Symptoms Monitoring and Management for Heart Failure Patients: A literature Review

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Outlines

- Background
- Aims
- Methods
- Results
- Conclusion

Background

- Heart Failure (HF) – a chronic and progressive clinical syndrome with high morbidity, mortality and re-hospitalization

(Centers for Disease Control and Prevention[CDC], 2012; Chen, Normand, Wang & Krumholz, 2011; Dickstein et al., 2008)

In Macau

- in 2005, out of the top ten diseases causing mortality, HF ranked the sixth, which has jumped up four ranks from 2004

(Health Bureau of Macau SAR government, 2010)

- Typical signs & symptoms

Signs	Symptoms
Elevated jugular venous pressure	Breathlessness
Pulmonary crackles	Fatigue
Cardiac murmur	Ankle swelling
Displaced apex beat	Reduced exercise tolerance
	Paroxysmal nocturnal dyspnoea
	Weight gain (>2kg/week) (McMurray et al., 2012)

→affecting well-being, ADL, QoL

(Johansson, Dahlstrom & Brostrom, 2006)

- Core of nursing:
  equip HF patients to learn to live with the chronic condition and master their self-care

Theoretic Framework– Self-care of Heart Failure Model

Self-care

naturalistic decision-making process involving the choice of behaviors that maintain physiologic stability (maintenance) and the response to symptoms when they occur (management)

(Riegel & Dickson, 2008)

- Adequate self-care include early detection that allows the patients and/or providers to initiate treatments in order to avoid exacerbations

(Walker, 2011)

Poor self-care

- Self-care is difficult:
  -Treatment consists of various and complex regimens
  -Lack of knowledge, multiple co-morbidities, physical limitation
  -Symptoms are insidious, nonspecific; misinterpretation as normal age-related changes

(Jurgens, 2006; Riegel & Carlson, 2002)

- Poor symptom recognition and delay in treatment (esp. elders pts) were reported

(Carlson, Riegel & Moser, 2001; Jurgens, Hoke, Byrnes & Riegel, 2009; Riegel et al, 2010)

Current Situation in Macau

- Lack of local studies about HF care
- Conventional discharge education mainly addresses on:
  - usage of the mediation and the date for pts' OPD follow-up with primary physicians
  - not standardized, lacks of advice on self-management
- Lack of any systematic HF programme and educational materials
- No structured follow-up arrangement (home visits or telephonic follow-ups)
- Insufficient transitional care and community care services
- By most of the time, worsening of condition at the time of physician contact which eventually lead to hospitalization
- In daily practice, readmission within short period of time due to the sudden/acute onset of HF can frequently be observed

Meta-analysis and Systematic Review about Disease Management Programmes (DMP)

- agreed on the favorable effect of DMPs on reducing the frequency of re-admission for HF or cardiovascular disease and medical expenditure

(Gonseth, Guallar-Castillon, Banegas, & Rodriguez-Artalejo, 2004; Whellan, Hasselblad, Peterson, O'Connor, & Schulman, 2005; Yu, Thompson, & Lee, 2006)

Meta-analysis and Systematic Review	Highlights of components
European Society of Cardiology (ESC) guideline (McMurray et al., 2012)	regular aerobic exercise (level of evidence = A), multidisciplinary management programmes (level of evidence = A), with structured follow-up, patient education with emphasis on adherence and self-care, optimization of medical treatment, psychosocial support, etc.
Yu et al. (2006)	starting in-hospital phase, addressing individualized risk factors, joint effort of multi-disciplinary care team, intensive education, self-care supportive strategies, drug titration by cardiac nurse with cardiologist back-up, exercise training and psychological interventions, arranging prompt medical referrals for any clinical deterioration and follow-up care

Aims

- Review the present evidence addressing self-care and symptom monitoring of HF
- Find out the knowledge and service gap in this field

Method

Search engines

- Databases: Medline + CINAHL Plus , Ovid SP, ScienceDirect, Embase
- Manual search: Google Scholar, Cardiovascular Journals

Key words search

- A combination of “Heart failure, symptom monitoring, symptom recognition, symptom awareness, weight monitoring”

