Case Report

Empowering Health Literacy in Low Socioeconomic Status Populations: A Comprehensive Approach to Addressing Heart Failure

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ABSTRACT

Background: Socioeconomic status and health literacy are key factors in improving health outcomes. Among patients with Congestive Heart Failure (CHF), this is especially important as patients must simultaneously manage their diet, exercise and medication regimen.

Objectives: To improve health literacy and understanding of CHF among low socioeconomic patients through educational binders.

Methods: Patients with a new diagnosis of heart failure with reduced ejection fraction were enrolled during their first visit to CHF clinic and provided an educational binder created by an interdisciplinary team. At each visit, patients were administered the health literacy questionnaire and the CHF education questionnaire until graduation from the program.

Results: Twenty-three patients were enrolled between February and November 2023, with 8 (34.8%) graduating an average of 22.0 ± 9.0 weeks after enrollment. From baseline to graduation/last visit, health literacy score was significantly improved from 13.8 ± 4.4 to 25.5 ± 3.9 (p=0.03) while CHF education score trended from 46.2 ± 11.3 to 50.2 ± 8.1 (p=0.66). Between enrollment and up to 12 weeks after graduation, 5 patients (21.7%) were readmitted to the hospital at least once with 3 (13.0%) readmitted specifically for CHF.

Conclusion: The current study demonstrated a positive impact on health literacy among patients enrolled in the binder program with low all-cause and CHF-related readmission rates. Overall, the CHF binder program exemplifies a promising approach to bridging the information gap for low-income patients with CHF. Further research and broader implementation of similar initiatives are warranted to advance health equity and improve outcomes for low-income individuals with chronic conditions.

Keywords: Congestive heart failure; Socio-economic status; Health literacy

INTRODUCTION

Socioeconomic Status (SES), typically encompassing education, income and/or occupation status, possesses the potential to exert a profound influence on various facets of an individual's life, including education, health, employment, housing, nutrition, food security, social mobility, cultural opportunities and psychological well-being. The intricate relationships between socioeconomic status and these outcomes are shaped by multiple contributing factors. Notably, the link between socioeconomic status and health is significantly influenced by health literacy [1]. A lower socioeconomic status, particularly marked by diminished educational attainment, emerges as a pivotal determinant affecting health literacy. Consequently, health literacy assumes the role of a mediator in the intricate connection between socioeconomic status and health status, quality of life and health outcomes.

A comprehensive systematic review has uncovered a significant independent association between education and health literacy, emphasizing that lower educational achievement correlates with diminished health literacy. Additionally, studies have revealed higher odds of limited health literacy among African Americans and Latino populations compared to Whites, which is likely compounded by the various socioeconomic factors this population is burdened with [2].

A cycle of low Socioeconomic Status (SES) gives rise to diminished health literacy, contributing to unfavorable health outcomes and elevated rates of chronic diseases, increased mortality and the adoption of adverse health-related behaviors [3]. Approximately 80 million Americans suffer with low health literacy, placing them at a heightened risk for poorer health outcomes [4]. Recognizing health literacy as a modifiable factor that shapes health outcomes, a dual approach is proposed: Enhancing health literacy by educating patients on their conditions, coupled with expanding the availability of health services tailored to individuals with lower educational attainment.

The correlation between low socioeconomic status and worsened health outcomes is compounded by limited access to healthcare [5]. This connection often leads to a rise in hospital readmission rates within this population. Notably, Heart Failure (HF) stands as a prevalent chronic condition in America, with >1 million annual hospitalizations nationwide and approximately 6.5 million individuals affected, with a higher prevalence in low SES populations and ranking as a leading cause of hospital readmission [6]. Patients with low SES and HF confront various obstacles, including restricted access to healthcare, challenges with medication adherence and disease management, additional social determinants of health strains and limited support from caregivers. Moreover, low SES is associated with other risk factors for HF, such as hypertension, diabetes, smoking, chronic stress, psychosocial disorders and obesity, exacerbating HF symptoms and increasing hospital readmission occurrences [7].

