The Impact on Care Plan Adherence and Outcomes When Patients Use Active Artificial Intelligence

ABSTRACT

BACKGROUND: Patients with chronic diseases commonly fail to properly adhere to the treatment plan provided by a physician or care provider, thereby failing to maintain their level of health, or exacerbating their condition. While there are many reasons why patients fail to adhere to their recommended treatment plan, the most common issues include medication adherence, such as forgetting to medications in the correct dose or at the correct time interval, or not understanding specific care or life-style instructions, known as health literacy. The objective of this study was to examine whether an active artificial intelligence-driven telehealth intervention (Wanda Health) improves patients' care-plan adherence and associated health outcomes as compared to using a conventional telehealth intervention.

METHOD: A six-month controlled before and after study was conducted on a 35-patient cohort having at least one chronic condition, including CHF, COPD, and Diabetes. The patients, being cared for by an accountable care organization using a home-based care model, had been using a conventional telehealth intervention for several months prior to the start of this study. The conventional telehealth intervention used simple thresholds to alert clinicians that a patient had vital signs that were outside simple limits. The Wanda Health intervention used up to 17 data elements, including vital signs and symptoms, that were processed through a machine learning algorithm to predict pending adverse events. The pending adverse events could be found up to seven days in advance of the adverse event occurring with clinicians being alerted throughout the course the care.

The research was conducted over 6 months between December 2018 and June 2019 with the patients having their conventional telehealth system replaced with the Wanda Health Telehealth system and they were instructed how to use the Wanda Health intervention. The patients were supplied with a tablet and biometric health monitoring devices for collecting weight, blood pressure, heart rate, and peripheral capillary oxygen saturation. Patients received automated daily "check-ins" (prompts) via the Wanda Health app on the tablet through which they were asked to complete a short survey of symptoms questions and take their vital signs. Clinical care teams were notified if the active artificial intelligence, monitoring trends in the patient's data in Wanda Health predicted a pending adverse event ("Alert") and clinicians were prompted immediately to make corrective interventions to address the root cause driving the Alert such as setting-up proactive medication reminders and providing live care coaching sessions to the patient via the telehealth system.

RESULTS: Two primary measures were used to compare the efficacy of the interventions for the entire patient cohort. The first measure used was Care Plan Adherence, calculated as the number of days in which a patient completed 100% of the tasks in their care plan. The second measured used was Average Patient Alerts/Day, calculated as the average number of alerts per day per patient using the intervention, that served as a proxy for evaluating the status of their overall health outcomes. The initial December 2018 Adherence rating for the cohort was 83%. At the end of the study in June 2019, the adherence measure had increased to 91%, showing a relative improvement of 10%. The December 2018 Average Patient Alerts/Day was calculated to be 0.83 and at the end of the research in June 2019 it had decreased to 0.67, indicating an overall relative improvement in health outcomes of 19%.

During the study, additional measures were collected to evaluate potential contributing factors. The 30-day avoidable rehospitalization rate was reduced by 88% for the month of June 2019. A satisfaction survey was fielded to the cohort at the end of the study to understand how using Wanda Health was viewed by the patients. 96% of the patients stated they were satisfied with Wanda Health and 95% said they would recommend using Wanda Health to family and friends.

CONCLUSION: The use of an active artificial intelligence telehealth intervention showed improvement for a patient cohort with chronic conditions versus a conventional telehealth solution. Even though this cohort had previously been using a traditional telehealth solution prior using Wanda Health's Artificial Intelligence-based solution, noticeable improvements were experienced in adherence and a reduction in negative health outcomes. Patients and clinicians also showed a very strong level of satisfaction with Wanda Health system.