

Evaluating the Validity and Reliability of Questionnaires Measuring Knowledge, Attitudes, and Practices Towards Antibiotic Resistance Among Youths: A Systematic Review Protocol

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ABSTRACT

This protocol for a systematic review describes the methodology for assessing the validity and reliability of questionnaires used in studies on antibiotic resistance among youths. It also seeks to evaluate the methodological quality of these studies in terms of their ability to influence youths' knowledge, attitudes, and practices (KAP) regarding antibiotic resistance, as measured by the identified questionnaires. The review will include an exhaustive literature search spanning 2013 to 2023 using key databases and grey literature sources. Data from eligible studies will be extracted regarding sample characteristics, methodological quality, and questionnaire validity and reliability metrics. The participants will be categorized into secondary school, high school, and undergraduate students. The review thoroughly evaluates the instruments' psychometric features, including face validity, internal consistency, test-retest reliability, construct validity, and hypothesis testing. Moreover, the protocol thoroughly examines the methodology and approach employed in the encompassed research, specifically emphasizing the educational setting and its impact on the efficacy of interventions to combat antibiotic resistance. The classification of individuals based on their educational stages enables a comprehensive evaluation of the effectiveness of KAP questionnaires in various educational contexts. A meta-analysis will be performed to quantify the cumulative effects of studies. The systematic review is anticipated to provide valuable insights into the validity and reliability of questionnaires used in antibiotic resistance studies focusing on youths. By evaluating the methodological quality of these studies, this review intends to contribute to the development of standardized measurement instruments and to enhance our understanding of how interventions impact youths' KAP related to antibiotic resistance.

Keywords: Questionnaires, Knowledge, Attitudes, Practices, Antibiotic Resistance, Youths, Systematic Review, Protocol

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1. INTRODUCTION:

Antimicrobial Resistance (AMR) refers to the development of bacterial resistance to antibiotics, which were once efficacious in treating infections. This can occur naturally or because of overuse or misuse of antibiotics [1]. Antibiotic resistance is a significant public health issue

that affects people across all age cohorts, including youths and adolescents. Prolonged illness, heightened mortality rates, and escalated healthcare expenditures ensue, resulting in extended hospitalizations for afflicted individuals [2][3].

Improper management of antibiotic drugs, such as prematurely discontinuing the treatment and utilizing remaining doses [4], among the younger generation is a significant concern [5]. The utilization of antibiotic therapies is disproportionately higher among younger

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patients compared to middle-aged populations [6]. The level of understanding among adolescents and young adults aged 14 to 24 regarding medical conditions effectively treatable with antibiotics is relatively lower compared to other age cohorts [7].

According to a comprehensive survey conducted in Europe, individuals between the ages of 15 and 24 exhibit the greatest rates of antibiotic usage. Moreover, compared to other demographic cohorts, this age group is more likely to employ antibiotics to treat upper respiratory tract infections (URTIs) [8]. Moreover, a study carried out in the United Kingdom found that persons in the younger age group (15-34 years) have worse levels of comprehension of AMR and the proper handling of self-limiting infections compared to older age groups [9]. Conversely, a cross-sectional study conducted in Palestine revealed a significant correlation between greater education, younger age, gender, occupation, high monthly income, and strong knowledge with a positive attitude toward antibiotic use [10].

This systematic review will evaluate the accuracy and consistency of questionnaires used to measure knowledge, attitudes, and behaviors (KAP) about antibiotic resistance among young people, specifically focusing on educational levels such as high school, secondary school, and undergraduate students. Previously, a comprehensive systematic review focused on the public without providing a detailed analysis based on their educational levels. In contrast, the current review takes a more specific perspective by focusing on the youth population and classifying them based on their educational status, including high school, secondary school, and undergraduate students [11]. The study largely concentrated on the methodology and tactics utilized in existing population-based surveys about antibiotic knowledge and awareness of antimicrobial resistance (AMR). While the referred research did not specify a quantitative data synthesis method, this systematic review presents a meta-analysis strategy to synthesize data and

construct visual representations using forest plots. In addition, the present research employs the Cochrane Risk for Bias instrument to assess the possible presence of prejudice in the included studies. It is worth noting that the prior systematic review did not mention the utilization of this technique for assessing the risk of bias [11]. The differentiations underscore the unique focus, goals, and methodologies of systematic reviews, which hold the potential to significantly enhance comprehension of antibiotic resistance among youths in diverse settings.

