

# An integrative review: adherence barriers to a low-salt diet in culturally diverse heart failure adults

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## KEY WORDS

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## ABSTRACT

### Objective

A sodium restricted diet (SRD) is generally included in chronic heart failure (HF) management. The objective of this review is to explore and synthesise the research findings of the adherence barriers to a SRD in adults from culturally and linguistically diverse (CALD) backgrounds with HF.

### Setting

The principle research question addressed in this review is:

what are the adherence barriers to a SRD for chronic heart failure management in adults from CALD backgrounds?

### Primary argument

Patient education plays an important role in health decision-making but it is only one of the many factors in dietary sodium restriction adherence. In order to promote the adherence behaviours among the adults with HF, nurses should develop a tailored approach to overcome individuals' perceived barriers and circumstances especially adults from CALD backgrounds.

### Results

The literature search was undertaken in PubMed, CINAHL and MEDLINE. After eliminating duplicates and applying the selection criteria, eleven titles were included in the review.

### Conclusion

This review found three major perceived barriers for adults living with HF to adhere to a SRD from CALD backgrounds: 1) lack of sufficient, appropriate provision of patient education; 2) the levels of interference with social and family life; and 3) the availability and affordability of healthier food alternatives. These barriers are critical to the design of nursing interventions for promoting adherence behaviours. Lack of published research in adults from CALD ethnic minority groups living with HF in Western countries limited the ability to explore all of the barriers identified in this review.

## INTRODUCTION

Heart failure (HF) is defined as a clinical syndrome that results from structural or functional abnormalities causing the heart to be unable to maintain adequate cardiac output to meet metabolic needs (National Heart Foundation of Australia and The Cardiac Society of Australia and New Zealand 2011). It is a chronic and irreversible medical condition that affects more than 23 million around the globe and 5.8 million people in the United States of America (USA) (Moe and Tu 2010; Lip et al 2004). It is estimated the total spending on HF management in the USA will increase from \$20.9 billion in 2015 to \$53.1 billion by 2030 (Ziaieian and Fonarow 2016). In Australia, approximately 480,000 people are living with HF (Atherton et al 2018) and more than 173,000 hospitalisations were associated with heart failure in 2015-2016 (Atherton et al 2018). From a public health point of view, chronic HF can be managed through a combination of medical and surgical treatments, promoting self-care behaviours, education and counselling (National Heart Foundation of Australia and The Cardiac Society of Australia and New Zealand 2011). In general, a sodium restricted diet (SRD) is one of the popular chronic HF management strategies.

### **The role of dietary sodium restriction in HF management**

Dietary sodium restriction is a common self-care strategy for HF management (Wessler et al 2014; Welsh et al 2013; Hummel et al 2009). Evidence shows that following a SRD may prevent fluid retention and associated symptoms in adults living with chronic HF (Welsh et al 2013). However high sodium (salt) intake is a worldwide health problem in this century. According to the World Health Organization (2016), many people in the world routinely consume 9 to 12 grams of salt every day. This is almost two to three times higher than the recommended amount of salt intake (5 grams per day) (World Health Organization 2012). In general, high dietary sodium intake does not only increase the risk of fluid retention and exacerbate the associated symptoms in adults with chronic HF, but it also reduces the therapeutic effects of angiotensin-converting-enzyme inhibitors (Suckling and Swift 2015). Angiotensin-converting-enzyme inhibitors are medications which are commonly prescribed for HF treatment. Therefore, adults with HF are often advised to restrict their sodium intake to 2 to 3 grams a day (World Health Organization 2012; National Heart Foundation of Australia and The Cardiac Society of Australia and New Zealand 2011; Neily et al 2002).

