

Background

- Health literacy is defined by the Center for Disease Control and Prevention (CDC) as “the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions”¹.
- Georgia Public Health District 8-2 (Southwest Georgia) was one of seven districts in Georgia to have an asthma prevalence rate over 7.5% and one of five districts with the highest asthma hospitalization and emergency department visit rates².
- Many patients with asthma struggle to control the disease, which may lead to exacerbations, hospitalizations, and mortality. Those with severe or uncontrolled asthma often have decreased overall quality of life³.
- Healthcare providers’ awareness of their patient’s health literacy may be helpful in successfully conveying adequate management strategies, giving the patient the best opportunity to achieve a high quality life.
- The purpose of this study is to describe and compare asthma self-management knowledge and control among patients with high and low health literacy.

Methods

- A cross-sectional research design was used in this study. Research assistants conducted a survey in a convenience sample of patients over a 4-day period at three Albany Area Primary Health Care sites (AAPHC). AAPHC is a Federally Qualified Health Center (FQHC). Research assistants used REDCap to conduct the surveys⁴.
- Items from the Behavioral Risk Factor Surveillance System (BRFSS) were used to measure health literacy⁵
 - Assessed participants’ abilities to obtain/understand health information from health professionals and written resources. Three items were rated on a 4 point scale, with 0 indicating low health literacy and 4 as high health literacy. Items were summed for an overall score. Scores were dichotomized based upon the median to create high and low health literacy groups.
- Asthma self-management was assessed by the Asthma Self-Management Knowledge questionnaire (ASM-K)⁶
 - Consists of 16 multiple choice items assessing knowledge of preventive strategies, inhaler use, and medications. Scale generates a score of 0 to 100. Higher scores indicate greater knowledge of asthma self-management.
- Asthma Control Test (ACT) was used to measure participants’ control of asthma⁷
 - Consists of 5 items measured on 5-point scale. Scores range from 5 (not controlled) to 25 (completely controlled). Scores of 5 to 15 indicate poorly controlled asthma, 16 to 19 indicate somewhat controlled asthma, and 20 to 25 indicate well controlled asthma.
- Statistical analyses were conducted with SPSS (version 25).

References

¹What is Health Literacy? | Health Literacy | CDC. (n.d.). Retrieved from <https://www.cdc.gov/healthliteracy/learn/index.html>
²Georgia Data Survey | Adult Asthma. (2016). The Georgia Department of Health. Retrieved from <https://dph.georgia.gov/sites/dph.georgia.gov/files/2016%20ADULT%20ASTHMA%20DATA%20SUMMARY%2008.2017.pdf>
³Furtado, P. R., Maciel, A. C. C., Barbosa, R. R. T., Silva, A. A. M. da, Freitas, D. A. de, & Mendonça, K. M. P. de. (2019). Association between quality of life, severity of asthma, sleep disorders and exercise capacity in children with asthma: a cross-sectional study. *Brazilian Journal of Physical Therapy / Revista Brasileira de Fisioterapia*, 23(1), 12–18.
⁴REDCap. (n.d.). Retrieved from <https://www.project-redcap.org/>
⁵Bhan, N., Kawachi, I., Glymour, M. M., & Subramanian, S. V. (2015). Time Trends in Racial and Ethnic Disparities in Asthma Prevalence in the United States From the Behavioral Risk Factor Surveillance System (BRFSS) Study (1999-2011). *American Journal of Public Health*, 105(6), 1269–1275.
⁶Mancuso, C. A., Sayles, W., Allegrante, J. P., Mancuso, C. A., Sayles, W., & Allegrante, J. P. (2009). Asthma Self-Management Questionnaire. *Annals of Allergy, Asthma, & Immunology*, 102, 294–302.
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⁸Social Determinants of Health | CDC. (n.d.). Retrieved from <https://www.cdc.gov/socialdeterminants/index.htm>

Results

Patient Demographics												
Number of Participants (n)	Age (years)			Race/Ethnicity (%)				Sex (%)		Insurance Status (%)		
	Min	Max	Mean	White/Caucasian	African-American/Black	Hispanic/Latino(a)	Other	Male	Female	None	Medicaid / Medicare	Private Insurance
40	18	85	44.45	15%	80%	2.5%	2.5%	10%	90%	25%	62.5%	12.5%

Table 1. Demographic characteristics of survey participants

1. How does the high health literacy group compare to the low health literacy group with respect to ASM-K?

ASM-K Scores	Group Statistics			Independent Samples T-Test			
	Health Literacy Group	n	Mean	Std. Deviation	t	95% Confidence Interval	
Scores	Low Health Literacy	20	31.8750	16.8317	-1.834	Lower	Upper
	High Health Literacy	20	42.1875	18.6813		-21.6951	1.0701

Table 2. Results from the t-test. A t-statistic of -1.834 shows that there is a difference in the mean ASM-K scores between the health literacy groups. However, because the 95% confidence interval of -21.7 to 1.07 includes the null-value, this difference is not statistically significant. Therefore, we fail to reject the null hypothesis.