According to the World Health Organization, youths between the ages of 15 and 24 undergo fast physical, cognitive, and emotional development [12]. This period is critical for their overall well-being but is also associated with high death rates, illness, and injury [13]. In his book on adolescence at the start of the twentieth century, Stanley Hall provided an informal definition of adolescence as the developmental phase that spans from 14 to 24 years [14]. The adolescent population is a significant demographic group in a nation and requires immediate attention. As current and future leaders, adolescents drive economic, social, and cultural progress [15]. According to a study conducted in England, adolescents have limited comprehension of antibiotics and the implications associated with antimicrobial resistance (AMR) [8]. The study additionally indicated that adolescents lacked interest in antibiotics, resulting in limited discourse among peers and educators. This lack of participation ultimately contributed to the comparatively low level of understanding regarding antibiotic resistance. Interventions promoting expert-driven behavioral change, effective communication, education, and training that enhance awareness and comprehension of rational antimicrobial use are strongly recommended. Additionally, restrictions on the distribution of antibiotics should be imposed by law [16].

The term "youth" gained popularity around the time of the United Nations' inaugural International Youth Year in 1985, coinciding with adolescence. The understanding of

youth generally encompasses those aged between 15 and 24 years. However, as articulated during the related international congress, the Barcelona Statement conceptualized youth as a social construct devoid of specific age parameters [17]. Most definitions of the more recently introduced terms young adulthood and emerging adulthood fall between 18 and 26 [18][19][20].

Antibiotic resistance interventions often employ questionnaires to measure their effectiveness, particularly in changing KAP among youths. However, the validity and reliability of these questionnaires have not been comprehensively assessed. This gap in the literature makes it challenging to compare the effectiveness of different interventions and to develop standardized measurement tools for future studies. Despite the crucial significance of this matter, there is a lack of complete assessment of the soundness and reliability of surveys used for gauging KAP of youths about antibiotic resistance. Questionnaires are frequently utilized in interventions that target modifying KAP within this population. The lack of a comprehensive assessment poses challenges in assessing the efficacy of various interventions, hence impeding the establishment of standardized measurement instruments for future research endeavors.

Given this context, the research question for this systematic review is as follows: "What are the validity and reliability of questionnaires used in studies evaluating youths' KAP regarding antibiotic resistance, and how effective are these studies at altering youths' KAP as measured by these questionnaires?"

The lack of standardized measurement tools in antibiotic resistance interventions hampers the ability to compare effectiveness and develop evidence-based strategies. This systematic review seeks to address this deficiency by identifying valid and trustworthy surveys, guiding the design of future interventions, and contributing to antibiotic stewardship among youths. Understanding the validity and reliability of these surveys is critical for creating successful antibiotic resistance education

campaigns for teenagers. A systematic review is required to collect and assess existing literature, fill the current gap, and facilitate future research and intervention initiatives.

2. THE REVIEW:

2.1. Aims:

This study aims to i) conduct a comprehensive analysis to identify and assess the validity and reliability of questionnaires employed in research studies that assess youths' KAP about antibiotic resistance, and ii) evaluate the methodological quality of the studies that used these questionnaires and the effectiveness of these studies in changing youths' KAP about antibiotic resistance, as measured by the identified questionnaires. The scope of this investigation will encompass scholarly publications released within the timeframe spanning from 2013 to 2023.

2.2. Methodology:

2.2.1. Design:

A systematic review that aims to evaluate the validity, reliability, and methodological quality of research utilizing questionnaires.