### **Potential barriers to follow a sodium restricted diet**

Salt (sodium) plays an important role in the sensory properties of foods (Liem et al 2011). It enhances the food flavour by increasing the sense of saltiness and sweetness, and suppresses bitterness (Liem et al 2011). Therefore, a reduction of salt in foods would reduce the overall appetitive responses to foods, thus increasing the perceived intensity of a bitter taste. As a consequence, following a SRD is often difficult to maintain in many culturally and linguistically diverse (CALD) adults especially older ones who may also suffer from taste disorders (dysgeusias) (Syed et al 2016). Overall, the adherence rate of a SRD among adults with chronic HF is approximately 25 to 28% (Lennie et al 2008; Chung et al 2006).

We know that dietary practices often represent an individual's cultural background and ethnic identity (Kenny 2015). This creates a challenge to the nurses in the delivery of care to the adults living with HF from different CALD backgrounds. Each individual may have their own cultural belief and expectations to their health. In most cases, adults are likely to sustain a health behavioural change if they perceive the health benefits are greater than the barriers and are capable of making the change (Rosenstock et al 1988). A CALD adult's perception of the barriers plays an important role in health-related behaviour changes. Therefore, there is a need to gain a better understanding of their perceived barriers to dietary sodium restriction adherence so that nurses can ensure the recommended interventional strategies are clinically and culturally appropriate to them.

This review will explore and synthesise the current available research findings of the barriers to adherence to a SRD in adults from CALD backgrounds with HF.

## METHODS

### Review method

The integrative review method was selected to conduct this review. This facilitates combining experimental and non-experimental studies into integrated results and conclusions to summarise known factors across cultures and studies to synthesise a fresh perspective (Whittemore and Knafl 2005). This review uses the steps outlined by Whittemore and Knafl (2005) as a framework to guide the review process.

### Problem identification

Changing an adult's health-related behaviour is a complex process and there are many barriers influencing the adherence behaviours for a medical condition. This review examined the evidence from studies focusing on the perceived barriers to adherence of a recommended SRD for HF management in CALD adults around the globe, including the role of culture and ethnic origin in SRD adherence. It aimed to answer the question, "what are the barriers to adherence of a sodium restricted diet for chronic heart failure management in adults from CALD backgrounds?"

### Literature search

The search was undertaken in three electronic databases; PubMed, CINAHL and MEDLINE using the years 2006 to 2017 as limiters. This time frame was chosen to ensure the literature review reflects the most recent clinical practice in this area. The combinations of search terms, culturally and linguistically diverse people, CALD, minority populations, immigrants, refugees, cardiac failure, heart failure, congestive heart failure, salt, sodium, salt restriction, sodium restriction and barrier(s) aimed to capture the articles in relation to the barriers to adults who were advised to restrict their dietary sodium intake for the management of heart failure around the world (table 1).

**Table 1: Article search results**

As at 14 January 2017	The number of articles		
	CINAHL	MEDLINE	PubMed
<b>Keywords used:</b>			
Group 1- populations:			
1a: (CALD OR Culturally and linguistically diverse people OR minority populations OR immigrants OR refugees)	15,539	17,457	26,227
1b: (heart failure OR cardiac failure OR congestive heart failure)	32,613	89,045	111,673
Groups 1a AND 1b	36	54	142
AND			
Group 2 – Sodium restriction (Salt OR Sodium OR Salt restriction OR Sodium restriction)	19,896	201,027	599,167
Group 3 – Barriers (barrier*)	37,094	139,528	141,773
<b>Results:</b>			
Groups 1a AND 1b AND 2	0	0	2
Groups 1b AND 2 AND 3	17	37	43

### Study selection

Studies (articles) to be included in the literature review had to meet all the inclusion criteria and did not fall under the exclusion criteria. The inclusion and exclusion criteria for this review are detailed in table 2. These criteria were set to ensure:

1. the same approach was taken in the study selection; and
2. only the current primary studies in adults living with HF and the barriers that they experienced were included in the review.

It is important to note, non-English language publications and postgraduate theses were not excluded in the search. Articles exclusively exploring the barriers of dietary sodium restriction in hypertension and renal failure management were excluded.