The estimated direct cost of HF care was approximately $31.7 billion in 2012 with costs projecting to double by the year 2030 and the bulk of cost are related to hospital readmissions [8]. Given the economic and health burden resulting from hospital readmissions, interventions targeting pre-hospitalization to reduce readmission rates warrant careful consideration. Specifically, focusing on social determinants of health, including economic stability, access to quality education, healthcare accessibility and quality and social and community context, proves essential to reducing hospital readmission rates [9]. Current interventions addressing social determinants of health emphasize improvements in housing stability, employment opportunities, health literacy and food security [10]. Programs structured to address education, lifestyle coaching and social support while concurrently addressing the medical and psychosocial aspects of HF management have been developed to enhance HF management, with collaboration between healthcare systems and social services.

St. Vincent's Clinic (SVC) serves the under- and uninsured population of Galveston, Texas and surrounding counties. A significant portion of our patients belong to a low socioeconomic class, putting them at an elevated risk of low health literacy, a factor linked to poorer health outcomes. Particularly in the case of patients with Congestive Heart Failure (CHF), there is a scarcity of readily available medical information for individuals with low Socioeconomic Status (SES), with an even greater gap for information in Spanish. This project aims to address this gap by creating educational binders, written at a 5th grade reading level and available in both Spanish and English, to empower and inform patients enrolled in the CHF program at SVC about their diagnosis and relevant contributing factors.

MATERIALS AND METHODS

The CHF binder project is a quality improvement initiative conducted at the St. Vincent's Student run free clinic in Galveston, Texas. This project was reviewed by the Investigational Review Board at the University of Texas Medical branch and was deemed to be exempt. The CHF program closely follows newly diagnosed, uninsured patients with CHF with tailored follow up for each patient based off their individual needs and disease severity. The CHF team consists of one attending physician, third year medical students, a social worker and a registered nurse along with support administrative staff.

A subset of patients from the CHF clinic was enrolled in the CHF binder study. Inclusion criteria included patients 18 years or older with a new primary diagnosis of heart failure with

reduced ejection fraction as confirmed by echocardiography that had never been managed for CHF previously. They were enrolled in the program at their first visit to the St. Vincent's CHF clinic following a hospitalization for a first-time heart failure exacerbation in the past 3 months. Patients were allowed one general medicine appointment at SVC to establish care before their first CHF clinic visit. Exclusion criteria included a primary diagnosis other than CHF during their recent hospitalization, patients with heart failure with preserved ejection fraction or patients who were planning on receiving health insurance in the next 6 months as they would then be able to establish care elsewhere.

At their first visit to the CHF clinic, enrolled patients were provided with an education binder assembled by an interdisciplinary team of students and faculty that contained vitals logs, schedules and information regarding heart failure, medications, nutrition, exercise and recipes all written at a 5th grade reading level (Supplementary Figure 1). A trained medical student would then review the binder in detail with the patient. Patients were also then provided other CHF-related resources such as blood pressure cuffs, scales to record their weight, journals, cooking utensils and more as needed.

Two surveys were also administered to the patient at baseline: The brief health literacy screening questionnaire (Figures 1 and 2) the heart failure education questionnaire. Both surveys were modeled to be scored using the Likert Scale. The health literacy questionnaire was based on a previously validated health literacy screening questionnaire with the addition of question, "how often do you have a problem understanding what is told to you about your medical condition?" [11]. This survey had a minimum score of 4 points and a maximum score of 20 points. The heart failure education questionnaire is a 15-question survey developed by a multidisciplinary team of providers designed to gauge understanding of heart failure, a heart-healthy diet and exercise. This survey had a minimum score of 12 points and a maximum score of 60 points. Three questions on the heart failure education binder were unscored as they were not structured according to the Likert scale. Binders and surveys were also available in Spanish as translated by a certified medical Spanish translator (Tables 1 and 2).

Table 1: Brief health literacy questionnaire. Patients were provided with this questionnaire at visit 1, visit 2 and graduation/ last visit on a laptop with options for both English and Spanish speaking patients. Scores were calculated using the Likert scale for a minimum score of 4 and maximum score of 20.