2.2.2. Search Strategy:

To ensure a thorough and targeted exploration of the existing literature, a systematic search will be conducted across four electronic databases: PubMed, CINAHL, Scopus, and Google Scholar. These databases have been chosen based on their pertinence to research in medicine and healthcare. The search scope will be restricted to publications published between January 2013 and December 2023 to encompass the most up-to-date and pertinent research outcomes.

The selection of search terms has been carefully chosen to correspond with the study inquiry. Boolean operators will be employed to enhance the precision and specificity of the search. The study will employ the following sets of search terms: ("Knowledge" OR "Attitudes" OR

“Practices” OR “Behaviors” OR “Awareness”) AND ("Adolescents" OR "Teens" OR "Youth" OR "Teenagers") AND ("Questionnaires" OR "Surveys") AND ("Antibiotic Resistance" OR "Drug Resistance" OR "AMR" OR "Antimicrobial Resistance”) NOT ("Antivirals" OR "Antifungals" OR "Animal Studies" OR "topical antimicrobials") AND ("Validity" OR "Reliability" OR "Measurement" OR "Assessment Tools").

A set of specific restrictions will be implemented to achieve a more refined selection of search results. Firstly, only articles that have been published in the English language will be considered for inclusion. Studies involving antiviral, antifungal, animal experimentation, or topical antimicrobial agents will be omitted. This detailed search strategy aims to achieve a high level of specificity, guaranteeing that only the most relevant studies are incorporated into the review.

2.2.3. Study Selection:

Inclusion Criteria

- Original research articles.
- Studies assessing KAP about antibiotic resistance.
- Involved youths between 14 – 24 years old.
- Manually administered or interviewer-administered questionnaire studies.
- Published between 2013 – 2023.

Exclusion Criteria

- Studies not published in English.
- Studies focus on topical antimicrobials.
- Investigations that employ data collection methods other than self-administered or interviewer-administered questionnaires.
- Research articles that fail to provide empirical data or methodological details concerning the utilized questionnaire's validity and/or reliability.
- Narrative reviews or editorial papers as they do not contain a methods section.

2.2.4. Data Extraction

Data from each eligible study will be extracted systematically using a standardized form. The full citation of the paper, including author(s) and year of publication, as well as the name of the questionnaire or instrument employed, will be extracted. The location of the study will also be mentioned. The study design will be recorded, indicating whether the study is a cross-sectional, cohort, or randomized controlled trial. Information on the sample size and response rate will be provided if available. The characteristics of participants, such as their age range and gender distribution, will be discussed. Specific variables or areas the questionnaire aims to measure, such as antibiotic resistance KAP, will be identified. The data collection method, whether self-administered or conducted by an interviewer, will be indicated. Outcomes from the study will be extracted, including any metrics or scales used for validity and reliability, such as Cronbach's alpha or test-retest reliability. The following tools—construct validity, internal consistency, reliability, face validity, and hypothesis testing—will be evaluated for validity and reliability.

Quality Assessment

To evaluate the efficacy of the instruments utilized in the research under consideration, we will adhere to the guidelines and templates provided by COSMIN (Consensus-based Standards for selecting health Measurement Instruments), as outlined by Mokkink (2018). The methodology is well acknowledged for its strong capacity to assess the psychometric characteristics of outcome measures. Instruments will be assessed within three primary categories: reliability, validity, and responsiveness.

The reliability domain encompasses an assessment of measurement inaccuracy, internal consistency, and reliability. Internal consistency pertains to the degree to which elements within a measurement instrument are interconnected according to the one-dimensionality

assumption [21]. Reliability can be understood as the measurement of consistency or stability over time. One commonly used method to assess reliability is test-retest reliability, which consists of conducting two separate measurements of the same construct and analyzing the degree of concordance between the results. This can be quantified using statistical techniques such as the intraclass correlation coefficient (ICC) [21].

