ASSESSMENT OF PARENTAL KNOWLEDGE AND ATTITUDES TOWARDS ANTIBIOTIC USE IN PAEDIATRIC CARE: IMPLICATIONS FOR ANTIMICROBIAL STEWARDSHIP

Dissertation Submitted to

The IIHMR University, Jaipur

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Master of Business Administration (MBA)

in

Hospital and Health Management

By

Trisha Sharma

Under the Supervision and Guidance of

Dr. Sanjay Gupta

2024

cloudnine

CERTIFICATE

This is to certify that **Dr. Trisha Sharma** in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the **IIHMR University, Jaipur** has successfully completed her/his internship at **Cloudnine Group of Hospitals** – Thanisandra Branch - Bengaluru, Karnataka during April 1st 2024 to June 30th 2024.

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Place: Thanisandra Branch - Bengaluru

Date: 30th June 2024

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CERTIFICATE

This is to certify that dissertation titled "**Assessment of Parental Knowledge and Attitudes Towards Antibiotic Use in Paediatric Care: Implications for Antimicrobial Stewardship**" is a record of the research work undertaken by Dr Trisha Sharma in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and ~~his~~/her approach to the research study has been sincere, scientific, and analytical.

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CHAPTER 1

INTRODUCTION

A vital component of contemporary medicine, antibiotics have transformed the way infectious diseases are treated and drastically decreased global morbidity and mortality rates. However, the development of antibiotic resistance jeopardizes public health worldwide and calls into question the efficacy of these life-saving medications. In paediatric care, where infections are common and antibiotics are frequently prescribed, the prudent use of these medications is imperative to mitigate the spread of resistance.

The increasing incidence of antibiotic resistance is one of the most substantial problems in modern medicine. Antibiotic resistance occurs when bacteria acquire approaches to withstand the antibiotics that originally killed them, making traditional treatments ineffective and resulting in prolonged infections, increased spread of resistant strains, and increased healthcare expenses. The World Health Organization (WHO) has highlighted antibiotic resistance as a major danger to global health, food security, and development. To address this issue, a multimodal strategy is required, including strong antimicrobial stewardship (AMS) initiatives that encourage the proper use of antibiotics.

Antibiotic misuse and overuse are especially extremely concerning in paediatrics. Antibiotics are commonly recommended to children, even for diseases that may not require them, such as viral infections. The use of antibiotics is not only contributing to the spread of antibiotic resistance, but it also poses direct health hazards to children, such as unpleasant medication responses and disturbance of the natural microbiome. Given the significant role that parents play in their children's health, their knowledge and attitudes regarding antibiotic usage are important predictors of appropriate antibiotic transmission.

Here, Antimicrobial stewardship refers to a coordinated effort within healthcare settings to optimize the use of antimicrobial agents, including antibiotics, antivirals, antifungals, and antiparasitic, with the overarching goals of improving patient outcomes, reducing the emergence of antimicrobial resistance, and minimizing adverse effects associated with antimicrobial therapy.

ABOUT CLOUDNINE HOSPITALS

Cloudnine Hospitals provide a significant breakthrough in India's maternity, neonatal, and fertility treatment. Cloudnine was founded in 2007 by Dr. R. Kishore Kumar and is financially funded by Matrix Partners. It focuses on providing high-quality care to moms and babies.

Comprehensive Maternity Care

Cloudnine's maternity services provide a wide range of care, including prenatal, antenatal, and postnatal services that are targeted to give the best possible results for both mothers and newborns. The hospitals have cutting-edge labor and delivery rooms, neonatal intensive care units (NICUs), and areas for various analgesic procedures during labour. This infrastructure provides a broad variety of maternity care services, with the goal of reducing perinatal morbidity and death.

Neonatal and Paediatric Care Specialization

The provision of specialized neonatal care is a cornerstone of Cloudnine's healthcare model. The NICUs are furnished with advanced technology and are staffed by experienced neonatologists, which is critical for the care of premature and critically ill neonates. Paediatric services at Cloudnine encompass general paediatrics, paediatric intensive care, and multiple paediatric specialties, thereby offering a comprehensive paediatric care continuum that addresses acute and chronic conditions.

Fertility Services and Advanced Reproductive Technologies

Cloudnine's fertility clinics deliver a variety of assisted reproductive technologies (ART), including in vitro fertilization (IVF) and intrauterine insemination (IUI). The clinics are staffed by specialists who develop personalized treatment protocols based on the latest evidence-based practices. This approach enhances the success rates of fertility treatments and provides significant support for couples facing infertility.

Gynecology & Women's Health

gynaecological care, including routine checkups, treatment of gynaecological problems, and sophisticated surgical procedures such as laparoscopy. This holistic strategy ensures that women's health needs are met at all phases of life, leading to better health outcomes.

Expansion and accreditation

Cloudnine has extended to over 30 hospitals in major Indian cities such as Bengaluru, Mumbai, Gurgaon, Chennai, Pune, and Hyderabad. This upward trend highlights the rising need for specialist maternal and child healthcare services. The hospitals have received various accreditations, including one from the National Accreditation Board for Hospitals and Healthcare Providers (NABH), demonstrating their commitment to high standards of patient care and safety.

Patient-Centred Approach and Community Outreach

Cloudnine is differentiated by its patient-cantered approach, which prioritizes compassionate and thorough treatment. Their care style includes breastfeeding counselling, prenatal education, and postnatal support. Cloudnine also participates in community outreach activities aimed at increasing awareness and educating the public about mother and child health. These efforts seek to encourage early diagnosis and prevention of health issues, thereby improving community health outcomes.

Cloudnine Hospitals has set a standard in mother and child healthcare with cutting-edge facilities, professional medical personnel, and a strong patient-centred care strategy. Their ongoing growth and innovation demonstrate their dedication to providing safe pregnancies, healthy newborns, and happy families. As a leader in this industry, Cloudnine continues to advance the maternal and child health.

IMPORTANCE OF ADDRESSING ANTIBIOTIC RESISTANCE

Antibiotic resistance endangers not just the health of individual patients, but also the global public health system. Infections produced by resistant bacteria are more difficult to treat, necessitating more costly or toxic treatments, longer hospital stays, and intensive care. The economic impact is significant, with increasing expenditures associated with longer hospitalizations, the need for more sophisticated treatments, and the social costs of increased morbidity and death.

Antibiotics are commonly recommended to children, even for diseases that may not require them, such as viral infections. The use of antibiotics in these cases not only contributes to the spread of antibiotic resistance, but it also poses direct health risks to children. These include unpleasant medication responses, such as allergic reactions or gastrointestinal problems, as well as alteration of the natural microbiota, both of which can have long-term health consequences.

Given the critical role that parents play in their children's health, their knowledge and attitudes toward antibiotic use are essential determinants of optimal antibiotic use. Parents are usually the key caretakers and decision-makers for their children's health, controlling when and how antibiotics are administered. Understanding parents' knowledge and attitudes is thus crucial for designing effective AMS treatments.

PARENTAL KNOWLEDGE AND MISUNDERSTANDINGS

Understanding parents' knowledge and attitudes is critical for developing successful AMS treatments. Despite their crucial role, parents have a huge knowledge gap about whether antibiotics are necessary and safe to use. Many parents have misunderstandings regarding antibiotics, such as thinking they are beneficial against viral diseases like the common cold or flu. These beliefs can lead to improper antibiotic demands from healthcare professionals, which leads to overprescription.

According to studies, a significant majority of parents are unaware of the differences between bacterial and viral illnesses. This lack of awareness frequently leads to the mistaken idea that antibiotics can treat all forms of illnesses, regardless of their cause. For example, Belongia et al. (2002) discovered that almost half of questioned parents felt antibiotics were required to treat viral illnesses.

Parents' attitudes toward antibiotics are influenced by a variety of factors, including past experiences, trust in healthcare providers, fear of illness complications, and a desire for quick relief of symptoms.

1. **Past Experiences:** Parents who have received a positive or near positive outcomes with antibiotics in the past may be more inclined to seek them for future, regardless of whether they are actually needed or not.
2. **Trust in Healthcare Providers:** A strong trust in healthcare providers can positively influence parents' acceptance of medical advice, including recommendations against unnecessary antibiotic use. Conversely, a lack of trust can lead to scepticism and demands for antibiotics.
3. **Fear of Complications:** Concern about the potential for an illness to worsen or lead to severe complications can drive parents to seek antibiotics as a precautionary measure.
4. **Desire for Quick Relief:** In today's fast-paced society, parents often seek quick and effective solutions to their children's illnesses. Antibiotics are sometimes perceived as a quick fix, even when other treatments may be more appropriate.

These attitudes can sometimes conflict with medical advice, leading to pressure on healthcare providers to prescribe antibiotics even when they are not medically indicated. Addressing these issues requires targeted education efforts and effective communication.

RESEARCH QUESTION

In what ways do parental understanding and beliefs concerning antibiotic utilization in pediatric healthcare shape prescribing behaviors for children? Additionally, how can insights derived from parental perspectives inform the development and implementation of robust antimicrobial stewardship strategies tailored to pediatric healthcare settings?

PRIMARY GOAL OF STUDY

The primary goal of this study is to comprehensively evaluate parents' knowledge, attitudes, and behaviours regarding antibiotic use in paediatric care. This evaluation aims to identify critical gaps in knowledge, prevalent misconceptions, and the key factors that drive parental attitudes toward antibiotic prescriptions. By thoroughly understanding these elements, the study seeks to inform the design and implementation of targeted antimicrobial stewardship (AMS).

OBJECTIVES

1. Evaluate parental knowledge levels regarding appropriate antibiotic use in pediatric care, including understanding of indications, dosing, and potential risks.
2. Investigate parental attitudes and beliefs towards antibiotic prescribing for children, exploring factors such as perceived necessity, concerns about side effects, and influences on decision-making.
3. Identify challenges and barriers faced by parents in adhering to antimicrobial stewardship principles in pediatric healthcare.

SPECIFIC OBJECTIVES

1. Assess parental knowledge:
    1.1. Evaluate parents' comprehension of antibiotic use, particularly the difference between bacterial and viral illnesses.
    1.2. Determine the amount of awareness of the dangers of antibiotic overuse, specifically the development of antibiotic resistance.
    1.3. Identify common parental knowledge gaps and misunderstandings.

2. Examine Parents' Attitudes and Behaviours:
    2.1. Investigate parents' views regarding antibiotics, especially their expectations for antibiotic prescriptions when their children become unwell.
    2.2. Investigate how previous experiences with antibiotic treatments impact present attitudes and actions.

2.3. Examine how parents' antibiotic-seeking habits are influenced by characteristics like as confidence in healthcare practitioners, fear of sickness consequences, and a desire for immediate symptom alleviation.

3. Identify influences on decision-making:
   3.1 Examine how various information sources (such as healthcare professionals, the internet, social media, family, and friends) influence parents' knowledge and views.
   3.2 Assess the efficacy of communication between healthcare practitioners and parents about antibiotic usage and resistance.

