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Increasing Health Literacy through NoteAid Translational Tool in Nursing

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**Increasing Health Literacy through NoteAid
Translational Tool in Nursing**

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Abstract

Background: Many adults in the United States lack health literacy necessary to understand patient education materials given to them, such as discharge summary. Re-hospitalization rates are higher due to poor transition of care planning. Older adults may only be provided with written instruction for their complex chronic conditions with multiple changes in medical or treatment plan, or uncommon surgical procedures. Nurses are instrumental in bridging the gap, as they often educate, advocate, and use health technology. *Purpose:* To educate nurses on the availability of *NoteAid* as a natural language translation system that can help increase their comprehension of electronic health records through participant evaluation how it can improve quality of care in transition of care process.

Methods: Ten nurses were presented *NoteAid* as a PowerPoint presentation. A post-evaluation including feedback, and knowledge question on part of sample Assessment and Plan from discharge summary with an overlay of *NoteAid* was included. The discharge summary was evaluated using Patient Education Materials Assessment Tool (PEMAT).

Results: Although there is a need for a larger sample size, the ten nurse participants were positive that *NoteAid* can be useful in improving their older patient's understanding of health teaching from discharge or visit summaries. However, the aging population may find it challenging, depending on their ability to use computers or technology available.

Implications: To decrease re-hospitalization rates, reduce common medical errors, and promote patient or family advocacy. This can help Hospital systems meet most of the "five pillars" of health outcomes for EHR meaningful use.

Keywords: *health literacy, patient education, transition of care, nursing informatics, NoteAid, nursing informatics, meaningful use*

Increasing Health Literacy through *NoteAid*

Translational Tool in Nursing

Introduction

Older adult patients often have multiple complex comorbidities and may also have a debilitating physical or mental condition that requires increased health monitoring (Kastner, et al., 2018). Often considered a vulnerable population, they may suffer from visual or sensory deficits, memory impairment, or mood disorders that can hinder how they process new health information. After readmission to the nursing home, subacute rehab, or discharge to their home following a recent hospitalization, patient education material (PEM) such as discharge summary is given to patients. Similarly, the availability of Electronic health records (EHR) in primary care or outpatient offices enabled patients to receive written instructions that were given at the time of the visit. These documents may serve as the only link to a successful transition of care.

As a method of communication, it is necessary for it to be effective in facilitating continuity of care between providers and specialists, easily understood, and appreciated for whom the instructions were intended to follow. Receiving the right medication at the right time ensures that discharge instructions for preventing exacerbations are followed. Post-surgical care is imperative to be followed exactly to avoid complications that can be life-threatening. Thus, decreasing the chances for unplanned and costly re-hospitalizations. Health disparity exists for this vulnerable population. Patients reported that they do not feel empowered, are unable to follow through between transition of care with their health providers. This necessitates consistent and effective hand-off practice (Groene, et al., 2012).

Most patient education materials (PEM) are in the 10th-grade level or higher. However, most adults in America (about 90 million) can read only at the 8th-grade level. Health literacy is

defined as a “complex phenomenon that involves skills, knowledge, and the expectations that health professionals have of the public’s interest in and understanding of health information and services” (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2010). The Institute of Medicine’s report (2014) used the definition for Health literacy as “The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.” Inadequate health literacy is related to poor health outcomes and hospitalization (Safeer and Keenan, 2005).

Background

The aging population in the United States influences healthcare policies and the delivery of care. According to the *Population Reference Bureau* (2019), with an average life expectancy of 79 years old compared to 68 years old back in 1950. Many baby boomers (born 1946 to 1964) will be part of the aging population turning between 52 to 70 years old, doubling the number of Americans who are at least 65 years old close to 100 million by 2060. Longevity driven by advances in medical science and technology contributes to many with complex chronic health conditions.

Health literacy is problematic for adults residing in the nursing homes, especially when accessing and understanding their electronic health records. Successful transition of care after hospital admission is accomplished when there is continuity in treatment or plan of care. Inadequate health literacy results in poor discharge planning-- where there is a breakdown of communication between health care providers—thus, a higher chance for hospital transfer to ED or hospital admissions (King, Gilmore- Bykovsky, Roiland, et al., 2013). The current hospital discharge handover practices were perceived by healthcare professionals themselves to be unsafe that do not promote empowerment. Consequently, inaccurate understanding that can lead to

patient harm related to medication errors, duplication of procedures, or tests to cite a few. Healthcare providers such as doctors and nurses receive a higher volume of calls questions from patients or family members because of lack or inadequate understanding that cuts back on efficiency and productivity.

The U.S. Department of Health and Human Services (2010) suggests that health literacy is a required proficiency for health promotion and prevention. They released a call for action to develop strategies and innovative opportunities to translate the data from well-documented research by the Institute of Medicine (IOM) and Agency of Healthcare Research Quality (AHRQ) on health literacy and health outcomes. This Doctor of Nursing Practice (DNP) Project encompasses several of the vision and goals set forth by the Department of Health and Human Services: to develop consumer information on health using *NoteAid* during discharge planning by nurses. It was developed at the University of Massachusetts Medical School.

Problem Statement

There is a lack of continuation of care post-hospital in the nursing home and outpatient settings. Adding to this is the problem of health illiteracy in the United States. The vulnerable population of patients aged 50 and above are at a higher risk for re-hospitalization after recent discharge from a hospital. Patient education materials, including the discharge summary, are often poorly understood by many patients, families, as well as direct care providers. These are usually provided instead of actual discharge teaching by nurses and doctors pressed for time in the acute care setting. Thus, instructions for follow up care, new or adjustment in medication regimen, and appointments not followed through leading to poor outcomes, medication errors, and increased incidence of cumulative transfer to the emergency department.

