HEALTH LITERACY AND ITS IMPACT ON VARIOUS DOMAINS OF CARDIOVASCULAR RISK FACTORS AND DISEASE OUTCOMES IN INDIAN POPULATION

Cardiology

S. Anbarasan

Senior Resident in Cardiology, Madras Medical College, Chennai.

N. Swaminathan*

Director and Professor of Cardiology, Madras Medical College, Chennai.*Corresponding Author

ABSTRACT

Introduction: Health literacy is the degree to which, individuals and groups can obtain, process, understand, evaluate, and act upon information needed to make informed health decisions. The objective of this study is to analyze the impact of health literacy on various cardiovascular disease risk factors and CVD risk factor outcomes.

Methodology: This is a cross sectional observational study carried out in a tertiary care Hospital involving 200 patients. Comprehensive History, physical examination and blood investigations were carried out. The functional health literacy was assessed by the tool developed by Michigan diabetes research and training centre after permission with appropriate modifications. The data collected was analyzed with appropriate statistical methods.

Results: The mean age of the population was 54.95 ± 9.5 years. Neither age, nor sex influenced Health literacy in our study. Also, the formal education did not have a significant impact on health literacy (P value-0.233). Adequate health literacy was associated with healthy eating patterns (P value (Chi square test)-0.002), improved physical activity (P value< 0.001) and improved adherence to treatment regimen (P value < 0.001). Health literacy also had favorable impact on smoking (P value- 0.001), on glycemic control (P value < 0.001) and waist circumference (P Value (ANOVA)- 0.029). There was no statistically significant impact of health literacy on both systolic (P Value (One way ANOVA)-0.549) and diastolic blood pressure (P Value - 0.375) in our study.

Conclusion: This study shows that Health literacy is a valuable and effective tool in addressing the major modifiable CVD risk factors. Improving Health literacy of the society will help in improving the full spectrum of essential, quality health services from health promotion to disease prevention, treatment, rehabilitation and palliative care.

KEYWORDS

Health literacy; Primordial Prevention; Primary prevention; Public Health.

1. INTRODUCTION

Health literacy represents the constellation of personal, cognitive and social skills which determines the ability of individuals to gain access to, understand, and use information to promote and maintain good health.¹ Understanding health literacy has a pivotal role in delivering quality health care, developing prevention initiatives, and addressing public health.² The World is witnessing a rapid epidemiological transition from Communicable diseases to Non- Communicable diseases, and this change is so rampant in developing countries like India. The prevalence of Coronary Artery Disease (CAD) is continuously increasing, and it has already surpassed Communicable diseases as a major cause of mortality in India.³ Results of the INTERHERT study had shown that Smoking, dyslipidemia, history of hypertension, diabetes mellitus, abdominal obesity, psychosocial factors, lack of consumption of fruits and vegetables and lack of physical activity account for most cases of Myocardial infarction.⁴ This association was present in both sexes and at all ages and all countries. Collectively, these risk factors accounted for 90% and 94% of Population attributable risk for men and women respectively.⁵ These results shed light on the importance of prevention of these modifiable risk factors. This study intends to analyze the influence of Functional Health literacy on the major modifiable cardiovascular risk factors.

2. MATERIALS AND METHODS

2.1 STUDY DESIGN:

This was a hospital based, cross sectional Observational study carried out over a period of 18 months in patients admitted to our ward. We included 200 patients of Type-2 Diabetes. Ethical committee clearance was obtained.

2.2 METHODOLOGY:

Informed consent was obtained from all patients. Patients with terminal illness, renal failure and cardiac failure were excluded from the study, as these can affect the neuro-cognitive capability and in turn the assessment of Health literacy. Patients who did not give consent were excluded from the study.