4. Develop targeted interventions:
   4.1 Use the assessment results to guide the creation of educational materials and activities that address the identified knowledge gaps and misunderstandings.
   4.2 Propose measures to improve healthcare personnel' communication skills, allowing them to more effectively address parental concerns and misconceptions about antibiotic use.
   4.3 Suggest collaborative techniques to include parents in AMS activities, generating a sense of shared responsibility for ensuring proper antibiotic usage.

SCIENTIFIC RATIONALE

The study is based on the concept that increasing parental education and changing attitudes regarding antibiotic usage can greatly contribute to more responsible antibiotic prescribing practices. By identifying and addressing the specific misunderstandings and knowledge gaps that lead to inappropriate antibiotic requests, AMS programmes may be better targeted to suit the requirements of the target community.

The need of accurate knowledge: Knowing when antibiotics are essential is critical for preventing their overuse. Misconceptions, such as the notion that antibiotics are useful against viral infections, lead to excessive antibiotic usage, hastening the development of resistant bacterial strains.

Attitudes and views of parents have a significant impact on their children's healthcare-seeking habits. For example, parents who assume antibiotics are a quick treatment for all ailments may encourage healthcare personnel to give them even when they are not medically necessary. Understanding these attitudes enables the development of treatments that can modify perceptions and encourage more suitable behaviours.

Effective communication between healthcare practitioners and parents is critical for expressing the proper use of antibiotics and addressing any concerns or misconceptions. Training healthcare practitioners to discuss the risks and benefits of antibiotic usage can help parents make more informed and cooperative decisions.

OPERATIONAL DEFINITIONS

In the context of this thesis, the following operational definitions are used to precisely describe the key concepts under investigation. These criteria are intended to provide a clear framework for data collection, analysis, and interpretation, which ensures consistency and clarity throughout the analysis process.

PARENTAL KNOWLEDGE

Definition: Parental knowledge refers to the level of understanding that parents possess regarding the use of antibiotics in treating paediatric illnesses. This encompasses awareness of:

- **When Antibiotics Are Necessary:** Understanding the specific conditions and infections (bacterial vs. viral) that warrant antibiotic treatment.
- **How Antibiotics Should Be Used:** Knowledge of proper antibiotic usage, including dosage, duration, and adherence to prescribed courses.
- **Antibiotic Resistance:** Awareness of the consequences of antibiotic misuse, such as the development of antibiotic-resistant bacteria.
- **Alternatives to Antibiotics:** Familiarity with non-antibiotic treatments and preventive measures for managing common paediatric illnesses.

Measurement: Parental knowledge is assessed through a structured questionnaire that includes:

- Multiple-choice questions to evaluate understanding of when antibiotics are necessary.
- Likert-scale items to gauge awareness of alternative treatments and preventive measures.

PARENTAL ATTITUDES

Definition: Parental attitudes encompass the beliefs, preferences, and perceptions that parents hold regarding antibiotic prescriptions for their children. This includes:

- **Beliefs About Antibiotic Efficacy:** Perceptions of how effective antibiotics are in treating various illnesses.
- **Preferences for Treatment:** Preferences for or against antibiotic use in specific scenarios.
- **Expectations from Healthcare Providers:** Expectations regarding the prescription of antibiotics during paediatric visits.
- **Concerns About Illness Severity:** Levels of concern about the severity of illnesses and the perceived necessity of antibiotics.
- **Trust in Healthcare Providers:** The degree of trust parents have in the advice and recommendations of healthcare professionals regarding antibiotic use.

Measurement: Parental attitudes are measured using a structured questionnaire with Likert-scale items to assess:

- Beliefs about the efficacy of antibiotics.
- Preferences for antibiotic use in various clinical scenarios.
- Expectations for antibiotic prescriptions.
- Concerns about illness severity.

- Trust in healthcare providers' recommendations.

ANTIMICROBIAL STEWARDSHIP

Definition: Antimicrobial stewardship (AMS) refers to the coordinated efforts and strategies aimed at promoting the appropriate use of antibiotics to minimize resistance and ensure optimal patient outcomes. Key components of AMS include:

- **Education:** Providing information and resources to both healthcare providers and the public about proper antibiotic use.
- **Guidelines Adherence:** Ensuring that antibiotic prescribing practices align with established clinical guidelines and best practices.
- **Patient Engagement:** Involving patients and their families in decision-making processes to enhance understanding and adherence to treatment recommendations.

Measurement: AMS efforts are evaluated through:

- Assessment of educational initiatives and their impact on knowledge and attitudes.
- Analysis of antibiotic prescribing patterns to determine adherence to guidelines.
- Evaluation of patient engagement activities and their effectiveness in promoting appropriate antibiotic use.

PEDIATRIC CARE

Definition: Paediatric care refers to the healthcare services provided to children, encompassing prevention, diagnosis, and treatment of illnesses by specialized healthcare providers such as paediatricians. It includes:

- **Preventive Care:** Routine health checks, vaccinations, and education on healthy behaviours.
- **Diagnostic Services:** Identification and diagnosis of acute and chronic illnesses in children.

- **Treatment:** Medical management of paediatric illnesses, including the use of medications, therapies, and other interventions.

Measurement: Paediatric care is described through:

- Documentation of the range of services provided by paediatric clinics.
- Analysis of clinical practices and treatment protocols.
- Evaluation of healthcare provider qualifications and training in paediatric care.

EXPECTED OUTCOMES

1. **Improved parental knowledge**:

1.1 A rise in the proportion of parents who know when antibiotics are and are not required.

1.2 Increased knowledge of the consequences of antibiotic overuse, particularly antibiotic resistance.

2. **Positive changes in attitude and behaviour:**

2.1 Antibiotics are being used less frequently for viral infections.

2.2 Increased adherence to physician guidance for antibiotic usage.

3. **Improved Healthcare Provider-Parent Communication:**

3.1 More effective talks regarding antibiotic usage, resulting in less pressure on healthcare practitioners to prescribe antibiotics incorrectly.

3.2 Increased parental satisfaction with the information and direction offered by healthcare practitioners.

4. Reducing inappropriate antibiotic prescribing:

4.1 A significant drop in the number of antibiotic prescriptions for diseases that are not medically essential.

4.2 A comparable decrease in the number of antibiotic-resistant illnesses.

By attaining these goals, the study hopes to contribute to AMS programs' overall efforts to reduce antibiotic resistance and enhance paediatric care quality. The findings will help policymakers, healthcare providers, and public health experts develop effective measures to encourage rational antibiotic usage while protecting public health.

CHAPTER: 2

LITERATURE REVIEW

Antimicrobial Resistance and Public Health

Antibiotic resistance is acknowledged as a major worldwide health problem. The overuse and abuse of antibiotics in both human and veterinary medicine has hastened the establishment and spread of resistant microorganisms. The Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) have stressed the critical need for concerted action to address antibiotic resistance, including promoting prudent antibiotic use and implementing antimicrobial stewardship (AMS) programs.

Antimicrobial stewardship programs

Antimicrobial stewardship programs are critical for optimizing antibiotic usage to enhance patient outcomes, reduce side effects, and limit resistance. These programs often take a multidisciplinary approach, such as developing antibiotic prescribing guidelines, providing education and training to healthcare workers, monitoring and providing feedback on antibiotic use, and patient education activities. Studies have demonstrated that AMS programs can successfully minimize improper antibiotic administration and enhance clinical recommendations adherence.

Parental Knowledge and Misconceptions

According to research, a considerable majority of parents are unaware of how to use antibiotics appropriately. For example, studies regularly show that many parents believe antibiotics are useful for treating viral illnesses like the common cold and influenza, despite the fact that these disorders are self-limiting and do not respond to antibiotic medication. This misperception can lead to improper demands for antibiotics, placing pressure on healthcare practitioners to prescribe them even when they are not required.

Belongia et al. (2002) discovered that parental misunderstandings about antibiotic usage were common, with almost half of questioned parents believing that antibiotics were required to treat viral illnesses.

Similarly, Pan et al. (2016) found that parents had a general lack of awareness about antibiotic resistance, with many uninformed of the long-term repercussions of antibiotic abuse.

Factors influencing parental attitudes

Parental views about antibiotics are impacted by a range of variables, including past disease and treatment experiences, faith in healthcare practitioners, fear of consequences, and a desire for immediate alleviation of symptoms in their children.

Cabral et al. (2015) found that parents frequently seek antibiotics because they are concerned about the severity of their child's sickness and the possibility of consequences if not addressed. This concern might lead parents to insist on antibiotic prescriptions, even when professionals advise against them.

The influence of healthcare practitioners in influencing parental views is equally important. Research has demonstrated that proper communication and education from healthcare providers may have a substantial impact on parental knowledge and acceptance of healthy antibiotic usage.

Barden et al. (1998) discovered that when healthcare personnel explained why antibiotics were not required for a specific sickness, parents were more likely to accept the decision and follow non-antibiotic treatment suggestions.

Educational Interventions and Communication Strategies.

Effective educational interventions are required to bridge the knowledge gaps and misunderstandings among parents. Educational initiatives that give clear, understandable

information on when antibiotics are needed and the hazards associated with their misuse have been found to increase parental understanding and attitudes.

Gonzales et al. (2008) found that focused instructional materials, such as brochures and movies, might successfully lower parental demand for antibiotics.

Healthcare practitioners play an important part in these educational initiatives. Training healthcare workers to properly communicate with parents about antibiotic usage is critical.

Szymczak et al. (2014) found that interactive communication training for healthcare practitioners enhanced their capacity to handle parental concerns and misconceptions, resulting in higher adherence to prescribing standards.

CHAPTER:3

METHODOLOGY

In order to present a comprehensive overview of parental perspectives, this research study uses a mixed-methods approach that includes quantitative surveys and qualitative interviews. A mixed-methods approach allows for a more robust study by integrating quantitative data with qualitative observations. The findings will help to shape the design of targeted interventions within AMS programs, encouraging greater antibiotic stewardship and aiding attempts and efforts to prevent antibiotic resistance.

QUANTITATIVE COMPONENT

STUDY DESIGN:

The quantitative component is constructed as a cross-sectional survey of parents who visit paediatric department of Cloudnine hospital Thanisandra branch. The approach enables for data gathering at a single point in time, resulting in a snapshot of parental knowledge and attitudes.

SETTING:

The study was conducted at a Thanisandra branch of Cloudnine Hospitals, Bangalore, a newly opened branch located in the suburbs of Bangalore, The unit started functioning on 10th of April 2024.

SAMPLING METHOD:

Stratified random sampling is used to represent diverse demographic groupings. This strategy includes categorizing the population into subgroups (strata) depending on factors such as age, gender, educational level, and socioeconomic position. To guarantee proportional representation, randomly selected samples are collected from each stratum.

STUDY POPULATION:

The study population will comprise children in the age range of one to twelve years receiving pediatric care services at Cloudnine Hospitals.