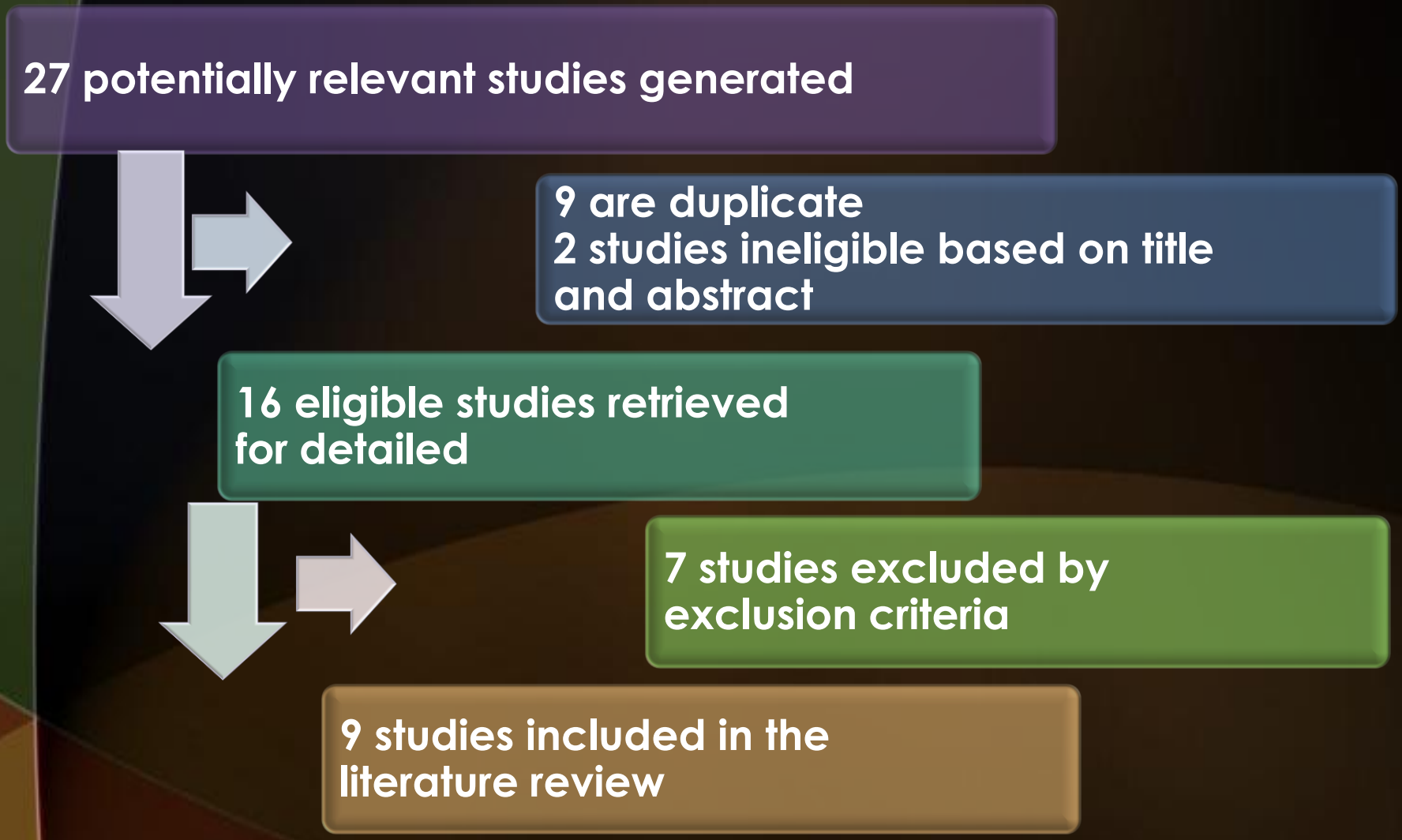
Inclusion criteria

- Full Text; Languages: English; Publication type: Original articles
- Year: 2002-January 2013;
- Main topic : education on symptom monitoring and management
- Target group: Aged
- Setting : Clinical setting, home-based setting

Exclusion criteria

- Articles which are:
- Study protocol
- case review, editor review, case study
- Topic related to implanted devices monitoring

Flow Diagram of Study Inclusion and Exclusion Process



Results

- Articles mainly on fluid retention monitoring

3 main categories:

- Exploring whether weight telemonitoring succeeded/ failed in reducing re-hospitalization (4)
- suggesting combination of weight + body fat % measurement (1)
- Evaluating ways to promote self-weighting (4)

