RESEARCH ARTICLE

Enhancing Capability of Surveillance Actors in Using Evidence-Informed Decision Making on Disease Response in Nigeria.

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Abstract

One objective of disease surveillance and response is to improve the flow of information required to monitor the spread of infectious diseases, and to evaluate the effectiveness of control and preventive measures. This study assessed surveillance actors' knowledge and capacity to access and utilize relevant evidence from COVID-19 response data. The study was carried out in Anambra State, Nigeria. We adopted a pre-test and post-test design for the study. The population included all the surveillance actors in Anambra state, and the sample was 42 surveillance officers drawn via purposive sampling. Demographic data and a pre-test questionnaire were administered before a one-day intensive training workshop. After the training, a post-test questionnaire was administered. Data were collected using a Likert scale that measuring the adequacy of the outcomes of the target participants. The scale ranged from 1 to 5, with 1 indicating grossly inadequate outcomes and 5 indicating very adequate outcome. Data were analyzed using means and standard deviations. The study results revealed an increase in the mean score of knowledge and capacity amongst the respondents. The findings of this study suggest that competence relevant to data analysis and translating data into evidence-informed decision making (EIDM) can be enhanced through training workshops. This study recommends a conscious effort to institutionalize training, capacity building, and mentoring for knowledge sharing and sustainability of EIDM.

Keywords: Surveillance, data, Infectious diseases, Surveillance actors, COVID-19, EIDM, Nigeria

Introduction

Managing infectious diseases requires a rapid and effective response to support decision-making. The decisions are complex and require an understanding of the disease, disease intervention and control measures, and the disease-relevant characteristics of the local community (Standley et al., 2018). Disease surveillance improves the flow of information needed to monitor disease spread, and to evaluate the effectiveness of control and preventive measures. The Integrated Disease Surveillance and Response (IDSR) tool and the Surveillance Outbreak Response Management and Analysis System (SORMAS) capture all the surveillance data on COVID-19 and other vaccine preventable diseases (VPD) in Nigeria. Having a robust database is not enough to support decision making process, but data must be analyzed and transformed into evidence-informed decision-making (EIDM).

The insufficient digital infrastructure, including internet connectivity and technology resources, in the state of Anambra, Nigeria, causes difficulties in gathering, storing, and sharing health data effectively. The state of Anambra stores health information in a number of disparate systems, making integration and access difficult. Health records that are fragmented or unavailable make it difficult to provide effective healthcare. There are barriers with access to comprehensive health data for study is a difficulty for researchers, legislators, and public health professionals. The ability to establish tailored treatments and policies is also constrained by restricted data availability, which may impede decision-making based on the available evidence. Together, governments, healthcare professionals, and technology stakeholders must work to close these gaps by investing in digital infrastructure, putting in place strict data security and privacy controls, encouraging interoperability, and standardizing data collection techniques (Ezenwaka et al, 2020).

EIDM has a large and growing evidence base, spanning a wide range of disciplines (Punton et al., 2016). EIDM is used when people who need to make choices use the best available evidence to motivate their decisions. Evidence can refer to scientific research but equally to citizens' voices, SORMAS data, or expert opinion, among other sources. EIDM aims to use the best available evidence for the decision at hand. It aims for evidence that is fit-for-purpose, suitable for the context, and scalable for the decision to be taken (Africa Evidence Network, 2021).

Among the many barriers to the use of evidence in decision-making, the low capacity of decision makers has attracted much focus in the last decade (Uneke et al., 2010). Therefore, there is an opportunity to promote evidence use by presenting and discussing the experiences on COVID-19 response, and thereby

strengthening individual and institutional capacity for evidence use amongst the surveillance actors. Developing the capacity of decision-makers to use research evidence through building knowledge, skills, commitment, relationships, and systems will allow for access, appraisal, and application of good quality evidence more effectively when forming policy. The use of research evidence will improve the quality of policies, ultimately benefitting more people experiencing poverty. Capacity development is a complex and multi-dimensional process that demands and involves more than a focus on individual skills, requiring intervention at individual, interpersonal, organizational, and institutional levels.