This quality improvement project aims to increase the knowledge and familiarization of nurses who teach patients, so that family members can understand their discharge summary by utilizing *NoteAid* tool.

Organizational “Gap” Analysis of Project Site

Nurses caring for older adults in the community or nursing homes within the Greater New York City are often involved in receiving discharge summaries post-hospital admission. There may be changes in their care plan, medications, or follow-up with new providers that can be easily missing from generic PEMs. There is usually little to no hand-off information happening between health care providers except for the printed discharge summary with the patient’s admitting diagnosis. This population is at even higher risk for poorer health outcomes. Some patients do not have any social support and have to manage their medical care on their own. Nurses have often advocated for patients who need assistance navigating the healthcare system and overall patient care. New York City is becoming even more diverse in culture and language than before. The expectation from nurses and the healthcare community is that they can adapt to this change in little time and have a broader wealth of knowledge.

According to the U.S. Department of Health and Human Services (2010), best practice is to use *Universal Precautions* approach so that all patients and family members are instructed and appropriately educated. The organization’s strength is that it has integrated electronic health records (EHR) with a robust Information technology (IT) department that is flexible to improvements. They can assist with uploading or typing the discharge summary to copy. Discharge summary information from the EHR analyzed through a translational tool called *NoteAid* is readily available and accessed by nurses. It is an opportunity to become familiar with translational tools that increase nurses’ understanding.

Review of Literature

PubMed was used on keywords “long term care hospital discharge” generated 2720 results. The top search results were articles that discussed the effectiveness of hospital discharge into long term care settings, the mortality risks and different comorbidities associated with recent hospital discharge and different medical conditions that can be prevented for readmission within 1-6 months post-discharge by improving transitional care such as stroke, schizophrenia-like psychosis, COPD, dementia, and cardiovascular disease.

A few of the top search results considered how reimbursement by Medicare affects the transition of care between these settings where the population they serve most of the federal health insurance recipients. To gather research on health literacy of patients, the keywords “*long term care health literacy*” was chosen, with 213 results that were tied to articles that tackled health care communication between providers, advancing transitional care, health literacy, and nutrition (which are often mentioned in most chronic conditions as part of lifestyle management).

Search site EBSCO host from CINAHL had fewer articles when using the medical subject headings (MeSH) term “*long term care hospital discharge*” with only 34 results. The articles that were included were broad. Relevant articles were studies on the type of care setting and 30-day hospital readmissions in older adults and cost and mortality with Transitional Care Management.

Some of the inclusion criteria: articles that will be reviewed will be in English format, published within 2009- 2019, patients in long-term care or outpatient older adults (65 years and older), health literacy, transition care to long term care or outpatient setting. The exclusion criteria would be complicated urinary tract infection, studies conducted in acute care

(emergency, ICU, hospital settings), level of evidence that is only based on expert opinions, vague and non-specific results or recommendations, redundant articles, or studies.

Overall, there is proper research supporting the need for improving transitional care management between acute care hospitals and long-term care and other outpatient settings. As social determinants such as poverty, education, and access to care often influence health outcomes, health literacy as an emerging topic needs to be addressed as this is now a public health issue (Centers for Disease Control and Prevention, 2016).

Health Literacy and Health Outcomes

The United States, as an industrialized country, is well-behind with an acceptable literacy and comprehension rate. The resulting increase in health care spending here compared to most nations may occur due to the lack of healthcare providers' effective methods for communicating medical instructions/recommendations and the patient or family members' lack of understanding to take ownership of their health conditions. It is a growing health disparity among racial and ethnic groups, with the majority of Hispanics and African Americans having below standard health literacy rates (U.S. Department of Health and Human Services, 2008).

The older adult population is especially vulnerable since many of them may have some cognitive or visual/hearing deficits as part of normal aging. Their complex medical condition, and often a long list of medications and increased number of a follow-up appointment with specialists makes it challenging to follow a medication regimen prescribed more than once a day (Safeer and Keenan, 2005). Moreover, there should be increased awareness of those who have inadequate health literacy. Healthcare providers are always responsible for explaining the treatment plan or any changes to the patients and their family representative. It is also their responsibility to make instructions simpler and avoid polypharmacy.

Transition of Care post-hospital discharge

Transitional Care has been identified to be a vulnerable period where health literacy may even be more strained. The recovering patient is adjusting from an acute hospital environment to long term care setting with fewer resources and different workload for nurses. Amongst those who are admitted back to long term care, has a 40% cumulative incidence and 50% higher risk for re-hospitalization compared to those who were never hospitalized (Grunier et al., 2012). Successful transitional care strategies rely on improved communication. Unfortunately, low health literacy is influenced by language and cultural barriers when patient education materials are only in English (World Health Organization, 2016). Nurses or sometimes nurse case managers are often the last link to ensure that there is a proper transition in care from the hospital back to the patient's nursing home. Patient satisfaction is increased and increased compliance when Nursing has an effective transitional care program (Lovelace et al., 2016).

NoteAid

NoteAid was developed by the University of Massachusetts as a “simplifying system” that aids in translating medical jargon into simpler definitions or explanations. It was evaluated by ten physicians from different clinical settings for content validation, and feedbacks (positive and criticisms) were also considered as part of the standard content analysis method. What was relevant in this project was that this attempted to understand the user's experience in interpreting and getting the accurate message across (clarifying terms and also tying it to what condition the patient may be aware of but not fully understood the relation) for someone who lacks health literacy (Chen et al., 2018).