Lit. supporting weight telemonitoring

Author(s)/ Study setting	Study Aims	Design/ Sample characteristics	Intervention or Main features	Results	Remarks
Chaudhry et al. (2007) (USA)	Detected association between daily weight change and hospitalizations for HF	Nested case-control study N=268 (case=134, control=134), Mean age 74 yrs, 50% male, 97% NYHA III	**Education** on self-weighting **Home monitoring system** (weight data sent from an electronic scale, via a standard phone line, to computerized database monitored by cardiac nurses Follow up to 18 months	At **1 week** before hospital admission, **weight gain** in the case patients **began to increase markedly** (P<.05) Difference in daily weight changes between case and control patients **within 30 days** before hospitalization was statistically significant (P<0.001)	Strength: Automatic transmission of data Limitation: Hospitalization and cause → self-reported **5 lbs in 3 days** considered as weight gain
Goldberg et al. (2003) (USA)	Determined whether daily weight and symptoms reporting would reduce rehospitalization and mortality rates	RCT (WHARF) N= 280 (CG=142, IG=138), mean age 59 yrs, 68% males, NYHA III & IV	CG: received home **weight log**, **education** for management of weight increase (usual care) IG: **usual care + home monitoring system** (weight and symptom data sent from an electronic scale, via a standard phone line, to computerized database monitored by cardiac nurses) Nurses reviewed reading **daily** Follow up to **6 months**	Significant **reduction in mortality** (p<.003) No significant differences in: 6-month hospitalization rates, ED visitation rate, QoL	Strength: Large sample size, multicentred Limitation: 1.potential recall bias in collection of hospitalization data; 2.not mentioned the standard of weight gain needed alertness

Lit. not supporting weight telemonitoring

Author(s)/ Study setting	Study Aims	Design/ Sample characteristics	Intervention or Main features	Results	Remarks
Lynga et al. (2012) (Sweden)	Determine whether daily electronic transmission of body weight to a HF clinic would reduce cardiac hospitalization	RCT (WISH) N=344 (CG=165, IG=179), Mean age 73 yrs, 75% males NYHA III & IV	CG: **education** on daily weighting and management for weight gain **Available for patients' telephone contact** when weight gain IG: **weight** from electronic scale was automatically transmitted to and monitored at the HF clinic, Nurses reviewed reading **within 4 days** Data collection: **12 month**	**No significant difference** in cardiac re-hospitalization (P =0.54) and death from any cause (P=0.32)	Longer time interval for reviewing the reading VS reviewing the reading daily, **>2 kg in 3 days** considered as weight gain Longer data collection duration
Zhang et. al (2009) (Germany, Netherlands, UK)	Predict episodes of worsening heart failure (WHF) using Home telemonitoring body weight data	**Retrospective analysis** of intervention arm of a RCT (TEN-HMS) N=135(IG), Mean age 67 yrs 80% male NYHA I-IV	**Home-based telemonitoring** Data of **weight, Bp, ECG** sent from an electronic scale, via a standard phone line, to web server monitored by study nurses Follow up: 8 month	only a **minority (18.5%)** of patients have substantial **weight gain** in the period **before a WHF hospitalization or episode of WHF**	Implication: Weight measurement: not sensitive enough to detect WHF; Suggesting +bio-impedance weight scales

Supporting VS not Supporting

- Difference in data collection duration
  - → HF patients deteriorates (HF trajectory)
  - → Mortality higher as time passed
- Usual care (education & telephone contact)
  - → less sensitive to detect the effect of the intervention

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Lit. suggesting combination of weight & Body Fat %

Author(s)/ Study setting	Study Aims	Design/ Sample characteristics	Intervention or Main features	Results	Remarks
Kataoka (2009) (Japan)	Examined the feasibility of monitoring changes in body weight and body fat % to estimate changes in body fluid status	Prospective **pilot** study N=64, Mean age 76.8 yrs 36% males NYHA II & III	Monitoring changes in body weight and body fat percentage (BF%) using commercially available digital weight scale incorporating **bioelectrical impedance analyzer**	In 38 patients developed worsening HF, **84% patients showed an increase in body weight concurrent with a decrease in BF%** during deterioration, **Combined monitoring of both body weight and BF%** provides **better predictive accuracy** (**70%,** 95% CI 59-81%) for identifying worsening HF status when compared with a **sole body weight monitoring** (**56%,** 95% CI 44-68%])	Suggest cutoff point of body weight gain: **≥1.5 kg with decrease in BF%** (high predictive accuracy: 70%, 95% CI 0.59-0.81) Limitation: Small, **single-centred** study Small sample size

