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KNOWLEDGE, ATTITUDE, AND PRACTICE OF ANTIBIOTIC USE IN CHILDREN ATTENDING OUTPATIENT DEPARTMENTS IN INDIA: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: In the pediatric population, parental views frequently result in antibiotic misuse and illogical use. **Purpose:** To ascertain the knowledge, attitudes, and practices of parents with relation to the use of antibiotics in their children. **Methods:** A cross-sectional study of mothers visiting the pediatric outpatient department at the Government Medical College and Hospital in Chennai's Omandurar Government Estate was carried out during August and September of 2022. A standardized questionnaire that was given by the interviewer was used to gather data. Excel was used to chart the data and express them as descriptive data. **Results:** Mean age of the mothers who participated in the study was 25.2 ± 9.1 years. About more than half (56%) of the participants didn't know about antibiotic use. Almost 73% of the participants give antibiotics if their child has fever without consulting a doctor. More than half (63%) of the participants have accepted that they do not fully complete the number of days of the course of antibiotic recommended by their pediatrician if their child feels better. The practice of reusing stored antibiotics from their previous prescription is prevalent up to 82%. Around 98% do demand to have an antibiotic if their child has fever and an equal proportion 93% of participants want to give antibiotics if their child has a sore throat. **Conclusion:** Approximately 74% of mothers receive antibiotics without a prescription, albeit at different frequencies. Our research suggested that parents may benefit from knowledge-based education initiatives.

Keywords: knowledge, attitude, practice, antibiotic use

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INTRODUCTION

Since their discovery, antibiotics have been heralded as a medical miracle, revolutionizing healthcare and dramatically lowering the death rates from infectious diseases. Antibiotics are regarded by some experts as the greatest invention of the 20th century. But an extremely serious threat has emerged as a result of their widespread and frequently inappropriate use: antibiotic resistance. This phenomenon, whereby bacteria adapt to resist the effects of antibiotics, carries the risk of making these life-saving medications ineffective, leading to an increase in infections that are incurable and endangering public health globally. It is estimated that bacterial antimicrobial resistance (AMR) was directly responsible for 1.27 million global deaths in 2019 and contributed to 4.95 million deaths In India, AMR directly caused 1.27 million of those deaths. 1 in 5 of those deaths occurred among children under 5 years old (WHO, 2021). Antibiotic resistance has been linked to a number of factors, including the overuse of antibiotics in humans and other animals, poor patient education when antibiotics are prescribed, a lack of infection control and treatment guidelines, a lack of scientific information for physicians regarding the prudent use of antibiotics, and the absence of official government policy regarding the prudent use of antibiotics in public and private hospitals (Chakraborty *et al*., 2020; Westerling *et al*., 2020). Inadequate knowledge, concern for children, and erroneous parental attitudes often lead to antibiotic misuse and overuse in the pediatric population. Parents frequently believe that antibiotics offer comprehensive and rapid disease treatment. Antibiotic resistance jeopardizes therapeutic efficacy, raises the rate of treatment failures, and causes more expensive and fatal illness episodes that are longer and more severe (Agarwal *et al*., 2015; McCullough *et al*., 2016). Antibiotic resistance has significant effects on public health. Common infections like skin infections, pneumonia, and urinary tract infections that have been treated for decades may become incurable, which would raise the rates of morbidity and mortality. The risk of infection could make medical procedures that depend on effective antibiotics, like organ transplants, chemotherapy, and surgeries, riskier or even impossible to perform. Furthermore, because antibiotic resistance necessitates lengthier hospital stays, more expensive treatment options, and decreased productivity due to illness, it has a significant financial impact. The main cause of resistance development is the improper use of antibiotics. Self-medication is one of the commonest causes for the emergence of antibiotic resistance due to low socio-economic status, inadequate time, lack of knowledge about antibiotic resistance, ignorance and urge to self-care; the practice of self-medication has been increased gradually in communities (Bennadi, 2013). In order to effectively control the use of antibiotics, a variety of strategies involving medical professionals, parents, and the general public are required. Reviewing the prudent use of antibiotics during deliveries as well as their use as preventatives is being called for (Renwick *et al*., 2018; Das *et al*., 2020).

