KNOWLEDGE, ATTITUDES, AND PRACTICES REGARDING ANTIMICROBIAL RESISTANCE IN LOW- AND MIDDLE-INCOME COUNTRIES: NARRATIVE SYNTHESIS

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Keywords: *knowledge, attitudes, practices; antibiotic resistance; low- and middle-income countries.*

KNOWLEDGE, ATTITUDES AND PRACTICES REGARDING ANTIMICROBIAL RESISTANCE IN LOW- AND MIDDLE-INCOME COUNTRIES - NARRATIVE SYNTHESIS

Introduction*. Antimicrobial resistance (AMR) is an acute medico-social problem, and in order to minimize its effects, a comprehensive approach is needed at the individual level and in the formulation of public health policies.*

Material and methods. *A narrative synthesis of KAP studies results on AMR in LMICs was conducted. The search for sources was performed in public databases. After identifying articles and removing duplicates, 23 relevant ones were selected, of which 14 were fully analyzed.*

Results. *Studies have indicated that knowledge is generally deficient in LMICs. Negative or neutral attitudes and practices concerning antibiotic prescribing and administration prevail, with widespread self-medication. Determining factors are diverse, and addressing the AMR phenomenon necessitates a comprehensive approach, including policy-level initiatives aimed at raising awareness and educating the population.*

Conclusions. *The determinants of population KAP in LMICs are influenced by the economic situation and the health system. Clear objectives, correct sampling techniques, and standardization of research instruments are necessary for KAP studies to ensure the representativeness of the data.*

Cuvinte-cheie: *cunoștințe, atitudini, practici; rezistența la antibiotice; țări cu venit mic și mediu.*

Introduction*. Rezistența la antimicrobiene (RAM) este o problemă medico-socială stringentă, iar pentru minimizarea efectelor acesteia este necesară o abordare comprehensivă, la nivel individual, și formarea politicilor de sănătate publică.*

Material și metode. *A fost realizată o sinteză narativă a rezultatelor studiilor CAP (Cunoștințe, Atitudini și Practici) privind RAM în țările cu venit mic și mediu. Sursele au fost căutate în bazele de date publice. După identificarea articolelor și dedublare, au fost selectate 23 de surse relevante, dintre care 14 au fost analizate integral.*

Rezultate. *Studiile au arătat că în țările cu venit mic și mediu, cunoștințele cu privire la prescrierea și administrarea antibioticelor sunt, în general, slabe, atitudinile negative sau neutre, iar practicile necorespunzătoare, fiind pe larg răspândită automedicația. Creșterea nivelului de conștientizare și educarea populației cu privire la fenomenul RAM necesită o abordare complexă, inclusiv la nivel de politici.*

Concluzii. *Determinantele CAP ale populației în țările cu venit mic și mediu sunt influențate de situația economică și de sistemul de sănătate. Pentru studiul CAP, care asigură reprezentativitatea datelor, sunt necesare obiective clare, tehnici de eșantionare corecte și standardizarea instrumentelor de cercetare.*

INTRODUCTION

Antimicrobial resistance (AMR) is a global threat to health, with significant impacts on healthcare systems and the economy (1). The misuse and overuse of antimicrobials remain the primary cause of the emergence of pathogens resistant to their action. Identifying knowledge gaps and planning interventions that could lead to rational antimicrobial use are crucial to reducing AMR (2). Minimizing the impact of antimicrobial resistance requires an appropriate policy response, based on good governance and coordination (3). Social and behavioral factors in the inappropriate use of antibiotics have been identified as key contributors to the emergence of AMR. Surveys on the knowledge, attitudes, and practices (KAP) of the population are part of the monitoring and evaluation framework proposed by the WHO Global Action Plan on Antimicrobial Resistance (4).

The aim of the study was to identify the characteristics of studies on knowledge, attitudes, and practices regarding AMR, as well as the KAP determinants of the population regarding the phenomenon of AMR in low- and middle-income countries (LMICs). The study is conducted within the Research Project "Phage treatment and wetland technology as intervention strategy to prevent dissemination of antibiotic resistance in surface waters (PhageLand)" with the code 22.80013.8007.1M and was approved by the Research Ethics Committee of Nicolae Testemițanu State University of Medicine and Pharmacy, minutes no. 7 dated January 9, 2022 (5).

MATERIAL AND METHODS

A narrative synthesis presenting the results of 14 KAP studies of the population regarding antimicrobial resistance in low- and middle-income countries (LMICs) was conducted. Source searching was performed in the PubMed, Google Scholar, and Hinari databases using the following keywords: "antimicrobial resistance AND kap", "antimicrobial resistance NEAR knowledge AND attitude AND practice", "antimicrobial resistance NEAR knowledge attitude practice".

The inclusion criteria for publications in the study were: articles published between January 2015 and January 2023; study types - narrative reviews, descriptive and observational studies on KAP of the population regarding antimicrobial resistance, with clear and explicit methodology; articles written in English.

