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Literacy-Sensitive Approach to Improving Antibiotic Understanding in a Community-Based Setting



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Background

Antibiotic Usage

- Overuse and misuse of antibiotics contribute to antibiotic-resistant bacterial infections¹
- Over 2 million people develop severe antibiotic-resistant infections every year with 23,000 deaths and an estimated \$20 billion in healthcare costs¹⁻²
- 45% of patients responding to a telephone survey believed viruses could be treated using antibiotics³
- 47% of adults surveyed do not always take the full course of antibiotics⁴

Patient Impact

- 46% of adults surveyed call their provider to ask for antibiotics when they have a cold or the flu⁴
- Unnecessary antibiotics were prescribed 80% of the time when some form of patient pressure was witnessed⁵
- 46% of patients with URIs who came to their physician expecting an antibiotic received one; 29% who did not expect an antibiotic received a prescription for one⁶
- 27% of prescriptions were written for treatment of illnesses for which an antibiotic was not indicated⁷

Role of Health Literacy

- "...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"⁸
- Given that approximately 36% of adult Americans were reported to have basic or below basic health literacy skills,⁹ literacy may play a role in antibiotic use
- No studies were identified relating health literacy to antibiotic knowledge or use

Specific Aims

- This study
 - Developed and deployed a program to enhance patient knowledge about antibiotic use
 - Evaluated whether providing patient education is associated with improvements in antibiotic knowledge
 - Explored the association between antibiotic knowledge and health literacy

Methods

- This study was approved by the University of Oklahoma Health Sciences Center Institutional Review Board

Sample

- 28 eligible, community-dwelling participants from within the Tulsa, OK metropolitan area
- ≥ 18 years old
- English-speaking

Study Design

- Prospective, pre-test post-test study
- Participant sociodemographic characteristics, including a measurement of health literacy, were collected at baseline
- Antibiotic knowledge (perceptions of appropriate use) were collected before and after the educational seminar
- Knowledge index constructed – summation of correct answers

Study Implementation

- An informational flyer with scheduled program times was utilized to recruit participants
- Participants completed:
 - Brief demographic survey
 - The Newest Vital Sign (NVS) health literacy survey
 - 14-item pre-test evaluation of current antibiotic knowledge (randomized to 2/3 of participants – 19)
- All participants received:
 - 30-minute educational PowerPoint presentation
 - 14-item post-test evaluation about antibiotic knowledge

Score Sheet for the Newest Vital Sign Questions and Answers

ANSWER CORRECTLY

Question	ANSWER CORRECTLY
1. If you eat the entire container, how many calories will you eat? Answer: 2000 is the only correct answer.	
2. If you are allowed to eat 60 grams of carbohydrates as a snack, how much ice cream could you have? Answer: Any of the following is correct: 1 cup for any amount up to 1 cup; half the container; 1/2 of the container. Your answer is correct. These must be ice cream cones that fit in your cone to measure it into a bowl.	
3. Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 1/2 of saturated fat each day, which includes one serving of ice cream. If you stop eating ice cream, how many grams of saturated fat would you be consuming each day? Answer: 22 is the only correct answer.	
4. If you usually eat 2,000 calories in a day, what percentage of your daily intake of calories will you be eating if you eat one serving? Answer: 20% is the only correct answer.	

Interpretation
 Score of 0-3 suggests high likelihood (50% or more) of limited literacy.
 Score of 3-3 indicates the possibility of limited literacy.
 Score of 4-4 almost always indicates adequate literacy.

Questions About Antibiotics

Please complete the following questions about antibiotics. Place an in the box that shows your answer.

Example	Agree	Disagree	I don't know
This page is white.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1. Viruses and bacteria are germs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Antibiotics are used to kill bacteria.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. You should stop taking an antibiotic as soon as you feel better.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Antibiotics are used to kill viruses.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. It is okay to take antibiotics prescribed for other people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Bacteria can become resistant to antibiotics.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Taking an antibiotic when it is not necessary can hurt you.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. It is okay to ask the doctor to prescribe an antibiotic for me when I have a cold or the flu.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Penicillin is an antibiotic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I should always finish all of the antibiotics given to me by my doctor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Over-the-counter medicines like ibuprofen or cough syrup can help treat the cold or the flu.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Antibiotics are used to treat a cold or the flu.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. It is okay to save antibiotics that have not been taken for the next time sick.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. The flu is a type of bacteria.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Statistical Analysis

- Descriptive statistics were used to describe the sample
- Wilcoxon signed rank tests and a dependent samples t-test were used to compare individual and cumulative pre/post antibiotic knowledge scores
- Pearson correlations were used to assess relationship between health literacy and pre-post antibiotic knowledge scores
- Kuder-Richardson 20 (KR20) was used to assess instrument reliability
- Stata 14.1© was used for analyses with a-priori alpha=0.05

Results

- 19 participants completed the seminar and both pre- and post-tests
 - Overall antibiotic knowledge index significantly increased by 2 points (12.95 vs. 10.95, p=0.0011)
 - Health literacy (NVS scores) was not significantly correlated with pre-test antibiotic knowledge scores (r=0.24, p=0.22), but was significantly correlated to post-test antibiotic knowledge scores (r=0.62, p=0.0004)
 - Test reliability was 0.79 and 0.70 for pre- and post-tests, respectively
- All participants
 - Scored lower on subset statements reflecting treatment of viruses

Conclusion

- Patients have limited understanding of bacteria versus viruses and treatment
- Educational programs can improve antibiotic use knowledge
- The educational program may be more effective for those with higher literacy levels

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Disclosure Statement

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