**Table 2: Inclusion and exclusion criteria**

Inclusion criteria
<ul style="list-style-type: none"> <li>• Peered reviewed,</li> <li>• primary research studies/empirical studies,</li> <li>• published in between 2006 and 2017,</li> <li>• the participants were at least 18 years of age with a confirmed diagnosis of HF, and</li> <li>• provided a discussion of the barriers to a SRD in chronic HF management.</li> </ul>
Exclusion criteria
<ul style="list-style-type: none"> <li>• Articles were not related to dietary sodium restriction in chronic HF management,</li> <li>• grey literature,</li> <li>• government reports, and</li> <li>• clinical guidelines and position statement.</li> </ul>

### Data evaluation

The Crowe critical appraisal tool (CCAT) was used to evaluate the quality of the selected studies. CCAT was selected because it can be used to appraise all research designs in health science research. Intraclass correlation coefficient is a common statistical test to measure reliability and consistency of the measurements between different types of research. The intraclass correlation coefficient of CCAT in appraising the descriptive, exploratory and observational research ranges from 0.91 to 0.64 (Crowe et al 2012). The absolute agreement value is 1.0 therefore a higher total or total percentage score indicates a higher level of credibility (Crowe and Sheppard 2011). The CCAT has a high level of consistency and reliability across a wide range of research designs. None of the included studies were excluded based on the results of this data evaluation rating system. Overall, the quality scores of the included studies ranged from 70 to 88% that indicated acceptable level of credibility. The scores of the included studies are presented in table 3.

### Data analysis

The data analysis consisted of two phases. In phase 1, each article's content was analysed to identify and summarise the (1) HF stages, (2) sample size and location, (3) research designs, (4) tools used, (5) major findings and (6) limitations. In phase 2, the summarised major findings were categorised using the frequency distribution to identify three key barriers to SRD adherence for HF management in adults from CALD backgrounds.

