





University of Dongola

Faculty of Medicine and Health Sciences
Department of Community Medicine
Research Methodology Course-Batch(23)

RESEARCH PROPOSAL

Knowledge,Attitude and Practice of Antibiotic Use and Misuse among Residents of Dongola City, Northern State, Sudan, 2026

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1. INTRODUCTION

1.1 Background

Antibiotics are among the most important medical discoveries of the twentieth century and have transformed the treatment of bacterial infections. Their value is now threatened by antimicrobial resistance (AMR), which occurs when bacteria change in ways that reduce the effectiveness of the medicines used to treat them. A global systematic analysis estimated that bacterial AMR was directly responsible for about 1.27 million deaths and was associated with 4.95 million deaths in 2019 [1].

Overuse and misuse of antibiotics are major drivers of resistance. Misuse includes taking antibiotics without a prescription, using them for viral illnesses such as colds and influenza, taking incorrect doses, stopping early, and sharing or storing leftover tablets [2]. For this reason, improving public awareness and understanding of AMR is the first strategic objective of the WHO Global Action Plan on antimicrobial resistance [3].

Self-medication with antibiotics is particularly common in low- and middle-income countries (LMICs), where antibiotics can often be bought from pharmacies without a prescription and where the cost and distance of consultations push people towards self-treatment [4,5]. The median prevalence in Africa has been reported as 55.7% [5], and estimates from Middle Eastern countries range from 12.1% to 93.1% [6].

In Sudan, antibiotics are legally prescription-only medicines, yet they are easily obtained from community pharmacies. A nationwide survey of 1,492 adults in 2021 found that 71.3% had used antibiotics as self-medication, mainly for tonsillitis and cough [2]. Since April 2023 the armed conflict has further disrupted health services and, according to a recent situational analysis, has increased self-medication and reliance on broad-spectrum antibiotics [7].

Knowledge, attitude and practice (KAP) surveys are a standard tool for measuring what a population knows, believes and does about a health issue, and for identifying the gaps that educational and regulatory interventions should address. Dongola is the capital of Northern State, but the KAP of its residents regarding antibiotics has not been described.

1.2 Statement of the problem

Antibiotic misuse is a growing threat in Sudan, where antibiotics are prescription-only by law but are widely obtained without a prescription, and where conflict has weakened the health system. A nationwide survey found that 71.3% of adults had used antibiotics as self-medication, and most obtained them directly from pharmacies [2]. The problem is driven by the dispensing of antibiotics without prescription, weak enforcement of regulations, the cost and distance of medical consultation, misconceptions and low awareness, disrupted health services, and the storage and sharing of leftover antibiotics [2,4,5,7]. If it continues, it can lead to antimicrobial resistance, treatment failure and prolonged illness, adverse drug reactions, higher health costs, and increased morbidity and mortality [1,3].

National and Khartoum-based surveys show inadequate public knowledge and a high prevalence of self-medication [2,8], but to the best of the investigators' knowledge, no community-based data describe the knowledge, attitude and practice of adult residents of Dongola City, Northern State. Without local evidence, health authorities cannot design targeted stewardship and awareness interventions. This study therefore aims to describe the magnitude of antibiotic misuse and its determinants in Dongola City.

1.3 Justification

This study is justified by the following:

- **Gap in knowledge:** no community-based KAP study on antibiotic use has been published from Dongola or Northern State.
- **Public health importance:** misuse of antibiotics accelerates AMR, which makes common infections harder to treat.
- **Usefulness of results:** the findings will give the Northern State Ministry of Health baseline evidence to plan antimicrobial stewardship and awareness campaigns [3].

1.4 Research question and hypotheses

Research question: What are the knowledge, attitude and practice regarding antibiotic use and misuse among adult residents of Dongola City in 2026, and which factors are associated with them?

Hypotheses:

- **H_0:** There is no association between the level of knowledge about antibiotics and self-medication with antibiotics. **H_1:** Poor knowledge is associated with a higher likelihood of self-medication with antibiotics.
- **H_0:** There is no association between sociodemographic factors (age, sex, education, income adequacy, health insurance) and the level of knowledge. **H_1:** At least one of these factors is associated with the level of knowledge.