Studies examining individual-level interventions, particularly training, suggest combining classroom learning with on-site projects to actively engage participants (Duong et al, 2022). Organizations may link to training success, especially as supporting organizations appeared to be an important contextual factor influencing training impact. One helpful way of understanding the mechanism through which training can improve capacity is the self-efficacy theory – training increases participants' confidence in their capability to perform a specific task or handle a particular situation. (Punton et al., 2016). Reports relating to interpersonal-level interventions discussed the role of networks, knowledge brokers, and champions in promoting EIDM (Punton et al., 2016). Individuals can lead to change through the mechanisms of 'cheerleading,' acting as 'transformational leaders' or 'network facilitators,' or promoting 'social learning' through role-modeling EIDM behaviors. Effective champions and knowledge brokers possess specific interpersonal skills, vision and commitment, and an appropriate level of seniority in an organization. The evidence on networks suggests that they may lead to change through the mechanism of 'social processing' – in which beliefs within a group shift towards a consensus – which may lead away from EIDM towards it. (Punton et al., 2016).

Training and mentorship programs in EIDM effectively improved the competencies of civil servants (Poot et al., 2018). However, such programs need to train a critical mass to enhance EIDM practice effectively (Poot et al., 2018). EIDM tools may also lead to change by increasing the value placed on evidence by convincing them of the benefit of data for decision-making. A virtuous circle may emerge, in which increased use of evidence leads to greater demand for it, and so on (Punton et al., 2016). Although solid individual and institutional capacities are critical in enabling evidence-informed decision-making (EIDM), these remain weak in many developing countries for many reasons. Lack of EIDM training programs for civil servants and low priority and investments in strengthening institutional structures and mechanisms for enabling EIDM are some of those reasons (Poot et al., 2018).

The study measured the difference between pre-workshop and post-workshop knowledge, this implies that the study aimed to evaluate the outcomes of the workshop, and the workshop aimed to enhance the capabilities of surveillance actors in using evidence informed decision-making on disease outbreak management and response of COVID-19 in Nigeria. The intervention aimed to improve the knowledge and capacity of surveillance actors to access and utilize relevant research evidence and data analysis options on for COVID-19 response, and to interpret data to inform decision-making on COVID-19 response.

Methods

Study area

The study was conducted in Anambra State, located in the southeastern area of Nigeria, which has a population of more than 4 million people. The state capital is Awka, and it has two tertiary hospitals, various secondary facilities, and several primary healthcare centers. At the time of the study, Anambra State had approved and executed an Incident Action Plan to respond to COVID-19, with surveillance being one of the crucial components to guarantee an effective response. Additionally, as of July 2023, disease surveillance efforts are ongoing in health centers and communities.

Study Design

The study design used in this research was a modified "before and after" intervention study design. This design was used to evaluate the effectiveness of an intervention by measuring the outcomes of the participants before and after the intervention. In this study, the intervention was given to a specific group of individuals, and the outcomes were measured using a 5-point Likert scale.

A Likert scale is a commonly used survey tool that measures people's attitudes or perceptions on a particular subject (Elliott, 2021). In this case, the Likert scale was used to measure the adequacy of the outcomes on the target participants. The scale ranged from 1 to 5, with 1 indicating grossly inadequate outcomes and 5 indicating very adequate outcomes.
We analyzed the difference between the before and after measurements to evaluate the effectiveness of the intervention and to determine whether it had a positive or negative impact on the outcomes.

Sample size and Sampling Technique

The sample size in this study comprised 42 surveillance actors, who were selected using purposive sampling. Purposive sampling is a non-probability sampling technique where participants are selected based on specific criteria or characteristics that are relevant to the research question. In this case, the

participants were selected from surveillance officers - local government area (LGA) Disease Surveillance and Notification officers (DSNOs) and contact tracers - who were deemed appropriate for the study. Finally, it is important to note that all 42 eligible DSNOs were physically present, which indicates a high level of participation and engagement in the study, and enhances the validity of the study findings.

Ethics approval and consent to participate

The Anambra State Health Research Ethics Committee (ANSHREC-01-01-2009-08-01-2022) gave approval for the study, and all procedures were conducted in accordance with appropriate regulations and guidelines. The study protocol, including the informed consent statement, was approved prior to the research. Before conducting the study, research respondents provided informed consent. Written informed consent was obtained and confidentiality ensured.