Furthermore, because antibiotic resistance necessitates lengthier hospital stays, more expensive treatment options, and decreased productivity due to illness, it has a significant financial impact. The main cause of resistance development is the improper use of antibiotics. A meta-analysis with 57 studies indicated that the prevalence of SMA among children was 24% worldwide, with a higher prevalence in the Middle East at 34%, Africa 22%, Asia 20%, and South America at 17%, while the lower prevalence in Europe at 8% (Bert *et al*., 2022). In order to effectively control the use of antibiotics, a variety of strategies involving medical professionals, parents, and the general public are required. Reviewing the prudent use of antibiotics during deliveries as well as their use as preventatives is being called for (Westerling *et al*., 2020). Genome surveys from environmental and clinical sources (microbes and metagenomes) will shed more light on these reservoirs and make predictions about the emergence and spread of antibiotic resistance.

The misuse of antibiotics is the primary factor contributing to the development of resistance. The private market's access to antibiotics without a prescription and the Indian Health Ministry's lax enforcement of the regulations governing the dispensing of antibiotics without a prescription contributed to an increase in antibiotic overuse. In order to

effectively restrict the use of antibiotics, a variety of strategies including medical professionals, parents, and the general public are required. Previous studies have demonstrated global and Indian patterns of improper antibiotic use (Batista *et al*., 2020; WHO, 2021), but they have not assessed the knowledge and attitude towards antibiotic use and resistance. Since parents' knowledge, attitudes, and practices are strongly linked to antibiotic misuse and overuse, it is crucial to look into how parents contribute to antibiotic resistance in tertiary healthcare facilities. Moreover, there are few population studies from the Indian state of Tamil Nadu that we could find in our literature search (Revathi *et al*., 2020). Therefore, in order to lay the foundation for future laws and public health campaigns aimed at addressing this rapidly expanding issue, this study set out to evaluate the knowledge, attitudes, and practices of women visiting the outpatient department of a tertiary hospital in Chennai about antibiotic resistance.

METHOD

Design Study

This was a descriptive cross-sectional study survey conducted from November 2022 - January 2023 at Government Medical College and Hospital, Omandurar Government Estate, Chennai, among the mothers of children ≤ 12 years of age attending the outpatient department of the tertiary care centre and are willing to participate in the study. Mothers who did not give consent to participate in the study were excluded from the study.

Sample Size Calculation

Taking 59.1% as proportion of mothers with adequate knowledge, from the research by Chakraborty *et al*. (2020) and assuming error as 8%, sample size size is calculated to be 150. Assuming 15% non-responders, 171 mothers were targeted for sample collection.

Sampling Technique

Consecutive sampling of the study population.

Data Collection Tool

The final data collection tool had four questions about respondents' practices about antibiotic resistance, seven questions about knowledge, six questions about attitudes, and seven questions about sociodemographic characteristics of the respondents. The number of children overall, age, gender, and socioeconomic class are examples of sociodemographic traits. The mothers' knowledge regarding antibiotics and their use, antibiotic resistance, the financial burden, and their own judgment of their level of knowledge was evaluated using a seven-item knowledge assessment questionnaire. Six items on a 3-point Likert scale (yes, no, sometimes) were used to gauge mothers' attitudes by creating hypothetical situations involving the use of antibiotics beyond prescription and its consequences. The practices were assessed by four items using a 3-point Likert scale (yes, no, sometimes) about the safety of antibiotic usage and the scenarios where the mothers will use antibiotics for their children.

Study Procedure

Data were collected using a structured, interviewer-administered questionnaire prepared in English and translated to Tamil by the interviewer. Descriptive statistics were used to assess the collected data. The data were transferred on to a Google Form for statistical analysis.

Statistical Analysis

Data were charted out in Excel and descriptive data was presented.