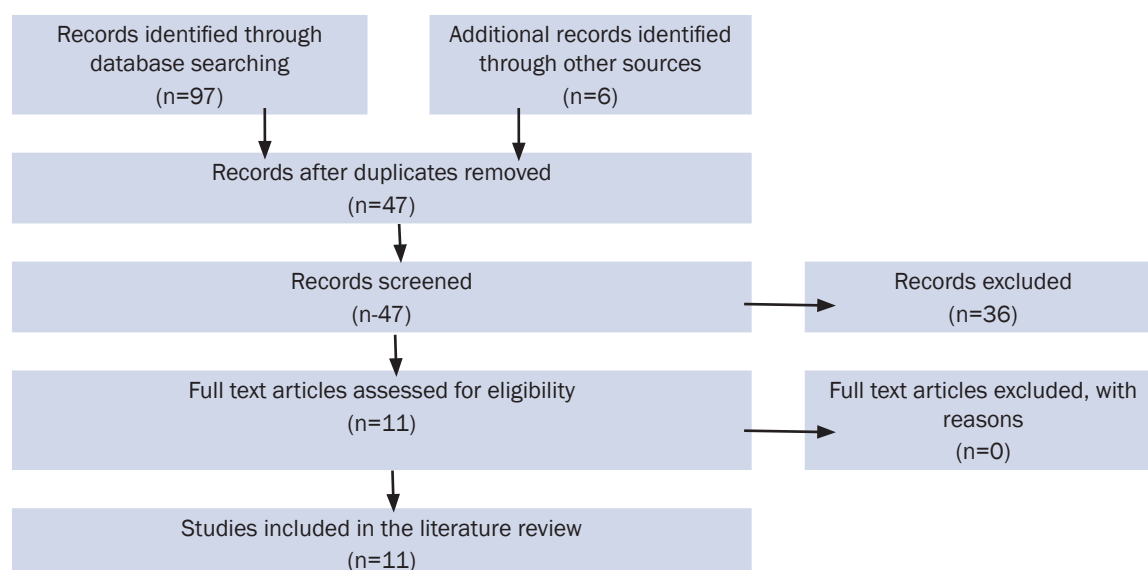
**Table 3: CCAT appraisal results**

Assessment of studies included in the review	Discipline	Country	Score (%)
Hoe et al (2015)	Nursing	USA	88%
Sethares et al (2014)	Nursing	USA	80%
Jiang et al (2013)	Nursing	Taiwan	75%
Pretorius et al (2012)	Medical	South Africa	80%
van der Wal et al (2010)	Nursing	The Netherlands	87%
Lennie et al (2008)	Nursing	USA & Australia	80%
Sheahan and Fields (2008)	Nursing	USA	88%
van der Wal et al (2007)	Nursing	The Netherlands	88%
Bentley et al (2006)	Nursing	USA	88%
Chung et al (2006)	Nursing	USA & Australia	73%
Kollipara et al (2006)	Allied health	USA	83%

## RESULTS

The search results showed there were 142 articles available in PubMed, 54 in MEDLINE and 36 in CINAHL databases when the authors combined the keywords in the population groups – people from CALD backgrounds (1a) and heart failure (1b). The number of articles reduced to 2 in PubMed and 0 in MEDLINE and CINAHL (table 1, result-A) when the authors combined the population groups (1a and 1b) with the search keywords related to salt or sodium restriction (group 2). Consequently, as a result of the limited availability of the articles (n=2) on the people from CALD backgrounds, therefore this literature review placed more focus on the heart failure, sodium restriction and barriers (groups 1b, 2 and 3).

The search using the search terms related to heart failure, sodium restriction and barriers led to a total of 97 titles; 43 titles from PubMed, 17 from CINAHL and 37 from MEDLINE (table 1, result-B). A further 6 titles retrieved were from the reference list of the reviewed papers. After eliminating duplicates and applying the inclusion and exclusion criteria, 11 titles met the selection criteria and were included in the review (figure 1).

**Figure 1: Flow chart of identified records**

Of the 11 included articles, four used the qualitative approach and seven used the quantitative approach. Of these, four studies used the same data collection tool, the Dietary Sodium Restriction Questionnaire (DSRO) that was developed based on the Theory of Planned Behaviour. Additionally, the research design of the other three studies were based on the health belief model. Convenience sampling was used in all included studies.

### Phase 1 Analysis

Most participants were diagnosed with New York Heart Association (NYHA) functional classes II, III and IV [NYHA functional class is a subjective estimate of a HF patient's functional capacity (American Heart Association 2015)] in the included studies. The studies conducted by Sheahan and Fields (2008) and Jiang et al (2013) did not include a cardiac function requirement in their sample recruitment criteria. The sample size varied according to the research design, it ranged from 12 to 33 in the included qualitative studies and 60 to 954 in the quantitative studies. The ethnocultural groups included American (n = 4), African American (n = 1), American and Australian (n = 2), Dutch (n = 2), South African (n = 1) and Taiwanese (n = 1). The methodology of the included studies are presented in table 4.

**Table 4: The methodology of the included studies**

Author/Date	HF stages	Sample	Design
Hoe et al (2015)	NYHA Classes I to IV	N = 232 USA	Quantitative; convenience sampling
Sethares et al (2014)	NYHA Classes II to IV	N = 78 USA	Quantitative; convenience sampling
Jiang et al (2013)	Medical records	N = 12 Taiwan	Qualitative; convenience sampling
Pretorius et al (2012)	NYHA Classes II, III & IV	N = 50 South Africa	Quantitative; convenience sampling
van der Wal et al (2010)	Hospitalised for symptomatic HF with structural changes	N = 15 The Netherlands	Qualitative; convenience sampling
Lennie et al (2008)	NYHA Classes II, III & IV	N = 246 Australia and USA	Quantitative; convenience sampling
Sheahan and Fields (2008)	Self-reported HT or HF	N = 33 USA	Qualitative; convenience sampling
van der Wal et al (2007)	NYHA Classes II to IV	N = 954 The Netherlands	Quantitative; convenience sampling
Bentley (2006)	NYHA Classes I, II & III	N = 20 USA	Qualitative; convenience sampling
Chung et al (2006)	NYHA Classes II, III & IV	N = 68 USA & Australia	Quantitative; convenience sampling
Kollipara et al (2006)	NYHA Classes III & IV	N = 219 USA	Quantitative; convenience sampling