Data Collection

The data collection process described in the scenario involves two main components: a pre-workshop survey and a one-day training workshop. The pre-workshop survey was in questionnaire format, and contained a mix of open-ended and closed-ended questions. The respondents were asked to complete the questionnaire before attending the training workshop. The questionnaire was interviewer-administered, meaning that a trained interviewer reads the questions to the respondent and records their answers.

The questionnaire was designed to collect information on several topics, including socio-demographic information such as age and level of education, as well as knowledge on surveillance, the use of data analysis tools, and data interpretation for informed decision making. The purpose of the pre-workshop survey was to establish a baseline of knowledge and skills among the participants before they attended the training workshop.

The one-day training workshop was organized for the 42 invited participants, and covered several topics related to surveillance, including Active Case Search, Event-Based Surveillance, Using ICT for measuring central tendency, and Developing capacity on internet use for evidence synthesis. The workshop was designed to be interactive and hands-on, with participants engaging in group activities and discussions to reinforce their learning. The goal of the workshop was to improve the participants' knowledge and skills in the areas covered by the training, and to equip them with the tools and techniques needed to collect and interpret data for informed decision making.

The baseline information was compared to the post-workshop questionnaire to evaluate the effectiveness of the training workshop by comparing the participants' knowledge and skills before and after the training.

Measurement of Variables

The independent variables of interest in this study were gender and age category, which were measured using a structured questionnaire. Gender was categorized into two groups: male and female, while age category was determined by the respondent's age at their last birthday. The mean and standard deviation were calculated for age. The remaining independent variables were measured using nominal or ordinal scales and were subsequently recoded into two categories. For categorical variables, frequencies and proportions were calculated.

Data Analysis

The data obtained through the 5-point Likert scales were examined using the Statistical Package for Social Sciences (SPSS) version 23 software for Microsoft Windows (IBM SPSS Statistics Version 23). Frequencies and proportions were computed for categorical variables, while means and standard deviations were calculated for other variables. The independent variables in the study were socio-demographic characteristics, while the dependent variables were knowledge of surveillance activities and data utilization for decision-making. The study also assessed the level of collaboration between surveillance actors and policymakers in utilizing informed evidence for decision-making. Additionally, the evaluation involved examining the process of assessing, adapting, and implementing evidence-informed practices relevant to decision-making. Complexity and factors influencing the use of informed evidence in decision making were determined.

Results

Socio-demographic features of respondents

All the forty-two (42) surveillance actors invited for this intervention workshop research attended the workshop and participated throughout the process of both the pre- and post-intervention workshops of this research study. A total of 42 complete questionnaires were collected in the pre- and post-workshop of this research and were included in the analysis for this study. Table 1 shows the socio-demographic characteristics of the respondents.

There were 71% females and 29% males: 61.9% of the respondents were within the age range >45 years while only 2.3% were within the age range of <25 years. The percentage of years of experience in current designation showed that 40.4% of the surveillance actors have 6–10 years of experience in their designation. 12.0% of the respondents had diplomas, 26.0% had bachelor's degrees, 36.0% had master's

degrees and 36.0% had a doctorate degree as their highest educational qualification.

Table 1: Socio-demographic characteristics of respondents (surveillance actors).

Demographic Characteristics (Respondents)	No. (%) of Respondents N = 42
Gender	
Female	32(79.0)
Male	10(21.0)
Age Group (y)	
<25	1(2.3)
25-34	5(11.9)
35-44	10(23.8)
>45	26(61.9)
Designation	
Surveillance Officers	42(100)
Years of experience in current designation	
<3	7(16.6)
3–5	8(19.2)
6–10	17(40.4)
>10	10(23.8)
Highest academic qualification	
Diploma	5(12.0)
Bachelor	15(36.0)
Masters	11(26.0)
Doctorate	11(26.0)

The capacity and knowledge of surveillance actors on the use of evidence-informed in the decision-making for disease response

The response of the surveillance actors before the intervention showed that their capacity and knowledge of the use of evidence-informed in decision-making was lower when compared with the response of the actors after the intervention workshop.

