmitted within 28 Days in saraburi hospital, *The Journal of Prapokklao Hospital Clinical Medical Education Center* 1 (1) (2013) 35–46.
- [14] P. Krethong, V. Jirapaet, C. Jitpanya, R. Sloan, A causal model of health-related quality of life in Thai patients with heart-failure, *J. Nurs. Scholarsh.: an official publication of Sigma Theta Tau International Honor Society of Nursing/Sigma Theta Tau* 40 (3) (2008) 254–260.
- [15] C.S. Lee, J. Suwann, B. Riegel, The relationship between self-care and health status domains in Thai patients with heart failure, *Eur. J. Cardiovasc. Nurs.: journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology* 8 (4) (2009) 259–266.
- [16] C. Phonphet, J. Suwann, D.K. Moser, Factors influencing health status among Thai patients with heart failure, *J. Card. Fail.* 14 (6) (2008) S5.
- [17] J. Rerkluenrit, P. Khwanchai, T. Soiron, Effects of a supportive educational program on functional status and self-care of persons with heart failure, *Rama Nurs J* 18 (102-118) (2012).
- [18] L. Ritklar, Effectiveness of a self - management program on dyspnea, re-admission, and quality of life in congestive heart failure patients, *Thammasat Medical Journal* 14 (2) (2014) 181–190.
- [19] Jom Suwann, Age and heart failure self-care, *Songkla Med J* 24 (4) (2009) 335–346.
- [20] S. Tummark, O. Panpakdee, K. Kuwawattasumrit, P. Oratai, Factors related to health promoting behaviors among patients congestive heart failure, *Thai Journal of Cardio-Thoracic Nursing* 20 (2) (2009) 32–44.
- [21] A. Wongpiriyayothar, U. Piamjariyakul, P.D. Williams, Effects of patient teaching, educational materials, and coaching using telephone on dyspnea and physical functioning among persons with heart failure, *Appl. Nurs. Res.: ANR* 24 (4) (2011) 59–66.
- [22] A. Wongpiriyayothar, L. Pothiban, P. Liehr, W. Senaratana, K. Sucumvang, Effects of home-based care program on symptom alleviation and well-being among persons with chronic heart failure, *Thai J Nurs Res* 12 (1) (2008) 25–39.
- [23] T. Yindesuk, W. Wachirawat, P. Keeratiyutawong, Clinical pathway for promoting self-management of patients with congestive heart failure at sappasittiprasong hospital, *Thai Journal of Nursing Council* 26 (4) (2011) 70–81.
- [24] C. Chiaranai, A phenomenological study of day-to-day experiences of living with heart failure: do cultural differences matter? *J. Cardiovasc. Nurs.* 29 (4) (2014) E9–17.
- [25] Juntima Rerkluenrit, Orasa Panpakdee, Porntip Malathum, Margaret Sandelowski, Supachai Tanomsup, Self - care among Thai people with heart failure Thai, *J. Nurs. Res.* 13 (1) (2009).
- [26] J. Kiatseesakul, S. Momkong, O. Pankakdee, T. Choon-Ngarm, The effect of A supportive educational program on knowledge self-care behavior, and the level of severity of heart failure, *Thai Journal of Cardio-Thoracic Nursing* 19 (2) (2008) 23–39.
- [27] Thai National Statistical Office, The average household income in Thailand, 2013. Available from: <http://service.nso.go.th/nso/web/statseries/statseries11.html>.
- [28] E.J. Benjamin, S.S. Virani, C.W. Callaway, A.M. Chamberlain, A.R. Chang, S. Cheng, et al., Heart disease and stroke statistics—2018 update: a report from the American Heart Association 137 (12) (2018) e67–e492.
- [29] N. Shah, V. Agarwal, N. Patel, A. Deshmukh, A. Chothani, J. Garg, et al., National trends in utilization, mortality, complications, and cost of care after left ventricular assist device implantation from 2005 to 2011, 101(4), 2016, pp. 1477–1484.
- [30] B. Riegel, A. Driscoll, J. Suwann, D.K. Moser, T.A. Lennie, M.L. Chung, et al., Heart failure self-care in developed and developing countries, *J. Card. Fail.* 15 (6) (2009) 508–516.
- [31] J.J. Atherton, C.S. Hayward, W.A.W. Ahmad, B. Kwok, J. Jorge, A.F. Hernandez, et al., Patient characteristics from a regional multicenter database of acute decompensated heart failure in Asia Pacific (ADHERE International-Asia Pacific), 18(1), 2012, pp. 82–88.
- [32] R. Krittayaphong, A. Ariyachaipanich, Heart transplant in Asia, *J. Heart Fail. Clin.* 11 (4) (2015) 563–572.
- [33] M.L. McEntee, L.R. Cuomo, C.R. Dennison, Patient-, provider-, and system-level barriers to heart failure care, *J. Cardiovasc. Nurs.* 24 (4) (2009) 290–298.
- [34] S. Tantivess, P. Werayingyong, P. Chuengsamarn, Y. Teerawattananon, Universal coverage of renal dialysis in Thailand: promise, progress, and prospects, *BMJ (Clinical research ed)* 346 (2013) f462.
- [35] Amanda Napoli, The Outcomes of Rapid Urbanization in Thailand, *Urbanities*, 2012.
- [36] C. Angkurawaranon, N. Wattanachariya, P. Doyle, D. Nitsch, Urbanization and Non-communicable disease mortality in Thailand: an ecological correlation study, *J Trop. Med. Int. Health* 18 (2) (2013) 130–140.

- [37] J. Zhao, S-a Seubsman, A. Sleight, Thai Cohort Study Team, Timing of urbanisation and cardiovascular risks in Thailand: evidence from 51 936 members of the Thai cohort study, 2005–2009, *J. Epidemiol.* 24 (6) (2014) 484–493.
- [38] F. Garip, S. Curran, Increasing migration, diverging communities: changing character of migrant streams in rural Thailand, *Popul. Res. Pol. Rev.* 29 (5) (2010) 659–685.
- [39] H.E. Verdejo, C. Ferreccio, P.F. Castro, Heart failure in rural communities, *Heart Fail. Clin.* 11 (4) (2015) 515–522.
- [40] C. Angkurawaranon, A. Wisetborisut, K. Rerkasem, S-a Seubsman, A. Sleight, P. Doyle, et al., Early life urban exposure as a risk factor for developing obesity and impaired fasting glucose in later adulthood: results from two cohorts in Thailand, 15(1), 2015, p. 902.
- [41] J. Rerkluenrit, O. Panpakdee, P. Malathum, M. Sandelowski, S. Tanomsup, Self - care among Thai people with heart failure Thai, *J. Nurs. Res.* 13 (1) (2009) 43.
- [42] M. Goddard, P. Smith, Equity of access to health care services: theory and evidence from the UK, *Soc. Sci. Med.* (1982) 53 (9) (2001) 1149–1162.
- [43] A. Oliver, E. Mossialos, Equity of access to health care: outlining the foundations for action, *J. Epidemiol. Community Health* 58 (8) (2004) 655–658.
- [44] M. Gulliford, J. Figueroa-Munoz, M. Morgan, D. Hughes, B. Gibson, R. Beech, et al., What does 'access to health care' mean? *J. Health Serv. Res. Policy* 7 (3) (2002) 186–188.
- [45] R. Penchansky, J.W. Thomas, The concept of access: definition and relationship to consumer satisfaction, *Med. Care* 19 (2) (1981) 127–140.
- [46] D. Moher, A. Liberati, J. Tetzlaff, D.G. Altman, Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement, *Int. J. Surg.* 8 (5) (2010) 336–341.