Qualitative Assessment of Knowledge, Perception and Experience of Physicians about Antimicrobial Stewardship in Nigeria during COVID-19 Pandemic

Oluwasola Stephen Ayosanmi, Tensaba Andes Akafa, Olanrewaju Felix Adeniran, Titilope Temidayo Ayosanmi, David Osahon Omorogie, and Michael Abayomi Akolawole

ABSTRACT

Background: The critical role of antimicrobial stewardship (AMS) in mitigating antimicrobial resistance cannot be overemphasized, especially during COVID-19 pandemic. This study aimed to understand the perception of physicians about AMS as it relates to their training and practice experience.

Method: A phenomenological qualitative study design was employed, and data was collected using a semi-structured questionnaire-based interview of a purposeful sample of practicing physicians in the federal capital territory of Nigeria. Eighteen physicians completed the interview and responded based on their perceptions and practice experience. Thematic analysis and coding of the data were performed through an iterative process.

Results: 56% of the respondents were female physicians, 67% worked in a private hospital/clinic, and 44% have been practicing for 11 – 15 years. 83% of the respondents think auditing clinicians would promote antibiotics stewardship. 44% of the respondents were unaware of clinical guidelines for an empirical antibiotics prescription. 56% felt doctors were not provided thorough training on AMS. The participants suggest that AMS in Nigeria could be promoted through training of personnel, establishing antibiotics policy and protocol, cessation of over-the-counter sales of antibiotics, creating awareness, access to prompt laboratory investigation and inter-professional collaboration between physicians and pharmacists. They also believed inter-professional collaboration is necessary to achieve AMS.

Conclusion: Physicians perceived a knowledge gap in AMS as a result of inadequate training and lack of clinical guidelines on antimicrobial stewardship in the healthcare system of Nigeria. Intensive education of healthcare providers and inter-professional collaboration are plausible approaches to improving antibiotic stewardship.

Keywords: Antibiotics, antibiotic resistance, antimicrobial resistance, antimicrobial stewardship.

I. BACKGROUND

Antimicrobial resistance (AMR) remains a global health burden, with a recent estimate of 4.95 million deaths associated with bacterial AMR [1]. The highest all-age death rate attributable to AMR was estimated in western sub-Saharan Africa, at 27.3 deaths per 100,000 [1].

This burden is associated with the irrational use of antibiotics, which is prevalent in sub-Saharan Africa, especially Nigeria, the most populous nation in Africa. In a survey of 12 developing countries, Nigeria has the highest rate of irrational drug prescriptions and 3rd highest African nation with antibiotics prescriptions [2].

The Nigerian government developed a national action plan for AMR from 2017 to 2022 in response to the global call for action raised by the world health organization [3]. In this action plan, antimicrobial stewardship was identified among other strategies as an approach to prevent AMR.

Antimicrobial stewardship (AMS) is a concept that describes the responsible use of antimicrobial drugs that involves enhancing actions that balance the need for appropriate treatment of patients and the longer-term societal need for sustained access to effective therapy [4]. Good antimicrobial stewardship consists of selecting the right drug and optimizing its dose and duration to cure an infection while minimizing toxicity and conditions for the
selection of antibacterial strains [5]. Several strategies, including prescriber education, formulary restriction, prior approval, streamlining, antibiotic cycling, and computer-assisted programs have been proposed to improve antibiotic use [5].

The current COVID-19 pandemic had increased the surge in the prescription of antibiotics for the prevention and treatment of the disease [6]. Antibiotic self-medication is prevalent at this time. A recent systematic review reported a global prevalence rate of antibiotics self-medication as 79% [7] and this behaviour is reportedly motivated by the public risk perception [8]. Hence, physicians who should discourage this practice should know about antimicrobial stewardship and mitigate irrational access to antibiotics.

The critical role of antimicrobial stewardship in mitigating antimicrobial resistance cannot be overemphasized. However, there is a need to assess physicians’ knowledge, awareness and perceptions about AMS in Nigeria to enhance the practice of responsible prescription of antibiotics. The understanding of antimicrobial stewardship among healthcare professionals, including medical students, is critical to its practice and overall mitigation of the current challenges with antimicrobial resistance globally.