1.5 Objectives

General objective

To assess the knowledge, attitude and practice regarding antibiotic use and misuse among adult residents of Dongola City, Northern State, Sudan, in October 2026.

Specific objectives

1. To describe the sociodemographic characteristics of the participants.
2. To measure the level of knowledge about antibiotics and antibiotic resistance.
3. To determine the attitude of the participants towards antibiotic use and misuse.
4. To determine the practices related to antibiotic use, including the prevalence, sources and reasons of self-medication with antibiotics in the previous 12 months.

5. To identify the factors associated with knowledge and with self-medication with antibiotics.
6. To assess the relationship between knowledge, attitude and practice scores.

2. REVIEW OF LITERATURE

This review moves from the global picture to the local situation and ends with the gap this study addresses.

2.1 Global level

AMR is recognized as one of the major threats to global health. The Global Burden of Disease analysis for 2019 attributed 1.27 million deaths directly to bacterial AMR and linked 4.95 million deaths to it, with the heaviest burden in low-resource regions [1]. Misuse of antibiotics through inadequate or incomplete dosing, over-prescribing, non-prescription sales and self-medication is consistently listed among the main drivers [2]. Systematic reviews show that non-prescribed use of antibiotics is especially frequent in LMICs, and the WHO therefore places public awareness at the centre of its Global Action Plan [3,4].

2.2 Regional level (Africa and Eastern Mediterranean)

A review of studies from Africa reported a median prevalence of self-medication with antibiotics of 55.7%, with the highest levels in West and North Africa [5]. In the Middle East, a systematic review found prevalence figures ranging from 12.1% to 93.1%, with non-prescription use reaching 82% in some countries [2,6]. Community studies in Jordan, Eritrea, Tanzania and the United Arab Emirates repeatedly identified cost saving, previous experience and convenience as the main reasons for self-medication [9,10,11,12]. Upper respiratory tract complaints, such as sore throat and cough, are the commonest conditions treated, even though most of them are viral [2].

2.3 National level (Sudan)

Studies in Sudan consistently show a high prevalence of antibiotic self-medication and gaps in knowledge.

Education and health insurance were associated with antibiotic self-medication in the nationwide survey, and younger and female respondents showed more positive attitudes in the Khartoum survey [2,8]. In addition, the conflict that began in 2023 has disrupted health services and AMR control efforts in Sudan [7].

2.4 Local level (Northern State and Dongola)

Most Sudanese data come from Khartoum, Gezira and university students. A study in River Nile State, a neighbouring state, examined irrational use of antibiotics among doctors, pharmacists and the public [19], which confirms that the problem extends beyond the capital. However, to the best of the investigators' knowledge, no published community-based KAP study on antibiotics has been conducted in Dongola or elsewhere in Northern State.

3. METHODOLOGY

3.1 Study design

A descriptive, community-based, cross-sectional study. This design is appropriate because the objectives are to estimate the level and frequency of knowledge, attitude and practice at one point in time and to explore associated factors; it is quick, inexpensive and suitable for a course project.

3.2 Study area

The study will be conducted in Dongola City, the capital of Northern State, located on the Nile in northern Sudan. The city has government and private health facilities, community pharmacies and the University of Dongola. The study will cover the residential neighbourhoods of the city.

3.3 Study population

Study population: all adults aged 18 years or older living in households in Dongola City.

Inclusion criteria: (1) age ≥ 18 years; (2) resident of Dongola City for at least six months; (3) willing to participate and give informed consent.

Exclusion criteria: (1) healthcare professionals and health-science students (doctors, pharmacists, nurses, laboratory and other health workers), because their knowledge differs from that of the general public; (2) persons unable to communicate or too ill to be interviewed; (3) visitors and temporary guests.

