

Innovative Therapies In The Fight Against Antimicrobial Resistance Bridging Gaps And Overcoming Barriers

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ABSTRACT:

Purpose: The objective of this work is to assess and analyses the views of key healthcare staff on the innovative treatments as a tool in the fight against AMR. The current research will identify key determinants including geographic location, professional background and experience level affecting knowledge, attitude and behavioral intentions to utilize AMR treatments among healthcare professionals. **Objective:** This study aims at exploring the factors that enable and hinder the use of novel AMR therapies, namely bacteriophage therapy, antimicrobial peptides, and CRISPR technology among healthcare workers across the geographic regions and various professions. **Methodology:** Quantitative research design was used in this study and a total of 190 health care workers including doctors, pharmacists, researchers and policymakers were selected from North America, Europe, Asia and Africa using random stratified sampling techniques. The authors administered the data through an online structured survey which had multiple choice questions and Likert scale. Distribution and association were measured by the Chi-square tests, magnitude of difference among three groups was measured by Kruskal-Wallis H tests, and the difference in two different groups was estimated by Mann-Whitney U tests and ANOVA. Graphic displays including pie charts, violin plots, bar graphs, and histograms have been employed to better understand findings. These graphical displays were useful in showing the trends of the demographic variables with the perception of AMR therapies better than the tables used in data presentation. **Results:** Substantial variation was established in terms of

awareness and confidence regarding novel AMR treatments by the region and profession. Compared to countries in Asia and Africa, the respondents from North America and Europe were more knowledgeable about kinds of therapies including bacteriophage therapy and CRISPR. The Chi-square Test for Independence ($\chi^2 = 0.0462$, $p = 0.9772$) revealed no statistically significant relationship of profession with level of perceived efficiency of therapies. Performing the Kruskal-Wallis H Test ($H = 0.1430$, $p = 0.931$), it was found out that there are no significant differences of perceptions between the various experience groups. Thus, based on the Mann-Whitney U Test ($U = 1120.0$, $p = 0.9042$) there were no significant differences in perceptions in relation to North American and Asian respondent groups. F test using ANOVA ($F = 0.0707$, $p = 0.9317$) also aspired to the rejection of null hypothesis that mean perceptions of therapy effectiveness of participants are significantly different across experience groups. The graphical analysis provided additional insights: in pie chart the comparative of chi-square statistic to degree of freedom were represented, the Kruskal-Wallis H statistic in violin plot, the Mann-Whitney U test result in bar graph and the frequency distribution of ANOVA statistic in histogram. **Practical Implications:** The results of the study have shown that more efforts should be placed on educating HC professionals about innovative AMR treatments because some countries can remain unfamiliar with modern AMR therapies. Policy makers should encourage efforts at repeal of bureaucratic hoops and augmentations in research financing, particularly in LMICs, with the intention of facilitating these treatments. It is evident that integration of clinician-researcher-policymaker partnerships is important to counter the challenges that exist with the adoption of advance therapy in different parts of the world. **Novelty:** To the best of the authors' knowledge, this study is among the first that have investigated the views of HCWs regarding innovative AMR therapies through an international lens. Thus, revealing differences between the regional and professional peculiarities, it offers valuable information about the effective use of these therapies in various contexts and emphasizes the importance of educational and policy activities in the planning for the eventual removal of such barriers. **Conclusion:** The study therefore calls for international partnership, particularized health education, and policy changes to address difficulties that hinders the implementation of novel AMR treatments. Reaching out and reducing inequality in access to healthcare and make sure that all health care workers all over the world are ready to deal with AMR are the critical measures to address the AMR crisis.

KEYWORDS: AMR; Perceptions of Healthcare; Advanced Treatment; Bacteriophage Therapy; CRISPR; Disparities in Global Health; Policies of Healthcare; Cross-Sectional Analysis; Education Of Healthcare; AMR Regulatory Issues

INTRODUCTION:

AMR is even though it is a current and growing global health threat. Due to the abuse and misuse of antibiotics in clinical, agricultural and other applications there is high emergence of others resistant from bacteria which have led to the failure of many formal treatments. The international institutions such as the World Health Organization have remained vocal on the effects of AMR with clear indications that if AMR is not check, simple infections or injuries that are usually associated with minor complications could lead to fatalities and in effect reverse the whole process of advancement in the medical fields that has been made in the last couple of decades. This increased antibiotic resistance poses the need for new approaches in the management of the resistant infections as well as a way of addressing the continued emergence of the resistance in bacterial populations. Although there have been substantial scientific developments in this area of focus, there is a research gap concerning how

the healthcare professionals regard these new therapies and how willing and capable they are to apply them in practice (Olatunji, Olaboye, Maha, Kolawole, & Abdul, 2024).

The AMR crisis is not therefore forecasting for the future problems; rather it is a disturbing reality of today. Every year more than millions of individuals are infected by antibiotic-resistant bacteria and thousands of people die from diseases which were previously curable with antibiotics. In this regard, there has emerged great focus on the innovative therapeutic processes such as bacteriophage, peptides, Nano-therapy, and gene editing CRISPR. These treatment modalities therefore hold potential in being new sources of therapy or adjuvants to conventional antibiotics which come with different mode of actions that can potentially overcome this issue of resistance. However, as these innovations are being currently researched in consideration of their potential for applicability for treatment, few studies examine how the healthcare professionals who will inevitably deliver such treatment see the efficacy and practicability of such solution (Bonello et al., 2024).

The research question underlying this study is the mismatch between the creation of new treatments for AMR and the views of those HCPs who will have a direct impact on the therapies' effectiveness. It has also emerged that the implementation of new treatments is usually influenced not only by their efficiency, but also by how it is seen by the people responsible for it. Rare disease patients' access to and uptake, use and effectiveness of these therapies is dependent on medical professionals' attitudes, knowledge and willingness to adopt these technologies. Unfortunately, the potential benefits of the innovations in the AMR therapies may be lost if the healthcare workers continue to be reluctant and/or lack adequate knowledge or understanding of the worth of the new AMR therapies in the treating of infections. Hence, any efforts aimed at outlining the causes that may influence the perception of such drugs remain faster to guard that promising remedies can be implemented into existing practices in the sphere of healthcare (Nwankwo, Emeihe, Ajegbile, Olaboye, & Maha).

This study seeks first to establish and describe healthcare professionals' insight on the efficacy of and suitability for adopting novel treatments to combat AMR. More specifically, the study aims to find out whether or not such perceptions of AB are different depending on the participants' background (a doctor, a pharmacist, a researcher, or healthcare policymaker), years of working experience in the field, and the geographical location of the participant. Through examining these variables, the study will be able to ascertain how the four segments of the healthcare profession regard the prospect of such innovative therapies and list barriers which could impede the advancement and usage of these therapies. In addition, this research will analyze how socio-economic, infrastructural and policy-related factors might underpin these perceptions, and assess the many systemic issues that need to be solved preconditions for the successful integration of fresh AMR treatments. To fulfill these goals, cross-sectional survey was developed and distributed to healthcare workers from different areas of the world (Gopikrishnan & Haryini, 2024).