INCLUSION AND EXCLUSION CRITERIA:

Inclusion criteria:

1. Parents or legal guardians of pediatric patients aged 0-12 years.

2. Parents or legal guardians who have sought medical care for their child in a pediatric between April to June 2024.

3. Willingness to participate in interviews or surveys for qualitative data collection.

4. Access to necessary technology (e.g., internet, phone) for participation in surveys or interviews.

Exclusion criteria:

1. Parents or legal guardians who are unable to provide consent for participation.

2. Parents or legal guardians with children who have chronic medical conditions requiring long-term antibiotic therapy, in order to eliminate any bias owing to distinct health demands.

3. Inability or refusal to participate in interviews or surveys

4. Individuals with cognitive impairments or mental health conditions that may hinder their ability to participate effectively in the study.

5. Parents who are healthcare professionals in order to eliminate any bias owing to advanced knowledge.

STUDY TOOLS:

1. Electronic Health Records – Usage of Lifetrenz and ADM site
2. Structured Interviews and Surveys

3. Case Report Forms

DURATION OF STUDY: 3 months (1st of April 2024 – 30th June 2024)

SAMPLE SIZE: 107 parents of children administered with antibiotics

SAMPLING TECHNIQUE: The sampling technique involved convenience sampling method.

DATA COLLECTION PROCEDURE:

The data collection procedure for the study was systematic and comprehensive to ensure the collection of high-quality data for the longitudinal cross sectional study.

SURVEY INSTRUMENTS:

The structured questionnaire contains four major sections:

1. **Demographic Information**: Gathers information on age, gender, education level, employment, number of children, and previous antibiotic usage. This material helps to contextualize the knowledge and attitudes being assessed.
2. **Knowledge of Antibiotic Use:** Contains questions that measure knowledge of when antibiotics are required, their efficiency against viral vs bacterial illnesses, and awareness of antibiotic resistance. To ensure clarity, questions are presented as multiple choice or true/false.
3. **Attitudes about antibiotics**: Uses Likert-scale questions (strongly agree to strongly disagree) to assess attitudes regarding antibiotic usage, confidence in healthcare practitioners, worries about illness severity, and expectations for antibiotic prescriptions.
4. **Sources of information**: Inquires into the sources from which parents receive information regarding antibiotics, including as healthcare providers, the internet, social media, and family or friends.

DATA COLLECTION

The survey is administered face-to-face in paediatric branch of Cloudnine Hospitals – Thanisandra Branch, to ensure high response rates and clear questions. The respondents' anonymity and confidentiality are protected in order to promote honest and accurate replies.

Data analysis includes descriptive and inferential statistics for quantitative data.

1. Descriptive statistics include frequencies, percentages, averages, and standard deviations, which describe demographic information, knowledge, attitudes, and sources of information.

2. Inferential statistics: Chi-square tests determine connections between categorical variables, whereas logistic regression analysis finds characteristics related to parental knowledge and attitudes. Statistical significance is defined as $p < 0.05$. To guarantee accuracy and dependability, data is analysed using software such as SPSS (Statistical Package for the Social Sciences).

QUALITATIVE COMPONENT

STUDY DESIGN:

The study design includes semi-structured interviews with a selection of parents from the survey respondents. This method provides for a thorough investigation of parental attitudes, beliefs, and experiences.

SAMPLING MEHOD:

Purposive sampling selects persons capable of providing thorough information. The sample size for qualitative interviews is established based on data saturation, which occurs when no new themes arise from the interviews, assuring thorough coverage of pertinent issues.

INTERVIEW GUIDE

The interview guide is semi-structured, with open-ended questions divided into three sections:

1. **Perceptions of Antibiotic** Use: Investigates perceptions about the importance and efficacy of antibiotics, awareness of antibiotic resistance, and previous antibiotic treatment experiences.
2. **Decision Making Processes:** Investigates variables influencing antibiotic-seeking decisions, contacts with healthcare practitioners, and responses to medical advice on antibiotic usage.
3. **Information Sources and Influences:** Investigates the impact of various information sources on knowledge and attitudes, including healthcare providers, the internet, and social networks.

DATA COLLECTION

Interviews are performed in a confidential location, either face-to-face or via phone/video call, as per participant request and the information was collected throught the help of google forms.

DATA ANALYSIS

Thematic analysis is used to study qualitative data in a systematic way.

- **Familiarization:** Transcripts are read several times to become immersed in the data and spot emerging patterns.
- **Coding:** The first codes are produced based on key remarks and patterns found in the transcripts. Codes are assigned to data segments that signify meaningful units.
- **Theme Development:** Codes are grouped into themes and subthemes to reflect larger patterns and discoveries. Themes are evaluated and developed to ensure that they appropriately represent the substance of the data.
- **Iteration and comparison:** Thematic analysis is carried out iteratively, with new data being compared to established themes to guarantee consistency and dependability.

DATA PREPERATION

1. Data Cleaning

- Verify data integrity by checking for missing values, outliers, and inconsistencies.
- Clean and preprocess data to ensure accuracy and completeness before analysis.

2. Descriptive Statistics

Demographic Description:

- Calculate frequencies and percentages for demographic variables (e.g., age, education level, occupation) to describe the study sample.

Variables of Interest:

- Describe distributions of key variables:
  - Knowledge about antibiotics (e.g., effectiveness against viruses, understanding of antibiotic resistance).
  - Attitudes towards antibiotic use (e.g., completion of antibiotic courses, perceptions of pharmaceutical advertising influence).

3. Inferential Statistics

I. Chi-Square Tests:

- **Objective**: Determine if there is a significant association between Education Level and:
  - Perceived influence of pharmaceutical advertising on antibiotic use decisions.
  - Knowledge about antibiotic resistance.
  - Attitudes towards completing antibiotic courses.

II. Procedure:

Step 1: Formulate Hypotheses:

- Null Hypothesis (H_0): There is no association between Education Level and the dependent variables.
- Alternative Hypothesis (H_1): There is an association between Education Level and the dependent variables.

Step 2: Select Test Statistic:

- Used Pearson Chi-Square and Likelihood Ratio Chi-Square tests for categorical variables.

Step 3: Set Significance Level:

- Choose a significance level (α) of 0.05 to determine statistical significance.

Step 4: Conduct Chi-Square Tests:

- Calculated observed and expected frequencies for each cell in the contingency table.
- Computed Pearson Chi-Square and Likelihood Ratio Chi-Square statistics.
- Determined degrees of freedom (df) based on the number of categories and sample size.

Step 5: Interpret Results:

- Compared computed Chi-Square values with critical values from Chi-Square distribution tables.
- Calculated p-values to assess statistical significance.
- Reject or fail to reject the null hypothesis based on p-values:
  - If $p < 0.05$, reject H_0, suggesting a significant association.
  - If $p \geq 0.05$, fail to reject H_0, indicating no significant association.

III. Symmetric Measures:

 Objective: Assess the strength of association between Education Level and the dependent variables using:

- Phi coefficient (φ) and Cramer's V.

 Procedure:

- Compute Phi coefficient to measure association strength for 2x2 contingency tables.
- Calculate Cramer's V for larger contingency tables to determine the degree of association.
- Interpret coefficients:
  - Values closer to 0 indicate weak association.
  - Values closer to ±1 signify stronger association.

4. Interpretation and Conclusion

 Summary of Findings:

Summarized significant associations found between Education Level and parental knowledge, attitudes, and behaviours regarding antibiotics.

 Implications:

Discuss implications of findings for antimicrobial stewardship initiatives and public health policies.

 Limitations:

Identify study limitations such as sample size constraints, self-report biases, and generalizability.

5. **Reporting and Presentation**

Presentation Format:

- Present results using tables, figures, and statistical summaries.
- Clearly label and interpret statistical outputs to facilitate understanding and reproducibility.

ETHICAL CONSIDERATIONS

1. Informed Consent: Participants are provided with detailed information about the study's purpose, procedures, potential risks, and benefits. Informed consent is obtained from all participants before data collection.

2. Confidentiality and privacy: Data are anonymized, and participants' identities are protected throughout the study. Only aggregated data are reported.

3. Voluntary Participation and right to withdraw: Participation is voluntary, and participants can withdraw from the study at any time without any consequences.

4. **Data Security:** Data are securely stored, with access restricted to the research team.

CHAPTER: 4

INTERPRETATION / RESULTS

DESCRIPTIVE ANALYSIS

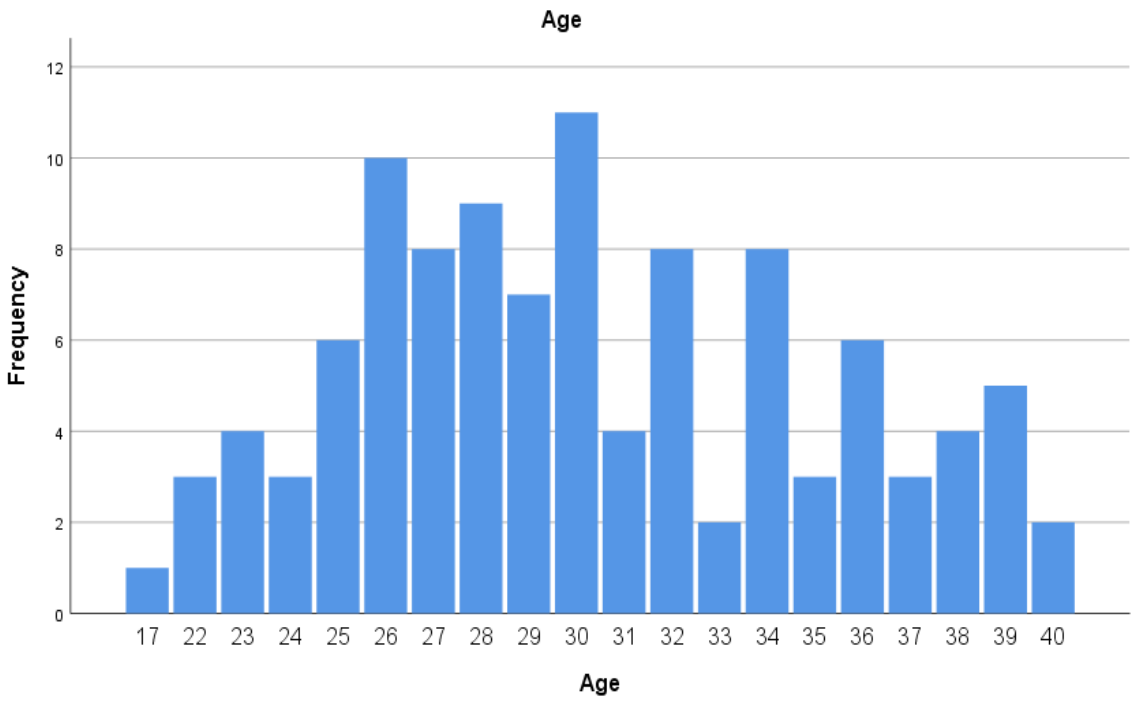
DEMOGRAPHIC INFORMATION:

Statistics

Age

N	Valid	107
	Missing	0
Mean		30.23
Std. Error of Mean		.476
Median		30.00
Mode		30
Std. Deviation		4.919
Variance		24.200
Skewness		.145
Std. Error of Skewness		.234

TABLE 1: Statistical interpretation of the age group of the participants



GRAPH 1: Frequency of the age group of the participants

TABLE 1: The table provides a detailed summary of the age distribution among 107 respondents. The data is relatively symmetric around the mean age of 30.23 years, with minimal skewness, and the most common age is 30,with around 10.8% of the people lying in that age group. The standard deviation and variance indicate moderate variability in the respondents' ages. Overall, the descriptive statistics suggest a well-distributed sample in terms of age.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	44	41.1	41.1	41.1
	Male	63	58.9	58.9	100.0
	Total	107	100.0	100.0	

TABLE 2: Statistical interpretation of the gender of the participants

TABLE 2: The table summarizes the gender distribution among 107 respondents, with 44 females (41.1%) and 63 males (58.9%), indicating a higher proportion of male respondents. There are no missing data for gender, and the valid percent matches the overall percent. The cumulative percent shows the progressive total, reaching 100% at the end of the male category.