### Phase 2 Barriers of following a SRD

Two authors (A.C., M.K.) reviewed the summarised findings of the included studies and used the categorical frequency distribution method to identify three key barrier categories. They were:

1. lack of patient education (Jiang et al 2013; Pretorius et al 2012; van der Wal et al 2010; Lennie et al 2008; Sheahan and Fields 2008; van der Wal et al 2007; Bentley 2006; Chung et al 2006);
2. interference with socialisation (Pretorius et al 2012; Lennie et al 2008; Sheahan and Fields 2008; Bentley 2006; Chung et al 2006); and
3. food preferences and non-affordability of a low sodium diet (Sethares et al 2014; Jiang et al 2013; Pretorius et al 2012; van der Wal et al 2010; Sheahan and Fields 2008; van der Wal et al 2007; Bentley 2006).

More specific details will be discussed in the following section.

## DISCUSSION

This review identifies three key perceived barriers of adherence to the recommended SRD (adherence behaviours) for HF management. Adults are likely to change their dietary practices (a health-related behaviour) if they perceive the benefits are greater than the barriers and are capable of making the change (Rosenstock et al 1988). So in order to minimise nonadherence to a SRD, nurses and other health care providers should take their clients' perceived barriers to the changes of dietary practice into account when providing care and treatment to this population group (Bentley et al 2005). More specific studies that explore the barriers to dietary modifications in adults from CALD backgrounds are needed. Based on the above results in phase 2, the three key barrier categories are used as a context for this review.

### Lack of patient education

Evidence shows that patient education not only improves adults' knowledge about heart failure and their recommended regimens, but also promotes self-management and adherence to the recommended SRD (Lennie et al 2008; Sheahan and Fields 2008; Bentley 2006; van der Wal et al 2007; Chung et al 2006). A semi-structured interview approach was utilised in these studies. Overall, participants' attitudes, barriers and knowledge in relation to SRD in heart failure management were measured in the data collection. Four included studies (Heo et al 2015; Lennie et al 2008; Bentley 2006; Chung et al 2006;) utilised the dietary sodium restriction questionnaire (DSRQ) that was initially developed by Bentley et al (2009) based on the Theory of Planned Behaviour in the interviews.

Accordingly, adults with HF prefer to receive both verbal and written SRD information from their health care providers (Bentley 2006). However not all adults with HF received the same level of education from their health care providers. Sheahan and Fields (2008) found that 58% of the participants received medical advice to restrict their dietary sodium intake but of those, only 24% received written information or instructions about SDR. Another study conducted in the USA and Australia also found that 20% of the participants did not receive formal medical advice to follow a SRD (Lennie et al 2008). Lack of sufficient patient education and formal advice by the health care providers may have a negative impact on the adherence. In addition, adults with less than adequate health literacy skills in acute care settings are often less prepared for self-management of the associated chronic conditions and therefore have poorer health outcomes (Lennie et al 2008). They are more at risk of misinterpreting the health-related information and may have ineffective communication with their health care providers. In most cases, low level of health literacy is often associated with poor information retention and SRD knowledge (Jiang et al 2013).