The mean of the pre-intervention workshop on capacity and knowledge ranged from 2.26 to 2.78 whereas the post-intervention mean ranged from 3.75 to 4.50 with a percentage increase from 6.04% to 13.09% (Table 2).

Collaboration between surveillance actors and policymakers on the use of informed evidence for decision making

In terms of collaboration, the mean ranged from 2.40 to 2.90 in the pre-intervention workshop while the mean in the post-intervention ranged from 3.17 to 3.90 with a percentage increase from 7.58 to 15.76. This indicates that the intervention programme adopted in this research improved the rate of collaboration or cooperation between surveillance actors and policymakers on the use of informed evidence for decision making (Table 3).

Assessing, adapting, and implementation

The ability of the surveillance actors to assess, adapt and implement the relevance of informed evidence in decision-making was lower than post intervention, with a mean range from 2.67 to 3.12. The ability of participants to access, adapt and implement informed evidence increased after the intervention, with a mean ranging from 2.96 to 3.96, and the mean percentage difference ranging from 1.56% to 12.52% (Table 4).

Complexity and factors influencing the use of informed evidence in decision making

Prior to the intervention, the responses of surveillance actors showed little knowledge about the complexity and factors influencing the use of informed evidence in decision making, with the mean value ranging from 2.56 to 3.17. Following the intervention workshop, the mean value ranged from 3.73 to 4.10, and the mean percentage difference ranged from 6.86% to 11.38% (Table 5).

Discussion

This study examined the effect of an educational intervention aimed at improving the capacity of surveillance actors in using evidence to inform decision-making on disease outbreak management and response in Anambra State, Nigeria. The study revealed good knowledge and understanding of surveillance activities by the surveillance actors. Other studies have shown that poor data entry quality and completeness is a significant challenge to evidence-informed decision-making (Ezenwaka et al., 2020). Existing data in the SORMAS platform were reported to be incomplete, making data analysis and usability (for program evaluation and decision-making) almost impossible (Ezenwaka et al., 2020). Poor data quality on SORMAS has been attributed to inadequate human resources and weak capacity to analyze and manage health data at the state and local government area levels. In the absence of reliable and usable data, program planning for surveillance may be done abstractly, without adequate consideration of context- and population-specific concerns and challenges (Bowen et al., 2005).

Table 2: Response of surveillance actors to questions on the capacity and knowledge of surveillance actors on the use of evidence informed in the decision making

Parameters assessed	Pre Intervention Mean	Post Intervention mean	Mean difference (%) N = 42
1. Capacity to identify/select relevant evidence for decision making	2.39	3.81	1.42(8.50)
2. Ability to adapt (extract, synthesize, and present) evidence used for decision making	2.37	3.88	1.51(9.03)
3. Ability to transform evidence into decision making useable form	2.78	3.79	1.01(6.04)
4. Level of your knowledge on the role of surveillance actors in decision making	2.47	3.83	1.36(8.13)
5. Level of knowledge of what evidence is in decision making context	2.59	4.04	1.45(8.67)
6. Level of knowledge of the meaning of decision making	2.57	3.94	1.37(8.19)
7. Level of understanding of decision making	2.33	3.75	1.42(8.49)
8. Understanding of the meaning of priority setting/policy agenda in decision making	2.26	3.58	1.32(7.89)
9. Level of understanding of the meaning of a decision making brief	2.3	4.19	1.89(11.30)
10. Level of understanding of what a decision making dialogue for the use of evidence	2.32	4.1	1.78(10.64)
11. Knowledge on the types of evidence that can be used for decision making	2.31	4.5	2.19(13.09)

Table 3: Response of surveillance actors and policymakers to questions on collaboration of surveillance actors and policymakers on the use of informed evidence for decision making