Education Level

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	12th Pass	12	11.2	11.2	11.2
	Graduate	41	38.3	38.3	49.5
	Postgraduate	54	50.5	50.5	100.0
	Total	107	100.0	100.0	

TABLE 3: Statistical interpretation of the education level the participants

TABLE 3: The table summarizes the education level distribution among 107 respondents. There are 12 respondents (11.2%) who have completed their 12th grade, 41 respondents (38.3%) who have completed their graduation, and 54 respondents (50.5%) who have completed their post-graduation. There are no missing data for education level, and the valid percent matches the overall percent. The cumulative percent shows the progressive total, reaching 100% at the end of the Post Graduate category.

Number of Children

		Frequency	Percent(%)	Valid Percent(%)	Cumulative Percent(%)
Valid	1	53	49.5	49.5	49.5
	2	41	38.3	38.3	87.9
	3	13	12.1	12.1	100.0
	Total	107	100.0	100.0	

TABLE 4: Statistical interpretation of the number of children of the participants

TABLE 4: The table summarizes the distribution of the number of children among 107 respondents. There are 53 respondents (49.5%) with 1 child, 41 respondents (38.3%) with 2 children, and 13 respondents (12.1%) with 3 children. There are no missing data for the number of children, and the valid percent matches the overall percent. The cumulative percent shows the progressive total, reaching 100% at the end of the 3 children category.

What factors influence your decision to give antibiotics to your child?

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	Doctor's recommendation	39	36.4	36.4	36.4
	Fear of complications	16	15.0	15.0	51.4
	Pressure from child or family	15	14.0	14.0	65.4
	Severity of symptoms	37	34.6	34.6	100.0
	Total	107	100.0	100.0	

TABLE 5: Statistical interpretation of the factors that influence the decision regarding taking antibiotics for the children

TABLE 5: The table summarizes the factors influencing the decision to give antibiotics to children among 107 respondents. The most common factor is the doctor's recommendation (39 respondents, 36.4%), followed by the severity of symptoms (37 respondents, 34.6%), fear of complications (16 respondents, 15.0%), and pressure from child or family (15 respondents, 14.0%). There are no missing data for these factors, and the valid percent matches the overall percent. The cumulative percent shows the progressive total, reaching 100% at the end of the severity of symptoms category.

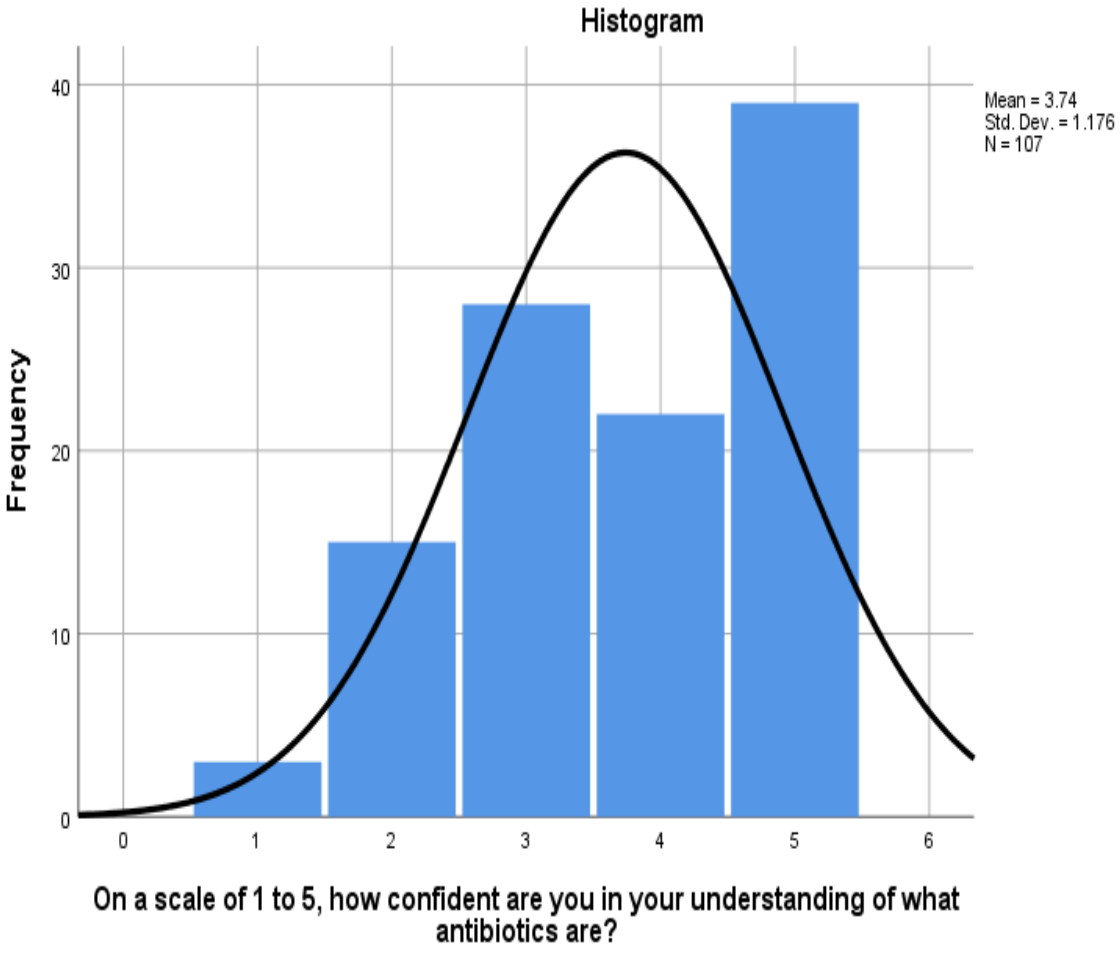


FIGURE for TABLE 6: Statistical interpretation of how much the participants are confident regarding their understanding of what antibiotics are?

On a scale of 1 to 5, how confident are you in your understanding of what antibiotics are?

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	Not at all confident	3	2.8	2.8	2.8
	Slightly confident	15	14.0	14.0	16.8
	Moderately confident	28	26.2	26.2	43.0
	Very confident	22	20.6	20.6	63.6
	Extremely confident	39	36.4	36.4	100.0
	Total	107	100.0	100.0	

TABLE 6: Statistical interpretation of how much the participants is confident regarding their understanding of what antibiotics are?

TABLE 6: Most respondents feel confident in their understanding of antibiotics, with 36.4% being "Extremely confident." Only a small fraction of respondents feel "Not at all confident" (2.8%). While most parents are confident in their understanding, targeted education could benefit those with lower confidence levels. The histogram and accompanying statistical summary provide a clear overview of the respondents' confidence in their understanding of antibiotics. Most respondents rate their confidence level between 3 and 5, indicating a generally high level of confidence. This information can be useful for identifying areas where further education and intervention may be needed to enhance parental knowledge and understanding of antibiotic use in paediatric care.

Do you believe antibiotics are effective against viruses?

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	No	42	39.3	39.3	39.3
	Not Sure	22	20.6	20.6	59.8
	Yes	43	40.2	40.2	100.0
	Total	107	100.0	100.0	

TABLE 7: Statistical interpretation of how effective antibiotics are against viruses.

TABLE 7: The results regarding beliefs about the effectiveness of antibiotics against viruses:

- **No**: 42 respondents (39.3%) believe antibiotics are not effective against viruses.
- **Not Sure**: 22 respondents (20.6%) are unsure about whether antibiotics are effective against viruses.
- **Yes**: 43 respondents (40.2%) believe antibiotics are effective against viruses.

These responses show a varied understanding among respondents about the role of antibiotics in treating viral infections, with a significant portion unsure or believing antibiotics are effective, despite them actually being ineffective against viruses.

How often should antibiotics be taken as prescribed?

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	Always	43	40.2	40.2	40.2
	Nott sure	3	2.8	2.8	43.0
	Only when needed	36	33.6	33.6	76.6
	Sometimes	25	23.4	23.4	100.0
	Total	107	100.0	100.0	

TABLE 8: Statistical interpretation of how antibiotics should be taken as prescribed.

TABLE 8: How often antibiotics should be taken as prescribed:

- **Always**: 43 respondents (40.2%) indicated that antibiotics should always be taken as prescribed. This response aligns with medical guidelines to complete the full course of antibiotics as prescribed by a healthcare provider to ensure effectiveness and reduce the risk of antibiotic resistance.
- **Not sure**: 3 respondents (2.8%) were unsure about how often antibiotics should be taken as prescribed.
- **Only when needed**: 36 respondents (33.6%) believe antibiotics should only be taken when needed. This response reflects an awareness of the importance of

using antibiotics judiciously to avoid unnecessary use and reduce the risk of antibiotic resistance.

- **Sometimes**: 25 respondents (23.4%) indicated that antibiotics should be taken as prescribed sometimes. This category may suggest varying degrees of adherence to prescription instructions depending on circumstances.

In summary, the majority of respondents (40.2%) recognize the importance of always taking antibiotics as prescribed. However, there is a significant portion (33.6%) who believe antibiotics should only be used when necessary, reflecting awareness of antibiotic stewardship principles.

How do you feel about requesting antibiotics from your child's healthcare provider for illnesses like colds or the flu?

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	I always request antibiotics	24	22.4	22.4	22.4
	I never request antibiotics	12	11.2	11.2	33.6
	I rarely request antibiotics	30	28.0	28.0	61.7
	I sometimes request antibiotics	41	38.3	38.3	100.0
	Total	107	100.0	100.0	

TABLE 9: Statistical interpretation of how antibiotics should be taken as prescribed.

TABLE 9: Summary of respondents' attitudes towards requesting antibiotics from their child's healthcare provider for illnesses like colds or the flu:

- **I always request antibiotics**: 24 respondents (22.4%) indicated that they always request antibiotics for illnesses like colds or the flu. This approach is concerning because antibiotics are ineffective against viral infections such as colds or the flu, and overuse can contribute to antibiotic resistance.