Question	1 point	2 points	3 points	4 points	5 points
1. How often do you have someone help you read hospital material?	Always	Often	Sometimes	Occasionally	Never
2. How often do you have problems learning about your medical condition because of difficulty understanding written information?	Always	Often	Sometimes	Occasionally	Never
3. How often do you have a problem understanding what is told to you about your medical condition?	Always	Often	Sometimes	Occasionally	Never
4. How confident are you filling out medical forms by yourself?	Not at all	A little bit	some what	Quite a bit	Extremely

Table 2: Heart failure education questionnaire. Patients were provided with this questionnaire at visit 1, visit 2 and graduation/last visit on a laptop with options for both English and Spanish speaking patients. Scores were calculated using the Likert scale for a minimum score of 12 and maximum score of 60.

Question	1 point	2 points	3 points	4 points	5 points
			Scored questions		

	Poor	Limited	Adequate	Good	Very good
1. How would you rate your understanding of the importance of exercise on heart failure?	Poor	Limited	Adequate	Good	Very good
2. How would you rate your understanding of exercises you can do to improve your health?	Poor	Limited	Adequate	Good	Very good
3. How confident are you with being able to exercise?	Not confident	Slightly confident	somewhat confident	Very confident	Completely confident
4. How would you rate your understanding of why you are taking multiple medications for your condition7	Poor	Limited	Adequate	Good	Very good
5. How would you rate your understanding of the importance of your dietary choices on heart failure?	Poor	Limited	Adequate	Good	Very good
6. How would you rate your understanding of how dietary changes can improve your heart failure symptoms?	Poor	Limited	Adequate	Good	Very good
7. How would you rate your understanding of how high salt content intake impacts heart failure?	Poor	Limited	Adequate	Good	Very good
8. What is your confidence level in identifying foods with high salt content?	Not confident	Slightly confident	somewhat confident	Very confident	Completely confident
9. How would you rate your understanding of the concept of being fluid overloaded?	Poor	Limited	Adequate	Good	Very good
10. How would you rate your understanding of measures to prevent fluid overload?	Poor	Limited	Adequate	Good	Very good
11. How would you rate your understanding of	Poor	Limited	Adequate	Good	Very good

how taking your medications consistently can improve your heart failure symptoms?					
12. How would you rate your understanding of the importance of taking your water pill?	Poor	Limited	Adequate	Good	Very good

Unscored questions

Which food has the highest salt content?	Canned veggies	Graham Crackers	Olive oil	Dried beans	Yogurt
How many different exercise types do you do?	walking	Cleaning	Stationary bike	Working in yard	Stretching
How often do you exercise?	Never	Once a month	Once a week	10 mins a day	30 mins a day

After their first visit, patients were scheduled for a second follow up visit within 1-3 months depending on the severity of their heart failure symptoms. After their second visit, a third follow up was scheduled. At their third visit, patients were either classified as "graduated" from the program or scheduled for additional follow up visits. Patients were considered for graduation by the primary CHF provider at St. Vincent's clinic if their heart failure was well-controlled with medications, diet and exercise, as determined by the provider based on vitals, symptoms, weight and medication adherence and their follow up visits were subsequently scheduled at 6-month intervals. At each visit, patients were also visited by the social worker as needed for any resources and in between visits, patients also were able to obtain appointments with nursing, nutrition, occupational therapy, respiratory therapy and pharmacy services. Both the health literacy survey and the heart failure survey were administered at each CHF follow up visit until graduation.

For the current quality improvement project, a chart review was also performed to collect additional demographic and medical information. Demographic data collected included age at enrollment, gender, education level, primary language, race, ethnicity and social determinants of health risk factors as documented in the electronic medical records. Medical information collected included ejection fractions as recorded by echocardiogram, patient-reported medication adherence and medical interventions performed in the hospitalization prior to enrollment and after enrollment. Information

regarding all-cause and CHF-related readmission to the hospital during enrollment and up to 12 weeks after graduation was also recorded.

All statistical analysis was performed using R version 4.3.2. Primary outcomes included changes in health literacy score and change in binder questionnaire score. Secondary outcomes included all-cause and CHF readmission rates. Descriptive statistics were used for categorical information and Student's t-test was used to compare continuous variables.