Parameters assessed	Pre Intervention Mean	Post Intervention mean	Mean difference (%) N = 42
1. Collaboration to get support with obtaining existing research evidence about high-priority policy issues?	2.66	3.35	0.69(8.30)
2. Collaboration to obtain succour with evaluating the quality and local applicability of existing evidence informed about high-priority policy issues?	2.4	3.71	1.31(15.76)
3. Collaboration to obtain assistance with presenting existing evidence informed about high-priority policy issues to other policymakers in a useful way?	2.9	3.52	0.62(7.58)
4. Collaboration by legislative committee testimonies and government-sponsored expert committees or public hearings?	2.58	3.65	1.07(12.87)
5. Collaboration through evidence informed conferences?	2.74	3.9	1.16(13.95)
6. Collaboration as part of a priority-setting process to identify high-priority policy issues for which evidence is needed?	2.58	3.69	1.11(13.36)
7. Collaboration as part of evidence informed about high-priority policy issues that they ordered?	2.57	3.35	0.78(9.38)
8. Collaboration as part of research about high-priority policy issues with which they were involved as a co-investigator?	2.51	3.17	0.66(7.94)

Table 4: Response of surveillance actors to questions on assessing, adapting, and implementing of evidence-informed relevant to decision making

Parameters assessed	Pre Intervention Mean	Post Intervention mean	Mean difference (%) N = 42
1. The skill to evaluate the differences in the research evidence in the context of your organization	3.12	3.77	0.65(7.82)
2. Capacity to access and use existing research evidence relevant to decision making	2.77	3.49	0.72(8.66)
3. The skill to evaluate and appropriate the quality of research methodology	2.8	3.25	0.45(5.42)
4. Ability to evaluate the reliability of specific research evidence and to compare research methods and results	2.7	3.52	0.82(9.87)
5. The ability to identify relevant similarities and differences between evidence informed	2.92	3.96	1.04(12.52)
6. Adequacy of present knowledge about initiating/conducting research relevant to decision making	2.81	3.79	0.98(11.79)
7. Adequacy of present knowledge about initiating/conducting research relevant to decision making	2.94	3.23	0.29(3.49)
8. Ability to access and use existing research evidence relevant to decision making	2.83	2.96	0.13(1.56)
9. The skill to evaluate and appropriate the quality of research methodology	2.83	3.77	0.94(11.31)
10. The skill to evaluate the reliability of specific research evidence and to compare research methods and results	2.67	3.71	1.04(12.52)

Table 5: Response of surveillance actors to questions on complexity and factors that influence the use of informed evidence in decision-making

Parameters assessed	Pre Intervention Mean	Post Intervention mean	Mean difference (%) N = 42
How would you rate your understanding of the complexity of the decision-making process, the roles of actors who influence change, the influence of power relations institutions, and global political economy issues in decision-making?	2.83	3.73	0.9(8.47)
How would you rate your knowledge about the different types and roles of evidence in decision-making?	2.88	4.04	1.16(10.91)
How would you rate your understanding of principles of priority setting for decision-making?	2.96	3.92	0.96(9.03)
How would you rate your understanding of Principles of ethics in decision-making?	2.88	3.9	1.02(9.59)
How would you rate your knowledge and understanding of decision-makers/legislators' leadership capacity development?	2.98	3.94	0.96(9.03)
How would you rate your knowledge and understanding of intersectoral collaboration in decision-making?	2.98	3.98	1(9.41)
How would you rate your knowledge and understanding of political and legislative processes in decision-making?	3.17	3.9	0.73(6.86)
How would you rate your knowledge and understanding of decision-making, consensus-building, and negotiation?	2.56	3.77	1.21(11.38)
How would you rate your knowledge and understanding of the role of implementation research in decision-making?	2.6	4.1	1.5(14.11)
How would you rate your knowledge and understanding of decision-making, policy monitoring, evaluation and performance assessment?	2.83	4.02	1.19(11.19)

There is a capacity gap amongst the respondents on using EIDM process. Previous studies have shown that evidence can improve the health system's effectiveness (Deans and Ademokun (2015). Therefore, the significance of EIDM amidst the diversity of healthcare needs should be promoted for effective, efficient, and equitable strengthening of the health system (Ezenwaka et al., 2020). More so, Deans and Ademokun (2015) have argued that those who seek to build capacity for evidence-informed decisions need to understand the actual capacity gaps of decision-makers. Nonetheless, decision making requires a range of knowledge and skills, including the ability to clarify problems, to decide on – and describe – the options to address the problem, to identify and address barriers to implementing the options, and to organize and run policy dialogues (Okorie et al., 2013).