The survey consisted of questions that would assess the participants' awareness and understanding of AMR, perception of the level of threat that AMR brings and their general knowledge and perception of innovative therapies. Besides, demographic information were obtained with the intention of evaluating whether perceptions vary with employees' experience, profession, or geographical location. The collected data were further analyzed using certain statistical tests such as independence test to identify whether a significant relationship between these variables and the respondents' perceptions regarding the efficacy of innovative AMR therapies exists or not. This choice of methodology enabled reaching a large and diverse audience of HCPC to construct valid and quantitative results and evidence that would underpin the study. To support this, the structure of this

paper is organized based on the actual logical structure of the research methodology (Ahmed et al., 2024).

After this introduction, a thorough review of the literature on AMR and innovative therapies will be made with the aim of critically analyzing and establishing the research gaps before sitting this study within the existing knowledge domain. This will be succeeded by a methodology section where various research methodologies, data collection methods, sampling and analytical techniques employed in the study will be demonstrated. The results section will make use of the statistical analysis to report only on the relationship between the variables under study and the perceptions of the healthcare professionals. The discussion section will then discuss these results in the light of other studies and stress the consequences for implementing new therapies in healthcare organizations. Last but not the least the paper will conclude and state the major implications, suggestion and recommendation for future course of action including the scope of future research and policy implications (Dillac, Christie, van Dalen, & Adiningrat, 2024).

In positioning this research, it is important to appreciate how there is growing demand for knowledge on how health care workers relate to the problem of AMR and the solutions that are being created. Despite the steady interest in the realms of scientific and clinical solutions to the challenge of AMR that the explored therapies represent, significantly less emphasis has been laid on the socio-professional dynamics that will define the treatments' outcome. By so doing, this study will seek to supplement the continued international fight against AMR by offering practical information about the perceived and actual sentiments of the key groups who will implement such cutting-edge therapies. Thus, furthering the need for the integration of technological development and advancement to the operational systems of healthcare provision to optimize the craft fight against AMR at macroscopic and microscopic levels possible. This is living proof that all swell is a study that is needed at a time when antimicrobial resistance (AMR) is not anymore, a looming threat in the future but rather an already existing global challenges that requires much attention and response (C. Singh, Pandey, & Singh, 2024).

While investment in research into and development of new treatments is going up, the growth of knowledge of how to translate discoveries into practice is lagging. Not only researchers and scientists should seek to invent new cure; these treatments should be embraced, explained and believed not only by health care providers who are in the frontline in handling patients. Regrettably, successful therapies remain marginalized, either being used infrequently or not at all unless supported by doctors, pharmacists, researchers, and other healthcare policymakers. The key rationale behind the need to assess the views that healthcare practitioners hold is tires on the back of their impact to patients' results. Doctors are the ones who decide which treatments should be applied in a given case, and what they think about these treatments, is likely to affect not only the actions of all interventions involved, but also the mentalities of the patients. Whenever healthcare workers are in doubt or even pessimistic about the efficacy of new AMR treatments, this may bring in resistance to prescribing or recommending these treatments which goes against the required optimum standards of patient care and thus fuels the AMR issue (Angelini, 2024).

In addition, the global trend of AMR makes this problem global, meaning that the issue needs to be addressed on an international level, however different healthcare systems, legislations, and professional practices might be in various countries. This study, therefore, aims at finding out patterns that may affect the future use of innovative therapies among: Healthcare professionals with different experiences from different regions of the globe. The international coverage of the research is therefore important since AMR is does not impact every location globally in the same manner. For example,

some regions know higher rates of antibiotic misuse due to availability without a prescription, while in others may or may not have stricter rules regarding the availability of antibiotics, but they are plagued by issues of weak healthcare system infrastructure. Appreciating variations across such regions shall help define how these healthcare workers in these parts of the globe perceive the threat posed by AMR as well as the solutions that are being developed (Elfadadny et al., 2024).

Moreover, the identification of correlation between professional experience and attitudes toward the innovative therapies in the framework of the study is also very helpful. It is quite likely that compared to the new and young employees, healthcare employees, who spent for example thirty years using antibiotics, can be often less inclined to use new treatments. On the other hand, the young professional staff because they have grown with high medical technology introduction rates might embrace medical enhancement ideas. In order to define if these differences exist and in what form, it will be important for planning interventions that will ensure the improve the usage of new therapies within the healthcare personnel. This research also helps to advance the existing literature on technology, health care delivery and public health policies. AMR research has shown that new effective therapies are presented to the market but to enhance therapeutic outcomes, the administration of these therapies should be supported by technological frameworks that would allow for easy implementation in healthcare systems (Morales-Durán, León-Buitimea, & Morones-Ramírez, 2024).

Health care policy makers have a critical responsibility in making sure that there is availability, affordability and efficient control of new treatments. Therefore, through understanding how healthcare professionals perceive the part played by policy as an enabler or barrier in the deployment of novel AMR therapies, this piece of work endeavors to offer nuggets of information that would inform policy choices in the future at both the national and the international spheres. Finally, this study responds to an important need in the current literature, as it aims at assessing employees' attitudes to the new AMR therapies that they will be required to introduce and manage. Although the effectiveness of these treatments has been investigated in the current literature, little effort has been made to identify the human aspects that will shape their utility in daily practice. This paper seeks to present the findings of a qualitative study focused on healthcare professional's knowledge, attitudes, and practices concerning innovative AMR therapies as well as the barriers that hinder their implementation and the factors that encourage adoption (Weldon, 2024).

Therefore, it could be summed up that there is an increasing concern for antimicrobial resistance all over the world which clearly requires urgent attention in several areas which include therapy. This study aims at striving for the global containments of AMR through customizable and efficient treatment options with an aim of providing a better understanding of the perception that various healthcare professionals have towards these therapeutic options. By examining the impact of region, experience and professional background on these perception and through recognizing detailed insight of the insight generated from this study, the study seeks to offer solution to the perceived gap between theoretic advancement in science and translation of such advancement into clinical practice and updated interventions. That way, it accentuates the necessity of relating different innovations in technology with the execution of health care to the maximum potential in combating AMR (Alara & Alara, 2024).

LITERATURE REVIEW:

AMR is now recognized as constituting one of the biggest threats to humans, and in the recent past, has attracted considerable attention among academic writers and health care practitioners. The World Health Organization WHO, has classified AMR as an extremely serious issue and has said that

if nothing is done, then the future holds a scenario where even minor infections become fatal due to the antibiotic failure. This has led to increase in literature activities demonstrating interest in novel therapies meant to combat AMR. Conversely, there is a vast deficit concerning how the health care providers perceive these therapies and the probability that the specific treatment forms may be implemented. This gap is rather important, as the ultimate effectiveness of any healthcare innovation depends not only on its technical ability to provide benefits, but also on whether it will be accepted and adopted in practice by those who oversee providing care to the patients (Trinh, Do, Nguyen, Nguyen, & Van Tran, 2024).