RESULTS

Demographics

Twenty-three patients with HFrEF were enrolled in the CHF binder program between February and November 2023. Eight patients (34.8%) completed the program and graduated an average of 22.0 ± 9.0 weeks after enrollment. Patients were an average of 52.5 ± 10.0 years old at enrollment (range, 23 to 69) and 65.2% were male. At baseline, 10 (43.5%), 6 (26.1%), 5 (21.7%) and 2 (8.7%) patients had an ejection fraction <20%, 20-30%, 30%-40% or 40%-50%, respectively. Social Determinants of Health (SDoH) risk factors are described in **Tables 3 and 4**.

Table 3: Patient demographics and baseline ejection fraction.

Demographic	All patients
Age, mean (SD)	52.5 (10.0)
Male, N (%)	15 (65.2)
Race	

White, N (%)	14 (60.9)
Black, N (%)	9 (39.1)
Ethnicity	
Not hispanic/Latino, N (%)	16 (69.6)
Hispanic/Latino, N (%)	6 (26.1)
Unknown, N (%)	1 (4.3)
Primary language	
English, N (%)	22 (95.7)
Spanish, N (%)	1 (4.3)
Ejection fraction	
<20%, N (%)	10 (43.5)
20%-30%, N (%)	6 (26.1)
30%-40%, N (%)	5 (21.7)
40%-50%, N (%)	2 (8.7)

Table 4: Social determinants of health risk factors at enrollment.

Social determinant of health	Risk level	N (%)
Tobacco	Low	6 (26.1)
	Medium	8 934.8)
	High	7 (30.4)
	Unknown	2 (8.7)
Financial	Low	8 (34.8)
	Medium	4 (17.4)
	High	11 (47.8)
Alcohol	No risk	19 (82.6)
	Heavy use	3 (13.0)
	Unknown	1 (4.3)
Food insecurity	No risk	13 (56.5)
	Risk present	10 (43.5)
Transportation	No risk	16 (69.6)
	Low risk	1 (4.3)
	Unmet needs	6 (26.1)
Housing	Low	12 (52.2)
	High	7 (30.4)

	Unknown	4 (17.4)
Intimate partner violence	No risk	16 (69.36)
	Unknown	7 (30.4)
Physical activity	Inactive	6 (26.1)
	Insufficient	9 (39.1)
	Sufficient	6 (26.1)
	Unknown	2 (8.7)
Social connections	Socially isolated	6 (26.1)
	Moderately isolated	8 (34.8)
	Socially integrated	1 (4.3)
	Unknown	8 (34.8)
Depression	No risk	11 (47.8)
	At risk	6 (26.1)
	Unknown	6 (26.1)

Appointment Compliance

Among patients with at least one scheduled follow up visit within the specified time frame, 11 (61.1%) patients were fully compliant with their scheduled visits, 6 (33.3%) patients had one instance of loss to follow up and 1 (5.6%) had two instances of loss to follow up. Among the 7 patients with at least one instance of loss to follow up, 5 eventually returned to clinic and 2 never returned to clinic. There were no statistically significant differences in baseline health literacy or heart failure education scores between patients with no instances of loss to follow up versus patients with at least one instance of loss to follow up.

Questionnaire Results

At baseline, enrolled patients had an average health literacy score of 13.8 ± 4.4 with an increase to 15.2 ± 4.2 at visit 2 and 25.5 ± 3.9 at graduation/last visit (**Figure 1**). There was no significant difference between health literacy scores from baseline to visit 2 (p=0.09) nor from visit 2 to graduation/last visit (p=0.39). However, from baseline to graduation/last visit, a statistically significant increase was seen (p=0.03) in absolute value of score as well as in change in score of 2.7 ± 3.5 (p=0.01).
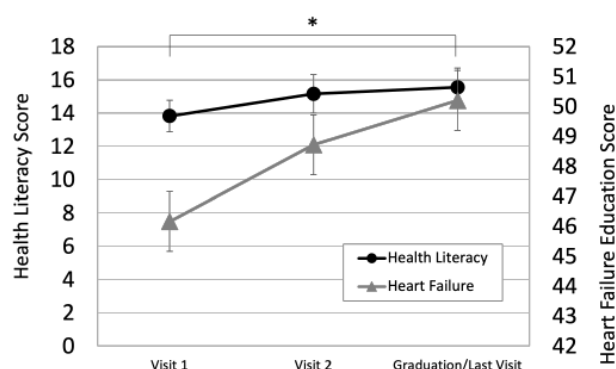

Figure 1: Health literacy and heart failure education questionnaire scores at visit 1, visit 2 and graduation/last visit. Error bars were calculated using standard error. A statistically significant increase in health literacy score was observed from visit 1 to graduation/last visit (p=0.03).