In many cases, adults with HF are told to avoid adding salt to the cooking and to remove salt from the dining table (Lennie et al 2008). The focus of the SRD education is often on identifying the high-sodium (salt) foods. As a result, many adults may not be aware of foods that contain low sodium when they shop in stores or order their meals in restaurants (Lennie et al 2008; Bentley 2006; Chung et al 2006). Further, this generic high sodium food information may mislead adults from CALD backgrounds because they may believe their cultural foods are low in sodium. Due to the possibility of language, age and/or cultural practices, these adults often have low functional health literacy skills, poor knowledge about the hidden salt in processed foods and the healthy affordable alternatives (Jiang et al 2013; Pretorius et al 2012). Jiang et al (2013) and van der Wal et al (2010) found their participants diluted the salty foods with water and perceived that to be an effective strategy in controlling sodium intake. This could be associated with low literacy skills resulting in lack of knowledge about or misunderstanding of SRD. For instance, none of the participants in the Taiwanese study could read and understand the food labels written in their own language (Jiang et al 2013). They relied purely on their sense of taste to control the sodium intake. Although the potential benefit of patient education about SRD in HF management is well established, health disparities do exist and result in adults from ethnic minority groups not receiving the culturally appropriate patient education. The study conducted by Kollipara et al (2006) found that four out of the eight frequently consumed high sodium foods by urban African Americans were not the core foods in Caucasian Americans and this cultural variation was not considered in the HF education in Dallas, USA. So, the minority ethnic populations may not accept and adapt to the SRD education designed for the mainstream population leading to a low adherence to the recommended health behaviour change (sodium restriction). Of note, adults with less experience/knowledge about the HF management often perceived more barriers and negative beliefs to the adherence of a SRD (van der Wal et al 2007). This will have a significant impact on the nurses when educating their clients from ethnic minority groups about sodium restriction.

### **Interference with socialisation**

The interference of socialisation with family and friends is another key barrier to adherence of a SRD in all communities regardless of the ethnic, cultural and socio-economic backgrounds (Chung et al 2006; Lennie et al 2008; Pretorius et al 2012; Sheahan and Fields 2008; Bentley 2006). Food is not only the basic human need for growth, but also an important social tool/media across all cultures (Cotugna and Wolpert 2011). Many adults on a SRD experience being excluded from family and friends' gatherings or perceived that their special dietary requirements limited their social opportunities. It is because they cannot share the same type of foods with friends resulting in less conversation topics in the event (Lennie et al 2008; Bentley 2006). Also, this may have a significant impact on the cultural value and food practices among adults from CALD backgrounds (Wu and Barker 2008). On the other hand, some family members may not understand and respect their medical needs. As a consequence, adults may feel alone or that they are being excluded from their immediate family members who continue to eat high sodium foods in the same household (Bentley 2006). This will have a significant impact on their health behaviours and adherence to a SRD in the long term. For this reason, nurses should encourage the immediate family members to participate in the care planning process. This does not only increase the self-efficacy of the adults, but also assists the family members to notice the barriers their loved ones are experiencing in dietary behavioural changes for HF management.

Further, lack of social interaction and loneliness during mealtimes may affect the adherence behaviours in adults with HF. Sheahan and Fields (2008) found that single older participants resided in group homes and had a lack of motivation to cook meals for themselves. Only two out of the 33 participants had the desire to cook. They tended to consume commercial or meals provided by the group homes, which were often high in sodium. Overall, very few studies have been undertaken to investigate the effects of social interference on



dietary behavioural changes. Study on the SRD among elderly or older adults living with HF in the communities or institutional facilities is a less explored topic and the current available literature may not fully reflect on their dietary practices.

### **Food preferences and non-affordability of a low sodium diet**

The perceptions of health/illness and adherence to the recommended SRD treatment for HF are often affected by individuals' food routines, cultural food practices, and beliefs about what makes foods look good and tasty. The study conducted by Sheahan and Fields (2008) found that both African American and Caucasian American participants who were raised with highly salted foods such as bacon and sausage in the south-eastern USA continued to consume high sodium foods even though they were given medical advice to follow a SRD regimen. Possibly, some adults may perceive meals without salt are tasteless and therefore this is a barrier to maintaining the sodium restrictions (Pretorius et al 2012; Sheahan and Fields 2008; van der Wal et al 2007). Their health decision-making about the dietary sodium restriction may not be based on the education or the social/family support they have received. In fact, their decision-making process may incorporate their daily routine, cultural food practices and life experience including the HF symptoms they are suffering. In a Dutch study conducted by van der Wal et al (2010) it was found there was a close relationship between the adults' daily routine and their adherence to a SRD. In other words, if the adults can establish a daily routine in restricting the amount of sodium in their diet, they are more likely to adhere to the sodium restriction. In practice, nurses may encourage adults to set up a series of small manageable goals in their care plan (Sheahan and Fields 2008). This may assist them to establish their routines that incorporate their own cultural food practices and beliefs in order to promote their adherence to the regime.