One of the pilot studies on *NoteAid* showed it improved the patient's comprehension of their electronic health record (either discharge summary or progress note) (Ramesh, Houston,

Brandt, Fang, & Yu, 2013). The medical concept is linked with MedlinePlus, Wikipedia, and Unified Medical Language System (UMLS). Among these, Wikipedia provided the best explanation or definition of a concept. The more medical terms filtered by an automated system for translating, readability of electronic health record improves. It is also dependent on the continuous evaluation of the quality of definition of medical terms.

Patient Education Materials Assessment Tool (PEMAT)

Patient education materials assessment tool (PEMAT) developed by AHRQ is an evidenced-based instrument that evaluates printed or audio-visual teaching tools for its understandability and actionability. One limitation of its use is that it “does not assess accuracy or comprehensiveness or perform readability test.” To ascertain construct validity of printed material, it is still required to use a separate readability test with the PEMAT (Shoemaker, Wolf, & Brach, 2014). The average interrater reliability of PEMAT from one study was 0.92 for understandability, and for actionability score of 0.93 (Vishnevetsky, Walters and Tan, 2017).

Meaningful Use

A growing emphasis on the quality as indicator of hospital grade rather than the volume of patients is part of recent changes in reimbursement policy led by Centers of Medicare and Medicaid Services (CMS) so healthcare systems can focus on the patient-provider relationship and improved health outcomes (Centers for Medicare and Medicaid Services, 2020).

“Meaningful use” is integrated into the Health Information Technology for Economic and Clinical Health (HITECH) Act (Centers for Disease Control and Prevention, 2019). EHRs are legal documents for containing codes for procedures and diagnosis that generates revenue. It is also an evidence of the type of care given to patients. Its use should be as “meaningful” to protecting patients, as well as to the user end-user through seamless exchange of information

making efficient transition between different levels and settings of care possible. They recently relabeled “Meaningful use” as “Promoting Interoperability” to emphasize its ability to connect and streamline data and information across different enterprise.

Evidence Based Practice

Evidenced based research proves that effective transition of care from hospital or outpatient specialist to nursing home depends on maintaining good communication. Health literacy warrants effective translation of complex medical jargon in patient education materials. A primary nurse or unit manager who is assigned to the recently re-admitted or admitted long term care patient is necessary, one who will be the care coordinator for assessing health literacy and follows up on their discharge summary plan. This project will educate nurses on the use of *NoteAid* to help them explain discharge notes and instructions. It is imperative that with the use of technology, that continuity and accuracy of care and treatment is maintained.

Theoretical Framework or Evidence Based Practice Model

The health literacy skills framework (Squiers et al., 2012) is appropriate for this translational project. It serves as a guide in developing an intervention for increasing health literacy. The left portion on the framework focuses on identification and assessment of patient or family’s individual characteristics such as their socioeconomic status, background, knowledge and capabilities (i.e. prior skill to use context clues) (see Appendix A for Health Literacy Skills conceptual framework). According to the framework, health literacy acquisition is limited to the availability of knowledge and opportunity to learn.

Health literacy as a skill that can be gained, learned, mastered through print materials, which will include discharge summary from the hospital. *NoteAid* translational system will augment and bridge the gap between prior knowledge and understanding towards

comprehension. If followed through, the expected outcome would be increased health literacy enabling them to have positive health behaviors such as medication compliance, prompt follow up with appointments and specialist, greater advocacy for those who are representatives of patient participating in this project, and decrease in readmission to hospital rates during the period of implementation

Goals, Objectives and Expected Outcomes

- DNP Student became familiarized with *NoteAid* system by annotation of 2000 terms.
- DNP Student demonstrated proficiency in use of *NoteAid*, to assist and teach nurses during the implementation of DNP Project via *Zoom* meeting.
- Nurses learned about the use and application of *NoteAid*
- Nurses self-reported better understanding of health records. They will lead the patient education discussion of their discharge or visit summaries from acute care hospital.

The DNP student set a date and time that volunteer nurses were available to meet through *Zoom* meeting for as short presentation on *NoteAid*, and gather feedback on it. The use of *NoteAid* can provide meaningful use of EHR for nurses when discharging patients from the healthcare facility.

Project Design

This Quality Improvement (QI) project was designed as an educational intervention for the nursing department. *NoteAid* was used and translated a specific instruction from the Assessment and Plan of a patient's electronic health record post-acute discharge summary, an outpatient clinic. The instrument Patient Education Materials Assessment Tool (PEMAT) was used to assess the discharge summary, whether they received an understandable and actionable material (Agency for Healthcare Research and Quality, 2013). PEMAT tool has a strong internal

consistency for understandability and actionability. It is, therefore, reliable for evaluating audiovisual materials. Moreover, it has a strong construct validity as well as assessing the appropriateness of the reading level of EHR material (Shoemaker, Wolf, & Brach, 2014).

The PowerPoint on the *NoteAid* tool was presented via *Zoom* in a virtual meeting with ten volunteer nurse participants in one session. Qualitative data collected from the short post-presentation evaluation asked about the nurses' years of experience, feedback on *NoteAid* tool usability through an open-ended question, and Likert score questions if the use of *NoteAid* would be relevant and appeal to the end-users in nursing. Accuracy in medication reconciliation decreases medication administration errors and the number of re-hospitalizations. A statistical analysis utilizing Spearman's Correlation was used to interpret data from the post-presentation evaluation.

This DNP project's purpose was to allow nurses to become familiar with *NoteAid* translational tool and improve the transition of care when reviewing discharge or visit summaries more efficiently with patients. The presentation and survey were completed in less than 30 mins. Moreover, it was convenient for the nurses without the need for travel or physically removing themselves from the workplace or home.