The exclusion criteria for publications in the study were: descriptive studies on KAP of medical, veterinary students or healthcare workers, articles lacking methodology or where it was presented unclearly.

The full text of the studies was evaluated based on the variables: purpose, methodology, cumulative number of participants/sample size, and results.

From the collected information, evidence on the knowledge, attitudes, and practices of the population regarding antimicrobial resistance was selected, interpreted, and presented considering the number, level of evidence, and quality of the studies. In Google Scholar, a total of 1,760 citations were identified, in the PubMed database - 511, and in HINARI - 523. After removing duplicate records and screening abstracts, 23 articles were selected, of which nine were excluded as they did not refer to low- and middle-income countries. Finally, 14 articles were fully reviewed.

RESULTS

After screening the full text, 14 articles listed in Table 1 were included in the integrative review, with a cumulative number of study participants of 9,380 individuals from the general population.

All 14 studies included in the analysis had clear objectives regarding the assessment of the population's knowledge, attitudes, and practices related to antimicrobial resistance and their consumption. Appropriate methodologies for population-based cross-sectional studies were employed concerning the researched questions.

The studies have shown that in most LMICs, the population has poor knowledge regarding antibiotic use (6, 7, 8, 12, 13, 14, 16, 18, 19). However, in some countries, there is a trend of improving knowledge in this area due to various awareness-raising and educational practices (9, 11, 15, 17), as well as improvements in socio-cultural factors (10).

In LMICs, alongside the population's limited knowledge about the proper use of antibiotics, there persists a negative attitude towards this phenomenon (6, 12, 13, 14, 16, 18) or a neutral one (19). In other countries, alongside higher levels of knowledge, there is also a conscious

Table 1. Studies on the Knowledge, Attitudes, and Practices of the Population Regarding Antimicrobial Resistance in Low- and Middle-Income Countries

Author	Country	Year	Aim	Type of study	Eligibility criteria	Sample	Source
Sa'ed H. Zyoud	Palestine	2012	Analysis of knowledge and attitudes regarding the use and practices of antibiotics in managing urinary tract infections in children on a large sample of parents	Cross-sectional	Study on KAP among parents of children with upper respiratory tract infections aged 18 to 50 years	385 parents	(6)
Grace-Ange Elong Ekambi et. al.	Cameroon	2015	Designed to determine the knowledge, attitudes, and practices regarding antibiotic use in an urban community and assess the factors associated with antibiotic use	Cross-sectional and prospectiv e study	Study on KAP conducted among the urban community, pharmacy customers, respondents aged >15 years	1,192 customer respondents	(7)
Inocêncio Mate et. al.	Maputo, Mozambique	2016	Obtaining data on KAP regarding the pres-cription and use of antibiotics in Sub-Saharan Africa	Cross-sectional study	KAP study on adults, aged >18 years, using a semi-structured questionnaire	1,019 particip.	(8)
Komal Raj Rijal	Nepal	2017	Exploring the KAP of antibiotic use among patients, healthcare workers, laboratories, drug sellers, and farmers in Nepal	Cross-sectional study	Face-to-face survey on KAP, including patients predominantly aged (50%) between 26–50 years	516 particip., of which 324 were patients	(9)
Moyukh Chowdhury et. al.	Matlab, Bangladesh	2017-2019	Exploring factors and practices regarding access to and use of anti-biotics, understanding antimicrobial resistance in rural communities in Bangladesh from a socio-cultural perspective	Qualitative study, ABACUS study	KAP study conducted among residents of different age groups in rural areas, aged 16-60 years	59 informants	(10)
Jane Mingjie Lim et. al.	Cambodia	2018	Assessment of public KAP regarding antibiotics and antibiotic resistance in Cambodia, providing baseline information to monitor the progress of future interventions	Descriptiv e study	KAP survey, antibiotic use among urban and rural populations, in Phnom Penh, Siem Reap, and Prey Veng. Age > 18 years	2,005 participants	(11)

Hassan Waseem et. al.	Sialkot, Pakistan	2018-2019	Assessment of knowledge about AMR and attitudes toward this phenomenon among community members, pharmacists/pharmacy owners, and doctors in the Sialkot district, Pakistan	Cross-sectional study	KAP study based on three self-administered questionnaires, intended for the general population aged 18-45 and above, pharmacists, and physicians	473 participants from the general population	(12)
Amit Khelgi et. al.	Mangaluru, India	2019	Assessment of knowledge regarding antibiotic use and AMR among the rural population in Mangaluru. Determination of attitudes of rural residents regarding antibiotic use. Analysis of their practices in antibiotic use	Cross-sectional study	KAP study based on a questionnaire, intended for the general rural population, aged 18-60 years	130 participants	(13)
Emelda E. Chukwu	Nigeria	2020	Assessment of the current level of awareness and knowledge of AMR among the Nigerian public	Cross-sectional study	KAP study, using a pre-tested and validated questionnaire, from the general public in North Central, North East, North West, South East, South South, and South West of Nigeria. Age 18-75 years and above	482 participants	(14)
Calvin Sindato et. al.	Tanzania	2020	Determining the knowledge, attitudes, and practices (KAP) regarding antimicrobial use (AMU) and AMR among the communities in Ilala, Kilosa, and Kibaha, Tanzania	Cross-sectional study	KAP study, using a semi-structured questionnaire, for the communities in Ilala, Kilosa, and Kibaha, aged 29-54 years	828 participants	(15)
Wudneh Simegn, Getachew Moges	Dessie, Northern Ethiopia	2021	Assessment of the level of awareness and knowledge of antimicrobial resistance and associated factors among adults in Dessie, Ethiopia	Cross-sectional study	Community-based KAP study involving adult individuals	407 adult participants	(16)