Therefore, the primary purpose of this study is to assess physicians’ knowledge, perceptions, and experience regarding antimicrobial stewardships, thereby understanding the root cause of indiscriminate prescription of antibiotics among physicians.

II. METHODS

An observational qualitative study using individual interview approach was employed for data collection to inquire from the physician their experience, knowledge and perception regarding AMS. Due to the busy schedules of these physicians and different locations of their practice, we could not organize a focus group meeting with them. Hence, an individual interview was considered as the approach that will address the research question until data saturation.

A semi-structured questionnaire was developed to be answered during the interview section. The questionnaire consisted of ten items created based on the review of previous literature and an iteration by clinicians with expertise in the field [9]-[11]. The questions addressed four constructs-subjective knowledge about antibiotics steward prescription decision making, promoting antibiotics stewardship and the role of inter-professional collaboration in antibiotics stewardship.

Participants were purposively selected to be physicians currently practicing within the city of Abuja, the Federal Capital Territory of Nigeria. Ethical approval was obtained from LIMI Hospital Group, Abuja (LIMI/REC/2022/0001). This qualitative inquiry was an initial phase in the development of a national survey tool on antimicrobial stewardship among Nigerian healthcare providers.

Interview questions were accessed online via Google doc platform to facilitate easy access due to the COVID-19 pandemic. Data was collected around the period of widespread Omicron variant between November and December 2021, hence no physical contact was made with participants. The research team contacted participant by telephone to inform them about the study and seek their consent to participate in the study. Responses were stored on Google drive cloud storage. All respondents consented formally to participation and their responses were completely anonymous. Each respondent took an average of two weeks to respond to the question. Data submitted to the Google cloud was retrieved to an Excel Spreadsheet for analysis and thematic synthesis. Thematic data analysis was done by manual review through an iterative deductive process where brainstorming and deliberative dialogue were implored before arriving at the final themes. A software for qualitative study was not considered because the responses were less than 30.

III. RESULTS

Eighteen practicing physicians from public and private hospitals in Abuja, Nigeria, responded to the interview out of the 100 physicians contacted giving a response rate of 18%. Table I shows the characteristics of the respondents. 56% of the respondents were female physicians, 67% worked in a private hospital/clinic and 44% have been practicing for 11-15 years.

<table>
<thead>
<tr>
<th>TABLE I: BASELINE CHARACTERISTICS OF THE RESPONDENTS (N = 18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Location of practice</td>
</tr>
<tr>
<td>Private Hospital/clinic</td>
</tr>
<tr>
<td>Public primary health care facility</td>
</tr>
<tr>
<td>Public tertiary hospital</td>
</tr>
<tr>
<td>Public secondary health care facility</td>
</tr>
<tr>
<td>Duration of practice</td>
</tr>
<tr>
<td>6-10 years</td>
</tr>
<tr>
<td>1-5 years</td>
</tr>
<tr>
<td>11-15 years</td>
</tr>
<tr>
<td>Sex at birth</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
</tbody>
</table>

A. Subjective Knowledge about Antibiotics Stewardship

About 56% claimed a good knowledge and awareness of clinical guidelines for an empirical antibiotic’s prescription. For example, a respondent said I’m aware that there are broad-spectrum and narrow spectrum antibiotics. Using my clinical acumen, I should know which to prescribe based on my findings.

However, 56% felt that doctors were not provided thorough training on antibiotics stewardship. 83% of the respondents thought that auditing clinicians would promote antibiotics stewardship (Table II). When asked if the physician thought auditing clinicians would promote AMS, one of them said Certainly! I believe auditing doctors periodically on the use of antibiotics would help immensely. Another responded replied that I think doctors should be audited routinely about their antibiotics prescription. Yes it will promote antibiotic stewardship.

When asked about what they knew about antibiotic stewardship, various themes were provided. For example, some of the themes expressed as what antibiotics stewardship meant to the physicians were as follows:

- proper use of antibiotics
- measures to improve how antibiotics are prescribed
- actions that promote rational use of antibiotics
being responsible for the proper use of antibiotics
- ensure and promote rational use of antibiotics
- rational prescription of antibiotics
- antibiotics regulation
- judicious use of antibiotics
- prevention of microbial resistance
- responsible use of antibiotics
- proper monitoring and record keeping of antibiotics administered to patients
- efforts to measure and improve how antibiotics are prescribed
- efforts to ensure proper and optimized use of antibiotics
- optimized antibiotics use

The most expressed theme in their definition of antibiotics stewardship was a proper use of antibiotics.