Ethical Clearance

Ethical approval was obtained from the Institutional Ethics Committee IEC number: 264/1EC/GOMC/2023 prior to the start of the study. Informed consent was obtained from the participants. Confidentiality was ensured.

RESULT

Sociodemographic Details

Out of the 171 subjects who were interviewed, 56% (n=95) were in the age group of 20-25 years (Figure 1). The majority of the participants had one child 52% (n=92) and 79% (n=135) of the participants belong to lower middle class according to modified Kuppusamy scale (Table 1). In the study, the mean age of the mothers who participated in the study was 25.2 ± 9.1 years.

Table 1. Distribution of Socioeconomic Status

Socio Economic Class		
Lower-middle	135	79%
Upper lower	30	18%
Lower	6	4%

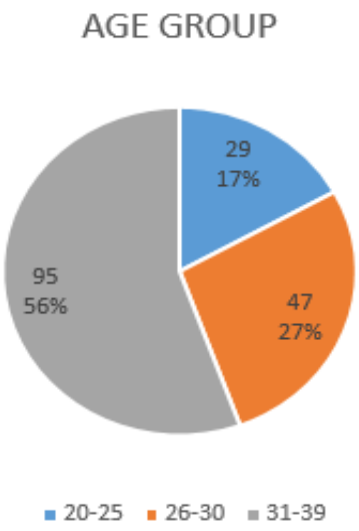

Figure 1. Age Distribution of Participants

Table 2 shows the knowledge of the participants on antibiotics use. About more than half (56%) of the participants didn't know about antibiotic use. Almost 73% of the participants give antibiotics if their child has fever without consulting a doctor. More than half of the participants feel that they could give antibiotics to their child if they contracted a bacterial/viral infection. Fortunately, 88% of the participants were aware that antibiotics are not indicated for pain. Only 29% of the participants decisively say that indiscriminate use of antibiotics leads to increased cost burden. The percentage of participants feeling that any antibiotic can be used for any infection is 90%.

Table 2. Knowledge of the Participants in Antibiotic Use

Sl.No	Questions	Yes	Percentage	No	Percentage
1	Antibiotic resistance means: if antibiotics are taken too often, they are less likely to work in future.	75	44%	96	56%
2	Your child has a fever. Should you give antibiotics without consulting a doctor?	125	72.84%	46	27%
3	Your child got a viral infection. Should you give antibiotics?	106	62%	65	38%
4	Your child got a bacterial infection. Should you give antibiotics?	68	40%	103	60%
5	Do you use antibiotics for pain?	21	12%	150	88%
6	Does indiscriminate use of antibiotics lead to increased cost burden?	50	29%	121	71%
7	Can all medicines work against all infections?	154	90%	17	10%

Table 3 talks about the attitude of the participants on antibiotic use. As shown below, more than half (63%) of the participants have accepted that they do not fully complete the number of days of the course of antibiotic recommended by their pediatrician if their child feels better. The practice of reusing stored antibiotics from their previous prescription is prevalent up to 82%. The habit of using a pediatric prescription for adults is prevalent up to 83%.

Buying over the counter drugs directly from the pharmacy without consulting a doctor prevails about 89%. Around 58% of mothers fail to check the expiry date of the medication they give to their children. Nearly 71% of the mothers tend to increase or alter the dosage of the prescribed medication if the illness of their child does not subside without consulting a doctor.

