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A Care Assessment System Supporting Community-Based Healthcare Environment

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Abstract and objective

Due to the large demands on the health system caused by factors such as the ageing population, prevalence of chronic diseases and shortage of healthcare worker, the trend has been to move the healthcare system into the community. A community based care setting encompasses a multi-disciplinary care team who would need to interact regularly between themselves and with patients at home. To enable such interaction, monitoring of patients need to be made regular and assessments made from such monitoring need to be accessible to the respective member of the care team at different timepoints of their care. The aim of this project is to develop a software platform technology that would provide such monitoring and assessment information in a community care environment. The development will incorporate clinical trial in which patient activity and physiological measures will be monitored with ambulatory devices, and the information being processed by the software platform to provide clinical measures for assessment to the multi-disciplinary care team. The outcome of the trial will establish the effectiveness and the benefits in provide chronic disease management in community care setting.

Keywords:

community care, chronic diseases management, health assessment

Introduction

It is well established that there are severe current pressures on our health systems caused by diverse factors such as ageing population, burden of chronic diseases, shortage of resources, diminished health workforce. Changes in healthcare delivery mechanisms by adopting new workforce models and workplace practices have been widely advocated to ease these pressures. Recent trends towards making such changes include *patient-centric care models* incorporating extended carer teams and detailed care plans, an*d place-based care initiatives* which permit care delivery to be conducted in community-based settings away from hospitals.

These approaches present a number of challenges on the human front. They require learning of new skills and protocols involving coordination of a large and diverse group of participants, only some of whom will have team skills and health systems domain knowledge. They also require substantial amounts of health information on the patient to be gathered and monitored, to ensure that care is proceeding beneficially, and allowing adjustments to be made to the care plan on an individual patient level. In addition, they need to respond to an expectation that comprehensive, updated and reliable information on all aspects of the patient's care progress should be available in future episodes involving clinicians and facilities outside of the normal care circle.

Methods

All of the above human issues can be addressed in part by use of platform software technology that provides:

- Monitoring capabilities to assess patient/disease status.
- Clinical measures derived from monitoring to enable health assessment of patient and also generate care plans
- Availability of these clinical measures for assessment to be performed at different timepoints and monitor patient progress against their care plan.

Development of such software platform technology has been taken by our research center through a clinical trial being conducted at a Brisbane community-based care setting. The clinical trial focuses on two areas of chronic diseases: chronic obstructive pulmonary (COPD) and cardiovascular diseases (CVD), which are most prevalent to the community of that setting. The trial employs ambulatory monitors worn by these cohorts of patients to measure their physical activity and vital signs. Information is either downloaded or streamed wirelessly to a PC with the software platform, which analyses the data for clinical assessments of physical activity and vital signs such as heart rate and respiratory rate. These clinical assessments are made available to the multi-disciplinary care team involved in care of the patients being participating in the clinical trial. From the clinical assessments used to measure against the care plan, a more perceivable feedback will be provided to patient to enable self-management.

Results

In the course of the clinical trial, the software platform technology will derive and adopt:

- Computational tools for the relevant clinical measures which provide immediate feedback of patient assessment for clinical decision making.
- User interface for easy interaction by the multi-disciplinary team
- Information flow that adapts to existing workflow of the community-based healthcare setting
- Key performance indicators used to contributes to care planning and its progress.

Following the development of the platform, the trial will establish its effectiveness and the engagement of the multi-disciplinary care team in providing care to chronic disease patients at various points of care in the community care setting. It will also establish the effectiveness of the platform to provide chronic disease management at different levels of risks of the CVD and COPD diseases (primary prevention, secondary prevention, and tertiary prevention).

Conclusion

The shift in the current health system to community care requires a change in workforce, workflow and interaction with the patients at homes to provide better quality of care. To address this change, a care assessment software platform technology is being developed through a clinical trial conducted with ambulatory monitoring of COPD and CVD patients in a community care environment. The trial will establish the effectiveness of the software platform to provide: care assessment of COPD and CVD patients through ambulatory monitoring technology, the accessibility of clinical information to the respective members of the care team, and the capabilities to create and monitor care plans. This effectiveness will be measured in accordance with healthcare benefits such as the ability to reduce hospital admissions, individualized care plans, elimination of duplication of assessment, and encouraging self-management.