The most common factor identified to influence the decision of antibiotics prescription was the clinical presentation of the patients, followed by the laboratory findings.

C. Promoting Antibiotics Stewardship

Suggestions provided by the respondents to promote antibiotics stewardship among clinicians include:
- Training of personnel - regular, mandatory, and retraining
- Antibiotics policy and protocol
- Stop over-the-counter sales of antibiotics
- Creating awareness
- Access to labs in rural hospital centres
- Stop counterfeit medications
- Increase availability of microbiology diagnostics
- Collaborations between physicians and pharmacists for updates

D. Role of Inter-professional Collaboration in Antibiotics Stewardship

Respondents identified the role of inter-professional collaboration in antibiotics stewardship. Some of the functions perceived to be played by this collaboration include:
- Better patient care
- Promote proper use of antibiotics
- Networking research on antibiotics
- Unanimous responsibility
- Teamwork
- Accountability
- Effective stewardship
- Improve efficiency
- Improve communication
- Development of a guideline
- Synergy in antibiotic use by health professionals
- promote awareness and education
- Optimal patient care

IV. DISCUSSION

This study provides baseline data on the knowledge, perception and experience of Nigerian physicians on antimicrobial stewardship using a phenomenological approach. To the best of our knowledge, this approach is novel in Nigeria’s context of assessing physicians’ perception of AMS.

The study provides a baseline understanding of the perspective of the respondents regarding antimicrobial stewardship in Nigeria. The knowledge displayed showed a need to provide more structured formal education including continuous professional development on antimicrobial stewardship. It also calls for a more organized institutional policy towards judicious use of antibiotics and the application of guidelines in making empirical decisions.

The subjective knowledge of the respondents about antimicrobial stewardship was self-rated good. This knowledge was further corroborated by the appropriate definition of antimicrobial stewardship when asked to express their thoughts about it. However, the perception of

TABLE II: RESPONDENTS’ PERCEPTION AND KNOWLEDGE ABOUT ANTIBIOTICS STEWARDSHIP

<table>
<thead>
<tr>
<th>Do you think auditing clinicians would promote antibiotic stewardship?</th>
<th>Yes</th>
<th>15 (83.3%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>1</td>
<td>(5.6%)</td>
</tr>
<tr>
<td>Maybe</td>
<td>2</td>
<td>(11.1%)</td>
</tr>
<tr>
<td>WHO</td>
<td>3</td>
<td>(16.7%)</td>
</tr>
<tr>
<td>NICE</td>
<td>2</td>
<td>(11.1%)</td>
</tr>
<tr>
<td>EMDEX</td>
<td>2</td>
<td>(11.1%)</td>
</tr>
<tr>
<td>STANDARD TREATMENT GUIDELINE</td>
<td>2</td>
<td>(11.1%)</td>
</tr>
<tr>
<td>NCDC</td>
<td>1</td>
<td>(5.6%)</td>
</tr>
<tr>
<td>NONE</td>
<td>8</td>
<td>(44.4%)</td>
</tr>
<tr>
<td>How would you describe your awareness, knowledge and use of guidelines for empirical antibiotic prescriptions?</td>
<td>Excellent</td>
<td>2 (11.1%)</td>
</tr>
<tr>
<td></td>
<td>Very good</td>
<td>2 (11.1%)</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>10 (55.5%)</td>
</tr>
<tr>
<td></td>
<td>Fair</td>
<td>4 (22.2%)</td>
</tr>
<tr>
<td>In your own practice, how would you describe your use of guidelines for prescribing antibiotics for your patients?</td>
<td>Excellent</td>
<td>1 (5.6%)</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>13 (72%)</td>
</tr>
<tr>
<td></td>
<td>Fair</td>
<td>3 (16.7%)</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>1 (5.6%)</td>
</tr>
<tr>
<td>Do you think doctors have thorough training (both in medical school and internship) about antibiotic stewardship?</td>
<td>Yes</td>
<td>8 (44%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>10 (56%)</td>
</tr>
</tbody>
</table>

B. Antibiotics Prescription Decision Making

Respondents reported the use of guidelines in making empirical prescriptions of antibiotics. 72% reported that their use of antibiotics guidelines for prescriptions in their practice was good. When asked to mention any guideline they frequently use, about 44% declared none. However, others said the guidelines provided by WHO (17%), National Institute for Health & Care Excellence (11%), Essential Medicines Index (11%), Standard Treatment Guideline (11%) and Nigeria Centre for Disease Control (6%).