In most cases, dining out is often a challenge to the adults who are on a SRD. This is because the commercial foods in restaurants are mostly prepared and cooked with excessive salt and seasonings to enhance the taste and appeal of foods. It is estimated over 70% of adults' dietary sodium intake is from commercial foods, so-called hidden salt (Lennie et al 2008). This results in a lack of food choices for the adults living with HF when dining out (Sethares et al 2014; van der Wal et al 2007). Apart from the reduced food selections, the affordability of healthy foods such as fresh fruits and vegetables is another key barrier to the adherence of SRD (Pretorius et al 2012; van der Wal et al 2010). This is a particularly important issue to the adults living in developing countries or from the low socioeconomic backgrounds. The high prices of healthier foods may further limit some adults' food selections. For example, evidence showed that adults with HF in Soweto would have to spend approximately 40% of their social security/disability benefits on foods if they adhered to the recommended SRD in 2008 (Pretorius et al 2012). Given these points, nurses should assess and tailor the health interventional designs according to individuals' food affordability and financial circumstances.

Further, eating a meal is not only essential for humans to maintain their lives, individuals' food selections and practices may also "reflect their attitudes toward health, spiritual beliefs, cultural norms and life experiences" (Kenny 2015). Therefore, the effects of food selections and practices on personal identity and group membership should not be overlooked or underestimated. This is particularly important to some members of ethnic and racial minorities. Giving up their cultural food patterns and food choices may be considered the same as losing their own identity (Parasecoli 2014). In addition, hidden salt in the traditional foods such as salt-cured meats and pickled vegetables is a health concern (Jiang et al 2013). In most cases, the influence of culture on dietary practices may not be adequately addressed in the educational interventions for the mainstream populations. Therefore, if possible, nurses must incorporate the cultural contexts of individuals' dietary practice in order to create culturally appropriate measures. An infusion of culturally appropriate healthier alternatives in their traditional dietary patterns may enhance the adherence behaviours in adults from CALD backgrounds (Mukherjea et al 2013).

## CONCLUSIONS AND RECOMMENDATIONS

This review revealed the key barriers to adherence of a sodium restricted diet (SRD) for chronic heart failure (HF) management in CALD adults including: 1) lack of sufficient appropriate patient education; 2) the levels of interference with social and family life; and 3) the availability and affordability of healthier food alternatives. In general, the adults' health decision-making about restricting sodium intake and changing their health behaviours may not be solely based on the education that they have received and their levels of understanding. Although patient education plays an important role in health decision-making, it is only one of the key factors in dietary sodium restriction adherence. In order to promote the adherence behaviours among the CALD adults with HF, nurses should routinely assess their individual needs and perceived barriers to sustain the dietary change for their medical conditions. Lack of sufficient appropriate education may result in adults being less prepared for self-management of their conditions and non-adherence to the SRD. This is a particularly important factor in dietary sodium restriction adherence among the adults from CALD backgrounds living with HF. These adults may not adhere to the recommended diet if the education and interventions are not culturally appropriate to their social and cultural life or incorporate into their traditional dietary patterns. Therefore, nurses should:

- tailor the SRD education that is designed for the mainstream population to adapt to meet the needs of adults from CALD backgrounds;
- encourage the adults and their immediate family members to participate in the care planning process in order to increase their self-efficacy in adhering to a recommended SRD at home; and
- provide culturally appropriate healthier food alternatives to promote their adherence behaviours.

Published research in adults from ethnic minority groups living with HF in western countries is scarce (table 1). Future research is needed to explore and address how to tailor the nursing interventions to meet the individual's needs, health literacy level, cultural practice and lifestyle in order to improve the adherence behaviours regarding SRD in these population groups.

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