- **I never request antibiotics**: 12 respondents (11.2%) stated that they never request antibiotics. This response aligns with appropriate medical advice to avoid unnecessary antibiotic use for viral illnesses.
- **I rarely request antibiotics**: 30 respondents (28.0%) mentioned that they rarely request antibiotics. This suggests a cautious approach to antibiotic use, recognizing the limited effectiveness against viral infections.
- **I sometimes request antibiotics**: 41 respondents (38.3%) indicated that they sometimes request antibiotics. This category suggests variability in behaviour, possibly influenced by factors such as perceived severity of symptoms or previous experiences.

In summary, while a significant portion (22.4%) of respondents always request antibiotics for colds or the flu, there is also awareness among others (11.2% never request and 28.0% rarely request) about the inappropriate use of antibiotics for viral infections. However, the fact that 38.3% sometimes request antibiotics indicates a need for continued education on the appropriate use of antibiotics to combat antibiotic resistance.

Do you believe antibiotic resistance is a significant issue?

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	no	13	12.1	12.1	12.1
	not sure	24	22.4	22.4	34.6
	yes	70	65.4	65.4	100.0
	Total	107	100.0	100.0	

TABLE 10: Statistical interpretation of do the participants believe that antibiotic resistance is a significant issue.

TABLE 10: Here is an interpretation of respondents' beliefs about whether antibiotic resistance is a significant issue:

- **No**: 13 respondents (12.1%) do not believe antibiotic resistance is a significant issue. This view might stem from a lack of awareness or understanding of the implications of antibiotic resistance on healthcare and treatment effectiveness.

- **Not sure**: 24 respondents (22.4%) are unsure about whether antibiotic resistance is a significant issue. This uncertainty could be due to insufficient knowledge or information on the topic.
- **Yes**: 70 respondents (65.4%) believe antibiotic resistance is a significant issue. This majority recognizes the importance of antibiotic resistance as a global health concern, impacting the effectiveness of antibiotics in treating bacterial infections.

In summary, while a significant proportion (65.4%) of respondents acknowledge antibiotic resistance as a significant issue, there is also a notable portion who either do not believe it is significant (12.1%) or are unsure (22.4%). Continued education and awareness efforts are crucial to address misconceptions and promote responsible antibiotic use to combat antibiotic resistance effectively.

Do you complete the full course of antibiotics prescribed to your child, even if they start feeling better?

		Frequency	Percent (%)	Valid Percent(%)	Cumulative Percent(%)
Valid	Always	59	55.1	55.1	55.1
	Never	5	4.7	4.7	59.8
	Rarely	13	12.1	12.1	72.0
	Sometimes	30	28.0	28.0	100.0
	Total	107	100.0	100.0	

TABLE 11: Statistical interpretation of do the participants complete the full course of antibiotics prescribed, even if they start feel better.

TABLE 11: Here is a summary of responses regarding whether respondents complete the full course of antibiotics prescribed to their child, even if the child starts feeling better:

- **Always**: 59 respondents (55.1%) indicated that they always complete the full course of antibiotics prescribed to their child, even if the child starts feeling better. This adherence to completing the full course is important to ensure that all bacteria causing the infection are effectively eliminated, reducing the risk of antibiotic resistance.

- **Never**: 5 respondents (4.7%) stated that they never complete the full course of antibiotics. This practice is concerning as it can contribute to incomplete treatment and potentially lead to antibiotic resistance.

- **Rarely**: 13 respondents (12.1%) mentioned that they rarely complete the full course of antibiotics. This suggests variability in adherence, possibly influenced by factors such as the child's improvement or misunderstanding of the importance of completing the course.

- **Sometimes**: 30 respondents (28.0%) indicated that they sometimes complete the full course of antibiotics. This category suggests inconsistency in behaviour, which could be influenced by various factors such as perceived improvement of symptoms or concerns about side effects.

In summary, while a majority (55.1%) of respondents reported always completing the full course of antibiotics prescribed to their child, there are also significant proportions who do not always adhere to this practice (4.7% never, 12.1% rarely, and 28.0% sometimes). Consistent education on the importance of completing antibiotic courses as prescribed is crucial to ensure effective treatment and combat antibiotic resistance.

How concerned are you about the impact of antibiotics on your child's long-term health?

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	Not concerned	12	11.2	11.2	11.2
	Somewhat concerned	39	36.4	36.4	47.7
	Very concerned	56	52.3	52.3	100.0
	Total	107	100.0	100.0	

TABLE 12: Statistical interpretation of what kind of impact of antibiotics have on the long-term health of the child.

TABLE 12: Summary of respondents' concerns about the impact of antibiotics on their child's long-term health:

- **Not concerned**: 11.2% of respondents are not concerned about the impact of antibiotics on their child's long-term health.
- **Somewhat concerned**: 36.4% are somewhat concerned about the impact.
- **Very concerned**: 52.3% are very concerned about the impact of antibiotics on their child's long-term health.

This data indicates a significant level of concern among respondents regarding the potential long-term effects of antibiotics on their children's health, highlighting the importance of informed decision-making and careful antibiotic use in paediatric care.

What do you understand about the importance of completing the full course of antibiotics?

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	Ensures complete elimination of infection	42	39.3	39.3	39.3
	Minimizes risk of recurrence	30	28.0	28.0	67.3
	Prevents antibiotic resistance	35	32.7	32.7	100.0
	Total	107	100.0	100.0	

TABLE 13: Statistical interpretation of importance of completing the full course of antibiotics.

TABLE 13: Interpretation of the above data:

- **Ensures complete elimination of infection** is identified by the highest proportion of respondents (39.3%) as the primary reason for completing a full course of antibiotics.
- **Prevents antibiotic resistance** is the next most common reason, noted by 32.7% of respondents.
- **Minimizes risk of recurrence** is considered important by 28.0% of respondents.

The cumulative percent column helps to understand the progression of responses. After the first category (complete elimination), 39.3% of respondents are accounted for. Adding

the second category (minimizes recurrence) brings the total to 67.3%, and finally, including the third category (prevents resistance) reaches 100%.

The data indicates that all three reasons are important considerations for respondents, with ensuring complete elimination of the infection being the most recognized, followed by preventing antibiotic resistance, and then minimizing the risk of recurrence.

How reliable do you consider information from the following sources regarding antibiotic use in children?

		Frequency	Percent(%)	Valid Percent(%)	Cumulative Percent(%)
Valid	Family and friends	10	9.3	9.3	9.3
	Healthcare providers	60	56.1	56.1	65.4
	Internet searches	37	34.6	34.6	100.0
	Total	107	100.0	100.0	

TABLE 14: Statistical interpretation of the reliability of information from the various sources regarding the use of antibiotics in children.

TABLE 14: Summary of how respondents perceive the reliability of information from different sources regarding antibiotic use in children:

- **Family and friends**: 9.3% of respondents consider information from family and friends reliable regarding antibiotic use in children.
- **Healthcare providers**: 56.1% view information from healthcare providers as reliable.
- **Internet searches**: 34.6% rely on information from internet searches regarding antibiotic use in children.

This summary indicates that while healthcare providers are widely trusted for information on antibiotic use in children, a significant portion also considers information from internet searches, albeit with some caution. Information from family and friends is perceived as less reliable compared to healthcare providers and internet sources.

How satisfied are you with the level of information provided by healthcare providers regarding antibiotic use for your child?

		Frequency	Percent(%)	Valid Percent(%)	Cumulative Percent(%)
Valid	Very comfortable	21	19.6	19.6	19.6
	Somewhat comfortable	21	19.6	19.6	39.3
	Neutral	25	23.4	23.4	62.6
	Somewhat uncomfortable	32	29.9	29.9	92.5
	Very uncomfortable	8	7.5	7.5	100.0
	Total	107	100.0	100.0	

TABLE 15: Statistical interpretation of how satisfied the respondents are with the level of information provided by the healthcare provider regarding use of antibiotics for your child.

TABLE 15: Summary of respondents' satisfaction levels with the information provided by healthcare providers regarding antibiotic use for their child:

- **Very comfortable**: 19.6% of respondents feel very comfortable with the information provided by healthcare providers regarding antibiotic use.
- **Somewhat comfortable**: Another 19.6% feel somewhat comfortable with the information.
- **Neutral**: 23.4% are neutral about the information provided.
- **Somewhat uncomfortable**: 29.9% feel somewhat uncomfortable with the information provided.
- **Very uncomfortable**: 7.5% feel very uncomfortable with the information provided.

Overall, the data shows a varied spectrum of satisfaction levels regarding the information provided by healthcare providers about antibiotic use for children, with a notable portion feeling either uncomfortable or neutral about the information received.

How often do you consult with pharmacists regarding antibiotic use for your child?

		Frequency	Percent(%)	Valid Percent(%)	Cumulative Percent(%)
Valid	Always	40	37.4	37.4	37.4
	Never	7	6.5	6.5	43.9
	Rarely	13	12.1	12.1	56.1
	Sometimes	47	43.9	43.9	100.0
	Total	107	100.0	100.0	

TABLE 16: Statistical interpretation of how often the respondents consult with the pharmacists regarding the antibiotic use for their child.

TABLE 16: Summary of how often respondents consult with pharmacists regarding antibiotic use for their child:

- **Always**: 37.4% of respondents always consult with pharmacists regarding antibiotic use.
- **Never**: 6.5% never consult with pharmacists regarding antibiotic use.
- **Rarely**: 12.1% rarely consult with pharmacists.
- **Sometimes**: 43.9% sometimes consult with pharmacists.

This summary shows that a significant portion of respondents (43.9%) consult with pharmacists sometimes, indicating a varying level of engagement with pharmacists regarding antibiotic use for their children.

Are you aware of programs or initiatives aimed at promoting responsible antibiotic use?

		Frequency	Percent(%)	Valid Percent(%)	Cumulative Percent(%)
Valid	No	47	43.9	43.9	43.9
	Yes	60	56.1	56.1	100.0
	Total	107	100.0	100.0	

TABLE 17: Statistical interpretation of how programs or initiatives aimed at promoting responsible antibiotic use.

TABLE 17: Summary of respondents' awareness of programs or initiatives aimed at promoting responsible antibiotic use:

- **No**: 43.9% of respondents are not aware of programs or initiatives aimed at promoting responsible antibiotic use.
- **Yes**: 56.1% of respondents are aware of such programs or initiatives.

This summary indicates that a majority of respondents are aware of efforts to promote responsible antibiotic use, but a significant portion (43.9%) are not familiar with these initiatives. Awareness of such programs is important for educating the public about proper antibiotic use and combating antibiotic resistance.

Do you encourage practices to boost your child's immune system to prevent infections?

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	No	21	19.6	19.6	19.6
	Yes	86	80.4	80.4	100.0
	Total	107	100.0	100.0	

TABLE 18: Statistical interpretation of well the participants encourage practises to boost their child's immune system to prevent infections.

TABLE 18: Summary of respondents' practices regarding boosting their child's immune system to prevent infections:

- **No**: 19.6% of respondents do not encourage practices to boost their child's immune system to prevent infections.
- **Yes**: 80.4% of respondents do encourage practices to boost their child's immune system.

