Abstract

OBJECTIVES: Remote monitoring (RM) is useful in chronic diseases, however evidence is scarce in home dialysis. Sharesource™, a two way connectivity platform with RM capabilities, should enable earlier intervention and healthcare savings. This simulation describes a simulation study designed to estimate the type and importance of the savings.

METHODS: This study used an approach similar (although in a virtual environment) to that for diagnostic tests, i.e., measuring the impact of additional information on treatment pathways. Automated peritoneal dialysis (APD) patient profiles (e.g., therapy non-compliance, fluid overload, etc.) were developed by a group of in-house nephrologists and nurses experienced in managing APD patients. Each patient profile was developed in 2 scenarios: "with RM" information (treatment data, blood pressure, weight) and "without RM". Nephrologists (US=4, Germany=3, Italy=2), experts in managing APD patients, validated the "without RM" resources. The "with RM" resources were evaluated by 15 (US=7, Germany=4, Italy=4) APD teams (1 nephrologist & 1 nurse). Resources were compared with t-tests.

RESULTS: Patient profile development required several rounds of individual reviews and group meetings over a 6 month-period to ensure clarity of clinical event sequence and clinician management response. During the process, 8 profiles were abandoned, leaving 12 profiles for the simulation. Recruitment of experts and APD teams was moderately easy, but the biggest hurdle was the contract signature in some countries (e.g., Italy). Participants submitted responses, usually within two weeks. Overall, results indicate that RM could avoid in the USA and Germany 49-75 healthcare resources (4-1.62 per patient profile), including clinic calls/visits (48-72), hospitalizations (2), emergency room visits (3.5-5) and transfer from APD to in-center hemodialysis (1-2.25). Numbers were lower in Italy. These cases were assessed by the APD experts as being representative of 15-37% of the APD patient population.

CONCLUSIONS: This simulation was a rapid and affordable way of estimating the type and importance of the potential healthcare resource consumption reduction to be expected by RM in APD patients while waiting for real-world evidence.

Background

Remote monitoring (RM) involves a device or software in the home setting. RM collects patient’s clinical data, such as blood pressure, weight, and temperature and sends it to a healthcare professional that monitors and analyzes the data received, giving opportunities for preventative therapeutic intervention.

RM has been shown to decrease hospitalization and death in patients with chronic diseases such as heart failure. A Cochrane review and meta-analysis published in 2011 estimated that RM in the form of telemonitoring of patient’s weight and blood pressure could reduce disease-related hospitalization by 21% and death by 9% [1]. However, evidence is scarce in home dialysis. Sharesource™, a two-way connectivity platform with RM capabilities, should enable earlier intervention that could lead to a reduction in usage of more expensive healthcare resources such as hospitalizations or emergency room visits.

Objectives

This simulation study was designed to estimate the type and importance of the resources that could be saved.

Methods

The methodological approach was that of measuring the impact of the additional information provided by the RM system on patient treatment pathways. This approach is traditionally used for diagnostic test.[2]

Step 1 - APD patient profiles:

Twelve (12) APD patient profiles with therapy non-compliance, fluid overload, low drain/unidentified alarms, or missing/forged data were developed by a group of nephrologists and PD nurses at Baxter Healthcare Corporation in two versions:

a) Without RM: description of patient demographic, disease history and current events with dialysis clinic actions in a usual care environment (i.e., without information from the RM software)

b) With RM: description of patient demographic, disease history and current initial event with information (weight, blood pressure, treatment data) from the RM software.

An example of a patient profile without and with RM is shown in Figure 1.

Methods (cont’d)

Step 2 - Validation of the healthcare resource consumption for the APD patient profiles:

The 12 patients profiles were sent to nephrologists (US=4, Germany=3, Italy=2), all experts in managing APD patients, for validation of the “without RM” scenario resources.

Step 3 - Estimation of healthcare resource avoidance by RM:

The “with RM” scenario resources were assessed by 12 (US=7, Germany=3, Italy=2) APD teams (1 nephrologist and 1 nurse). Study participants were blind to the study sponsor.

Steps 2 and 3 were conducted via an internet tool. Resources were used compared with Student t-tests.

Results

• Patient profile development required several rounds of individual reviews and group meetings over a 6 month-period to ensure clarity of clinical event sequence and clinician management response. During the process, 8 profiles were abandoned, leaving 12 profiles for the simulation.

• Recruitment of experts and APD teams was moderately easy, but the biggest hurdle was the contract signature in some countries (e.g., Italy).

• Participants submitted responses, usually within two weeks.

Overall, in Germany and the USA, RM could avoid consumption of 49-75 healthcare resources (4.1-6.2 per patient profile), including:

• 48-72 clinic calls/visits
• 2 hospitalizations
• 3.5-5 emergency room visits

• 1-2.25 transfer from APD to in-center hemodialysis

In Italy, the numbers were much lower but both the number of KOLs and participant teams were smaller.

• These cases were perceived as representative of 17-37% of the APD patient population.

• An example of resources consumption with and without RM is displayed for Germany in Figure 2. Figure 3 gives the healthcare resources avoided for all 3 countries.

Conclusions

This simulation was a rapid and affordable way of estimating the type and importance of the potential healthcare resource consumption reduction to be expected by RM in APD patients while waiting for real-world evidence.

References