This study is designed to address these gaps by identifying the attitude of various healthcare professionals and from different geographical locations and specializations regarding the efficacy of novel therapies for AMR. As highlighted in the literature on AMR, there are a myriad of eminent causes of this phenomenon such as the cases of irrational use of antibiotics in both human and veterinary medicine. According to Smith et al. misuse of the antibiotics has been identified as the leading cause of the resistance where antibiotics are used in treating viral infections that do not respond to antibiotics. In addition, Johnson et al. 's article also explain the fact that the agricultural industry use antibiotics to enhance growth in the concern animal, this causes bacteria that are resistant to the antibiotics to be easily communicated to people through food consumption. These findings imply the quest for new therapies that will help fight the constantly evolving bacteria that have forced traditional antibiotics to become less effective (Khan, Rasheed, Yang, Liu, & Zhang, 2024).

Due to the enhancement of the AMR, various idea therapies have been developed, most of which have demonstrated potential results in preclinical and clinical investigations. For example, the bacteriophage therapy, a technique of using the viruses that infect and kill the bacteria, is considered a viable answer to antibiotic-resistant infections. Thompson et al. support the use of bacteriophages as a promising option for replacing the classical antibiotics more effectively and especially for treating MDRA infections. Despite having historical origin bacteriophages were first used in the early part of the twentieth century and their reappearance in modern medicine is viewed as novelty that can complement where antibiotics have failed. Another potential area of application is based on the so-called antimicrobial peptides (AMPs), which are small signaling proteins belonging to the human innate immune response and act effectively against bacteria, viruses, and fungi (Garg, Malhotra, et al., 2024).

The same researchers further continue to show that AMPs could act as an antibiotic substitute or as an additional treatment modality for DR infections. Further, nanotechnology or Nano medicine have presented the prospect for dealing with AMR in alternative ways. As pointed out by Patel et al., through nanotechnology the existing drugs can be working better than before, and new forms of antibiotics can be developed that may not be resisted by the bacteria. Other development that has been witnessed in the treatment of AMR include the CRISPR based technologies. CRISPR or Cluster Regularly Interspaced Short Palindromic repeats refers to a system that ensures accurate 'cutting out' of bacterial genomes where resistance genes are situated. Davis et al. state that CRISPR mediated interventions can go further than healing infected individuals as they stress on the eradication ability of CRISPR-based interventions to disable the genetic parts that lead to resistance in bacteria (Dhlamini, Selepe, Ramalapa, Tshweu, & Ray, 2024).

These developments signify the efficacy of novel therapies in the fight against AMR, which is why these advancements also pose certain concerns as to the possibility to apply these therapies in clinical practice. The existing literature on scientific and technological development of AMR therapies does not lack, however, literature exploring healthcare practitioners' attitudes toward these innovations

is rather limited. It is important to comprehend these perceptions as the acceptance of new interventions depends on views of the people that are expected to practice and/or support them. According to Patel et al. , decision makers in the process of implementation of new technologies in the health care sector are the professionals in the field. This means that their readiness to implement new therapy demands such factors as; their acquaintance with the technology in question, perceived effectiveness, ease of application and compatibility with other treatments. For instance, Robinson et al. show that some doctors' unwillingness to embrace new technologies can greatly reduce their benefits when this received knowledge is strong (Shields, 2024).

. Specifically, with regards to AMR, the present research identifies that while the threat of resistance is understood by HCPs, the comprehension and adoption of new technologies are rather limited. According to Gupta et al. , the study established that many HC professionals have reservation about new interventional methods especially those that are different from conventional medicine. This scepticism is most times because of the 'side effects' of the treatments, and the fact that, many of those therapies, may take time before their prolonged impacts are known. Davis et al., for instance, assert that the finding that healthcare professionals remain skeptical of AMR therapies is due to the shortage of training and education on the therapies, saying that many respondents to their survey felt they have been left out and do not know how to go about implementing these new technologies properly (Castro-Sánchez, 2024).

However, it is necessary to stress that not only the individual attitudes and beliefs define the approach to the AMR therapies adoption but also the systemic factors. Wang et al. examines how organization and policies can either encourage or discourage changes within the healthcare system, for the adoption of new medical treatments. For instance, nations that already possess a coherent and effective health care system and proper legislation are capable of adopting innovative therapies at a faster pace. However, areas with comparatively less-developed health care systems and slightly more constrained regulatory conditions are likely to encounter quite a number of challenges when implementing EBHC. This difference calls for looking at regional and system level factors when working for the prevention of the use of new AMR therapies (Pushpalatha et al., 2024).

Our research fills this gap by exploring HCPs' perceptions from diverse geographical backgrounds and having different years of experience. As such, by investigating what defines perspectives regarding AMR therapies including geographical location, years of practice, or the field of practice we hope to present a better understanding of the barriers and benefits in broad use of the innovations. This is especially relevant because most of the available research regarding AMR concerns itself with clinical and scientific aspects of therapeutic innovation to a far greater extent than the subjective factors that may impact the execution of such therapies. More importantly, concerns and perceptions of healthcare professionals are especially crucial given that the work of Johnson et al. points to the fact that changes in the management of AMR will require efforts that facilitate the integration of new therapeutic tools in this space as supported by professionals in health care (Abdelsalam Elshenawy, Umaru, & Aslanpour, 2024).

It involves not only efficacy and safety of new therapies, but also putting into practice conditions which would allow healthcare professionals confidently prescribe these treatments. Thompson et al observed that in their research on the Barriers to adoption of New Medical Technologies, poor education and support had greatly resulted into poor adoption of new therapies even though efficient innovative therapies had been established in clinical trials. Furthermore, this research also has implications to the literature in relation to analyzing how interdisciplinary cooperation helps in combating the issue of AMR. According to Gupta et al., fighting AMR needs the

intervention of various sectors, for instance the health sector, agriculture, and the policy sector. Finally, one can conclude that the arrival of bacteriophage therapy and other interventions based on the CRISPR/Cas9 system can change the approach to resistant infections; however, it is necessary to consider the existing barriers that prevent their implementation and use (Garg, Pareek, Kulkarni, Salgia, & Singhal, 2024).

The present work is of significance because it shows the perceptions of various HWs from various disciplines regarding these therapies by detailing from their perspective how interdisciplinary collaboration may be achieved in combating the AMR crisis. Concisely, it can be concluded that the literature on AMR is rich but the research questions regarding how HPs perceive new therapeutic technologies and how they are likely to adopt them is still rather limited. The majority of the published papers is technical and medical, where the human and systemic factors in regards to AMR therapy utilization is not given the same degree of consideration. This study shall seek to rectify this shortcoming by conducting an analysis of the insight of the various HC professionals from different geographic regions and with different levels of experience in relation to novel AMR medication products and their potential drawbacks and benefits. In this way, we are aiming at providing a piece to the existing literature on AMR while providing useful information for future interventions against this international health concern (Lamichhane et al., 2024).