Matrujyoti Pattnaik, Ashish Kumar Nayak, et. al.	Odisha, India	2021	Determining the knowledge, attitudes, and practices (KAP) regarding the use of antimicrobials and AMR among rural communities in Tigiria (Odisha), India	Cross-sectional study	KAP study based on a standardized questionnaire, using an electronic device with Open Data Kit, participants aged from 18 to over 60 years	1,003 participants	(17)
Haileyesus Dejene	Gondar, Northern Ethiopia	2021	Assessment of the knowledge, attitudes, and practices of the residents of Gondar city regarding the use of antimicrobials and AMR	Cross-sectional study	KAP study involving the residents of Gondar city using a pretested semi-structured questionnaire, aged 18 years.	400 participants	(18)
Zahraa N. Fakhreldain, Hayder CH. Assad	Iraq	2021-2022	Collecting data reflecting the level of knowledge about antibiotics, attitudes toward them, and their use within the Iraqi community, and exploring associated predictive factors of the patient	Cross-sectional observational study	KAP study based on a validated and pretested self-administered questionnaire. Patients presenting at a microbiological laboratory in the Al-Sadr medical city	475 patients	(19)

attitude, with the population being aware of some terms related to antimicrobials and antibiotic resistance. Most participants acknowledged that antibiotic resistance is a problem (9, 11, 15, 17). The population's practices regarding antibiotic resistance are inadequate (6, 7, 8, 12, 13, 14, 16) where self-medication and inappropriate prescribing of antimicrobials are widespread (7, 8, 14, 16), and where access to healthcare facilities is lacking (10). Overall, antibiotic administration practices are correlated with the population's level of knowledge. Thus, in some cases, appropriate practices have been identified in the surveyed population, but they still require improvement (9, 11, 15, 17, 19). Awareness campaigns to mitigate inappropriate antibiotic use (9) are welcome, as well as policies regarding proper antibiotic use, banning over-the-counter sales without a prescription, and adopting a One Health approach (9, 10, 16).

DISCUSSIONS

Following the analysis of scientific publications, the main determinants of the key compartments were identified. The low level of knowledge among the population about AMR in LMIC is primarily influenced by the low level of education of the population (8) and limited access to medical information (9), including information about antibiotics and their correct administration. The negative attitudes of the population towards AMR are largely exacerbated by the low standard of living (13) and the indifferent attitude towards pressing public health issues (15, 18), lack of trust in the healthcare system (10), and poor communication between doctors and patients. The poor practices of the population regarding AMR are largely determined by poverty and poor economic conditions, the reuse of leftover antibiotics (6, 14), and self-medication (7, 9, 13, 17). The main reasons cited for practicing self-medication in developing countries are the lack of access to nearby healthcare, financial constraints, ignorance (7), and, most importantly, the lack of or minimal control by authorities over antibiotic consumption, inevitably leading to the worsening of the AMR situation (9, 10, 12).

KAP studies can help decision-makers plan actions and strategies to combat AMR and mitigate its effects (20). To maximize the impact of KAP studies, support from public health programs is necessary to make progress in addressing AMR issues (21). Increasing awareness and educating the population about antibiotic resistance play an important role in preventing the spread of this phenomenon (22).

CONCLUSIONS

1. This synthesis has identified several characteristics of studies on knowledge, attitudes, and practices regarding antimicrobial resistance and its consumption.
2. Clear objectives of the survey/study are necessary.
3. To ensure the representativeness of the obtained data, appropriate and scientifically sound sampling techniques are necessary.
4. To obtain credible and comparable data, pilot testing of surveys and questionnaire implementation methods, as well as standardization of research instruments, are necessary.
5. During questionnaire development, the characteristics of healthcare systems and access to healthcare services must be taken into account.
6. KAP studies are a valuable tool, especially if supported by public health programs aimed at developing measures to reduce the phenomenon of AMR.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

FUNDING ACKNOWLEDGEMENTS

The study is conducted within the Research Project “Phage treatment and wetland technology as intervention strategy to prevent dissemination of antibiotic resistance in surface waters (PhageLand)” with the code 22.80013.8007.1M.

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