For the heart failure education questionnaire, patients had an average score of 46.2 ± 11.3 at baseline, 48.7 ± 5.9 at visit 2 and 50.2 ± 8.1 at graduation/last visit. There was no statistically significant difference in absolute score seen from baseline to graduation/last visit (p=0.66), baseline to visit 2 (p=0.95) or visit 2 to graduation/last visit (p=0.60). Additionally, no statistically significant difference was observed in change in score from baseline to graduation/last visit (p=0.33).

For the un-scored question regarding which food has the highest salt content, at baseline, 73.7% of patients correctly answered, "canned vegetables." At visit 2, 78.6% of patients correctly answered; 42.9% of patients had correctly answered previously, 28.6% of patients had previously answered incorrectly and subsequently answered correctly and 7.1% of

patients previously answered correctly and subsequently answered incorrectly. At graduation/last visit, 90.0% of patients correctly answered; 60.0% of patients had correctly answered previously, 10% of patients had incorrectly answered previously and continued to answer incorrectly, 30.0% of patients had previously answered incorrectly and subsequently answered correctly and 0% of patients previously answered correctly and subsequently answered incorrectly.

For the unscored question regarding frequency of exercise, from baseline to graduation/last visit, 37.5% of patients maintained the same frequency, 37.5% had decreased their frequency and 25.0% had increased their frequency.

at least one time between enrollment and up to 12 weeks after graduation and 3 patients (13.0%) had a readmission related to CHF. When comparing patients with zero all-cause readmissions to patients with at least one all-cause readmission, there were no statistically significant differences in baseline health literacy score (p=0.21) or heart failure education score (p=0.65). Similarly, there were no statistically significant differences in baseline health literacy or heart failure education score at between patients with zero CHF-related readmissions (p=0.15) versus patients with at least one CHF-related readmission (p=0.55).

Readmission Rates

Readmission rates and causes were calculated and described in **Tables 5 and 6**. Overall, 5 patients (21.7%) were readmitted

Table 5: All-cause and CHF-related readmissions.

All-cause readmission	
# of readmissions	**# of patients**
0	18
1	4
2	1
CHF-related readmission	
# of readmissions	**# of patients**
0	20
1	2
2	1

Note: CHF: Congestive Heart Failure

Table 6: Causes of readmission by patient.

Patient	CHF-related	Weeks from enrollment	Chief complaint	Final diagnosis	Interventions
3	Yes	43.6	SOB	Acute on chronic HF	LHC, RHC, medication change
4	No	7.9	CP	Non-Cardiac CP	ACS ruled out
6	Yes	4.0	SOB/CP	Acute on chronic HF	Diuresis
	Yes	12.3	SOB/CP	Acute on chronic HF	Diuresis, RHC
10	No	8.9	CP	Unstable angina	Nuclear stress test
16	Yes	16	SOB	Acute on chronic HF	Diuresis

Note: CHF: Congestive Heart Failure; SOB: Shortness of Breath; LHC: Left Heart Catheterization; RHC: Right Heart Catheterization; CP: Chest Pain; ACS: Acute Coronary Syndrome

DISCUSSION

Socioeconomic status, encompassing education, income and occupation, significantly influences various aspects of an individual's life, including health outcomes. The interplay between socioeconomic status and health is mediated by factors such as health literacy, with lower educational attainment emerging as a pivotal determinant affecting health literacy. To address the impact of low socioeconomic status on health outcomes, interventions targeting social determinants of health, including education, healthcare accessibility and economic stability, is crucial. The CHF binder study serves as a quality improvement project to bridge the information gap for patients with congestive heart failure in low socioeconomic classes by creating educational binders in English and Spanish, aiming to empower and inform patients about their diagnosis and contributing factors.