This summary shows that a majority of respondents actively encourage practices to enhance their child's immune system as a preventive measure against infections.

If yes, which alternatives are you familiar with?

		Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Valid	Natural Remedies	49	45.8	45.8	45.8
	Symptom Management	35	32.7	32.7	78.5
	Watchful Waiting	23	21.5	21.5	100.0
	Total	107	100.0	100.0	

TABLE 19: Statistical interpretation of the alternatives procedure that the participants are familiar with.

TABLE 19: Summary of respondents' familiarity with alternatives for boosting their child's immune system:

- **Natural Remedies**: 45.8% of respondents are familiar with natural remedies as alternatives to boost their child's immune system.
- **Symptom Management**: 32.7% are familiar with symptom management as an alternative approach.
- **Watchful Waiting**: 21.5% are familiar with watchful waiting as a strategy.

This summary indicates varying levels of familiarity with different alternatives to boost a child's immune system among respondents, with natural remedies being the most commonly recognized approach.

TABLE 20: Summary of the crosstabulation between Education Level and beliefs about antibiotics' effectiveness against viruses:

- **12th Pass**: The majority (66.7%) believe antibiotics are ineffective against viruses.
- **Graduate**: Nearly half (48.8%) believe antibiotics are beneficial against viruses.
- **Postgraduate**: Views are evenly split between effectiveness, ineffectiveness, and uncertainty about antibiotics against viruses.

This summary highlights varying beliefs across education levels regarding the effectiveness of antibiotics against viral infections.

Education Level * Do you believe antibiotics are effective against viruses? Crosstabulation

			Do you believe antibiotics are effective against viruses?			
			No	Not Sure	Yes	Total
Education Level	12th Pass	Count	8	2	2	12
		Expected Count	4.7	2.5	4.8	12.0
	Graduate	Count	13	8	20	41
		Expected Count	16.1	8.4	16.5	41.0
	Postgraduate	Count	21	12	21	54
		Expected Count	21.2	11.1	21.7	54.0
Total		Count	42	22	43	107
		Expected Count	42.0	22.0	43.0	107.0

TABLE 20: Statistical interpretation of the crosstabulation between education level and beliefs about antibiotics' effectiveness against viruses.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.505[a]	4	.239
Likelihood Ratio	5.574	4	.233
N of Valid Cases	107		

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is 2.47.

TABLE 21: Statistical interpretation of the chi-square test for the crosstabulation between education level and beliefs about antibiotics' effectiveness against viruses.

TABLE 21: Based on the Chi-Square tests conducted on the crosstabulation data:
• The Pearson Chi-Square was 5.505 with 4 degrees of freedom, resulting in a p-value of 0.239.
• The Chi-Square likelihood ratio was 5.574 with 4 degrees of freedom, resulting in a p-value of 0.233.
These findings indicate that there is no statistically significant relationship between education level and views regarding the efficacy of antibiotics against viruses. The p-values (0.239 for Pearson Chi-Square and 0.233 for Likelihood Ratio Chi-Square) are higher than the standard significance level of 0.05, suggesting that we cannot reject the null hypothesis. As a result, we do not have enough information to establish that education level effects opinions regarding antibiotic efficiency against viruses in this population.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.227	.239
	Cramer's V	.160	.239
N of Valid Cases		107	

TABLE 22: Statistical interpretation of the symmetric measures for the crosstabulation between education level and beliefs about antibiotics' effectiveness against viruses.

TABLE 22: Based on the symmetric measures calculated for the association between Education Level and beliefs about antibiotic effectiveness against viruses:

- **Phi coefficient**: 0.227 with an approximate significance of 0.239.
- **Cramer's V**: 0.160 with an approximate significance of 0.239.

These measures indicate a weak association between Education Level and beliefs about antibiotic effectiveness against viruses. Both Phi and Cramer's V coefficients are relatively low, suggesting that there is little to no practical significance or strong relationship between these variables in the sample data. The approximate significances (p-values) of 0.239 further support the finding that there is no statistically significant association between Education Level and beliefs about antibiotic effectiveness against viruses in this study.

Crosstab

			Do you complete the full course of antibiotics prescribed to your child, even if they start feeling better?				
			Always	Never	Rarely	Sometimes	Total
Number of Children	1	Count	28	1	7	17	53
		Expected Count	29.2	2.5	6.4	14.9	53.0
	2	Count	24	4	5	8	41
		Expected Count	22.6	1.9	5.0	11.5	41.0
	3	Count	7	0	1	5	13
		Expected Count	7.2	.6	1.6	3.6	13.0
Total		Count	59	5	13	30	107
		Expected Count	59.0	5.0	13.0	30.0	107.0

TABLE 23: Statistical interpretation of the crosstabulation between the number of children and do the participants complete the full course of antibiotics prescribed to their child, even if they start feeling better.

TABLE 23: Here's a concise summary of the crosstabulation:

- **Always**: 52.8% always complete the full course of antibiotics.
- **Never**: 4.7% never complete the full course.
- **Rarely**: 12.1% rarely complete the full course.
- **Sometimes**: 28.0% sometimes complete the full course.

The data also includes counts for respondents based on the number of children they have (1, 2, or 3), showing varying levels of adherence to completing antibiotic courses as prescribed.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.032[a]	6	.420
Likelihood Ratio	6.443	6	.375
N of Valid Cases	107		

6 cells (50.0%) have expected count less than 5. The minimum expected count is .61.

TABLE 24: Statistical interpretation of the chi square test for crosstabulation between the number of children and do the participants complete the full course of antibiotics prescribed to their child, even if they start feeling better.

TABLE 24: According to the Chi-Square tests performed on the crosstabulation data:
• The Pearson Chi-Square was 6.032 with 6 degrees of freedom, yielding a p-value of 0.420.
• The Chi-Square likelihood ratio was 6.443 with 6 degrees of freedom, yielding a p-value of 0.375.

These findings show that there is no statistically significant relationship between completing the whole course of antibiotics recommended to children and the number of children the respondents had. The p-values (0.420 for Pearson Chi-Square and 0.375 for Likelihood Ratio Chi-Square) are larger than the standard significance level of 0.05, indicating that we cannot reject the null hypothesis. As a result, based on this sample data, there is insufficient evidence to establish that the number of children increases the chance of finishing antibiotic treatments as prescribed.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.237	.420
	Cramer's V	.168	.420
N of Valid Cases		107	

TABLE 25: Statistical interpretation of the symmetric measures for crosstabulation between the number of children and do the participants complete the full course of antibiotics prescribed to their child, even if they start feeling better.

TABLE 25: Based on the symmetric measures calculated for the association between completion of antibiotic courses and the number of children:

- **Phi coefficient**: 0.237 with an approximate significance of 0.420.
- **Cramer's V**: 0.168 with an approximate significance of 0.420.

These measures indicate a weak association between completion of antibiotic courses and the number of children respondents have. Both Phi and Cramer's V coefficients are relatively low, suggesting that there is little to no practical significance or strong relationship between these variables in the sample data. The approximate significances (p-values) of 0.420 further support the finding that there is no statistically significant association between these variables.

TABLE 26: Concise summary of the crosstabulation:

- **Always**: Higher rates among Post Graduates (66.7%), followed by Graduates (43.9%) and 12th Pass (41.7%).
- **Never**: Lower rates overall, with none among Post Graduates.
- **Rarely**: Varies from 8.3% (12th Pass) to 14.6% (Graduate).
- **Sometimes**: Ranges from 22.2% (Post Graduate) to 33.3% (12th Pass).

This table shows the distribution of completion behaviours across different levels of education. It highlights varying levels of adherence to completing antibiotic courses as prescribed, with higher educational attainment generally associated with higher rates of always completing the full course.

Crosstab

			Do you complete the full course of antibiotics prescribed to your child, even if they start feeling better?				
			Always	Never	Rarely	Sometimes	Total
Education Level	12th Pass	Count	5	2	1	4	12
		Expected Count	6.6	.6	1.5	3.4	12.0
	Graduate	Count	18	3	6	14	41
		Expected Count	22.6	1.9	5.0	11.5	41.0
	Postgraduate	Count	36	0	6	12	54
		Expected Count	29.8	2.5	6.6	15.1	54.0
Total		Count	59	5	13	30	107
		Expected Count	59.0	5.0	13.0	30.0	107.0

TABLE 27: Statistical interpretation of the crosstabulation between education level and the completion of the full course of antibiotics prescribed to the child, even if they start feeling better.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.183[a]	6	.083
Likelihood Ratio	12.169	6	.058
N of Valid Cases	107		

a. 6 cells (50.0%) have expected count less than 5. The minimum expected count is .56.

TABLE 28: Statistical interpretation of the chi square test for crosstabulation between education level and the completion of the full course of antibiotics prescribed to the child, even if they start feeling better.

TABLE 27: Based on the Chi-Square tests conducted on the crosstabulation data:
• Pearson Chi-Square: 11.183, 6 degrees of freedom, p-value = 0.083.
• The Chi-Square likelihood ratio was 12.169 with 6 degrees of freedom, yielding a p-value of 0.058.
These findings indicate that there is no strong evidence of a statistically significant link between education level and completion of antibiotic courses recommended to children. The p-values (0.083 for Pearson Chi-Square and 0.058 for Likelihood Ratio Chi-Square) exceed the standard significance level of 0.05, suggesting that we do not reject the null hypothesis. As a result, based on the sample data, there is insufficient evidence to establish that education level increases the chance of finishing antibiotic regimens as recommended.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.323	.083
	Cramer's V	.229	.083
N of Valid Cases		107	

TABLE 28: Statistical interpretation of the symmetric measures for crosstabulation between education level and the completion of the full course of antibiotics prescribed to the child, even if they start feeling better.

TABLE 28: Based on the symmetric measures calculated for the association between Education Level and completion of antibiotic courses:

- **Phi coefficient**: 0.323 with an approximate significance of 0.083.
- **Cramer's V**: 0.229 with an approximate significance of 0.083.

These measures indicate a moderate association between Education Level and completion of antibiotic courses prescribed to children. Both Phi and Cramer's V coefficients suggest

a slightly stronger relationship compared to earlier analyses, though the p-values (0.083) still do not reach conventional levels of statistical significance (typically $p < 0.05$).

Therefore, while there appears to be some association between Education Level and completion behaviours, it is not strong enough in this sample to confidently assert a significant relationship.

Education Level * Do you believe antibiotic resistance is a significant issue? Crosstabulation

			Do you believe antibiotic resistance is a significant issue?			
			no	not sure	yes	Total
Education Level	12th Pass	Count	2	6	4	12
		Expected Count	1.5	2.7	7.9	12.0
	Graduate	Count	6	12	23	41
		Expected Count	5.0	9.2	26.8	41.0
	Postgraduate	Count	5	6	43	54
		Expected Count	6.6	12.1	35.3	54.0
Total		Count	13	24	70	107
		Expected Count	13.0	24.0	70.0	107.0

TABLE 28: Statistical interpretation of the crosstabulation between education level and do they believe antibiotic resistance is a significant issue.