Ensuring that evidence from research is used for decision-making is essential to ensure that decision-makers develop and implement the right policies that will be effective and will lead to significant improvement in service delivery outcomes (Campbell et al., 2007). Securing this capacity among surveillance actors will help to ensure that policy briefs are produced and used more effectively and efficiently.

The intervention component of this study contributed to the improved capacity of the respondents, as they have showed commitment and enthusiasm for new knowledge. The responses before the intervention showed that their capacity and knowledge on the use of evidence informed in decision making was lower when compared with the responses after the intervention workshop. The mean of pre-intervention workshop on capacity and knowledge ranged 2.26 to 2.78 whereas, post-intervention mean ranged from 3.75 to 4.50 with percentage increase ranged from 6.04% to 13.09% (Table 2). The previous study recognized that intervention/programs are more effective if supported by evidence, enabling better value for money, transparency in decision-making, and accountability Deans and Ademokun (2015). Therefore, incorporating evidence-informed into decision-making is critical for health systems responsiveness and successful implementation of endemic disease control programs (Ezenwaka et al., 2020).

In terms of collaboration, positive interaction can sensitize and upskill both parties through learning from each other about their values, work contexts and practices (Uneke *et al.* 2015). Interactions are more sustainable when there is strong organizational support, and where formal arrangements are put in place rather than relying on individuals (Uneke *et al.* 2015). Here, capacity-building focuses on forging or enhancing connections across a spectrum of interactivity from information exchange forums to formal partnerships and the co-production of research (Ritter, 2009; World Health Organization, 2008). Individual, organisational and institutional capacity have crucial roles to play in forming and sustaining interpersonal networks (Galadanci *et al.,* 2007).

The ability of the surveillance actors to assess relevant information of informed evidence, to adapt and implement research evidence for decision making was g enhanced after the post intervention workshop training. The workshops were generally well received with high levels of self-reported improvement in understanding, which is in agreement with Uneke *et al.* (2015) who identified training workshop as a major strategy for engagement stakeholders for decision making.

In this study, the response of surveillance actors on the complexity and factors influencing the use of informed evidence showed little knowledge about the complexity and factors influencing the use of informed evidence in decision making prior to the intervention. Simplifying the complexities in decision making process depend greatly on information from surveillance officers and other sources such as consultants, researchers, and health experts Uneke *et al.* (2015) . Studies have shown that many of decision makers have more confidence in information coming from their staff more than information that comes from any other sources Uneke *et al.* (2015). Decision-makers may also need specialist knowledge and skills to access, appraise, generate and apply research in their work. Although many have substantial skills and experience in these areas, others do not (Carney, 2006); they lack confidence and want training (Wallace *et al.,* 2012). Individuals' beliefs about the value of research and requirements of different policy roles are also considered to be important mediators of use (Mijumbi *et al.,* 2014).

Policy implications

This study is expected to highlight key major gaps in the evidence informed decision-making process in Nigeria. We have established the importance of skill set and knowledge base for synthesizing information, data analysis and interpretation as a mechanism for implementation capacity building of surveillance actors on the EIDM process.

Recommendations

The study team has made the following recommendations:

- Continuous mentoring of surveillance actors to align the beliefs, views, attitudes and opinions towards evidence informed decision making for policy formulation.
- The surveillance actors should collaborate to ensure that research evidence has the required attributes that would inform concrete decision making.
- Stakeholders should improve on technical support by organizing for more training of the surveillance officers on evidence informed decision making.

- State actors and stakeholders should establish relevant platforms to disseminate and implement research results for use in decision making.

Conclusion

The study's findings suggest that training workshops can enhance the process of converting data into decisions that are supported by the available evidence. It is essential to actively incorporate training, capacity building, and mentorship activities for knowledge exchange and decision-making based on evidence within institutions in order to maintain long-term sustainability. However, improving institutional capacity for evidence necessitates a diverse strategy, sustained political commitment, and large long-term investments. These actions will help surveillance actors better understand their data, interpret it effectively, and use it as a tool for decision-making.

Declaration

We hereby declare that there is no conflict of interest amongst the authors. We have unity of purpose in this research work.

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Competing interests

The authors declare that they do not have any conflicts of interest.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request (igweakpa3@gmail.com).

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Authors' contributions

All authors made a significant contribution to the work reported, whether in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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