

Telehealth monitoring decreases missed treatments in new dialysis patients

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Patients with good self-management skills have better outcomes, improved quality of life, fewer complications, and reduced use of health care resources compared with those who do not self-manage their health.¹ Frequent and consistent monitoring of patient's health status by health care professionals also effectively improves patient outcomes and reduces complications.

Recently, telehealth monitoring has been gaining interest in various health care settings. Telehealth monitoring involves the use of electronic information and telecommunication technologies to provide access to health assessment, diagnosis, intervention, consultation, and surveillance.^{2,3} Telehealth monitoring helps the transmission of biologic or physiologic data between the patients' homes and health professionals for data interpretation and decision-making using web-based real-time systems. It enables patients to monitor and transmit their biometric data from home, and transfer it remotely to a central data management system, where a health care provider on the receiving end of the system systematically monitors a patient's health status.^{2,3} Thus, many health care experts believe that telehealth monitoring is a promising solution for cost-effective healthcare management. However, its impact on

patient outcomes in various clinical settings is yet to be evaluated.

Renal Ventures Management (RVM) conducted a quality improvement project to examine the effectiveness of telehealth monitoring in patients who were undergoing hemodialysis. Specifically, this study assessed the rate of missed hemodialysis treatments due to hospitalizations, nonadherence, and other reasons in incident patients using telehealth monitoring for four months.

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Patients enrolled in the telehealth monitoring had fewer missed treatments

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The findings were compared with those patients who did not participate in telehealth remote monitoring. Telehealth monitoring was provided by AuthentiDate, a provider of secure health information exchange, workflow management services, and telehealth solutions.

Patients were provided devices that measured blood pressure, temperature, pulse rate, oxygen saturation, blood glucose level, and weight. They were also provided an android tablet which allowed for Bluetooth connection to the measuring devices or manual entry of vital sign measurements. Patients were educated on the use of the devices and the android tablet and were asked to monitor their vital signs at a prescribed frequency at home. The information was automatically transmitted to a secure database using AuthentiDate

software. The data was organized and made available to health care providers on a secure website provider portal which could be accessed through the Internet. The patients also received education on health topics through the Android tablet after answering a series of needs assessment questions.

The process

The quality improvement project was conducted by RVM clinics in the Dallas region from September 2015 through February 2016. Initially, baseline data on missed treatments were collected for six months on incident patients for whom telehealth monitoring was not available. Prior to the start of the telehealth monitoring, patients who recently started hemodialysis were introduced to an in-house self management program. Patients requiring palliative care, those who were in long-term care centers, and who had cognitive deficits and lacked family support, were excluded from this in-house self-management program and subsequently from the telehealth monitoring project.

Following the acclimation with the clinic and the staff, patients were provided with health monitoring devices along with the tablet and were educated on their use and purpose of the study. Patients were encouraged to monitor vital signs at least daily. Patients were also encouraged to undergo the self-paced education program through the tablet with a preset curriculum. A care coordinator of the program followed up weekly with the patient to reinforce the progress and communicate the vital

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signs trend with the patient's health care team including the prescribing physician. Care was adjusted based on the trend.

When patients completed the self management program after four months, the devices were returned to the care coordinator. Missed treatments due to hospitalization, illness, nonadherence, and other reasons were tracked and assessed at the time of completion of the project.

Results

A total of 95 new hemodialysis patients were included in the project. Of the 95 patients, 78 participated in standard care that was carried out without telehealth monitoring. The remaining 17 patients were included in the telehealth monitoring project. Missed treatments were assessed as the patients' outcome for four months and the findings were compared to standard care. Missed treatments included those due to hospitalizations, acute illness, nonadherence, and other reasons. The findings presented in Table 1 reveal the difference in missed treatments between the two patients groups. These results indicate that patients enrolled in the telehealth monitoring had fewer missed treatments (0.9%) compared with those in the baseline group without telehealth monitoring (1.6%), resulting in a 44% reduction.

Table 1. Results of telehealth monitoring

	Number of patients	Missed treatments
Without telehealth monitoring	78	1.6%
With telehealth monitoring	17	0.9%

Discussion

There is considerable interest in the potential of telehealth remote monitoring to improve the quality, safety, convenience, and cost-effectiveness of health care.^{4,5} This idea

has accompanied the realization that traditional health care delivery may be unable to cope with future levels of chronic disease management in an ageing and medically complex population. In addition, economic pressures on health systems call for solutions that will keep such patients out of hospital while monitoring their health efficiently. Moreover, telehealth remote monitoring promotes adherence in patients and provides an opportunity for the health care team to individualize patient education and coaching which further improves the patient's self-management skills.

This quality improvement project assessed the effectiveness of telehealth monitoring by evaluating the missed treatment rate in patients who were undergoing hemodialysis and demonstrated that patients using telehealth monitoring had substantially fewer missed treatments than those treated without remote monitoring. The ease of setup and devices use, bits of health education through the Android tablet, and overall simplicity of the process were merits of this telehealth remote monitoring project. However, patients were required to have frequent reminders to monitor the vital signs to ensure good compliance. Only seven out of 17 had greater than 75% adherence rate in daily monitoring. An in-center staff member who interacts with patients

every treatment should be designated as the coordinator to frequently remind patients on self-monitoring and thereby improve compliance. There were technical difficulties causing gaps in regular monitor-

ing such as devices failure needing replacement, patients' incomplete understanding of using the devices which was reported a few days after starting the monitoring, and some patients' limited skill level on using technology caused delay in their overall practice. These concerns were addressed as occurred and the occurrence of these issues decreased in the later part of the study.

Conclusion

Telehealth remote monitoring appears to be an effective strategy in improving the quality of delivery of care for hemodialysis patients. This quality improvement project demonstrated that telehealth remote monitoring can improve clinical and health care delivery outcomes in incident dialysis patients. Special attention should be given to factors such as ease of devices use, access to a care coordinator to monitor patients closely, and a well defined process of monitoring. *NN&I*

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