Content validity (including face validity), structural validity, hypothesis testing for construct validity, cross-cultural validity, and criterion validity are all components of the validity assessment's domain [18]. Structural validity refers to the extent to which scores accurately represent the fundamental structure of the construct being evaluated [21].

The review process will be structured into three tables to facilitate a systematic study. In the first table, the validity and dependability of the questionnaires utilized in the studies will be assessed, evaluating each questionnaire's psychometric performance. This table will show how well the questionnaires measure youths' antibiotic resistance KAP.

The second table will summarize the studies' methodology, sample characteristics, education levels (secondary school, high school, and undergraduate students), and critical conclusions. This table will compare the studies' methodologies, highlighting their strengths and weaknesses, and help explain study diversity. The education level is essential since it considerably impacts youths' understanding of antibiotic resistance. Data will be analyzed individually for secondary school, high school, and undergraduate students by categorizing the studies based on participants' educational backgrounds. This classification helps to measure the efficacy of interventions at various educational stages.

The third table will cover the themes and questions regarding KAP. The purpose of this table is to offer a comprehensive analysis of the inquiries and topics about KAP surrounding antibiotic resistance. By categorizing

issues and themes, a more comprehensive understanding of the principal areas of emphasis within the encompassed subjects can be attained. Additionally, this table will provide information regarding the nature of the question, such as whether it is a multiple-choice or a Likert scale question, as well as its correspondence with the KAP components. Furthermore, we will consider the participants' educational levels to determine whether the questions and subjects differ depending on their educational backgrounds.

Practices incorporating educational attainment levels within these tables will augment the comprehensiveness of our analysis, enabling us to derive more significant insights into the influence of educational stages on the knowledge, attitudes, and practices of adolescents concerning antibiotic resistance. This technique aligns with our objective to offer significant insights into the validity and reliability of surveys across diverse educational environments.

2.2.5. Data Synthesis:

The primary approach for data synthesis in this systematic review will involve the utilization of meta-analysis. This statistical technique will be employed to combine the results from the included research, and a forest plot will be used to summarize the collective effects visually and quantitatively. The quantitative approach utilized in this research will begin with calculating effect sizes, which may include odds ratios for categorical data or mean differences for continuous data. Additionally, matching confidence intervals will be determined for each study. The heterogeneity among research will be evaluated by applying statistical tests, such as Cochran's Q and the I² statistic, to measure the extent of variability observed in the results of different studies.

A forest plot will be utilized to present the meta-analysis results comprehensively. The effect sizes and confidence intervals for each study incorporated in the analysis will be presented in this plot, facilitating a

comprehensive scrutiny of the findings. Additionally, the forest plot will summarize the overall effect, offering a concise representation of the collective findings. When encountering significant heterogeneity, researchers will perform subgroup analysis and sensitivity studies to investigate potential factors contributing to the observed variability. In addition, assessing publication bias will involve the utilization of methodologies such as funnel plots and statistical tests.

A forest plot will be a highly effective visual instrument for communicating the findings, providing valuable information regarding the overall effect's direction and magnitude and the observed variability among the various studies. This methodology will substantially contribute to compiling evidence about antibiotic resistance among youths, ensuring the findings are clearly presented and can be effectively interpreted.

2.2.6. Risk for Bias:

The Cochrane Risk of Bias instrument will be applied to assess the potential for bias in the included studies. As moderator factors, additional potential sources of bias, including funding and publication status, will also be investigated.

2.2.7. Ethical Considerations

This review does not entail direct interactions with human or animal subjects. As such, no special ethical approvals or informed consent are required. The review focuses exclusively on the analysis of previously published studies and the synthesis of available data. Given the nature of this research, which involves the examination of existing research outputs, no special ethical considerations or permissions are required.