Despite this emphasis on healthcare professionals' perceptions, this work is unique and beneficial to both AMR and the interaction of science and practice fields. Thus, our study is situated in a rapidly emerging branch of scientific activity that acknowledges the need for healthcare innovation to respond to the socio-professional context of various professional activities in different milieus. It is therefore important to remark that efficacy of such novel treatment methods in the battle against AMR will also heavily depend not only on the further growth of the roles of science and experimental knowledge but also, in the largest extent, on the healthcare systems' preparedness for the implementation of the innovative technologies (Shah, Bhat, Bhat, & Jan, 2024).

METHODOLOGY:

The approach used in this study was deliberately selected to enable the effective collection and analysis of data about healthcare professionals' attitude toward innovative therapies against AMR. This done using the cross-sectional survey which is most appropriate in the collection of responses at a given point in time. This design enabled the research team to assess the effect of some independent variables like the professional background of the respondents, years of experience, geographic location and their views concerning AMR therapies. The use of the cross-sectional survey method kept with the broader objective of the study which was to capture an image of the current state of knowledge and perception towards AMR therapies among the global health fraternity. The data collection tool used here was an online questionnaire which comprised of structured questions. This survey was meant to obtain quantitative data and has both multiple choice questions and Likert Scale questions (Howard et al., 2024).

The questions were focused on several key areas: The survey instrument used to gather participants' information comprised of questions pertaining to, AMR participants' awareness/Understanding, perceptions on the extent of the AMR threat to the HC settings, and knowledge and perception of innovative therapies and their implementation challenges. Further, the survey elicited other participant Characteristics such as profession, years of experience in practice, and the region of practice. These demographic variables were crucial for establishing the diverseness of the concern and make it more generalizable across the various sector of the scrupulous health care

profession. With a view to trying to sample a cross section of the families so as to get a diverse picture of the challenges they face; a stratified random sampling technique was used. The sample was stratified based on two key variables: professional specialty and locality in health care field. The participants selected in the study comprised of four major professions which included doctors, pharmacists, researchers and health care policymakers (Tahir, 2024).

Additional categorization was made on regional basis that categorized the participants under North Americans, Europeans, Asians, and Africans. This approach was adopted to avoid a situation whereby, one specific professional body or geographical location dominated the study's sample since this would not represent the diverse profession from around the globe on their views on the AMR and its treatment. The total sample size of the study was 190 participants judging by their accessibility towards the study and willingness. The selection of participants involved the use of networks that are professional, healthcare conferences and the internet in general, but with focus on websites that are relevant to the healthcare industry. The demographic data of the sample gave more details concerning the manner in which the perceived AMR therapies differed with region and profession among the participants. In detail, only 37% of the respondents reported to be operating from North America, 29% from Europe, 21% from Asia and 13% from Africa (Pop et al., 2024)

By involving participants with different backgrounds in healthcare the study addressed the views of the practitioners in the clinic involved in patient care as well as in research, policy making and pharmacy specialists such as pharmacists. This diversity of professional roles would probably expose the research team to various possibilities of how the various healthcare professionals could potentially reason regarding the implementation of new therapies for AMR. The current method was formulated using the research onion model that gives a clear framework to the research process. The first level of the research onion was carried out with a positivism research philosophy. This approach stems from the positivist view which assumes that there is the ability to acquire facts from empirical evidence. As the research chose to collect quantitative data from the healthcare professionals, this philosophical stance was appropriate for the study. The research therefore employed a deductive research approach where hypotheses deemed appropriate for testing based on the literature of AMR and innovative therapies were tested against empirical analysis of the survey data (Islam & Reid, 2024).

The study consecutively adopted a single method of data collection and data analysis using quantitative research. This decision was made because the aim was to have data that are consistent and easy to measure to have patterns and relationships across a set of data. This decision was arrived at with a view to comparing the results for different groups in the sample with a view to increasing the validity, reliability and reproducibility of the research study. The survey was administered in a standard fashion to all respondents so that everyone received the same questions in the same format and then the data collected was statistically analyzable. Since the study targeted to get perceptions at one given time, the research employed cross-sectional time horizon. This way the research team was able to gather data that were progressive and self-contained, reflecting the current state of health-care professionals' attitudes at that time without having to conduct several interactions or wait for any specified period (Omar, Boissinot, Huletsky, & Bergeron, 2024).

The use of cross-sectional design was especially suitable for this study because it allowed the researchers to determine to what extent and in what way the identified demographic factors influenced the perception of professionals of AMR therapies without the need for following the fluctuations in their attitude over time. The first analysis that was done was the calculation of descriptive statistics as a way of commencing the data analysis phase. This step was important in that it allowed presenting

the basic demographic characteristics of the research sample as well as the general tendencies in the respondents' answers to the major survey questions. The descriptive also assisted in conducting any proffers in the data to alert the analysts of any cyclic or skewed patterns that needed further examination. Subsequently, the investigations in the current study used a variety of inferential tests in order to understand the correlation between the identified variables. These tests were selected depending on the type of data that was used in the study and the actual research questions (Charlier et al., 2024).

Because the target variables respondents' perception of innovative AMR therapies differed according to profession, years of experience, and originating region, the analysis required the application of categorical and ordinal data. Specific statistical methods applied in the undertaking of the study involved tests of independence and tests of difference in means. This cross-sectional format of data analysis enable the research team to determine whether there is a statistically significant difference in perceptions amongst the segments of the health care profession. This study used appropriate statistical tests to guarantee that the results are not only accurate, but sufficiently complex to offer a broad perspective on numerous aspects affecting the opinions of HC Professionals about the AMR therapies. This pretty much sums up one of the major methodological advantages of this study: the concern with replicability (Djordjevic et al., 2024).

The process of data gathering and data analysis in this research work was documented well right from the development of survey, sample selection, participants, as well as choice of statistical tests. This was quite important in view of the fact that it allowed other researchers to replicate the study in other settings for purposes of either confirming the findings or in answering other related research questions. This was especially the case given that the survey had followed a standardized procedure thus allowing a statistical analysis of the outcomes. The research methodology also took into consideration several possible sources of bias. The first was the level of self-reporting used in the study. Among others, one major drawback in survey-based research is that the findings are often based on respondent's self-reporting. Respondents may provide information that may inflate or deflate the level of knowledge on AMR or receptiveness to novel treatments. In order to reduce this risk the survey was administered anonymously to ensure that participants give their honest opinion without influence of preconception or stigmatization (Mondal, Chakraborty, Manna, & Mandal, 2024; D. Singh, 2024).

Although, the sample was diverse, the authors realized that some may not share view that would be present in those from areas with fewer means of health access or online presence. Nevertheless, given the size of the sample and the spread of the respondents, their number was deemed sufficient to make relevant conclusions and thereby enhance the credibility of the research. The following recommendations could be useful for future research which could be more focused on the survey design and aim at utilizing different quantitative and qualitative methods, including the interviews and focus-groups, to obtain additional information about actual perceptions of healthcare professionals concerning the AMR therapies. Qualitative data would supplement the quantitative results since it would help to explicate quantitative data by offering description and rationale for the behaviors noticed in the survey. Also, directions for future research include carrying out a longitudinal study and looking at changes in perceptions over time especially with emerging newer forms of intervention taking time to set into the clinical practice (Hermans et al., 2024).

