Decision Support for Patient-Centered Care

Care management strategies could be effectively used and augmented by shared decision support systems or artificial intelligence. Evidence-based approaches to the determinants and consequences of chronic care management are suggested. The proper utilization of care management strategies will not only enhance better patient care outcomes but also reduce the hospitalization or readmission.

1. Introduction

Multiple or polychronic conditions are often observed in the elderly population, irrespective of gender, race/ethnicity, and socioeconomic conditions of the people. Given the prevalence of poly conditions exists, little is known about the progression or trajectory changes of the disease process at the population level. Thus, health services researchers with the "big data" approach could explore the time-person-place trilogy of etiologies for poly chronic conditions, particularly in a relationship to the investigation of metabolic-related diseases [1][2]. Cost containment and related issues are complex problems that require systematic investigation. The transition from the Affordable Care Act (the Obama Care) to the new or alternative care modalities engenders serious concerns about the coverage of the uninsured and the preexisting conditions. Carefully designed value-based payment, incentive plan, hospital penalty program, and quality improvement programs in response to cost control and management problem are imperative.

2. Intervention Design for Optimizing Self-Care Efficacy

The healthcare delivery systems are constantly under pressure. It is unclear about the optimal relationship existed between efficiency and quality of care, however. The United States is an innovative country that does not believe in the use of a one-size-fits-all strategy in the design of alternative healthcare organizations. More experiments in the design and implementation of a new healthcare organization are needed [5]. Patient-centered care such as Medical Homes is considered a popular solution to the primary care alternative in the United States [6][7]. The key principles in delivering primary and preventive care to the high-risk population include: 1) demand management ranging from needs assessment to patient engagement; 2) personalized care design [8]; 3) use of health information technology to improve patient-physician communications and disease monitoring [9]; 4) identification of m-health utility; 5) encouragement or incentivization of preventive care practice; 6) promotion of community participation or engagement for the culture of health as noted in the Robert Wood Johnson Foundation's innovative research initiative. It is interesting to note that the patient-centered care movement has fostered an emerging research discipline.

The evolution of data science from the development of descriptive data analytics to predictive analytics has led to the detection of disease patterns and treatment plan variations for the chronic care population. However, the lack of specificities and conceptually grounded models prevents the formulation of effective predictive analytics that will help guide the policy interventions and changes needed.

Disease management is a proactive approach to management of chronic conditions such as heart failure, hypertension, coronary heart disease, diabetes, COPD, asthma, and chronic kidney disorder through the provision of coordinated and integrated care to contain costs and improve patient care outcomes [10][11]. A transdisciplinary approach to disease management is therefore developed by integrating the macro- and micro-domains of a healthcare system. The macro system components include the contextual factors such as the socio-culture, political, and physical environmental aspects of the delivery system. The micro system components consist of personal-level and behavioral factors such as patients' knowledge (K) about the disease and care process, motivation (M) to change, attitude (A) towards a specific treatment or care plan, and preventive care practice (P). These KMAP components may either directly or indirectly affect the variability in patient care outcome measures. Disease management research should call for the integration of both micro- and

macro-determinants of personal and population health [12]. Thus, the results can be used in the design and evaluation of decision support systems with the assistance of computer technologies and communication networks for improving self-efficacy and patient-centered care performance [2].

Promoting a population health management strategy requires careful guidance from evidence-based research to shed some light on proof. Evidence is often accumulated from experiential and scientific knowledge through experimentation. One promising approach is to expand data mining efforts guided by a transdisciplinary research perspective coupled with the design of graphic-user interface (GUI)-based decision support systems [5]. This enables researchers to validate and confirm the predictive analytics with large databases for multiple population groups. Ultimately, more efficient and effective care modalities, the evidence-based practice, can be developed from applying healthcare informatics research to optimize health and well-being of the population.

Ideally, investigators could formulate a data-driven and empirical analysis of factors influencing medical adherence of people suffering from chronic conditions, particularly related to DM. By targeting high-risk groups of diabetes with hypoglycemia, self-care decision support networks to avoid hospitalizations and readmissions could be achieved.

The intervention design for optimizing self-care efficacy consists of the following:

1. Conduct Systematic Review and Meta Analysis of Personal Factors Influencing

Hospital Admission and Readmission: An example can be viewed from Wan et al. [12].

2. Design Self-Care Decision Support System for Diabetes Care: Human factors such as self care, restfulness, awareness of healing environments, activities, thrust, interpersonal relationships with providers or others, outlook of healing process, and nourishments are essential for strengthening adherence and self care.
3. Build a Cloud-Based Data Compilation System to Capture Patient Care Experience and Outcomes: The use of decision-support software developed for diabetes care management coupled with a Cloud-based data infrastructure enables investigative teams to collect timely information and data in regard to the determinants and consequences of care management innovation.
4. Validate the Self-Care Model(s) with Validation Data Generated from the Data Infrastructure: When the validation data become available, a systematic evaluation of self-care modalities can be performed. This will further solidify the effectiveness of self-care management approaches.
5. Implement a Value-Based Practice System for Diabetes Care: Wan [13] advocates the need for employing evidence-based research approaches to planning, implementing and evaluating care management strategies for DM.
6. Disseminate the Experimental Results Through Publications: Care management has potential to alter the disease trajectories if it is implemented timely and effectively through targeting and segmenting the high-risk patient population. Varying strategies for optimizing efficiency and effectiveness of chronic care for DM should be experimentally assessed.

3. Conclusion

In conclusion, the utility of integrating micro- and macro-determinants of healthcare outcomes as noted in *Population Health Management for Poly Chronic Conditions* [13] and *A Life Course Perspective on Behavior and Health* [14] demonstrates the need for employing a transdisciplinary perspective to understand how to formulate behavioral and health interventions. Thus, a conceptual or theoretical basis for the design and evaluation of decision support systems is developed for enhancing self care and efficacy. Furthermore, statistical models for targeting high-risk DM patient population with hypoglycemia could generate systematic knowledge about important determinants of health differentials in diabetes care [15].

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