Table 3. Attitude of the Participants on Antibiotic Use

Sl.no	Questions	Yes	No	Sometimes
1	Your child had a fever. You went to the doctor, and he gave antibiotics for 5 days. After 2 days your child starts to feel better. Do you stop giving antibiotics to your child after that?	64 (37%)	62 (36%)	45 (26%)
2	You have left out antibiotics from the previous time that your child got sick. Six months later your child got sick again. Will you use the previously stored antibiotics now?	85 (50%)	32 (19%)	54 (32%)
3	You have left out antibiotics from the previous time that your child got sick. Later some other members of your family got sick. Will you use the previously stored antibiotics now?	92 (54%)	29 (17%)	50 (29%)
4	When your child gets sick, do you directly get antibiotics from the pharmacy without consulting a doctor?	109 (64%)	19 (11%)	43 (25%)
5	You are about to give medicine to your child. Do you check the expiry date before giving?	56 (33%)	72 (42%)	43 (25%)
6	Your child got sick. The doctor prescribed antibiotics for 5 days. Your child has not recovered much after 5 days. Do you continue giving the same medicine for more days / higher dose without consulting the doctor?	83 (49%)	50 (29%)	38 (22%)

Practices of Participants on Antibiotic Resistance

As shown below in Table 4, around 98% do demand to have an antibiotic if their child has fever and an equal proportion 93% of participants want to give antibiotics if their child has a sore throat. Around 94% of participants feel antibiotics are almost always safe for their children

Table 4. Practice of the Participants on Antibiotic Use

Sl.No	Questions	NO	YES	SOMETIMES
1	Do you consider giving antibiotics to your child when they have a fever?	3 (2%)	146 (85%)	22 (13%)
2	Do you consider giving antibiotics to your child when they have a cold / sore throat?	12 (7%)	138 (81%)	21 (12%)
3	Do you consider antibiotics to be safe?	10 (5.85%)	62 (36.26%)	99 (57.89%)
4	Do you pay attention to the expiry date at the time of purchase of an antibiotic?	28 (16.37%)	12 (7.02%)	131 (76.61%)

DISCUSSION

Over the past 50 years, antibiotics have shown to be an effective and reliable weapon against a variety of infections. In the twenty-first century, there is a severe threat to public health, particularly in poor countries, due to the rise of antibiotic-resistant pathogenic bacteria and their widespread dissemination across the human population (WHO, 2021). Antimicrobial resistance (AMR) may have arisen mostly from self-medication, improper prescription, inappropriate usage, and overuse of these medications, in addition to other equally important social and cultural variables. Antibiotic resistance will ultimately lead to more severe illnesses with higher death rates by decreasing the therapeutic efficacy of the medications and increasing treatment failures. Not to mention the significant impact this will have on various healthcare management systems and the world economies.

To the best of our knowledge, this is the first study to examine mothers visiting the outpatient department of a tertiary hospital in Chennai with regard to their knowledge, attitudes, and practices regarding the use of antibiotics in children. The mothers who took part in the study were 25.2 ± 9.1 years old on average. The majority of participants—56%, were unaware that antibiotics are used. When their child has a fever, nearly 73% of the participants treat them with antibiotics without first visiting a doctor. More than half (63%) of the participants acknowledged that if their

child feels better, they may not take the full course of antibiotics as prescribed by their pediatrician. Reusing stored antibiotics from an earlier prescription is a common practice, accounting for up to 82% of cases. When their child has a fever, about 98% of parents do insist on giving them an antibiotic, and an equal percentage 93% of participants feel that if their child has a sore throat, they should give them antibiotics.

According to the study's findings, approximately 74% of mothers obtain antibiotics without a prescription on a varied basis. This is comparable to the global estimate of antibiotic dispensing without a prescription, which is above 60% (Batista *et al*, 2020). As many as 36.4% of mothers use medicines from local pharmacists without prescription in another study in Chennai (Revathi *et al*., 2020). Nepal *et al*. (2020) reported that 21.4 % of the parents are taking the antibiotics from pharmacists without any prescription due to time constraints. Despite this, nearly half of mothers believe that antibiotic resistance is a global public health issue, and over 1/4 are aware that antibiotics should only be taken after consulting a doctor. While half of the mothers reported having knowledge about antibiotic resistance, the study participants' perceived knowledge of antibiotics and the problem of bacterial resistance was passable. However, their actual practices were not up to par.