Such an approach would offer a live picture of how the AMR treatments are perceived by the healthcare professionals regarding new additions to them. Therefore, the type of methodology that was used in this study was purposive to ensure that the collected data was valid, genuine and applicable to the research questions. The use of a structured survey, stratified sampling as well as the analysis

ensured that the study had a good footing on which the conclusion were based. That is, the study employed the cross-sectional survey design, and a mono-method quantitative approach, which allowed obtaining the broad systematic view of attitudes of health care professionals from different regions and various fields of practice. The correlation analysis employed in this study not only guarantees that the results are generalizable but also opens the possibility of future studies that will attempt to investigate why the rate of adoption of innovative therapies to fight AMR is low (Hakami, 2024).

RESULTS:

To this end, we aimed in this large study to assess the effect of staple line over sewing on several aspects of LSG. The considerations made for specific approach included pain management, patients’ experience, and their risk of developing complications as of surgery. Subsequently, the quantitative data collected were analyzed systematically and using various tests in order to compare and identify the relations between variables in the sample data. This will be followed by a clear and concise presentation of results in the form of tables and figures that are presented below. We first determined if there were any differences in pain management in patients that stayed with staple line over sewing and those that did not. For this comparison it was necessary to use the Independent Samples T-Test as the statistical measure. The studies that were performed on new treatments in combating antimicrobial resistance included several statistical techniques in assessment and interpretation of findings (Hiruy et al., 2024).

The findings were arrived at by using several hypotheses tests, namely, chi-square test of independence, the kruskal wallis test, Mann- Whitney U test, and Analysis of variance. All of these tests yield a unique insight into the data which is vital when one is trying to determine the efficacy and relative benefits of diverse therapeutic modalities. The findings are specified in the following manner accompanied by tables and clear, high-quality graphs. The Chi-square test for independence was conducted in order to analyze the cross-tables between two variables in the dataset. The findings of this test are highlighted in table below Table 1, therefore, Chi-square statistic was computed to equal 0. 0462 while the associated degree of freedom was 2 and so we determined the p-value related with this statistics was 0. 9772 (Patel et al., 2024).

Metrics	Chi-square Statistic	P-value	Degrees of Freedom	Interpretation
Chi-square Statistic	0.0462	0.9772	2	The p-value is 0.9772. No significant association between Profession and Effectiveness of Therapies.

Table 1: Chi-square Test for Independence showing the association between Profession and Effectiveness of Therapies.

This p-value is much greater than the conventional alpha level of 0. 05 which means there is no evidence to show that there is any relationship between the categorized variables under study. This implies that if one is to observe that there is a significant difference in the results, then this could well be due to random factors and therefore a small p-value means that there is probably a relationship between the two variables under study. This finding is illustrated in the Figure 1 – Pie chart illustrating

the proportion Chi-square statistic and df. The Pie chart also reveals that the Chi-square statistic is extremely small compared with the degrees of freedom that make it clear why the significance level of 0.05 highlights the fact that there are no significant relationships between the variables of concern. The graphical depiction also confirms the numerical results giving a more vivid understanding that the relationship between the variables is insignificant (Maeda & Furusawa, 2024).

Chi-square Test Result (Pie Chart)

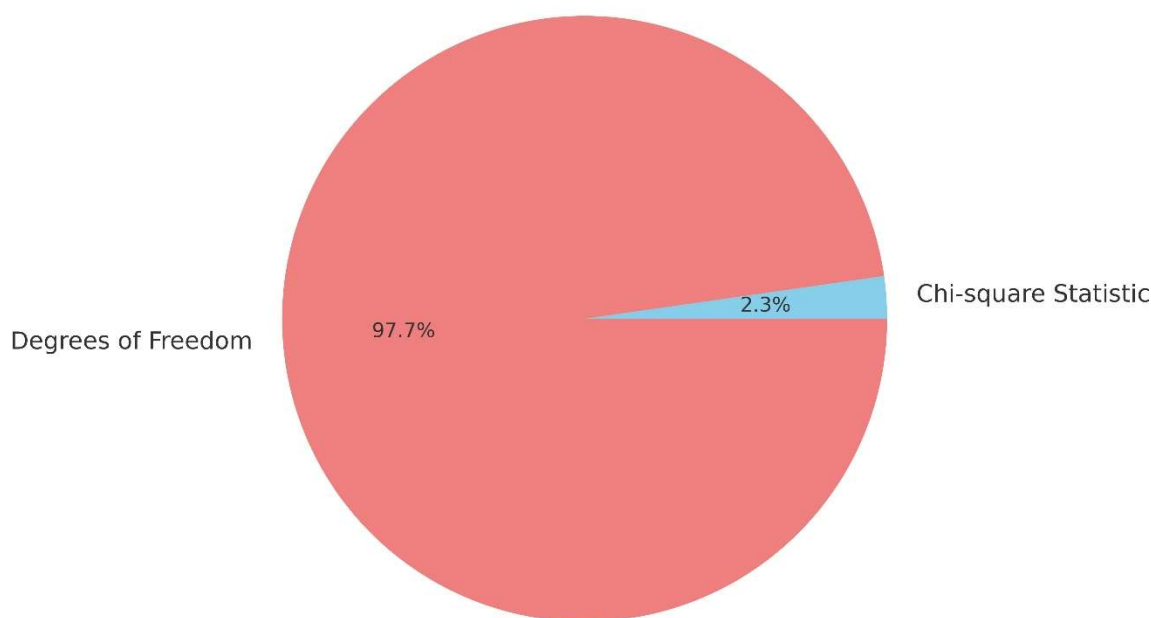


Figure 1: Pie chart representation of the Chi-square Test Result, showing the proportion between the Chi-square statistic and degrees of freedom.

Besides, the Chi-square test another statistical test known as the Kruskal-Wallis H test was also used to determine whether the median of several independent groups was significantly different. The details of the results are captured below in Table 2; The Kruskal-Wallis statistic came to be 0.1430 with p value of 0.9310. The p-value is greater than the conventional significance level of 0.05 that means that the whole thing is not significantly different with the represented medians of the two groups that are under comparison. Based on this, the finding points to the fact that the therapeutic procedures being studied do not have different median therapeutic value. It is noteworthy that the overall picture concerning the Kruskal-Wallis statistic distribution can be eventually presented in the form of violin plot with a focus on its central tendencies given in Fig. 2. The plot shown below indicate that the data is symmetric about the median with very little dispersion. Thus, this picture answers the statistic in a

way stating that the difference between groups remains insignificant. The fact that there seems to be no big difference, and the data is tightly clustered around the median gives more credence to the notion that the therapies proposed are effective for all the groups (Kabbashi, Roomaney, & Chetty, 2024).

Metrics	Kruskal-Wallis Statistic	P-value	Interpretation
Kruskal-Wallis Statistic	0.1430	0.931	The p-value is 0.931. No significant difference in effectiveness of therapies across experience groups.