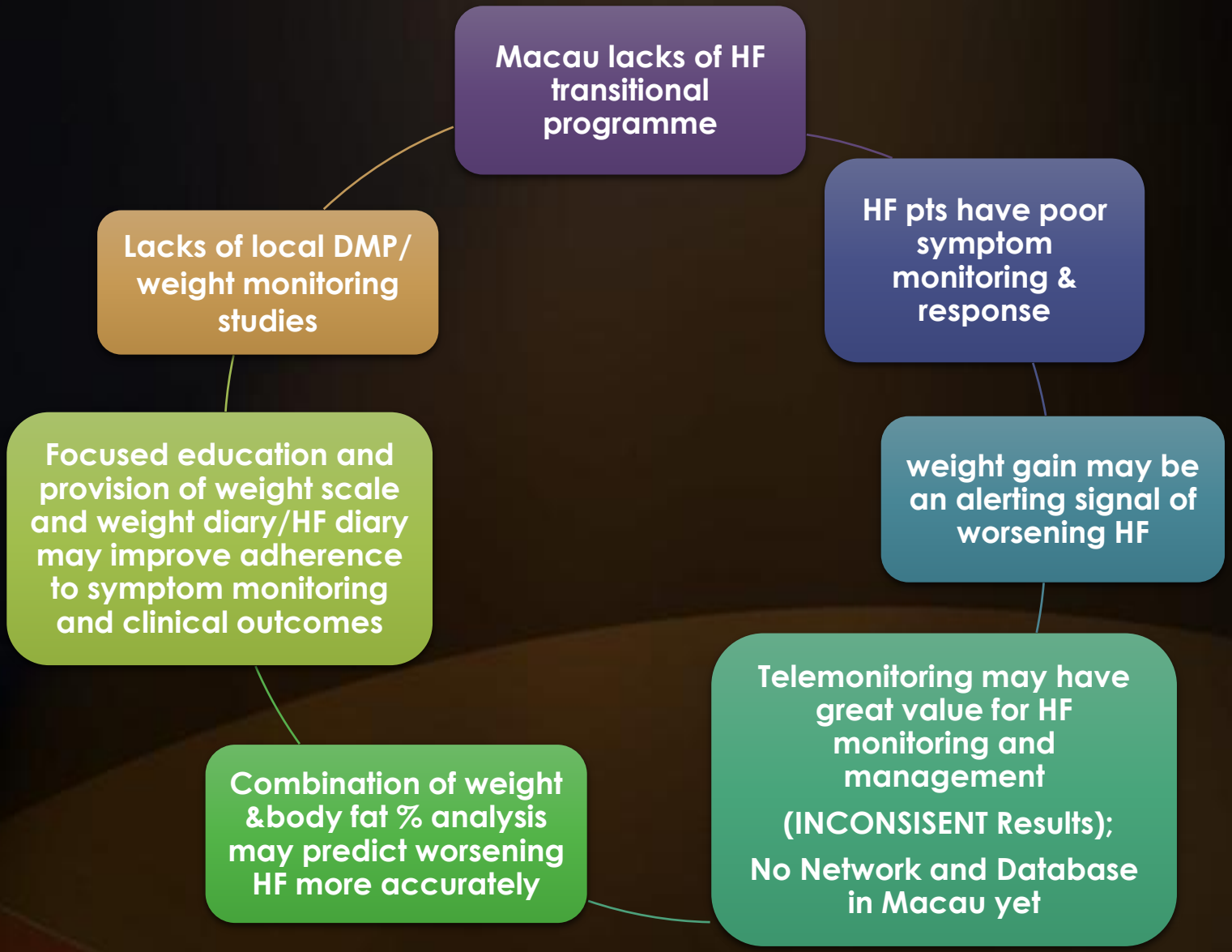
Lit. analyzing ways to promote weight monitoring

Author(s)/ Study setting	Study Aims	Design/ Sample characteristics	Intervention or Main features	Results	Remarks
Jones et al. (2012) (USA)	Evaluated if adherence to weight monitoring and diuretic self-adjustment was associated with HF-related ED visits or hospitalizations	Nested case-control analysis N=303 (case=54, control=124, neither=119) Mean age 60.9 yrs 52% males 51% NYHA II	**Education** including weight monitoring and diuretic self-adjustment, Provision of **bathroom scale** and **diary**, Provision of **Water Pill Guide** to those can handle Follow up to 1 year	Adherence of weight monitoring (OR 0.42, 95% CI 0.23-0.76) and diuretic self-adjustment (OR 0.44, 95% CI 0.19-0.98) associated with **lower** odds of HF-related ED visits or hospitalizations	Limitation: Potentially under-estimated adherence as nonreported data is considered to be nonadherent, younger and less advanced HF samples (11% NYHA IV)
White et al. (2010) (USA)	Evaluated weight monitoring diaries for adherence to daily weight monitoring and medical advice-seeking behavior after weight gain	**Analysis of Intervention arm** of a RCT N=20 (IG) Mean age 70 yrs, 75% males	**Education** on prompt response to weight gain and lower extremity edema, Utilization of **weight diary** Follow up to 3 months	High adherence score(79.4%) of daily weighting; **0.06 %** of subject **contacted physician** when weight gain	**≥3 lbs in 1 day** considered as weight gain Limitation: Small sample size Implication: Weak management behavior (barriers?)