Detailed history of the patients illness, physical activity pattern, diet pattern, psychosocial history, targeted physical examination including anthropometric measurements were taken. 6ml of fasting venous sample was taken from each patient and was used for measuring fasting Blood sugar, HbA1c, Serum creatinine, Fasting Lipid profile. The measurements were done by Beckmann's automated analyzer. The measurements were done on the same day of withdrawal of blood.

health literacy tool developed by Michigan Diabetes research and training Institute, after obtaining permission. The questionnaire was appropriately modified for suiting Indian population. The modified questionnaire was pre-tested by pilot testing and yielded good internal validity. Patients were divided into three groups based on their scores obtained.

2.3 DATA ANALYSIS:

Statistical analysis was performed by the SPSS program for Windows, version 20.0. Categorical variables were presented as absolute numbers and percentages, and continuous variables as Mean $\pm$ Standard deviation, median if the data is skewed. Normality of the data was checked by Shapiro Wilk test. ANOVA and Kruskal Wallis test was used for comparing continuous variables with normal distribution and skewed distribution respectively. Categorical variables were analysed with Chi Square test. Other statistical tests were used as appropriate. P value of less than 0.05 was considered to be statistically significant at 95% confidence levels.

3. RESULTS

The influence of various demographic parameters on health literacy was studied. The mean age of the study population was 54.95 ± 9.5 years. 56.5 % of the study population were females and 43.5% were males. There was no statistically significant relationship between age or sex with health literacy.

3.1 ADEQUATE FORMAL LITERACY—DOES IT TURN INTO ADEQUATE HEALTH LITERACY-

14.5% of study population did not have formal any education. 43.5% had primary school level education (Class 1-5). 8.5% had secondary school level (Class 6-10), 23.5% had senior secondary level (Class 11,12) of Education and 10% of study population were graduates. The health literacy across various levels of formal literacy is shown in Figure-1.

Figure-1. Relationship of formal literacy and health literacy

Health literacy of the patients was analyzed by using the Functional

The association between health literacy and formal education was assessed by Chi Square Test which yielded a P value of 0.233, signifying no statistically significant association between the two variables. *This showed that achieving good formal literacy in the population does not always translate well into adequate health literacy levels.*

3.2. HEALTH LITERACY AND HEALTHY EATING PATTERN & EXERCISE

In the population studied, 56.5% of population were having diet rich in fruits and vegetables, where as 43.5% of population were not. 55% of the participants were doing adequate physical activity including daily aerobic exercise and 45% were not doing . The distribution of healthy diet pattern, adequate physical activity and adherence to prescribed medications was studied across the levels of health literacy. The association of the above parameters with the level of health literacy was analyzed with Chi Square test and the results are depicted in Table-1.

Table-1. Health literacy and its association with Physical activity, Diet pattern and Medication compliance

Parameter	Level of health Literacy			P Value (Chi-Square Test)
	Low Frequency/%	Marginal Frequency/%	Adequate Frequency/%	
Diet rich in fruits and Vegetables	16 (38.10%)	37 (51.40%)	60 (69.80%)	0.002
Adequate Physical activity	14 (33.30%)	34 (47.20%)	62 (72.10%)	<0.001
Compliance with prescribed drugs	12 (28.60%)	37 (51.40%)	62 (72.10%)	<0.001

3.3 HEALTH LITERACY AND SMOKING

In our study we found that 45.2% of patients with low health literacy are current smokers, whereas only 12.8% of persons with adequate health literacy are current smokers. Also it was found that only 9.5% of people with low health literacy have quit smoking (Former smokers) where as 25% of patients with adequate health literacy have quit smoking (Former smokers) . The association between smoking and health literacy analyzed with Chi- square test indicated a statistically significant association between the level of health literacy and smoking. (P Value=0.001). The results are depicted in Table-2.

Table-2. Smoking and Health Literacy.