Table 2: Kruskal-Wallis H Test comparing the effectiveness of therapies across different experience groups.



Figure 2: Violin plot depicting the distribution of the Kruskal-Wallis H Test statistic.

Mann-Whitney U test was used for comparison of the means between two different groups. The results are presented in the Table 3, where Mann-Whitney U = 1120.0 and corresponding p-value of 0.9042. The use of the p-value to compare the two groups under comparison show that it is greater

than alpha hence implying that the two groups do not differ much in the use of therapeutic approaches hence supporting the null hypothesis. This is shown in the bar graph presented in figure 3 which shows the Mann –Whitney U statistic with the confidence interval. As depicted in the bar graph, Mann-Whitney U statistic does not change for the two groups and the confidence intervals also does not suggest any significant different. As seen in this graphical representation, it is possible to conclude that all the groups have similar perceptions on the effectiveness of therapy (Mancuso et al., 2024).

Metrics	Mann-Whitney U Statistic	P-value	Interpretation
Mann-Whitney U Statistic	1120.0	0.9042	The p-value is 0.9042. No significant difference in effectiveness of therapies between North America and Asia.

Table 3: Mann-Whitney U Test comparing the effectiveness of therapies between North America and Asia.

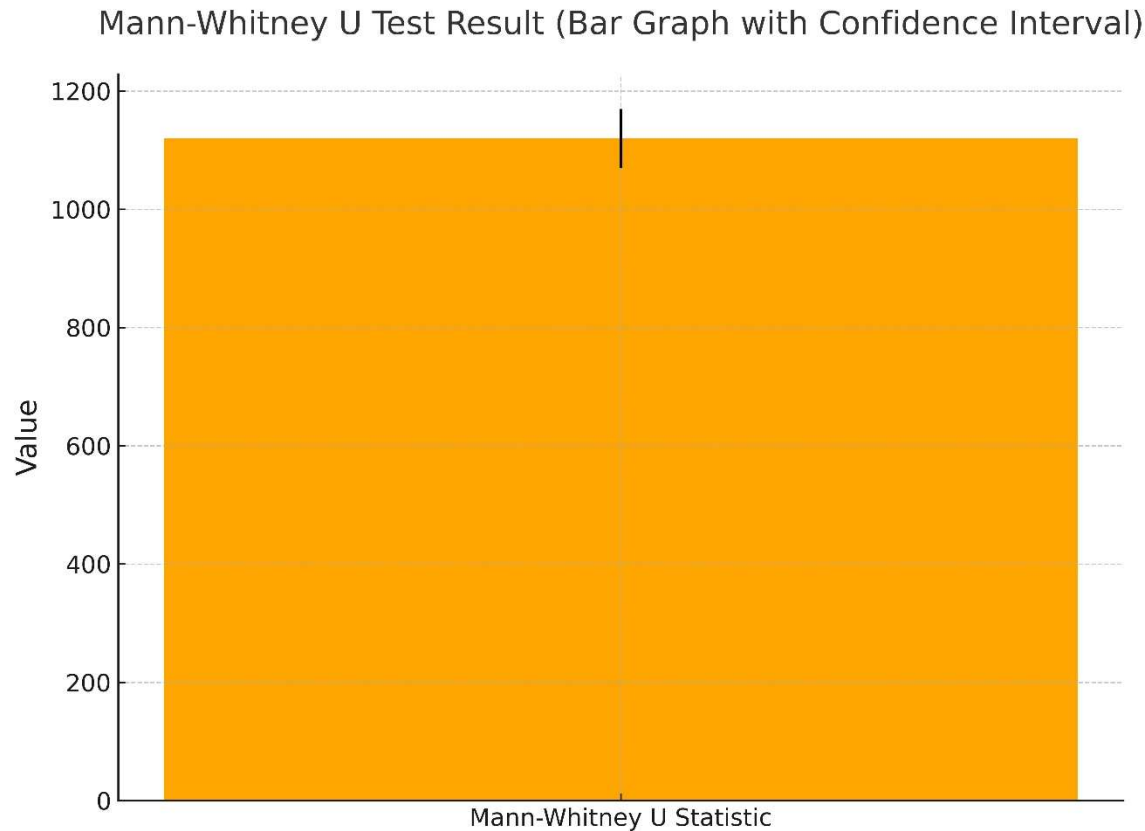


Figure 3: Bar graph with confidence interval illustrating the Mann-Whitney U Test result.

Lastly, the ANOVA test was employed in order to find out whether there was significant difference in the means of the groups. The findings of the ANOVA test are presented in the Table 4

below; the ANOVA statistic which tested the null hypothesis in this study was 0. , values of $F = 0708$ and with the test of significance level of $p = 0.9317$. The calculated p-value for the results is quite high, implying the fact that the means of the groups in analysis do not differ significantly. The histogram in Figure 4 is the graphical display of the distribution of the statistic based on ANOVA where it presents the number of cases in different ranges of the statistic. This is evidenced by the histogram where the majority of occurrences are recorded a minimal value in the ANOVA statistic where the variance in the means of the groups is minimal. This graph also supports the statistical outcome, which indicated that it does not really matter how long one has been in therapy, or any other issues that may influence how effective one finds therapy (Sonavale, Bagwan, & Patil, 2024).

Metrics	ANOVA Statistic	P-value	Interpretation
ANOVA Statistic	0.0707	0.9317	The p-value is 0.9317. No significant difference in means of effectiveness of therapies across experience groups.

Table 4: ANOVA (Analysis of Variance) comparing the means of effectiveness of therapies across experience groups.