3. DISCUSSION AND CONCLUSIONS

This protocol for a systematic review outlines the methods for analyzing the validity and reliability of questionnaires used in research on antibiotic resistance among adolescents. The methodological quality of these studies in terms of their capacity to reflect the KAP of young people in relation to antibiotic resistance will be highlighted. Information regarding the quality of the methodologies employed, the characteristics of the samples, and the questionnaires' validity and reliability metrics will be obtained from studies appropriate for the present analysis.

The present analysis will encompass an assessment of the construct validity, face validity, internal consistency, test-retest reliability, and overall reliability of the instruments. A meta-analysis will quantify the combined impact of all the research. This review proposes to contribute to the development of standardized assessment tools and to expand our understanding of how interventions affect young people's knowledge, attitudes, and behaviors (KAP) linked to antibiotic resistance by assessing the methodological quality of the research.

This protocol is expected to have some inherent limitations. Systematic reviews and meta-analyses are constrained in their ability to calculate effect sizes by the number of available studies on the topic, the level of detail provided in the study reports regarding interventions, and the reported data types. All eligible studies will be incorporated, and the authors of primary studies that fail to provide adequate data for effect size calculation will be contacted.

Conflict of interest statement

The authors assert that they have no conflicting interests.

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تقييم صحة وموثوقية استبيانات قياس المعرفة والمواقف والممارسات تجاه مقاومة المضادات الحيوية بين الشباب: بروتوكول مراجعة منهجية

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ملخص

يصف هذا البروتوكول للمراجعة المنهجية منهجية تقييم صحة وموثوقية الاستبيانات المستخدمة في الدراسات حول مقاومة المضادات الحيوية بين الشباب. ويسعى أيضًا إلى تقييم الجودة المنهجية لهذه الدراسات من حيث قدرتها على التأثير على معارف الشباب ومواقفهم وممارساتهم (KAP) فيما يتعلق بمقاومة المضادات الحيوية، كما تم قياسها من خلال الاستبيانات المحددة. باستخدام قواعد البيانات الرئيسية ومصادر الأدبيات الرمادية، ستضمن المراجعة بحثًا شاملاً في الأدبيات يمتد من عام 2013 إلى عام 2023. وسيتم استخراج البيانات من الدراسات المؤهلة فيما يتعلق بخصائص العينة، والجودة المنهجية، ومقاييس صلاحية الاستبيان وموثوقيته. سيتم تصنيف المشاركين إلى طلاب المدارس الثانوية والمدارس الثانوية والطلاب الجامعيين. تستلزم المراجعة إجراء تقييم شامل للميزات السيكو مترية للأدوات، بما في ذلك تقييم صلاحية الوجه، والاتساق الداخلي، وموثوقية الاختبار وإعادة الاختبار، وصلاحية البناء، واختبار الفرضيات. وعلاوة على ذلك، فإن البروتوكول يدرس بدقة المنهجية والنهج المستخدم في البحث الشامل، مع التركيز على وجه التحديد على البيئة التعليمية وتأثيرها على فعالية التدخلات لمكافحة مقاومة المضادات الحيوية. يتيح تصنيف الأفراد بناءً على مراحلهم التعليمية إجراء تقييم شامل لفعالية استبيانات KAP في العديد من السياقات التعليمية. لتحديد الآثار التراكمية للدراسات، سيتم إجراء التحليل التلوي. ومن المتوقع أن توفر المراجعة المنهجية رؤى قيمة حول صحة وموثوقية الاستبيانات المستخدمة في دراسات مقاومة المضادات الحيوية التي تركز على الشباب. ومن خلال تقييم الجودة المنهجية لهذه الدراسات، تهدف هذه المراجعة إلى المساهمة في تطوير أدوات قياس موحدة وتعزيز فهمنا لكيفية تأثير التدخلات على المعرفة والأفكار والممارسات لدى الشباب فيما يتعلق بمقاومة المضادات الحيوية.

الكلمات الدالة: مقاومة المضادات الحيوية، الاستبيانات، الشباب، المعرفة، المواقف، الممارسات، مراجعة منهجية، بروتوكول.

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