Our surveys were designed to assess patients' understanding and perception of their diagnosis and management for heart failure. Our measurable outcomes focused on health literacy, understanding the importance of diet, exercise and medication. Additional chart reviews were completed to focus on all-cause readmissions, CHF-related readmissions and social determinants of health including tobacco risks, financial risks, food insecurity and education levels. Overall, our goals were to assess patients improved understanding of their diagnosis and factors that impact their condition, improvement in health literacy throughout the enrollment, while factoring in their social determinants of health.

This quality improvement project showed a positive trend in self-reported health literacy, observed from the initial visit to the graduation visit. Although there was not a statistically significant improvement in the understanding of CHF and the significance of diet, exercise and medications, binder scores exhibited a promising upward trend. The lack of statistical significance can be attributed to the limited sample size. These findings emphasize the consistent utilization of the binder contents throughout the CHF program, typically spanning 9-12 weeks. Continuing the study with increased enrollment could provide the power to detect a statistically significant difference in understanding of CHF and the significance of diet, exercise and medications.

Additionally, in the current study, all-cause and CHF-related readmission rates were 21.7% and 13.0%, respectively, up to 12 weeks after graduation. Though this was among a small population, this appears to be an improvement over the previously reported 50% or greater all-cause 6-month readmission rate among CHF patients nationally [12–15]. Another study by Khan et al., also reported meaningful readmission rates at 30 and 90-days of 18.2% and 31.2%, respectively [16]. Although there did not appear to be a statistically significant correlation between health literacy or CHF education scores and readmission rate in the current study, the low readmission rates observed are promising and warrant further study.

Significantly, a substantial portion of our enrolled patients lacked documented information regarding their education or reading levels in their electronic medical record charts. It is crucial to acknowledge and address this barrier to health, as it plays a pivotal role in influencing health literacy and comprehension of written and spoken medical information. Extensive documentation indicates that low education levels contribute to poor health literacy, thereby exacerbating health outcomes. Taking proactive steps to include a patient's education level in their chart can enhance patient empowerment and understanding during all subsequent medical visits by motivating providers to target their communications to the level of the patient's education.

More than half of our patient's encountered challenges related to tobacco risk, financial vulnerabilities and food insecurity, all of which could significantly affect their CHF status and elevate their susceptibility to developing CHF initially. Conducting surveys to assess the social determinants of health for each patient proves valuable, enabling healthcare providers to formulate more personalized care plans tailored to the specific needs of each individual patient.

This CHF binder program serves as a powerful quality improvement project that addresses poor health literacy at a root cause and tailors patient care at an appropriate level. What sets this study apart is the creation of educational binders written at a 5th-grade reading level, encompassing crucial information on medication compliance, diet, exercise, fluid overload assessment with practical interventions for patients to address while at home and healthy recipes tailored for low-income individuals. To enhance inclusivity, both the binder and assessment surveys are available in Spanish and English. Patients enrolled in the program experienced consistent follow-up, benefitting from a holistic approach that integrates nurse visits, nutrition, occupational therapy, respiratory therapy and pharmacy services. This immersive patient-centered strategy, coupled with the educational binder, facilitated close monitoring to effectively manage their chronic condition and reduce exacerbations.

Our study and program encountered several limitations, with the most notable being the small sample size, posing challenges in achieving statistically significant data results. This is likely attributed to the structure of our student clinic and CHF enrollment program with specific enrollment and qualification criteria. The survey questionnaire addressing the binder content was developed by a multidisciplinary team to address the content within it; however, this survey lacked validation, while the brief health survey was validated. Additionally, a number of our patients were lost to follow-up, contributing to prolonged attrition rates. While focusing on the holistic approach of addressing SES-related challenges, it is worthwhile to continue to study the other contributing factors aside from health literacy when it comes to health outcomes. Our study is limited to focusing on health literacy when addressing SES-related health outcomes; moving forward a multitude approach should be considered.