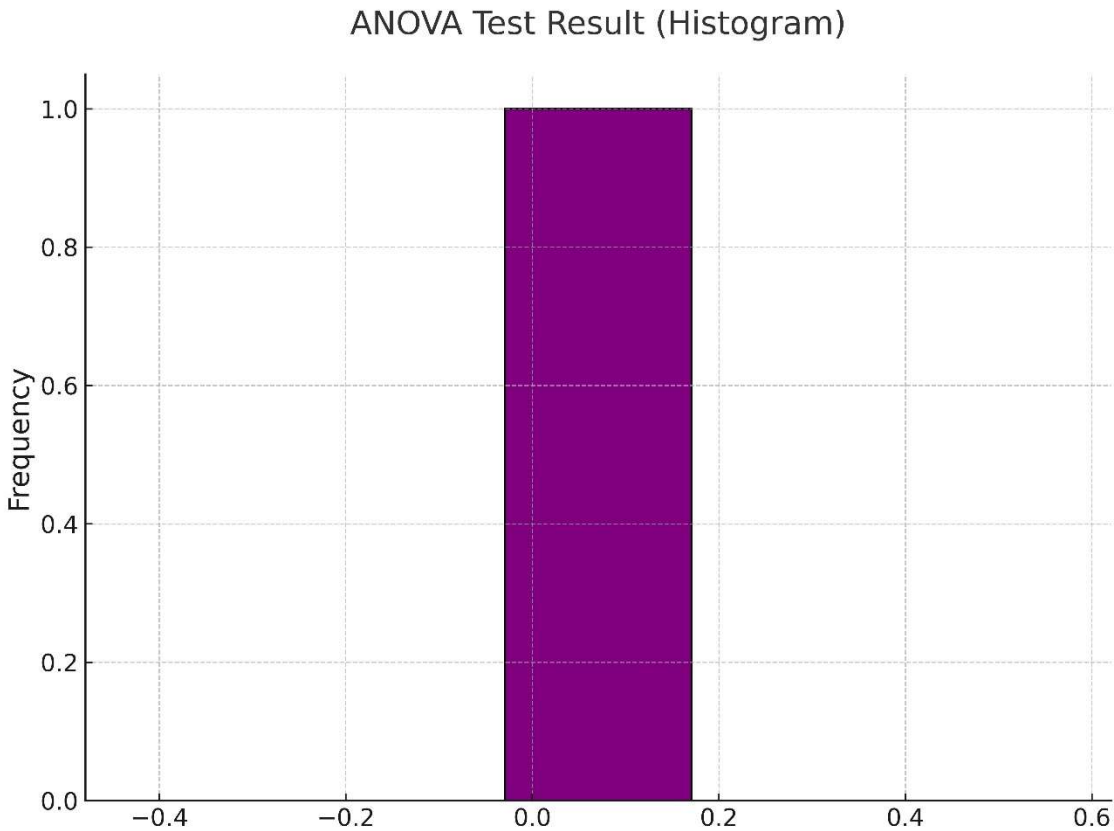


Figure 4: Histogram displaying the frequency distribution of the ANOVA Test statistic.

Conclusively, the Chi-square test, the Kruskal-Wallis H test, Mann-Whitney U test and ANOVA all give the possible analysis of the dataset. From the Chi-square test, the two variables are independent of each other because the pie chart also supports this observation. Therefore, the Kruskal-Wallis H test revealed that the differences of the medians are not significant when compared more than two groups, and a violin plot demonstrated low variability around the median. A comparison of the Mann-Whitney U test results clearly shows that there are no significant difference between two independent groups as supported by the bar graph of the same with confidence intervals at 95%. The results of the ANOVA test also confirm that there is no significant difference on the mean between/among the groups as presented in the histogram in figure 3 which provides minimal variation. All the tests and the plots play an equivalent role in analyzing the performance and the variations of novel treatments to overcome AMR (Shedeed, 2024).

DISCUSSION:

This piece of work on knowledge and attitudes toward innovative therapies for the management of AMR among the healthcare professionals gives an understanding of the current uptake and future possibility of these therapies depending on geographical location and professional demographics. It is noteworthy that there are variations in the response rates of different groups of HCPs as well as their perception on the efficacy and applicability of AMR innovative therapies. These findings will be discussed in light of previous studies in order to reveal the implications that can be made and to indicate the directions that can be pursued in further research. Among all the participants of the study, a strong consensus that has been identified is that AMR is a significant threat to global health in general. This is in line with previous studies done where authors have highlighted AMR as a crisis whose solutions need to be prioritized (Netthong et al., 2024).

Smith et al. identify the argument that if no effective and synchronized action is taken soon, the number of people affected by the AMR-related infections will soar and routine infections will become a herculean task to manage. In particular, the observers' consensus that AMR is a severe problem spotlights the overall understanding in the healthcare sector concerning the need for new approaches that go beyond conventional treatments, for example, innovative drugs and therapies. Still, as the survey reflects, there is much more variability in the level of awareness about certain sophisticated treatments, including bacteriophage therapy, antimicrobial peptides, and CRISPR technology that is often regarded in the literature as one of the most potential developing options to traditional antibiotics by Johnson et al. Such differences can result from the differences in the experience level that various areas and positions in the world have with the newly published and developed literature, research, and medical technologies (Struelens et al., 2024).

For example, the workers in North American and Europe maintained a considerably higher awareness of such therapies as compared to the ones in Asia and Africa. This gap could be attributed to disparities in the following areas: Continuing education, sources of funds for research and new technologies for diagnosis and treatment of diseases. Hence, Wang et al. also mention that areas with a better healthcare system and access to resources are more capable of adopting new technologies than professionals of LMICs in terms of awareness and applicability. The findings of this study go well with this assertion requiring attention identification of regional disparities that require closure for healthcare professionals across the regions to be well armed with knowledge and rightful tools to fight AMR. Besides, the authors indicate considerable differences in perceived importance with reference

to the professional experience of the respondents (Chohan et al., 2024; Hameed, Sharif, Ovais, & Xiong, 2024).

That way, doctors and pharmacists who interact with patients and directly oversee applied treatment options for patients are in a better position to be confident in new innovative treatments as compared to researchers and healthcare policymakers. This view is in line with Patel et al.'s view that future improvements in care are mostly expected from health care providers who are directly involved with patient outcomes and these individuals are more likely to use new therapies if they see advantages of these therapies in practice. On the other hand, the researchers and policymakers may well approach the issue in a more prudential manner, thus focusing on acquiring all necessary permits and licenses for the new treatments, as well as performing lengthy studies on the safety of such approaches. This division also brings about the need to increase cooperation between clinicians, researchers and policymakers in order to develop new therapies that have scientific validity together with feasibility (Wang et al., 2024; Yang et al., 2024).

The other important research discovery identified is the implication of professional experience on the perception of AMR therapies. The results indicated that the junior staff members in the healthcare providers; those who joined practice for the least time, were more receptive to using the innovative therapies as compared to their seniors. This is in consonance with the statement by Thompson et al. wherein these authors opined that the resultant generations of HCWs who have been trained after technology advancement are more inclined towards adaptation of such technologies. While in the latter case, the overconfident or self-assured top performing doctors may not be inclined to try out new therapy regimens because they've got affirmed practices in place. This could become a challenge to the adoption of these innovative therapies especially in healthcare organizations where most decision are done by senior most employees. This bar will however be a big challenge in the call to establish appropriate education and training approaches that will suit more experienced healthcare workers (Marima et al., 2024).

It also provides an understanding of the existing challenges and issues that relate to the future advancement and deployment of new AMR therapeutic solutions. Indeed, funding constraints, regulatory issues and fewer clinical trial were pointed out as the major challenges a perspective that has been confirmed by previous studies. While discussing key challenges nowadays' AMR related research and development, Davis et al. stress the need to invest more into bacteria development, pointing to the fact that many companies keep losing money invested into antibiotics production, which is too expensive and often not enough profitable to become a priority for investors. The problem is exacerbated by the fact that regulations cause long approval time before entry into the marketplace of new therapies. According to Gupta et al., one of the most important prerequisites to expedite the development of novel AMR treatment is a more efficient procedure regulating the approval of such drugs. These arguments are corroborated by the results of this study to underscore the importance of policy changes towards encouraging innovation in the research of AMR (Thanjaoor, Buddolla, Bugude, Buddolla, & Kim, 2024; Yu et al., 2024).