Different factors were identified when asked about what informed their decisions to prescribe antibiotics for their patients. Some of the factors include:
- Laboratory microbiology test results
- Practice environment
- Clinical experience
- Clinical features from history and physical exams
- Guidelines
- Antibiotics use history
- Clinical diagnosis
- severity of illness
- Availability of funds

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inadequate training of physicians on AMS does not reflect the good knowledge expressed by the respondents. This may be because the perception of inadequate training is based on their recall of their training experience while their knowledge about AMS is just an academic knowledge. Having a practiced-based experience of AMS is more pragmatic in improving antimicrobial stewardship. Hence, physician knowledge about AMS should not be limited to a head knowledge of the concept but an applied knowledge built on clinical experience and institutional policies. Studies have shown that training and retraining of clinicians, including medical students, are critical to improving the knowledge about AMS [12]-[16].

An aspect of the prudent use of antibiotics is the decision-making process of physicians during clinical encounters. Respondents in this study did not show an encouraging use of clinical guidelines in their decision to give antibiotics. While clinical presentation and laboratory findings are fundamental in making diagnostic decisions, an objective approach to empirical prescription of antibiotics is required. Clinical decision support systems (CDSS) have been reported to improve judicious prescription of antimicrobial agents [17]. Where there is no formalized CDSS, clinical treatment guidelines such as WHO, NICE and NCDC are used by clinicians [18]. In Nigeria, there is limited data on specific CDSS and guidelines to improve AMS.

A recent systematic review of in-patients’ antimicrobial prescriptions and the status of antimicrobial stewardship programmes in Nigerian hospitals shows a high level of inappropriate antibiotics prescriptions and a lack of structured AMS teams in hospitals [19].

The study participants provided reasonable suggestions on how to promote antimicrobial stewardship. A more worrisome challenge to AMS addressed by the respondents is the self-medication with antibiotics and the indiscriminate antibiotic access over the counter. One of the respondents noted that over-the-counter purchase of antibiotics should be stopped to promote antimicrobial stewardship. This is so true as a recent systematic review by [7] showed a high prevalence of antibiotics self-medication among Nigerians and other developing countries for prevention and treatment of COVID-19 symptoms. The availability of clinical guidelines and inter-professional collaboration within the Nigerian health care system is another measure noted to promote AMS in the country.

The role of inter-professional collaboration is critical to the achievement of antimicrobial stewardship. A study showed that an inter-professional curriculum on antimicrobial stewardship improves knowledge and attitudes towards appropriate antimicrobial use and collaboration [20]. Another qualitative study also showed inter-professional collaboration as a facilitator for antimicrobial stewardship [21]. The current study’s participants perceived inter-professional collaboration as an instrument that could promote proper use of antibiotics, better patient care, the efficiency of care delivery, development of guidelines and effective antimicrobial stewardship.

The current study has its strength as a phenomenological presentation of physicians’ experience and opinions that can improve the status of antimicrobial stewardship in Nigeria. This report can inform the development of a clinical guideline and clinical decision support system that will enhance antimicrobial stewardship. This qualitative finding also provides data that can enhance the development of study instrument for a national survey of clinicians and medical students in Nigeria on this topic.

However, some limitations common to qualitative research design affected the study. The purposive nature of the study sampling is typical of a qualitative study. Also, reaching out to physicians across the country could provide more elaborate description of the status of AMS in the country. Therefore, a national survey may be an appropriate approach to achieving more intensive data to represent the status of AMS knowledge, perception, and experience among physicians in Nigeria.

**CONFLICT OF INTEREST**

Authors declare that they do not have any conflict of interest.

**REFERENCES**