CONCLUSION

The presented discourse underscores the profound impact of Socioeconomic Status (SES) on various facets of individuals' lives, particularly within the realm of health outcomes. The intricate interplay between SES, health literacy and social determinants of health necessitates targeted interventions to alleviate disparities. The quality improvement project at St. Vincent's clinic, exemplified by the creation of educational binders for CHF patients in low socioeconomic classes, demonstrates a commendable effort to empower individuals by enhancing health literacy. While the positive trend in self-reported health literacy is promising, acknowledging the limitations, such as a small sample size and 'no-show' rates, remains crucial. This study reinforces the importance of addressing SES-related challenges through holistic approaches, emphasizing the need for systemic changes to tackle social determinants of health and promote equitable healthcare outcomes for vulnerable populations.

Clinical Competencies

Among patients with congestive heart failure, health literacy is an especially important factor for clinicians to consider when deciding on a treatment plan, as patients must be able to manage their diet, exercise and numerous medications daily. Education level and socioeconomic status must be taken into account to ensure patient understanding of their management plan and optimal health outcomes.

Translational Outlook

The current study demonstrated that educational material delivered at a proper reading level and language may aid in improving patient outcomes and health literacy.

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REFERENCES

1. Stormacq C, Van den Broucke S, Wosinski J (2019) Does health literacy mediate the relationship between socioeconomic status and health disparities? Integrative review. Health Promot Int. 34(5):e1-7.

2. Gupta VK, Winter M, Cabral H, Henault L, Waite K, et al. (2016) Disparities in age-associated cognitive decline between African-American and Caucasian populations: The roles of health literacy and education. J Am Geriatr Soc. 64(8):1716-23.

3. Bostock S, Steptoe A (2012) Association between low functional health literacy and mortality in older adults: Longitudinal cohort study. BMJ. 344.

4. Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K (2011) Low health literacy and health outcomes: an updated systematic review. Ann Intern Med. 155(2): 97-107.

5. Fiscella K, Franks P, Gold MR, Clancy CM (2000) Inequality in quality: Addressing socioeconomic, racial and ethnic disparities in health care. JAMA. 283(19): 2579-2584.

6. Browder SE, Rosamond WD (2023) Preventing heart failure readmission in patients with low socioeconomic position. Curr Cardiol Rep. 25(11):1535-42.

7. Fogacci F, Borghi C, Tocci G, Cicero AF (2022) Socioeconomic status as determinant of individual cardiovascular risk. Atherosclerosis. 346:82-83.

8. Bilchick K, Moss T, Welch T, Levy W, Stukenborg G, et al. (2019) Improving heart failure readmission costs and outcomes with a hospital-to-home readmission intervention program. Am J Med Qual. 34(2):127-135.

9. Jilani MH, Javed Z, Yahya T, Valero-Elizondo J, Khan SU, et al. (2021) Social determinants of health and cardiovascular disease: Current state and future directions towards healthcare equity. Curr Atheroscler Rep. 23:1-1.

10. Daniel H, Bornstein SS, Kane GC, Health and Public Policy Committee of the American College of Physicians (2018) Addressing social determinants to improve patient care and promote health equity: An American College of Physicians position paper. Ann Intern Med. 168(8): 577-578.

11. Chew LD, Griffin JM, Partin MR, Noorbaloochi S, Grill JP, et al. (2008) Validation of screening questions for limited health literacy in a large VA outpatient population. J Gen Intern Med. 23:561-566.

12. Virani SS, Alonso A, Benjamin EJ, Bittencourt MS, Callaway CW, et al. (2020) Heart disease and stroke statistics-2020 update: A report from the American Heart Association. Circulation. 141(9):e139-596.

13. Heidenreich PA, Albert NM, Allen LA, Bluemke DA, Butler J, et al. (2013) Forecasting the impact of heart failure in the United States: A policy statement from the American Heart Association. Circ Heart Fail. 6(3):606-619.

14. Yancy CW, Jessup M, Bozkurt B, Butler J, Casey DE, et al. (2013) 2013 ACCF/AHA guideline for the management of heart failure: A report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 62(16):e147-239.

15. van Walraven C, Jennings A, Forster AJ (2012) A meta-analysis of hospital 30-day avoidable readmission rates. J Eval Clin Pract. 18(6):1211-1218.

16. Khan MS, Sreenivasan J, Lateef N, Abougergi MS, Greene SJ, et al. (2021) Trends in 30-and 90-day readmission rates for heart failure. Circ Heart Fail. 14(4):e008335.