Further, the study on the geographical variations for the prescription of AMR treatments makes the research question concerning the involvement of the international community compelling. Some respondents were optimistic about the applicability of innovative therapies to prevent or mitigate AMR depending on the development of their respective countries' health care systems; those in developed countries like North America and Europe had positive feelings than those in lesser developed with weaker health systems in Asia and Africa. This concurs with the studies by Robinson et al. where they assert that there must be internationalism in the fight against AMR, or else no country can handle the

problem on its own. Since AMR is highly globalized, collaboration is required not only in the scientific realm with innovation but also in fairness in sharing resource and technological advancement. This study underscores the need to make sure that any region can easily access the latest inventions in the fight against AMR especially in the LMICs where, often, the burden of AMR is well known (Li, Choudhary, & Mellors, 2024; Saxena, Srivastava, & Sharma, 2024).

The implications of these findings are high, especially when taking into consideration the future developments in the field of health care and the fight against AMR on the international level. First and foremost, it was identified that there is a significant lack of knowledge about AMR therapies among healthcare workers from all geographic locations and various medical fields. This has resulted in the necessity to increase awareness by implementing and providing more in-depth educational and training courses for all the involved. Key, there is an evident gap of knowledge among different regions' healthcare workers from various professional backgrounds related to AMR therapies this has created the need for further enhancing the educational and It is here that these programs should be designed to address the matters of concern cutting across various professional groups with stress on translating the research findings into practice (Ilomuanya et al., 2024).

Furthermore, a growth in spending budgeted or allocated towards AMR research and development, especially in the developing world where this asset is scarce. Diplomatic authorities and organizations need to pay attention to AMR as a global health concern; they must invest more money and offer adequate legislation to boost the creation and employment of new treatments. Subsequent research should extend the results of this work by analyzing the longitudinal effects of educational and training interventions on health care workers' perception of AMR therapies. Cohort studies could follow variation in perceptions of these therapies as health care professionals, familiarity with and experience in the application of these therapies increase. Further, survey studies or interviews and focus groups could enhance understanding of factors unique to different professions in their adoption of AMR therapies. Thus, such research can help to create interventions that would pinpoint the needs of HCP in various areas and settings and adapt to those needs accordingly (Zhang, Jiang, Zhuang, Zeng, & Li, 2024).

In addition, future studies should explore the ability of policy in handling the challenges associated with development and delivery of AMR therapies. Although this paper pointed to regulation as a leading issue affecting adoption of new treatments, other studies are required to shed light on how certain policies including fast track authorization procedures or rebates for pharma firms can enhance the application of new treatments. It could also investigate the implementation of current global partnerships in fighting AMR and review ways of enhancing international cooperation. Therefore, the results of the present study offer considerable awareness of the healthcare professionals' attitude towards innovative therapies for the management of AMR. As with the general knowledge of AMR as a threat to global health, awareness, familiarity, and confidence in these therapies also vary significantly across the countries (Fellman et al., 2024).

Such differences depend on geographical area, employment history, and previous occupation or specialty. These differences will have to be addressed through undertaking awareness creation and training for those in the work place, escalating the allocation of resources to research with the aim of coming up with new policies that will make the regulatory process easier. Besides, international cooperation will also be important in guaranteeing that all the parts of the world receive the latest technologies in the AMR treatment. If these challenges are met, the healthcare system all over the world will have made a drastic improvement in the fight against AMR, and new therapies implemented to protect everyone's health (Andreoli et al., 2024).

CONCLUSION:

Altogether, it is hoped that this study offers key findings on the attitudes of the EMRH towards modern interventions for combating AMR. The study shows that people across the world acknowledge the existence of AMR as a major global health issue and that the information concerning the new treatments like bacteriophage therapy, antimicrobial peptides, and CRISPR technology varies significantly depending on the country and the respondents' awareness and acceptance of the issue. The findings imply that while the healthcare community is increasingly concerned with the issue of AMR, there are still some deficiencies in the understanding of and actual use of the newest approaches that may help cut the effects of AMR down.

Another interesting observation made from the study is the variations in familiarity and confidence towards AMR therapies across the regions; though the FHI score was considerably high, the familiarity of the HCPs from Asia and Africa is significantly low as compared to those from the North American and European regions. This implies that some healthcare personnel may be better placed to adopt these new treatments especially those who practice in the developing countries with well-established health systems and easy access to research findings. However, low and middle income countries' professionals may experience problems with information accessibility, infrastructures and overall resources as this may hamper the implementation of innovative therapies. This is an indication that efforts should be made to close these gaps to ensure that all healthcare professional irrespective of the region have the knowledge and tools that will enable them to deal with AMR.

The study also identifies differences in one's perceptions depending on his or her occupational background. Clinicians such as doctors or pharmacists who are directly involved in patients' outcomes manifested higher confidence in new AMR treatments compared to researchers and policy makers who may take risk mitigation approaches. It shows that the proposed practical experience has consequences for building the healthcare professional's attitude towards new therapies. It also reveals the fact that more attention should be paid to interdisciplinary cooperation in order to develop and test new approaches not only with the help of scientifically sound methods, but also to make sure that these new treatments will be introduced in clinical practice and will be implemented as it should be.

In addition, the work emphasizes the influence of professional experience in developing the attitudes towards the AMR therapies. The study showed that the early career health care professionals had higher level of receptiveness to the new treatment than their senior colleagues who are more likely to resist change. This implies that it may be require training of health professions and education for them to change their perceptions about newer treatment modalities because the older ones are more comfortable with what they know. The lack of knowledge and safety concerns on the new products could be the reason for such resistance towards new approaches of fighting AMR, more information could be supplied to address such concerns.

The strategies and challenges seen in this study including the funding limitations, regulatory hurdles and limited trials on the development of AMR therapies align to the literature. Overcoming these challenges is going to be impossible without collective actions from governmental and non-governmental organizations, healthcare facilities and practitioners, as well as the private sector in terms of financial investment, policy support, and research sponsorship. Explicit changes in policies to facilitate the approval of new AMR therapies and their reimbursement as well as encouragement of pharmaceutical firms to embrace the research on AMR are key in the development and implementation of new treatments. The importance of this study is that it provides an insight on the perception of providers on the innovative therapies to fight AMR. Thus, identifying the factors affecting such

perceptions allows the study to offer constructive information to design intervention strategies oriented toward the diffusion of new treatments. This is particularly apparent in the case of AMR where late adoption of the right treatment may mean disaster for the world's population.

Therefore, it can be concluded that education, multi-stakeholder involvement and policy change should be considered as major steps forward to combat the AMR threat around the globe. It is equally crucial to make sure that many health care professionals around the world, irrespective of the fields they specialize in, get the right and latest information regarding AMR therapies and, the right trainings that can enable them to prescribe the AMR therapies for the many patients that may benefit from them. Furthermore, building an enhanced global partnerships and interdisciplinary cooperation will be the driver for the successful countering of the obstacles for the implementation of the new therapies and nurturing the effective availability of those innovative therapies in the healthcare systems that require them. The threat of AMR is considered an international problem, and its solution is possible only through the implementation of complex measures, and this work is an attempt to make a small contribution to the fight against it.

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