Project Site and Population

This project was conducted online, given the concurrent COVID-19 pandemic within the Greater New York City area. The volunteer participants were ten nurses who have an active license as a Registered Nurse or Licensed Practical Nurse in New York and New Jersey with different years of experience and perform patient education regularly. They have had experience in either receiving or giving discharge and visit summaries that given to patients and there is a broad diversity of both the healthcare community and the community it serves. The stakeholders

were the director of nursing, Vice President of Operations, IT department, nursing education, and volunteer participants.

The resources necessary were the DNP student's computer with a video camera and microphone connected through internet access. The volunteer nurse participants needed a desktop, laptop, tablet, or smartphone that is compatible with the *Zoom* meeting and receiving the evaluation as a Word document. There was a short tutorial or presentation by the DNP student on the *NoteAid* tool. The assessment was sent to nurses to answer and return to the DNP student.

The different facilitators identified were: highly motivated management staff, nurses who are engaged or invested in wanting to improve care, and if feasible, IT department able to assist with integrating *NoteAid* in the facility's computer for easier access. Some of the barriers identified are: an organizational structure without dedicated Research department or Quality Improvement Officer, staff nurse resistance to change, patients from ER visits transferred back to the long-term care facility without any discharge summary, and language barrier if English is their second language.

Methods

Measurement Instruments

In order to measure the outcomes of this DNP Project, the following instrument was used: Patient Education Materials Assessment Tool (PEMAT) to evaluate a discharge summary on whether they received an understandable and actionable material (Agency for Healthcare Research and Quality, 2013). As mentioned previously, this tool helps evaluate both print and audio-visual materials was found to have strong internal consistency for understandability and actionability, it is reliable to assess audiovisual materials. It is however limited in assessing a

material's readability, but the concepts on PEMAT increases the chance to evaluate materials for understandability (Shoemaker, Wolf, & Brach, 2014).

For qualitative data collection or descriptive statistics, volunteer nurse participants took a short survey that will ask about their highest educational level achieved, and whether their primary language is English or other non-English. Nurses were trained in using *NoteAid* tool that help patients and/ or their family member to understand about their discharge summary. Post-intervention, the accuracy of medications reconciled and supposedly taken as prescribed, or treatment recommendations will be evaluated through a follow-up questionnaire. Feedback from nurses on use of *NoteAid* were also be collected as part of post intervention evaluation.

Data Collection and Analysis

Volunteer licensed nurses were only asked their year(s) of experience as a practicing nurse. Their actual names were not collected nor mentioned in the research paper. An assigned number for each participant was used to match their responses on post-evaluation after the DNP gave a PowerPoint presentation on *NoteAid*. The post-evaluation handed to nurses were a mix of multiple-choice questions, open-ended question, and sample patient discharge summary from the Assessment and Plan without any patient identifiers included. Their responses were recorded in an excel spreadsheet. Statistical Package for the Social Sciences (SPSS) software was used to help interpret data results. Resulting data will be disseminated through a poster presentation.

The data findings may be shared with the developers from UMASS Biomedical Informatics Natural Language Processing (UMass BioNLP) group spearheaded by Dr. Hong Yu. To date, there are no existing data on nurses using the translational software. Also, translational software such as *NoteAid* has not been integrated in most EHR for improving transition of care process.

Timeline

A summarized table of DNP project timeline can be found in Appendix B. There had been several revisions throughout the DNP course due to initial delays in feedback for approval of project implementation. The final data analysis was completed on April 30, 2020 where it can be presented to the College of Nursing, faculty, and other nurses through poster presentation.

Ethical Considerations/Protection of Human Subjects

The University of Massachusetts, Amherst (UMass) Internal Review Board (IRB) approved the DNP student's work as a quality improvement project on *NoteAid* prior to implementation. All participants were protected by the Health Insurance Portability and Accountability Act of 1996 (HIPAA), which protects the privacy of patients' health information (Department of Health and Human Services, 2013). Additionally, the DNP student conducted this project by following the *Standards of Care* for practice. All information collected as part of evaluating the impact of this project was aggregated data from the survey questionnaire and did not include any potential patient or nurse participant identifiers.

The risk to patients participating in this project was no different from the risks of patients receiving standard Nursing education in-service on best practices for transition of care. Participant confidentiality was assured by coding the participants using individual identification numbers. The list of participants and their identifying numbers were kept in a laptop that is not for public use that is password protected, only accessible to the DNP student conducting project. All electronic files containing identifiable information were permanently deleted from the DNP laptop that is password protected to prevent access by unauthorized users other than the DNP student.

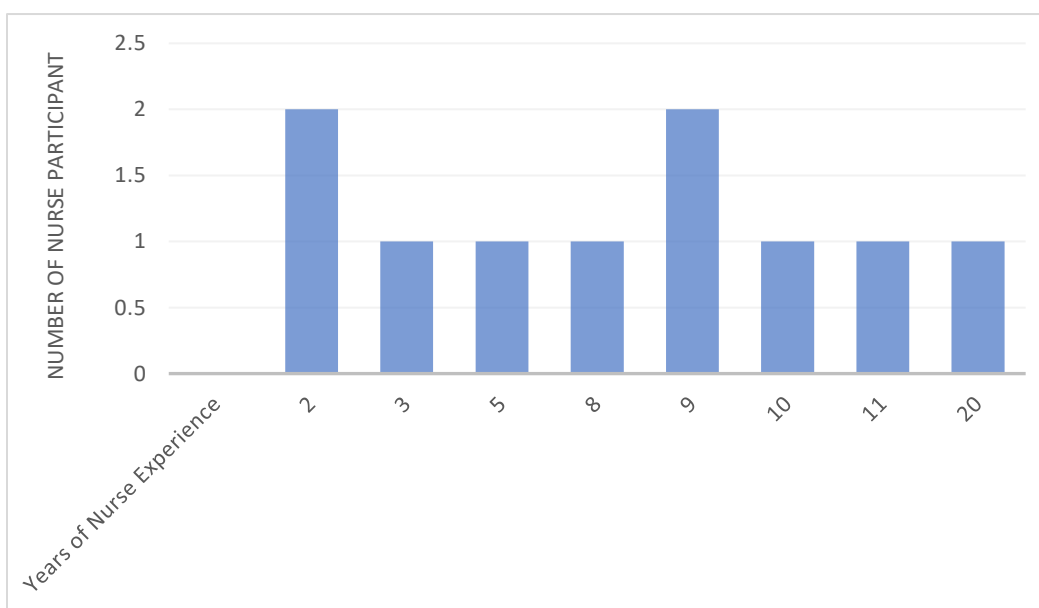
One barrier identified is the availability of nurses for the training to participate due to conflicting schedule or appointments. Also, it may be a problem for nurse to use on patients who are unable to read or understand basic English due to change in mental status, medication side effect, hearing/ visual impairment, or language barrier.