Lit. analyzing ways to promote weight monitoring(con't)

Author(s)/ Study setting	Study Aims	Design/ Sample characteristics	Intervention or Main features	Results	Remarks
Eastwood et al. (2007) (USA)	Compare the clinical and hospital outcomes of diary users and diary non-users; evaluate the format of the Heart Health Diary	**Retrospective, descriptive** design N=124, Mean age 60.8 yrs, 66% males NYHA II & III	Provision of **Heart Health Diary** to all participants Analysis on clinical and hospital outcomes of **diary users** and **non-users** Data collection: 6 month	56% were diary users & 44% were non-users **Diary users** had 35% **more telephone contacts** (p<.007) and 47% **more clinic visits** (p<.001)than diary nonusers did Diary users had **improvement in EF% , NYHA, BNP** (p<.05)	Limitation: 1.Non-randomized sample limited the generalizability of the result 2.Lacking information of educational , cognitive level and social support
Wright et al. (2003) (New Zealand)	Evaluates the use of a heart failure diary on self-weighing behaviours; Compare the level of knowledge of heart failure self-management of IG to CG	RCT (AHFMS) N=197 (CG=97, IG=100) Mean age 73 yrs 64% males 33% live alone	3 group-**education** sessions in clinic Provision of **heart failure diary** Follow-up to12 month	76% were diary users, 67% weighed regularly Diary users had **fewer death and hospitalization** than non-users (p<.0001) **Better self-monitor knowledge** in IG (p<.0001) Patients with **scales at home more likely to weigh** themselves (OR 6.3, 95% CI 1.7, 14.1)	Implication Suggest the provision of scale for the patients Monitor weight change of **2 kg**

Summary of Knowledge & Service Gaps



Future studies & service

- Evaluating the effectiveness of a nurse-led education programme (providing education materials for symptom monitoring and management) after discharge for HF patients in Macau

- Mode for delivering education and follow up

  - Home visits?

    → limited manpower and transportation expense may be barriers to this approach

  - Developing and utilizing future and new technology

    e.g. telemonitoring, phone apps, web camera, etc.

References

- Carlson, B., Riegel, B., & Moser, D. (2001). Self-care abilities of patients with heart failure. *Heart & Lung, 30*(5), 351-359.
- Centers for Disease Control and Prevention (2012). *Heart failure fact sheet.* Retrieved from http://www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_heart_failure.htm
- Chen, J., Normand, S. L. T., Wang, Y., & Krumholz, H. M. (2011). National and regional trends in heart failure hospitalization and mortality rates for Medicare beneficiaries, 1998-2008. *Journal of the American Medical Association, 306(15),1669-1678.*
- Chaudhry, S. I., Wang, Y., Concato, J., Gill, T. M., & Krumholz, H. M. (2007). Patterns of weight change *preceding hospitalization for heart failure. Circulation, 116, 1549-1554.*
- Dickstein, K., Cohen-Solal, A., Filippatos, G., McMurray, J. J. V., Ponikowski, P., Poole-Wilson, P. A., … Swedberg, K. (2008). ESC guidelines for the diagnosis and treatment of acute and chronic heart failure 2008, *European Heart Journal, 29*, 2388-2442.
- Eastwood, C. A., Travis, L., Morgenstern, T. T., & Donaho, E. K. (2007). Weight *and* symptom diary for self-monitoring in heart failure clinic patients*. Journal of Cardiovascular Nursing, 22(5), 382–389.*
- Granger, B. B., Moser, D., Germino, B., Harrell, J., Ekman, I. (2006). Caring for patients with chronic heart failure: The trajectory model. *European Journal of Cardiovascular Nursing, 5*, 222-227.
- Goldberg, L. R., Piette, J. D., Walsh, M. N., Frank, T. A., Jaski, B. E., Smith, A. L.,…Loh, E. (2003). Randomized trial of a daily electronic home monitoring system in patients with advanced heart failure: the weight monitoring in heart failure (WHARF) trial. *American Heart Journal, 146*(4), 705-712.
- Gonseth, J., Guallar-Castillon, P., Banegas, J. R., & Rodriguez-Artalejo, F. (2004). The effectiveness of disease management programmes in reducing hospital re-admission in older patients with heart failure: a systematic review and meta-analysis of published reports. *European Heart Journal, 25*(18), 1570- 1595.