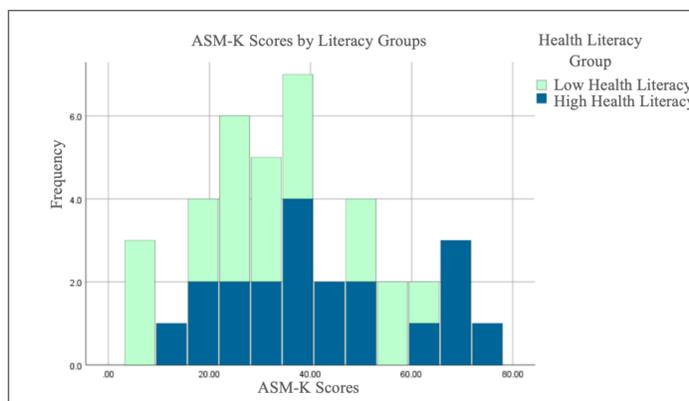


Figure 1. Frequency distribution of ASM-K scores by health literacy groups.

2. How does the high health literacy group compare to the low health literacy group with respect to asthma control?

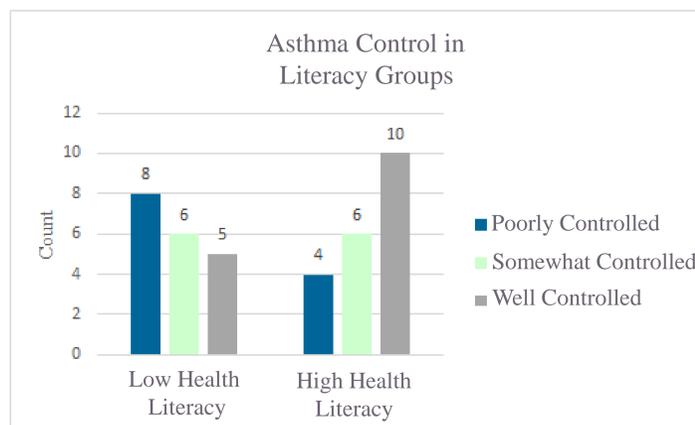


Figure 2. Graph of the number of people within each health literacy group stratified by asthma control level. One participant is excluded from the low health literacy group, because he or she did not complete the survey.

Results Cont.

Health Literacy Group		Asthma Control Level				Statistical Test		
		Poorly Controlled Asthma	Somewhat Controlled Asthma	Well Controlled Asthma	Total	Pearson Chi-Square		
		Value	Df	p-value				
Low Health Literacy	Observed	8 (42.1%)	6 (31.6%)	5 (26.3%)	19	2.976*	2	.226
	Expected	5.8	5.8	7.3				
High Health Literacy	Observed	4 (20%)	6 (30%)	10 (50%)	20			
	Expected	6.2	6.2	7.7				
Total		12	12	15	39			

Table 3. Results from the chi-square test. Observed (black) and expected (red) counts of patients according to health literacy group and asthma control level. Additionally, results of the Pearson chi-square test are shown to the right.

- If there were no difference between low and high health literacy groups based on asthma control levels, then the observed values would approximate the expected values. The chi square test measures if there is a statistically significant difference between the observed and expected values.
- The chi square value of 2.976, when compared to the null value of 0.00, shows that there is a difference in asthma control level between literacy groups. However, because the p-value of .226 is greater than the p-value of 0.05, the difference is not statistically significant at the 0.05 level.

Discussion

Findings

- The low health literacy group had less knowledge (M=31.9, SD=16.8) compared to the high group (M=42.2, SD=18.7). Approximately 74% of the low health literacy group had poorly or somewhat controlled asthma compared to 50% of the high health literacy group.
- Study results revealed no statistically significant differences in ASM-K and ACT scores across low and high health literacy groups.
- In general, the ASM-K scores were low for both groups regardless of health literacy. The overall mean for both groups combined was 37.03%, out of a range of scores from 0 to 100%. In addition, only 38% of all participants had well controlled asthma.
- These results suggest that improving health literacy may not be the sole mechanism for improving asthma self management knowledge and asthma control in patients.

Limitations

- Health literacy is self-reported by participants, which may be subject to social desirability bias. Objective measurements of individuals’ health literacy may be needed to improve accuracy and discriminatory ability.
- Since this study was conducted via convenience sampling, there is a possible bias in data gathering, under-representing or over-representing some groups. Additionally, results may not be generalizable.
- The small sample size may limit the statistical power to detect differences between groups.

Future Research

- Researchers and physicians may need to work together to look into other factors that may explain low asthma self-management knowledge and less than adequate asthma control. For example, social determinants of health including low income, allergies, unstable housing, or substandard location may influence asthma outcomes in vulnerable populations⁸.
- Further research could test interventions to bolster asthma self-management knowledge and asthma control in an effort to improve asthma-related outcomes.