Results

Ten nurses in the Greater New York City area work full time as Registered Nurses and Licensed Practical Nurses respectively in either long-term care or outpatient settings working with adults and older adults. Specific age groups of their patients were not collected. Coordinating a scheduled *Zoom* meeting and recruitment of participants was done remotely either through phone, email, or video chat. They were not required to provide any of their demographic data except for the number of years they practiced, and participation was voluntary. The sample varied widely (see Figure 1) in their years of experience, averaging 8.5 years.

Figure 1

Nurses' years of experience in practice. (N=10)



This reflects a bimodal distribution where nurses who are new to their careers as well as those who are practicing for almost a decade in Nursing were among the more frequent participants in this study (mode 2, 9).

Part of the Assessment and Plan included in the survey question was taken from a patient discharge summary in hospital. This patient education material was evaluated using the PEMAT tool for its understandability and actionability with scores of 42% and 60% respectively. After nurses received a brief training on *NoteAid*, post-evaluation question answers were collected ensuring their anonymity. Likert scale responses were tallied and assigned a corresponding numerical value from 1 to 5. This data was analyzed using SPSS software for different interpretations.

The sample size available was small (N=10) inadequate for generalizing results amongst all nurses, and the possibility of bias is high. However, Spearman's Correlation (nonparametric) test was used to look for any correlation between the ordinal variables.

Different questions were explored after data was received. First, nurses' perception of how *NoteAid* can assist in their own understanding of instructions in discharge summary had a moderately negative correlation to whether they teach patients any changes to their plan of care (see Table 1). Although this estimate is limited on its effect on most long-term and outpatient settings, having a translational tool available will enhance transition of care and meet the goals for meaningful use if other barriers for them to access it are lessened or controlled such as inadequate time, staffing shortage to name a few.

Table 1. Nurses doing discharge planning who found NoteAid Useful

		NotesAid helpful in understanding instructions	Nurse teach plan of care
NotesAid helpful in understanding instructions	Correlation Coefficient	1.000	-.526
	Sig. (2-tailed)	.	.119
	N	10	10
Nurse teach plan of care	Correlation Coefficient	-.526	1.000
	Sig. (2-tailed)	.119	.
	N	10	10

Note. (rs= -.526, n = 10, p >0.05)

Nurses' comfort in using computers had a positive, strong correlation with how *NoteAid* appeal to them (see Table 2). This association may be in part due to their familiarity with the equipment and knowing how to navigate controls or access the internet browser. Therefore they are more likely to appreciate utilizing a new translational software. The sample group thought *NoteAid* is useful as an aide for translating medical jargon.

Table 2. Correlation NoteAid Positive & Personal Comfort using Computers

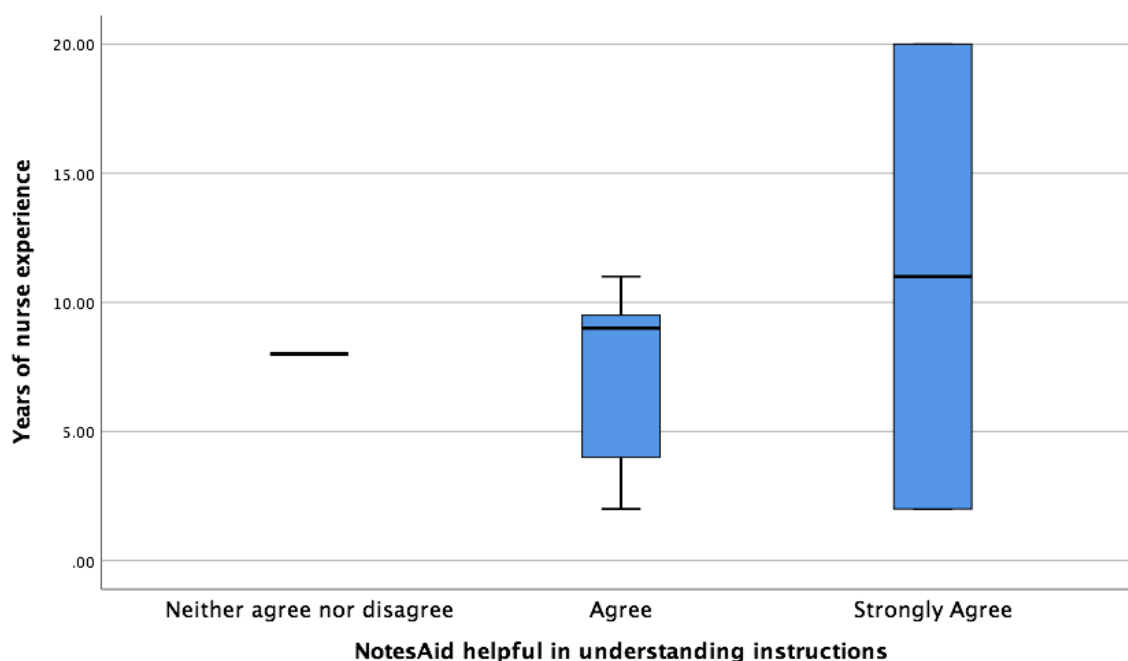
		How nurses like NotesAid	Nurse comfort on use of computers
How nurses like NotesAid	Correlation Coefficient	1.000	.080
	Sig. (2-tailed)	.	.827
	N	10	10
Nurse comfort on use of computers	Correlation Coefficient	.080	1.000
	Sig. (2-tailed)	.827	.
	N	10	10

