論 文 全 文 要 約

Examining effect of Nurse-led collaborative management using telemonitoring to improve quality of life and prevent rehospitalization in patients with heart failure

（心不全患者の QOL の改善と

再入院予防を目的とする

遠隔モニタリングを用いた

看護師主導型共管理プログラムの効果検証）

主指導教員：森山 美知子教授

（医系科学研究科　成人看護開発学）

副指導教員：木原 康樹教授

（医系科学研究科　循環器内科学）

副指導教員：加古 まゆみ准教授
（医系科学研究科　国際災害看護担当）

水川　　真理子

（医歯薬保健学研究科　保健学専攻）

SUMMARY

In a super-aging society in Japan, the number of patients with heart failure (HF), along with its associated medical expense, has been increasing substantially and has become a nation-wide problem. To resolve this issue from a nursing perspective, this project was conducted to establish an effective and practical HF disease management program, and to verify its effect, so as to prevent its re-hospitalization of HF patients.

Chapter 1 discussed HF issues in the super-aging society in Japan and worldwide from an epidemiological perspective, examined HF disease management measures taken in the world and Japan and their effectiveness, and revealed remained issues that research needed to consider. The revealed issues indicated that we, as medical and nursing professionals, needed to develop new measures to support/assist elderly patients who were not able to follow self-management education and repeated exacerbation and rehospitalization that results.

Chapter 2 reviewed previous studies conducted on HF patients in order to create a new strategy for this research. First, I examined self-management education programs for HF patients and described the rise of telemonitoring. It was clarified that although disease management based on self-management education and telemonitoring for patients with HF has been implemented in many countries, its effect was controversial. The main reasons in this regard are the lack of interactive communication that is necessary for patients to understand the meaning of data and case management to deal with difficulties in daily life caused by severe symptoms, since most HF patients are elderly.

Based on the literature review, I introduced the concept of collaborative management in which health care professionals, especially nurses, and patients collaboratively work together to deal with symptoms and issues related to HF. I operationally defined <u>collaborative management</u> as "<u>the patient working collaboratively with health care professionals to identify problems and manage their condition and daily life, using a telemonitoring system with timely care coordination. Collaborative management is care that strengthens and supports patients' self-management skills and early detection of increased symptoms. It is care that promotes taking collaborative action to deal with problems related to exacerbation of HF</u>."

Chapter 3 presented the development of the nurse-led collaborative management program using telemonitoring to prevent rehospitalization in patients with HF, which was based on the concept discussed in Chapter 2.

The goal of this program was that a patient working collaboratively with health care professionals could identify problems and manage their diseases and daily life, using a telemonitoring system with timely care coordination <u>to prevent aggravation of HF, especially rehospitalization, and consequently improve his/her QOL</u>. The contents were set based on self-management education as foundation of the program. In this foundation, patients learn how to manage necessary actions and lifestyle changes from nurses. The duration and the process of providing the program, and the education material were created.

On this basis, telemonitoring which measured blood pressure, pulse rate, and body weight, and timely feedback by telenursing have been incorporated to enhance timely interactive communication between nurses and patients, and provide case

management.

Chapter 4 verified the effectiveness and feasibility of the nurse-led collaborative management program on severe HF patients in the community (published in the *International Heart Journal* 60(6), 1293-1302, 2019).

A three-arm randomized controlled trial (RCT) was conducted as a pilot study. Fifty-nine HF patients were recruited through five collaborating health care facilities in Hiroshima Prefecture, and were randomly allocated to one of three study groups: the usual care (UC) group (n = 19), the self-management (SM) group (n = 20), and the CM group (n = 20). The trial duration was set for 12 months intervention and 12 months follow-up.

As shown in the results, QOL, as the primary endpoint, improved significantly ($P < 0.05$), and the readmission-free survival rate differed significantly between the CM and UC groups ($P = 0.020$). Rehospitalization rates were high in the UC (11/19; 57.9%) compared with the SM (5/20; 27.8%) and CM groups (4/20; 20.0%). Therefore, we concluded that CM has the potential to improve psychosocial status in patients with HF and to prevent rehospitalization due to HF.

Chapter 5 examined the results for indicators not included in Chapter 4. In this chapter, the effects of physiological indicators were examined. There was a statistically significant increase in Cre in the SM group at 18 months; however, this change was not critical. The blood pressure of the UC group showed a statistically significant increase after the intervention; however, it did not yield a clinically abnormal value. Thus, there were no changes indicating the program's effectiveness. There was a limitation in

verifying the effect of the program on physiological indicators, due to the small sample size and a high drop-out rate.

Chapter 6 presented an analysis and discussion on who would benefit most from the CM program using telemonitoring to prevent rehospitalization based on the pilot study. A triangulation approach was used in which quantitative data were compared with qualitative data (This study was a post-hoc analysis of data from the RCT trial described in Chapter 4 & 5).

Of the 59 patients, 19 and 36 patients were categorized into the CM suitable and SM suitable groups, respectively. Four patients had to be excluded mainly due to, worsening cognitive functions. The quantitative findings clarified that CM is effective in patients with American Heart Association (AHA) stage D HF or an increased cardiothoracic ratio (CTR), and previous repeated hospitalization history. Qualitative analysis revealed that <u>CM is appropriate in patients with a narrow threshold of weight gain; moreover, CM can be an educational tool to enhance self-management skills among patients in whom educational intervention alone is ineffective. Furthermore, patients who require social support in ADL/IADL need CM support.</u>

Despite RCTs examining telemonitoring use in patients with HF, only a few studies have retrospectively performed in-depth analysis of those interventions that can prevent rehospitalization. In this study, I identified the clinical indicators and clarified the characteristics of patients who are suitable for CM, including their sociological and psychological aspects, to prevent rehospitalization.

Conclusions

In this project, an innovative concept of collaborative management was

introduced for disease management of HF, which is expected to solve problems and concerns, especially for elderly patients with multiple comorbidities who experience repeat admissions, and have difficulty acquiring self-management. In collaboration, I developed a program that allows patients to live at home without exacerbation while suffering from HF, and verified its effectiveness and feasibility in the pilot study.

The collaborative management program not only detects abnormalities early through telemonitoring, but also provides a mechanism for medical professionals to collaborate with patients in a timely manner to help solve various problems facing them. It was shown that re-hospitalization was prevented with a statistically significant difference compared to usual care of HF management, and that patients' QOL improved. In addition, the analysis also revealed patient characteristics that are suitable for this collaborative management.

Although there was study limitation that the results of Study 2 and 3 cannot be generalized to all HF patients due to the small sample size and the high drop-out rate. However, I believe that the collaborative management program developed by the researcher has potential to be effective in improving QOL of elderly patients with HF with complex conditions and background by preventing readmission, and could be a model for future severe HF care and management.

Recommendations

In the light of the findings of this study, the following recommendations are suggested.

1. To validate the findings from this study, an intervention study with a larger sample size is needed in which participants are allocated to either a CM or an SM group

based on the characteristics identified in the present study.

2. Clinical indicators to be considered in the introduction of the CM program are AHA stage D HF, increased CTR, a narrow threshold for weight gain, and previous repeated hospitalization.

3. CM using telemonitoring can be used as a useful educational tool to enhance self-management skills in patients who were not able to acquire self-management skills with educational intervention alone.

4. CM using telemonitoring can be used for patients who need social support in ADL/IADL to assess the patients' changeable condition and arrange the social resources.