TABLE 29: Concise summary of the crosstabulation:

- **12th Pass**: Higher uncertainty (50.0%) about antibiotic resistance as a significant issue.
- **Graduate**: More recognition (56.1%) of antibiotic resistance as a significant issue.

- **Post Graduate**: Strongest recognition (79.6%) of antibiotic resistance as a significant issue.

This table shows the distribution of beliefs about antibiotic resistance across different levels of education. It indicates varying levels of concern about antibiotic resistance, with higher levels of education generally associated with greater recognition of antibiotic resistance as a significant issue.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12.887[a]	4	.012
Likelihood Ratio	12.794	4	.012
N of Valid Cases	107		

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is 1.46.

TABLE 26: Statistical interpretation of the chi square test crosstabulation between education level and do they believe antibiotic resistance is a significant issue.

TABLE 30:Based on the Chi-Square tests conducted on the crosstabulation data:
• The Pearson Chi-Square is 12.887 with 4 degrees of freedom, resulting in a p-value of 0.012.
• The Chi-Square likelihood ratio was 12.794 with 4 degrees of freedom, resulting in a p-value of 0.012.

These findings show that there is a statistically significant link between education level and attitudes concerning antibiotic resistance as a major issue. The p-values (0.012 for both tests) are less than the standard significance level of 0.05, indicating that we reject the null hypothesis. As a result of this sample data, there is adequate evidence to infer that education level impacts perceptions regarding antibiotic resistance, with higher education levels being related with a better identification of antibiotic resistance as a serious issue.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.347	.012
	Cramer's V	.245	.012
N of Valid Cases		107	

TABLE 26: Statistical interpretation of the symmetric measures for the crosstabulation between education level and do they believe antibiotic resistance is a significant issue.

TABLE 31: These measures indicate a moderate association between Education Level and beliefs about antibiotic resistance. Both Phi and Cramer's V coefficients suggest a meaningful relationship between these variables in the sample data The p-values (0.012) are smaller than the standard significance level of 0.05, showing that there is statistically significant evidence to indicate that Education Level effects attitudes about antibiotic resistance as a serious concern. Specifically, higher levels of education tend to be associated with a greater recognition of antibiotic resistance as a significant concern.

TABLE 32: Brief summary of the crosstabulation:

- **Little influence**: Higher among 12th Pass (33.3%), lower with higher education.
- **No influence**: Similar across education levels, with fewer as education increases.
- **Not sure**: Minimal variation across education levels.
- **Significant influence**: Higher with Post Graduates (38.9%), varied among others.
- **Some influence**: More common among Graduates (29.3%) and Post Graduates (38.9%).

This summary highlights differing perceptions of pharmaceutical advertising's influence on antibiotic use decisions based on varying levels of education.

Crosstab

			How much influence do you think pharmaceutical advertising has on parental decisions regarding antibiotic use for their children?					
			Little influence	No influence	Not sure	Significant influence	Some influence	Total
Education Level	12th Pass	Count	4	2	1	4	1	12
		Expected Count	2.4	1.2	.3	4.3	3.8	12.0
	Graduate	Count	9	6	1	13	12	41
		Expected Count	8.0	4.2	1.1	14.6	13.0	41.0
	Postgraduate	Count	8	3	1	21	21	54
		Expected Count	10.6	5.6	1.5	19.2	17.2	54.0
Total		Count	21	11	3	38	34	107
		Expected Count	21.0	11.0	3.0	38.0	34.0	107.0

TABLE 32: Statistical interpretation of the crosstabulation between education level and do the influence of pharmaceutical advertising has on parental decision making on antibiotic use for their children.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9.179[a]	8	.327
Likelihood Ratio	9.494	8	.302
N of Valid Cases	107		

a. 8 cells (53.3%) have expected count less than 5. The minimum expected count is .34.

TABLE 33: Statistical interpretation of the chi square test for crosstabulation between education level and do the influence of pharmaceutical advertising has on parental decision making on antibiotic use for their children.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.293	.327
	Cramer's V	.207	.327
N of Valid Cases		107	

TABLE 33: Statistical interpretation of the symmetric measures for crosstabulation between education level and do the influence of pharmaceutical advertising has on parental decision making on antibiotic use for their children.

TABLE 33: Concise summary based on the provided information:

- **Chi-Square Tests**: Education Level does not show a significant association with perceived influence of pharmaceutical advertising on antibiotic use decisions (Pearson Chi-Square, p = 0.327; Likelihood Ratio Chi-Square, p = 0.302).
- **Symmetric Measures**: There is a weak to moderate association between Education Level and perceptions of pharmaceutical advertising influence (Phi = 0.293, p = 0.327; Cramer's V = 0.207, p = 0.327).

These findings suggest that Education Level does not strongly influence how parents perceive the impact of pharmaceutical advertising on their decisions regarding antibiotic use for children.

CHAPTER: 5

DISCUSSION

INTERPRETATION OF RESULTS

The study intended to measure parental knowledge and attitudes on antibiotic usage, with a particular emphasis on the implications for antimicrobial stewardship. Detailed analysis of survey results produced important insights regarding parental awareness, practices, and attitudes of antibiotic usage and resistance.

Key Findings

1. **Demographic Characteristics**:
    - The sample comprised 107 participants with diverse educational backgrounds: 12th Pass (11.2%), Graduates (38.3%), and Post Graduates (50.5%).
2. **Knowledge about Antibiotics**:
    - A significant portion of parents (40.2%) mistakenly believed that antibiotics are effective against viruses, while 39.3% correctly understood that they are not, and 20.6% were unsure.
    - Awareness of antibiotic resistance varied, with 65.4% recognizing it as a significant issue, 22.4% uncertain, and 12.1% dismissing its importance.
3. **Attitudes Towards Antibiotic Use**:
    - Regarding the completion of antibiotic courses, 55.1% of parents consistently completed the full course, while 28.0% did so sometimes, 12.1% rarely, and 4.7% never.
    - The influence of pharmaceutical advertising on parental decisions showed variability, with some parents acknowledging significant influence (35.5%) and others reporting little to no influence (29.9%).

4. **Associations with Education Level**:

   - Chi-Square tests revealed a statistically significant association between education level and understanding of antibiotic resistance ($\chi^2 = 12.887$, df = 4, p = 0.012), with higher educational attainment linked to better awareness.

   - No significant association was found between education level and beliefs about the effectiveness of antibiotics against viruses ($\chi^2 = 5.505$, df = 4, p = 0.239) or completion of antibiotic courses ($\chi^2 = 11.183$, df = 6, p = 0.083).

LIMITATIONS OF THE STUDY

1. **Sample Size and Generalizability:**
   a. Sample Size: The study included a small sample size of 107 individuals, which may restrict the generalizability of the results. Larger sample numbers will produce more reliable data and enable more clear conclusions.
   b. Geographical limitations: The study was done in a specific geographic location, limiting the results' application to other regions with diverse demographics, cultural traditions, and healthcare systems.

2**. Self-reported data**

a. Response Bias: Using self-reported data might induce response bias, in which individuals supply socially preferred answers rather than true ones. This might have an impact on the findings' accuracy, especially when dealing with sensitive matters like medication adherence.

b. Recall Bias: Participants may not properly recall previous antibiotic-related actions or experiences, thus resulting to data discrepancies.

3. **Survey design:**

a. Questionnaire Limitations: The questionnaire's design, including question wording and organization, may impact how participants answer. Any ambiguity or leading questions may influence the results.

b. Limited characteristics: The study concentrates on certain characteristics linked to antibiotic knowledge and attitudes, perhaps leaving out other key factors that impact parental behaviour, such as socioeconomic position, cultural views, and access to healthcare.

4. **Cross-sectional Design:**

a. Temporal Limitation: Because this is a cross-sectional research, data is collected at a single moment in time, making it impossible to determine causation or changes in knowledge and attitudes over time.

STRENGTHS OF THE STUDY

- **Relevant and Timely Topic:**
    a. Public Health Importance: The work tackles a crucial public health issue—antibiotic resistance—that is a global concern. By concentrating on parental knowledge and attitudes, it gives useful information about a crucial demographic that determines antibiotic usage in children.

- **Comprehensive Data Collection:**

    a. Multiple Variables: The study investigates several elements of knowledge and attitudes resulting in a thorough understanding of the factors that influence parental antibiotic use.
    b. . This includes opinions regarding antibiotic efficacy, adherence practices, and attitudes against pharmaceutical advertising.

c. Demographic study: By include demographic variables such as education level and number of children, it is possible to conduct a thorough study of how these characteristics influence parental knowledge and attitudes.

- **Educational implications:**

a. Targeted suggestions: The findings make specific suggestions for educational interventions and public health initiatives that may be used to enhance antimicrobial stewardship practices.

b. Healthcare Provider Role: The study emphasizes the importance of healthcare practitioners teaching parents, highlighting the necessity for constant and clear communication in order to reduce antibiotic overuse.

- **Statistical analysis:**

a. Robust Statistical Methods: The use of Chi-Square tests and symmetric measures allows for a robust statistical analysis of the data, assisting in the identification of significant connections between variables and assuring the dependability of the results reached.

- **Foundation of Future Research:**

a. The study's findings and emphasized knowledge gaps form a solid platform for future research. It identifies areas which require additional exploration, such as the long-term impact of educational initiatives and the role of other demographic variables.

IMPLICATIONS FOR ANTIMICROBIAL STEWARDSHIP

The findings of this study underscore the necessity for comprehensive and targeted interventions within antimicrobial stewardship (AMS) programs to address gaps in parental knowledge and attitudes towards antibiotic use in paediatric care. Effective strategies should be multifaceted, incorporating educational initiatives, enhanced communication, and collaborative approaches to foster better understanding and practices among parents.

1. **Educational Campaigns**

1.1 Clear and Accessible Information:

• Create evidence-based instructional materials explaining when antibiotics are essential, distinguishing between bacterial and viral illnesses, and highlighting the consequences of antibiotic abuse, including the development of resistance.
• Targeted messaging addresses typical misunderstandings and knowledge gaps for non-medical audiences.
• Use diverse forms, such as brochures, posters, films, and interactive internet information, to accommodate varied learning styles and reading levels.

1.2 Dissemination Channels:

• Distribute instructional materials at paediatric clinics, including waiting areas, consultation rooms, and health visits. Include brief educational sessions or movies during clinic appointments.
• Collaborate with schools to include antibiotic teaching into health curriculum and parent-teacher meetings, providing consistent messaging for both students and parents.
• Use various online platforms like social media, healthcare websites, and mobile apps to share information broadly. Create intriguing and shareable material, such as infographics and animated movies, to reach a larger audience.

2. **Enhanced Communication**

2.1 Training Healthcare Providers:

• Train healthcare personnel on good communication skills, emphasizing the necessity of optimal antibiotic usage and addressing family concerns and misconceptions.
• Encourage shared decision-making by engaging parents in talks about their child's treatment options and explaining the rationale for not administering needless antibiotics.