Note. (rs= .080, n = 10, p >0.05)

Interestingly there was a variation between those who have been practicing in Nursing atleast 9-10 years. More senior nurses “strongly agreed” on *NoteAid*’s usefulness in clinical practice (see Figure 2). Although it is unclear whether they are actually doing more patient education with their patients compared to newer nurses who may be more focused on completing tasks and getting acclimated to the new role.

Figure 2

Perceived usefulness of NoteAid by nurses per number of years in Nursing



Discussion

Nurses in the Greater New York City area who works with adults and the geriatric population are leading the way in enhancing the transition of care process across health care settings. They often are the last clinician providing discharge instructions and reviewing a safe plan of care with the rest of the care team during interdisciplinary meetings. Increasing health

literacy amongst nurses is crucial for accuracy and efficiency in workflow. For instance, a high-risk medication such as coumadin that is new for a patient going home can be confusing. It can also be challenging to follow, depending on the variation with the scheduled dose(s). Many patient education materials score low on PEMAT's understandability and actionability.

Frequently, nurses can assess for deficiencies in patient understanding. Then they can direct patient teaching on what may be unclear for the patient. In clinical practice, ensuring that patients gained knowledge and that they can follow up on this is not consistently feasible. After discharge, there is little to no hand-off happening between change in settings and healthcare providers. Leaving these same patients who are recuperating from an illness, procedure, or surgery along with their family or healthcare proxy to advocate for themselves. The vulnerable older adult generation is at increased risk of falling through the cracks, given the complexity of their comorbidities.

From this project, nurses found that *NoteAid* is helpful, and more seasoned providers appreciate the need for a translational tool for their practice. The presentation on *NoteAid*, which served as basic training and introduction, was well-received among all participants, either responding “agree” or “strongly agree” with how they liked the new idea. Its purpose for development helps ensure that health outcomes are improved, disparities minimized, patient safety, as well as workflow efficiency on care coordination, is the priority when clinicians use EHR.

The Centers for Medicare and Medicaid Services pushed for this developmental project through the Health Information Technology for Economic and Clinical Health Act (2019). On the Health Literacy Skills Framework (see Appendix A), intrinsic patient factors (demographics, resources, and knowledge) accompanied by a health-related stimulus (change in health condition/

hospitalization) influence one's health literacy skills comprised of their ability to interpret patient education materials, communicate effectively, and navigate through the health system. There is a feedback system as each experience based on outcomes and ecological influences (includes access to health care provider) that oversees and intervenes at any point.

By utilizing RTI's health literacy skills framework, Advanced Nurse Practitioners are capable of influencing patient's health-related behaviors and outcomes. They can assess the patient as a whole, appreciate social barriers to learning, and have advanced training in chronic disease management. A few of the common chronic conditions in adults and older adults are often the result of unhealthy lifestyle behaviors. Hypertension that can eventually lead to costly heart failure has modifiable risk factors such as diet and physical activity. With the use of EHR, either the Nurse Practitioner or other medical provider includes specific instructions in their discharge summary on limiting salt intake. NPs can propose quality improvement projects such as the *NotesAid* translational tool within their practice, healthcare system, or community to facilitate and enhance the process of transition of care and patient education.

New software platforms introduced in the medical setting are seen either as an opportunity to improve the systems process or a hindrance to actual practice. Despite federal mandates to switching paper charts to electronic health records, several hospitals in rural areas, private practice, and long-term care settings find it less efficient for their users. The debate ensues on whether the use of EHR in clinical setting is patient or healthcare provider- friendly.

Adults and geriatric patients with significant changes in health post-discharge from acute care will often need short term rehabilitation at long term care facilities. The nursing staff receives these patients with compromised physical and mental health, many lacking health literacy skills, or unable to follow through on their discharge plan. When healthcare providers

educate these patients and empower them to master and actively participate in their own care, patients and their caregivers can promote advocacy to improve their health status.

Cost Benefit Analysis

There was minimal total financial cost for this project as most of the materials used were presented electronically, rather than printed materials. Dissemination of survey questions was also done “virtually” as an attachment file that did not cost extra for the DNP student nor participants. *NoteAid* translational tool is provided for free as an open source, and their technical support for any issues that arise without any charge.

Since most institutions have electronic health record systems in place, implementation of integration with *NoteAid* will not be incurred. Cost reductions from reduced waste and increase in efficiency of clinicians are the long-term benefits of this project. Approximate cost of medical errors in a year is \$20 Billion not including damage, injury, or death resulting from such medical errors (Rodziewicz and Hipskind, 2020).

The Advanced Nurse Practitioner equipped with both the role and experience as an ordering provider and a patient advocate helps keep total expenditure on human resources, and improved health outcomes, yielding to a higher return on investment for the United States.

Conclusion

Health literacy is a major health issue with the aging population. By applying the health literacy skills framework, systems such as *NoteAid* can be useful in clinical practice as a translational tool for nursing. A lack of communication in the growing complex healthcare system affects not just the patient’s care. It can also lead to medical errors, higher hospital readmission rates, higher facility nursing costs, and lower budget or reimbursement.