Smoking history	Level of health Literacy			P value
	Low Frequency/%	Marginal Frequency/%	Adequate Frequency/%	
Current	19 (45.20%)	21 (29.20%)	11 (12.80%)	0.001
Former	4 (9.50%)	11 (15.30%)	22 (25.60%)	
Never	19 (45.20%)	40 (55.60%)	53 (61.60%)	
Total	42 (100%)	72 (100%)	86 (100%)	

3.4 HEALTH LITERACY AND OBESITY

The mean Body mass index (BMI) was 27.27 kg/m², 27.72 kg/m² and 26.75 kg/m² for low, marginal and adequate health literacy respectively. There was no statistically significant relation between health literacy and BMI (P Value=0.080) in our study. The mean waist circumference was 92.71, 94.10, 91.21 cms in low, marginal and adequate health literacy groups respectively. It was found that Mean waist circumference decreased as health literacy improved. The difference was statistically significant (P Value=0.029) by *One Way ANOVA*.

3.5 HEALTH LITERACY AND BLOOD PRESSURE

Systolic blood pressure and Diastolic blood pressure was found to be normally distributed in the study population. The mean systolic blood pressure was 139, 138 and 136 in low, marginal and adequate health literacy respectively. The mean diastolic blood pressure was 90, 89 and 87 in low, marginal and adequate health literacy population respectively. Relationship between blood pressure and health literacy was analysed with One way ANOVA. There was no statistically significant relationship between the level of health literacy and systolic blood pressure (P Value=0.549) and diastolic blood pressure (P

Value=0.375).

3.7 HEALTH LITERACY AND DYSLIPIDEMIA

The relationship of various lipid parameters including Total cholesterol, Triglycerides, LDL, HDL and Non-HDL cholesterol with the level of health literacy was studied.. It was found that none of the studied lipid parameters had a significant association with the level of health literacy in our study.

4. DISCUSSION

Health literacy has dynamic and important interfaces with CVD prevention, recognition, management, and treatment. Strasser coined the term primordial prevention and suggested that prevention of CVD should go beyond the concept of primary prevention.⁵ Adopting primordial prevention as a strategy to combat the growing epidemic of CVD becomes the need of the hour. Achieving adequate health literacy in the population will help people to understand the health benefits and hazards of various life style factors and will enable them to wisely choose. Health literacy in the community will influence structural characteristics of the environment, such as food patterns, physical activity, smoking, alcohol availability, psycho social factors and these may have important implications in the future.

Our study focused on the impact of health literacy on major modifiable CVD risk factors. Both the age and sex did not influence health literacy in our study. In contrary to the popular belief, our study found that Formal literacy status has little to do with functional health literacy. Brucki et al⁶ and Williams DE et al⁷ have reported similar results. This shows that separate strategies to develop health literacy should be devised in addition to improving General literacy.

Health literacy had a favorable impacts on various life style patterns including healthy diet, adequate physical exercise and adherence to healthy habits, avoidance of smoking in our study. People with adequate health literacy also had higher chances of quitting tobacco smoking in our study. Heide VD et al and Shibuya et al showed similar patterns in context of smoking and health literacy.^{8,9}

Health literacy had favorable impact on glycemic control. *Anbarasan et al* have showed that poor health literacy is associated with higher frequency of developing diabetic complications including neuropathy, retinopathy and frequent diabetes related hospitalisations.¹⁰ BMI did not show significant association with health literacy and so does lipid profile parameters and Blood pressure in our study population. Williams DE et al observed similar results in a large observational study in 10,644 patients⁷. But the results were conflicting with other studies including that done by Shibuya et al and McNaughton CD et al.¹¹ Further research is needed to explore this unexpected finding.

Inadequate health literacy is a barrier that will need to be overcome to fulfill the mission of cardiovascular health across the spectrum of prevention, screening, and treatment. Health literacy supports people with chronic conditions to understand health information, follow treatment regimens, access healthcare services, and make healthcare decisions, thereby playing a pivotal role in secondary prevention of CVD.¹² Health literacy has a strong association with 'Self care', which encompasses actions ranging from medication adherence, diet adherence, symptom monitoring and response to symptoms.¹³ Studies have shown that improved self care leads to improved disease outcomes and quality of life.¹⁴ WHO advocates plans to promote health literacy as an integral part of the effort to prevent chronic diseases.¹⁵ In the process of making health decisions, people often interact with information, environment, community, resources, supports and each of these is influenced by health literacy¹⁶. The health decisions so made lead to health actions, which in turn contributes to health outcomes.