- Health Bureau of Macau SAR government. (2010). *Bulletin of Statistics 2009.* Retrieved from http://www.ssm.gov.mo/design/statistic/2009/data/link/pdf/1-9.pdf
- Johansson, P., Dahlstrom, U. & Brostrom, A. (2006). Factors and interventions influencing health-related quality of life in patients with heart failure: A review of the literature. *European Journal of Cardiovascular Nursing, 5*(1), 5-15.
- Jones, C. D., Holmes, G. M., Dewalt, D. A., Erman, B., Broucksou, K., Hawk, V., … Pignone, M. (2012). Is adherence to weight monitoring or weight-based diuretic self-adjustment associated *with* fewer heart failure-related emergency department visits *or hospitalizations? Journal of Cardiac Failure, 18(7), 576-584.*
- Jurgens, C.Y., Hoke, L., Byrnes, J.,& Riegel, B. (2009). Why do elders delay responding to heart failure symptoms? *Nursing Research, 58* (4), 274-282.
- Jurgens, C. Y. (2006). Somatic awareness, uncertainty, and delay in care-seeking in acute heart failure. *Research in Nursing & Health,* 29(1), 74-86.
- Kataoka, H. (2009). A new monitoring method *for the* estimation *of* body fluid status *by* digital weight scale incorporating bioelectrical impedance analyzer *in* definite heart failure patients*. Journal of Cardiac Failure, 15(5), 410-418.*
- Lyngå, P., Persson, H., Hägg-Martinell, A., Hägglund, E., Hagerman, I., Langius-Eklöf, A., & Rosenqvist, M. (2012). Weight monitoring in patients with sever heart failure (WISH). A randomized controlled trial. *European Journal of Heart Failure, 14*(4), 438-444.
- McMurray, J. J.V., Adamopoulos, S., Anker, S. D., Auricchio, A., Bohm, M., Dickstein, K., … Zeiher, A. (2012). ESC guidelines for the diagnosis and treatment of acute and chronic heart failure 2012. *European Heart Journal, 33*, 1787-1847.

- Riegel, B., & Carlson, B. (2002). Facilitators and barriers to heart failure self-care. *Patient Education and Counseling, 46*, 287-295.
- Riegel, B., & Dickson, V. V. (2008). *A* situation-specific theory of heart failure self-care*. Journal of Cardiovascular Nursing, 23* (3), 190-196.
- Riegel, B., Dickson, V. V., Cameron, J., Johnson, J. C., Bunker, S., Page, K., & Worrall-Carter, L. (2010), Symptom recognition in elders with heart failure. *Journal* of *Nursing* Scholarship, 42 (1), 92–100.
- Walker, C. (2011). *Effects of the use of a heart failure diary on self-care and quality of life* (Master's Thesis). University of North Florida, Jacksonville.
- Whellan, D. J, Hasselblad, V., Peterson, E., O'Connor, C. M., & Schulman, K. A. (2005). *Metaanalysis and review of heart failure disease management* randomized controlled clinical trials. *American Heart Journal, 149*(4), 722-729.
- White, M. M., Howie-Esquivel, J., & Caldwell, M. A. (2010). Improving heart failure symptom recognition: a diary analysis. *Journal of Cardiovascular Nursing, 25*(1), 7-12.
- Wright, S. P., Walsh, H., Ingley, K. M., Muncaster, S. A., Gamble, G. D., Pearl, A., … Doughty, R. N. (2003). Uptake of self-management strategies in a heart failure management programme. *The European Journal of Heart Failure, 5*(3), 371-380.
- Yu, S. F. D., Thompson, D. R., & Lee, T. F. D. (2006). Disease management programmes for older people with heart failure: Crucial characteristics which improve post-discharge outcomes. *European Heart Journal, 27*, 596–612.
- Zhang, J., Goode, K. M., Cuddihy, P. E., & Cleland, J. G. F. (2009). Predicting hospitalization due *to* worsening heart failure using daily weight measurement: analysis of the Trans-European Network-Home-Care Management System *(*TEN-HMS*)* study*. European Journal of Heart Failure, 11(4), 420–427.*