Nurse Practitioners (NPs) are well-equipped to educate patients, families, colleagues, and the public whenever there is a gap in knowledge. They can assist the nursing department to implement a successful transitional care program using an online translational resource.

There is a need for duplication of this project in a larger sample size. To achieve a closer estimate on its usefulness and gather more concrete feedback with its accuracy from medical professionals-- whether it helps eliminate confusion and promote continuity of care across different healthcare settings.

In light of the current COVID-19 pandemic, the United States healthcare system has rapidly transitioned its traditional services into virtual or telehealth visits. Although many patients own smartphones or technological devices that are enabled for video visits, this adds another layer of challenge to health care providers, especially those who have a visual, hearing, or physical and mental impairments. Understanding medical jargon is only part of the “bigger picture” that needs to be addressed in helping patients increase their health literacy skills. Many media outlets throw out information that is often misleading and easily misinterpreted by the layperson.

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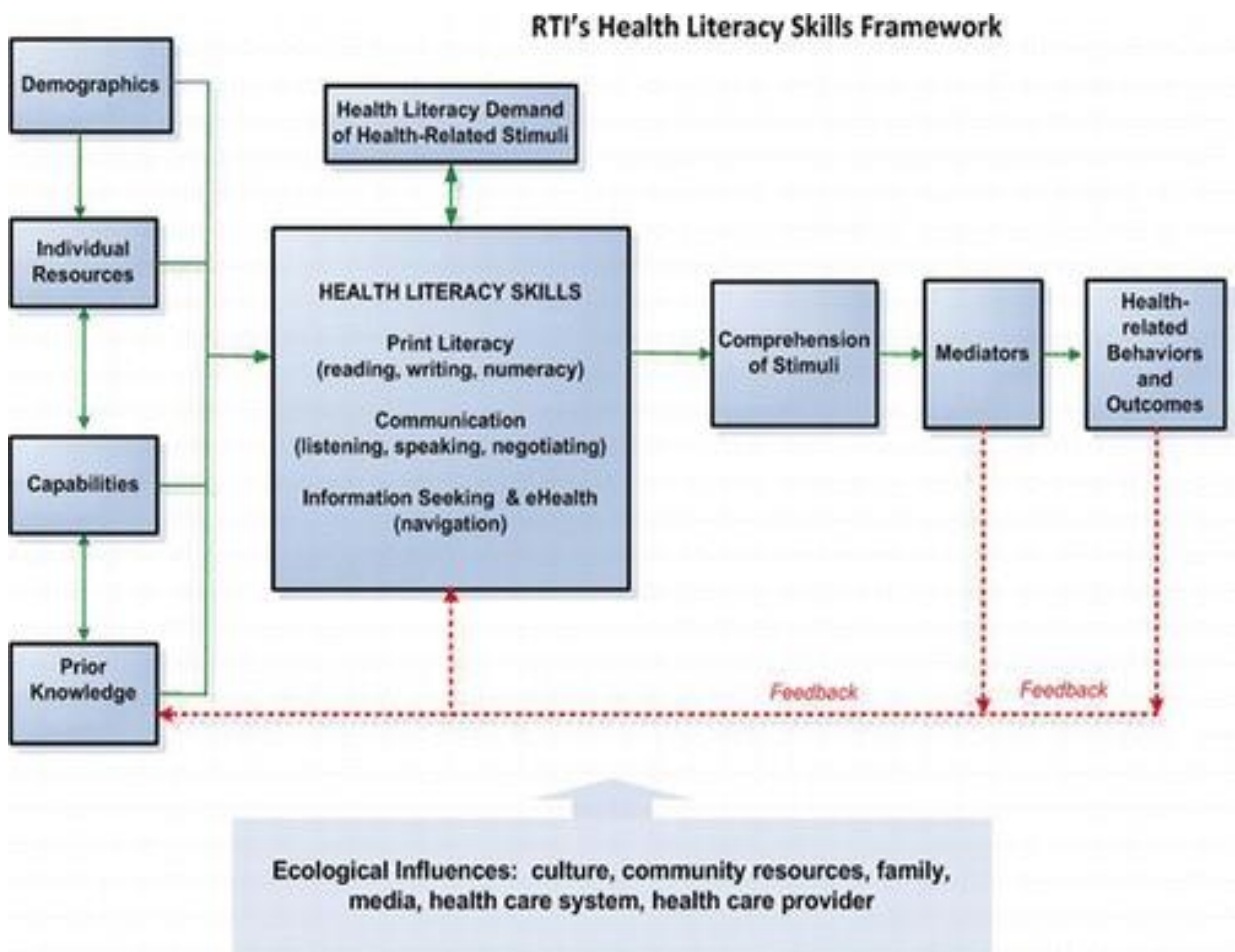
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Appendix A

Health Literacy Skills Competency Framework (Squiers et al., 2012).



Appendix B

Timeline

Table 1

Task	October 2019	November 2019	December 2019	January 2020	February 2020	March 2020	April 2020
Recruitment of eligible participants	X	continued					
Intervention; Evaluation; Toolkit; Posttest			X	X	X		
Analysis of outcomes							X
Results presented to Stakeholders							X

Appendix C

Patient Education Material Assessment Tool (PEMAT) (Agency for Health Research and Quality, 2015)

Title of Material:

Name of Reviewer:

Review Date:

Read the PEMAT User's Guide (available at: <http://www.ahrq.gov/professionals/prevention-chronic-care/improve/self-mgmt/pemat/>) before rating materials.