2.2 Standardized Communication Tools:

• Develop and distribute decision aids, such as brochures or digital tools, for healthcare clinicians to utilize during consultations to explain proper antibiotic usage.
• Provide parents with take-home papers that reinforce consultation information, such as tips for managing viral illnesses and when to seek additional medical counsel.

3. **Collaborative Approaches**

3.1 Engaging Parents:

• Conduct focus groups and gather input from parents to understand their viewpoints, preferences, and impediments to implementing approved antibiotic practices. Use this input to help improve instructional materials and interventions.
• Conduct interactive and engaging parent education sessions conducted by healthcare experts to discuss antibiotic usage and resistance.

3.2 Community Involvement:

• Collaborate with community organizations, such as parenting groups and local health departments, to enhance educational efforts and guarantee consistent message in various venues.
• Conduct community-wide public health programs including schools, community centres, and local media to promote antibiotic stewardship and proper usage.

3.3 Monitoring and Feedback:

• Monitor educational programs' influence on parental knowledge and antibiotic prescription behaviours. Utilize data to continually improve and modify strategy.
• Regular updates: Provide parents with periodic information and feedback on the performance of AMS programs and their role in fighting antibiotic resistance, encouraging positive behaviours, and ensuring adherence to recommendations.

CHAPTER: 6

CONCLUSION

FINDINGS

1. **Knowledge About Antibiotics:**
    - A significant portion of parents (40.2%) incorrectly believe that antibiotics are effective against viruses, while 39.3% correctly know they are not.
    - Awareness of antibiotic resistance is relatively high, with 65.4% acknowledging it as a significant issue.

2. **Attitudes Towards Antibiotic Use:**
    - Only 55.1% of parents always complete the full course of antibiotics prescribed to their child.
    - Parents' comfort levels with information provided by healthcare providers vary, with only 19.6% feeling very comfortable.
    - Pharmaceutical advertising has a varied influence on parental decisions, with 35.5% perceiving significant or some influence.

3. **Education Level and Antibiotic Knowledge:**
    - Higher education levels correlate with better knowledge about antibiotic resistance and also regarding their appropriate antibiotic use. Postgraduate parents show the highest awareness.

4. **Consultation and Sources of Information:**
    - Healthcare providers are considered the most reliable source of information regarding antibiotic use (56.1%).
    - A substantial number of parents (43.9%) consult pharmacists regarding antibiotic use for their child.

5. **Programs and Initiatives:**
    - Awareness of programs promoting responsible antibiotic use is moderate, with 56.1% of parents aware of such initiatives.

IMPLICATIONS

1. **Educational Interventions:**
    - There is a clear need for educational programs targeting parents, especially those with lower education levels, to correct misconceptions about antibiotics and viruses.
2. **Healthcare Provider Engagement**:
    - Enhancing the communication skills of healthcare providers to ensure parents feel more comfortable and informed about antibiotic use can improve adherence to prescribed courses.
3. **Public Health Campaigns:**
    - Campaigns should be made to emphasize and promote the risks of incomplete antibiotic courses and the importance of completing the full prescription to combat antibiotic resistance.
4. **Pharmaceutical Advertising Regulation**:
    - Given the influence of pharmaceutical advertising, stricter regulations and clearer guidelines on antibiotic promotions can help mitigate inappropriate parental demands for antibiotics.
5. **Antimicrobial Stewardship Programs:**
    - Increasing awareness and accessibility of antimicrobial stewardship programs can further educate parents on the responsible use of antibiotics.
6. **Enhanced Role of Pharmacists:**
    - Pharmacists play a crucial role in educating parents about antibiotics and should be more actively involved in public health initiatives.

By addressing these implications, the study highlights areas where intervention can promote the responsible usage of antibiotics, ultimately reducing the potential risks of antibiotic resistance and improving public health outcomes.

RECOMMENDATIONS

Recommendations for further research

- **Longitudinal Studies**: Conduct longitudinal studies to determine the long-term effects of educational interventions on parental knowledge and antibiotic usage habits.
- **Behavioural Factors**: Investigate other factors, such as cultural influences and socioeconomic level, that may influence parental understanding and attitudes about antibiotic usage.
- **Intervention Effectiveness**: Assess the effectiveness of various forms of educational interventions (e.g., seminars, instructional pamphlets, and digital media campaigns) in modifying parental antibiotic-use habits.
- **Healthcare Provider Training**: Investigate how better training for healthcare providers affects their capacity to properly educate parents about antibiotics.

By implementing these recommendations and focusing on continuous improvement in educational strategies, healthcare systems can foster a more informed public, ultimately contributing to the global effort to combat antibiotic resistance.

RECOMMENDATIONS FOR THE EFFECTIVENESS OF ANTIMICROBIAL RESEARCH

Based on the reports of this study, several recommendations can be formulated to improve parental knowledge and attitudes towards antibiotic use, thereby supporting antimicrobial stewardship efforts:

1. **Educational Campaigns**:
    - **Targeted Messaging**: Develop educational campaigns that specifically address common misconceptions about antibiotics, such as their ineffectiveness against viral infections.
    - **School-Based Programs**: Implement educational programs in schools to reach parents through their children, emphasizing the importance of proper antibiotic usage and then reducing the risks of antibiotic resistance.

2. **Healthcare Provider Training**:
    - **Enhanced Communication**: Train healthcare providers on effective communication strategies to discuss antibiotic use with parents. This includes providing clear, consistent information about when antibiotics are necessary and the importance of completing prescribed courses.
    - **Standardized Guidelines**: Develop and distribute standardized guidelines for healthcare providers to follow during consultations, ensuring all parents receive the same high-quality information about antibiotics.

3. **Public Health Initiatives**:
    - **Media Campaigns:** Launch public health initiatives across numerous media channels to increase awareness about antibiotic resistance and encourage responsible usage. These campaigns should address the influence of pharmaceutical advertising and encourage parents to seek medical advice rather than relying on advertisements.
    - **Community Engagement**: Engage community leaders and local groups to communicate antibiotic stewardship information and resources, leveraging their influence to reach a broader demographic section of the society.

4. **Pharmacist Involvement**:
    - **Consultation Services**: Encourage parents to consult with pharmacists regarding antibiotic use. Pharmacists can provide valuable information about proper usage, potential side effects, and the importance of adherence to prescribed courses.
    - **Public Workshops**: Organize workshops and informational sessions led by pharmacists in community settings, such as local libraries and community centres, to educate parents about antibiotic use and resistance.

5. **Policy Recommendations**:
    - **Regulation of Pharmaceutical Advertising**: Advocate for stricter regulations on pharmaceutical advertising to ensure that promotional materials are accurate and do not mislead parents about the efficacy and appropriate use of antibiotics.
    - **Antibiotic Prescription Policies**: Implement policies that require healthcare providers to follow evidence-based guidelines when prescribing antibiotics, reducing the likelihood of unnecessary prescriptions.

6. **Parental Resources**:
    - **Information Pamphlets**: Provide simple leaflets and brochures in healthcare settings that explain correct antibiotic usage, the importance of completing the entire course, and the consequences of antibiotic resistance.
    - **Online Resources**: Develop and maintain an online resource hub where parents can access reliable information about antibiotics, including FAQs, myth-busting facts, and expert advice.

7. **Immune System Support**:
    - **Promote Healthy Practices**: Encourage practices that support children's immune systems, such as a balanced diet, regular physical activity,

adequate sleep, and proper hygiene. Educating parents on these behaviours can lower the number of illnesses and the need for medications.

- **Alternative Approaches**: Educate parents on alternative approaches to managing minor infections, such as natural remedies, symptom management, and watchful waiting, thereby reducing the over-reliance on antibiotics.

8. **Research and Monitoring**:
    - **Ongoing Research**: Support ongoing research to monitor parental knowledge and attitudes towards antibiotics, tracking changes over time and evaluating the effectiveness of educational interventions.
    - **Data Collection**: Implement regular surveys and feedback mechanisms to gather data from parents, healthcare providers, and pharmacists, ensuring continuous improvement in antibiotic stewardship programs.

By implementing these recommendations, healthcare systems and public health organizations can significantly enhance parental understanding and attitudes towards antibiotics, fostering more responsible use and combating the growing threat of antibiotic resistance.

Based on the data that has been collected through the 107 respondents the recommendations for making the understanding of the data better are as follows:

1. **Enhance Confidence in Understanding Antibiotics**:
    - **Finding**: The majority of parents (56.1%) reported being very or extremely confident in their understanding of antibiotics, yet 16.8% had low confidence.
    - **Recommendation**: Implement targeted educational programs to boost the confidence of parents who feel only slightly or moderately confident. These programs should include detailed explanations of antibiotic functions, appropriate uses, and the dangers of misuse, flyers can be made

and distributed in the hospital for the same whenever antibiotics are prescribed to the patient.

2. **Correct Misconceptions About Antibiotic Use**:
    - **Finding**: Many parents believe antibiotics are effective against viral infections.
    - **Recommendation**: Distribute clear and accessible educational materials that explain the difference between bacterial and viral infections, and emphasize that antibiotics are ineffective against viruses like colds and the flu.

3. **Promote Proper Antibiotic Adherence**:
    - **Finding**: Only a portion of parents understand the importance of completing the full course of antibiotics.
    - **Recommendation**: Reinforcing messages from the doctors about the importance of finishing the entire prescribed course, even if the child feels better. Utilising visual aids and handouts in clinics to underline this message.

4. **Address Factors Influencing Antibiotic Use**:
    - **Finding**: Key factors influencing decisions to give antibiotics include doctor's recommendations (36.4%) and the severity of symptoms (34.6%).
    - **Recommendation**: Train healthcare providers to clearly communicate the necessity (or lack thereof) for antibiotics, particularly in the context of symptom severity, and to provide guidance on managing symptoms without antibiotics when appropriate.

5. **Reduce Pressure to Prescribe Antibiotics**:
    - **Finding**: Some parents feel pressured by family members or perceive a need to request antibiotics.

- **Recommendation**: Educate parents and family members collectively, where possible, to reduce internal pressure. Promote open dialogues during consultations to ensure parents do not feel pressured to ask for unnecessary antibiotics.

6. **Improve Accessibility to Reliable Information**:
    - **Finding**: Parents often rely on various sources for information, including the internet and social media.
    - **Recommendation**: Develop and promote reliable online resources and platforms where parents can access trustworthy information about antibiotics and paediatric health. Encourage healthcare providers to recommend these resources during consultations.

7. **Support Informed Decision-Making**:
    - **Finding**: Some parents have reported giving antibiotics without a prescription due to various reasons, including cost concerns.
    - **Recommendation**: Provide clear guidance on the dangers of non-prescribed antibiotic use. Discuss cost-effective treatment options and generic antibiotics during consultations to mitigate cost concerns.

By focusing on these specific recommendations, healthcare providers can significantly improve parental knowledge and attitudes towards antibiotic use, contributing to better antimicrobial stewardship and paediatric health outcomes.

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