5. CONCLUSION

This study re-emphasizes the need to raise the health literacy levels in the population which is an indirect but a powerful strategy to conquer the growing menace of CVD risk in the community.

This research did not receive any specific grant from funding agencies in the Government, Private, or not-for-profit sectors.

There is no conflict of Interest for any of the authors of this study.

REFERENCES

1. Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs AMA. Health literacy: report of the council on scientific affairs. *J Am Med Assoc* 1999; 281(6):552-557
2. Magnani JW, Mujahid MS, Aronow HD, Cené CW, Dickson VV, Havranek E et al. Health Literacy and Cardiovascular Disease: Fundamental Relevance to Primary and Secondary Prevention: A Scientific Statement From the American Heart Association. *Circulation*. 2018;138:e48–e74.
3. Guha S, Sethi R, Ray S, Bahl VK et al. Cardiological Society of India: Position statement for the management of ST elevation myocardial infarction in India. *Indian Heart J*. 2017;69(1):S63–S97.
4. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet*. 2004; 364: 937–952.
5. Strasser T. Reflections on Cardiovascular diseases. *Interdisciplinary science Review*. 1978; 3: 225-30.
6. Brucki SDM, Mansur LL, Goulart MTC, Nitrini R. Formal education, health literacy and Mini-Mental State Examination. *Dement Neuropsychol*. 2011;5(1):26-30.
7. Willians DE, Kripalani S, Schildcrout JS, Cawthon C, Wallston K, Mion LC et al. Association of brief health literacy screening and blood pressure in primary care. *J Health Commun*. 2013;18(1):129-142.
8. Heide VD, Uiters E, Rademakers J, Struijs JN, Schuit AJ, Baan CA. Associations among health literacy, diabetes knowledge, and self management behavior in adults with diabetes: results of a Dutch cross sectional study. *J Health Commun* 2014;19 (2):115-131.
9. Shibuya A, Inoue R, Ohkubo T, Takeda Y, Teshima T, Imai Y. The relation between health literacy, hypertension, knowledge, and blood pressure among middle-aged Japanese adults. *Blood Press Monit* 2011;16(5):224-230.
10. Anbarasan S, Gurtoo A, Srinivaasan M, Khan M. Level of health literacy in Type 2 diabetic persons and its relation to glycemic control. *J Assoc Physicians India*. 2019 April; 67(4): 59-62.
11. McNaughton CD, Kripalani S, Cawthon C, Mion LC, Wallston KA, Roumie CL. Association of health literacy with elevated blood pressure: a cohort study of hospitalized patients. *Med Care* 2014;52(4):346-353.
12. Kanj M & Mitic W. Promoting health and development: Closing the implementation gap. World Health Organization, 2009([http:// www. who. int/healthpromotion/ conferences/7gchp/Track1_Inner.pdf](http://www.who.int/healthpromotion/conferences/7gchp/Track1_Inner.pdf) [accessed 04 April 2019])
13. Garcia AC, Sabatar AM, Sanchez E, Kangasniemi M, Vela RJ, Caballero VG. Relation between health literacy, self-care and adherence to treatment with oral anticoagulants in adults: a narrative systematic review. *BMC Public health*. 2018 Oct 4;18(1):1157.
14. Lee CS, Moser DK, Lennie TA, Tkacs NC, Margulies KB, Riegel B. Biomarkers of myocardial stress and systemic inflammation in patients who engage in heart failure self-care management. *J Cardiovasc Nurs*. 2011; 26:321–328.
15. World Health Organization. Global action plan for the prevention and control of noncommunicable diseases 2013 – 2020, World Health Organization, 2013 (<http://www.who.int/nmh/publications/ncd-action-plan/en/> [accessed 04 April 2019])
16. Sentell T, Zhang W, Davis J, Baker KK, Braun KL. The Influence of Community and Individual Health Literacy on Self-Reported Health Status. *J Gen Intern Med*. 2014 Feb; 29(2): 298–304.