UNDERSTANDABILITY

Item #	Item	Response Options	Rating
Topic: Content			
1	The material makes its purpose completely evident.	Disagree=0, Agree=1	
2	The material does not include information or content that distracts from its purpose.	Disagree=0, Agree=1	
Topic: Word Choice & Style			
3	The material uses common, everyday language.	Disagree=0, Agree=1	
4	Medical terms are used only to familiarize audience with the terms. When used, medical terms are defined.	Disagree=0, Agree=1	
5	The material uses the active voice.	Disagree=0, Agree=1	
Topic: Use of Numbers			
6	Numbers appearing in the material are clear and easy to understand.	Disagree=0, Agree=1, No numbers=N/A	
7	The material does not expect the user to perform calculations.	Disagree=0, Agree=1	
Topic: Organization			
8	The material breaks or "chunks" information into short sections.	Disagree=0, Agree=1, Very short material*=N/A	
9	The material's sections have informative headers.	Disagree=0, Agree=1, Very short material*=N/A	
10	The material presents information in a logical sequence.	Disagree=0, Agree=1	
11	The material provides a summary.	Disagree=0, Agree=1, Very short material*=N/A	

Topic: Layout & Design			
12	The material uses visual cues (e.g., arrows, boxes, bullets, bold, larger font, highlighting) to draw attention to key points.	Disagree=0, Agree=1 Video=N/A	

Item #	Item	Response Options	Rating
Topic: Use of Visual Aids			
15	The material uses visual aids whenever they could make content more easily understood (e.g., illustration of healthy portion size).	Disagree=0, Agree=1	
16	The material's visual aids reinforce rather than distract from the content.	Disagree=0, Agree=1, No visual aids=N/A	
17	The material's visual aids have clear titles or captions.	Disagree=0, Agree=1, No visual aids=N/A	
18	The material uses illustrations and photographs that are clear and uncluttered.	Disagree=0, Agree=1, No visual aids=N/A	
19	The material uses simple tables with short and clear row and column headings.	Disagree=0, Agree=1, No tables=N/A	

Total Points: _____

Total Possible Points: _____

Understandability Score (%): _____

(Total Points / Total Possible Points) × 100

ACTIONABILITY

Item #	Item	Response Options	Rating
20	The material clearly identifies at least one action the user can take.	Disagree=0, Agree=1	
21	The material addresses the user directly when describing actions.	Disagree=0, Agree=1	
22	The material breaks down any action into manageable, explicit steps.	Disagree=0, Agree=1	
23	The material provides a tangible tool (e.g., menu planners, checklists) whenever it could help the user take action.	Disagree=0, Agree=1	
24	The material provides simple instructions or examples of how to perform calculations.	Disagree=0, Agree=1, No calculations=NA	
25	The material explains how to use the charts, graphs, tables, or diagrams to take actions.	Disagree=0, Agree=1, No charts, graphs, tables, or diagrams=N/A	
26	The material uses visual aids whenever they could make it easier to act on the instructions.	Disagree=0, Agree=1	

Total Points: _____

Total Possible Points: _____

Actionability Score (%): _____

(Total Points / Total Possible Points) × 100

Appendix D

Outline of PowerPoint presentation for Nurses: (10-15mins)

- I. What is NoteAid?
 - How or why it is developed
 - Background on University of Massachusetts team behind NoteAid
 - Annotations
- II. Impact on Nursing
 - Patient Education
 - Understandable
 - Efficient
 - Quality Improvement to help with processing
 - Time and Cost Saving
 - Patient Safety
 - Reduce medical errors and rehospitalizations, better health outcomes
- III. How to Use NoteAid
 - Accessing the website
 - Steps to transfer discharge summary Assessment and Plan
 - Conversation with Patients

Appendix E
Survey Questionnaire

1. I am comfortable with using computers
 - a) Strongly agree
 - b) Agree
 - c) Neither agree nor disagree
 - d) Disagree
 - e) Strongly disagree

2. I educate my patients/ family/ co-workers if there are any changes in the plan of care
 - a) Strongly agree
 - b) Agree
 - c) Neither agree nor disagree
 - d) Disagree
 - e) Strongly disagree

3. Discharge summary or provider reports are difficult to understand
 - a) Strongly agree
 - b) Agree
 - c) Neither agree nor disagree
 - d) Disagree
 - e) Strongly disagree

4. I like the NoteAid system
 - a) Strongly agree
 - b) Agree

c) Neither agree nor disagree

d) Disagree

e) Strongly disagree

5. What do you like about the NoteAid system?

6. The NoteAid translational tool is helpful for me to understand provider instructions

a) Strongly agree

b) Agree

c) Neither agree nor disagree

d) Disagree

e) Strongly disagree

7. The NoteAid system is easy to use

a) Strongly agree

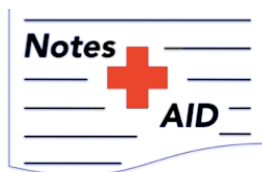
b) Agree

c) Neither agree nor disagree

d) Disagree

e) Strongly disagree

8. Knowledge- based questionnaire from discharge summary.



NoteAid, the clinical Notes Aid system, helps patients comprehend their electronic health record notes by linking clinical jargon to corresponding lay definitions. Please copy and paste free text into the search box.

Enter text to be simplified

Notify your doctor if you have any symptoms of flu.

Simplified sample text with CoDeMed (Common Definition in Medicine) definitions

Notify your doctor if you have any **symptoms** of flu.

[[symptoms]] : When you're sick, you usually have symptoms - body changes like a fever that let you know something's not right.

[[flu]] : A viral infection that affects the nose, throat, and lungs. It gives you fever, muscle aches and pains. It is spread easily.

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- a. Tell the doctor you have the flu.
- b. No need to call the doctor if you don't feel right.
- c. When you're sick, just stay home.
- d. Sneezing, coughing, and feeling sick are symptoms of flu.