3.4 Sample size

The sample size was calculated using the single population proportion formula for cross-sectional studies [20]:

$$\mathbf{n = Z^2 \times p\,(1 - p) / d^2}$$

where Z = 1.96 (95% confidence level), p = 0.5 (expected proportion; 50% is used because no local estimate exists, which gives the largest sample), and d = 0.05 (margin of error).

$$\mathbf{n = (1.96)^2 \times 0.5 \times 0.5 / (0.05)^2 = 384}$$

Adding 10% to compensate for non-response and incomplete questionnaires gives **384 + 38 = 422 participants**.

3.5 Sampling technique

The study will employ a multi-stage random sampling technique: neighbourhoods of Dongola City will be selected randomly, then households within them, and one eligible adult from each selected household will be chosen by lottery.

3.6 Study variables

3.7 Data collection methods and instruments

Data will be collected by **face-to-face interviews** using a **structured, interviewer-administered Arabic questionnaire** adapted from published Sudanese studies [2,8,16]. It covers sociodemographic characteristics, knowledge, attitude and practice. Data collectors will be trained fellow medical students.

3.8 Data analysis plan

Data will be analysed using SPSS version 26. Descriptive statistics (frequencies, percentages, mean ± SD) will be used, the chi-square test for associations, and binary logistic regression to identify factors associated with antibiotic self-medication. A p-value < 0.05 will be considered statistically significant.

4. ETHICAL CONSIDERATIONS

- **Approvals:** ethical clearance and administrative permission will be obtained before data collection.
- **Informed consent:** the purpose and voluntary nature of the study will be explained and written consent will be obtained (Appendix A).
- **Confidentiality and data protection:** no names will be recorded, questionnaires will be coded, and data will be stored securely and used only for research purposes.
- **Risks and benefits:** the risk is minimal; each participant will receive brief advice on correct antibiotic use.
- The study will follow the principles of the Declaration of Helsinki [21].

5. TIMETABLE

No.	Activity	Time period
1	Submission of research proposals	20–24 September 2026
2	Presentation of research proposals	27 September–01 October 2026
3	Data collection	04–22 October 2026
4	Data analysis	25 October–05 November 2026
5	Writing results and discussion	08–19 November 2026
6	Writing the final report	22 November–03 December 2026
7	Electronic submission of research to the Department of Community Medicine	06–10 December 2026
8	Research evaluation (refereeing)	13–24 December 2026
9	Amendments to research	27–31 December 2026
10	Research discussion/viva	03–04 January 2027

6. RESOURCES AND BUDGET

No.	Item	Qty/Days	Cost (SDG)
1	Printing & photocopying of questionnaires (450 copies)	1	150,000
2	Stationery (pens, files, notebooks)	1	20,000
3	Transportation for data collectors (19 days)	19	250,000
4	Data collectors' incentives (4 collectors)	4	120,000
5	Data entry & statistical analysis support	1	300,000
6	Communication (airtime/internet)	1	30,000
7	Printing of the final report & binding	5	50,000
8	Contingency (10%)	-	50,000
	Total		**970,000**

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APPENDIX A: INFORMED CONSENT FORM

Study title: Knowledge, Attitude and Practice of Antibiotic Use and Misuse among Residents of Dongola City, Northern State, Sudan, 2026

Investigators: Medical students, Department of Community Medicine, Faculty of Medicine and Health Sciences, University of Dongola.

Purpose: to find out what people in Dongola City know and do about antibiotics, so that health authorities can plan better health education.

Procedure: you will be asked questions for about 15 minutes. Your name will not be written on the questionnaire.

Risks and benefits: there is no known risk. You will receive advice and a leaflet on correct antibiotic use. There is no payment for participation.

Voluntary participation and confidentiality: participation is voluntary. You may refuse to answer any question or stop at any time without any consequence. Your answers will be kept confidential and used only for research.

Statement of consent: I have read (or had read to me) the information above, my questions were answered, and I agree to participate in this study.

Participant’s signature / thumbprint: _____ Date: ___/___/2026

Witness (if the participant cannot read): _____

Interviewer’s name and signature: _____