Based on a convenience sample of 500 individuals chosen at random, Mouhieddine *et al*. (2015) reported that 46.1% of the participants had moderate knowledge levels and 3.5% did not know that antibiotics are not antiviral. 56.0% of study participants said they would also anticipate an antibiotic prescription from their physician for a common cold. Likewise, Jifar & Ayele (2018) found that 83% of participants in Harar, Eastern Ethiopia, indicated that antibiotics expedite the healing process for colds.

Reducing the number of unnecessary antibiotic prescriptions, choosing the right dosage and length of antibiotic regimens, and putting the vaccination schedule into practice are some recommendations for addressing this crisis (WHO, 2021). Reducing the prescription of antibiotics for URTIs may be accomplished through patient-oriented interventions, particularly delayed prescriptions (Mortazhejri *et al*., 2020) In the end, patients who use these antibiotics are the ones who are most important to the efforts to control antibiotic usage (Almagor, 2018). Based on our and other researchers' findings, it appears that implementing awareness campaigns about antibiotic knowledge and appropriate use should happen quickly. Furthermore, health authorities ought to allocate more funds toward policy formulation and a stricter monitoring system concerning antibiotic accessibility.

Interventions with pharmacy professionals are necessary because they play a crucial role in the dispensing of antibiotics. The majority of community pharmacists are aware that one of the primary factors contributing to the rise in antibiotic resistance is the irrational use of antibiotics; they also know that all medical professionals, including themselves, must exercise reason and cease prescribing and distributing an excessive amount of antibiotics ineffectively (Jamshed *et al*., 2018). A prior study discovered that the adoption of various activities involving pharmacists, such as nationwide campaigns and initiatives, health professional workshops, the production of flyers and posters, television shows, newspapers, and the introduction of patient counseling guidelines, enhanced the use of antibiotics and, as a result, decreased the prescription and dispensing of inappropriate antibiotics (Marković-Peković *et al*., 2017). The study's limitation is that it only included mothers who visited pediatric outpatient departments.

CONCLUSION

Though at varying frequencies, 74% of mothers get antibiotics without a prescription. More than half (63%) of the participants have accepted that they do not fully complete the number of the days of the antibiotic courses recommended by their pediatrician if their child feels better. Around 98% do demand to have an antibiotic if their child has fever and an equal proportion 93% of participants want to give antibiotics if their child has a sore throat.

SUGGESTION

Programs for knowledge-based education may be beneficial for parents, according to our research. It is commonly

recognized that utilizing the media to spread public health messages reinforces and encourages changes in behavior. Making extensive and efficient use of these resources as well as the mainstream media may improve mothers' performance. Training programs that prioritize the performance of healthcare workers inside the system are crucial. Parents should be the target audience for training programs to increase their performance and understanding at health centers. After content validity and professional assistance, a pamphlet can be created and provided to the ward for distribution to the parents of children being admitted to the wards. Strict guidelines should be enforced to prohibit the sale of antibiotics without prescription.

There are several ways to carry out awareness campaigns: i) by means of national initiatives that support immunization and cleanliness, ii) by revising university curricula to include public health courses and workshops for all majors, iii) through intervention and media campaigns, iv) by taking on a more proactive role, pharmacists should inform and motivate patients to visit primary care facilities for these minor ailments whenever they arise. Lack of these tactics may cause the knowledge attitude and practice (KAP) to continuously deteriorate in response to antibiotic use and resistance, which could have greater detrimental effects on the emergence of antibiotic resistance (AR).

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CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

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AUTHOR CONTRIBUTION

Merly Ann Mathew data collection, data analysis, manuscript writing, study design, data collection and supervision, data analysis, manuscript revision literature review, reference. Prasananjali A data collection, data analysis, manuscript writing, reference. Rammohan study design, data collection and supervision, data analysis. Vidhyashree MD data collection, data analysis, literature review, reference. Arun Murugan study design, data collection and supervision, manuscript revision. Ramasubramanian data collection, data analysis, manuscript writing, literature review, reference. Pavithra G study design, data collection and supervision, manuscript revision. Sathishkumar K study design, data collection and supervision, data analysis, manuscript revision.

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