ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

Magnitude and Factors Associated with Research Misconduct at Public University in Ethiopia: a Cross-Sectional Survey

By

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RESEARCH PROJECT SUBMISSION FORM

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Declaration of Principal Investigator

I, the undersigned investigator, assured that this work, " Magnitude and Factors Associated with Research Misconduct at Public University in Ethiopia: a Cross-Sectional Survey," is my original work. All references were duly acknowledged. I agreed to provide necessary updates and amendments as per the Department's terms and conditions.

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LIST OF ABBREVIATIONS

AOR: Adjusted Odds Ratio

CHS: College of Health Sciences

CI: Confidence Interval

CoI: Conflict of Interest

EPHI: Ethiopian Public Health Institute

FFB: Fabrication, Falsification, Plagiarism

FMoE: Federal Ministry of Education

ICMJE: International Committee of Medical Journal Editors

IRB: Institutional Review Board

LMICs: Low-and-Middle-income-countries

OECD: Organization for Economic Co-operation and Development

ORI: Office of Research Integrity

OSTP: Office of Science and Technology Policy

QRPs: Questionable Research Practices

RCR: Responsible Conduct of Research

RMC: Research Misconduct

SPSS: Statistical Package for Social Sciences

TRREE: Training and Resources in Research Ethics Evaluation

WHO: World Health Organization

ABSTRACT

Background: Research integrity in Ethiopia, essential for ethical scientific research, has been inadequately addressed, resulting in gaps in combating misconduct like plagiarism and data falsification. This research systematically assessed the magnitude and factors associated with research misconduct at a Public University in the country.

Objective: To assess the magnitude, attitudes and factors associated with research misconduct among researchers at Public University in Ethiopia.

Methods: An institutional-based cross-sectional study was conducted from January to April 2024. The sample sizes were determined based on each specific objective, resulting in a total of 297 participants, selected via simple random sampling using the lottery method. Due to the sensitive nature of the study, data collection was carried out using a structured self-administered questionnaire. The data were then entered into Epi-Data 3.1 and analyzed with SPSS version 27. Descriptive statistics, including frequency and percentage, were used to summarize the data. Chi-square tests and binary logistic regression were employed to test for associations, with the results presented in tables.

Result: A total of 244 researchers participated, resulting in 82% response rate. In our study, 37.7% of our participants self-reported committing at least one wrongdoing. Authorship misconduct was the most common form of self-report misconduct with 47.5%, 95% CI [41.1%, 54.0%] followed by falsification with 38.9%, 95% CI [32.8%, 45.4%]. Regarding attitude towards responsible conduct of research, 61.1%, 95% CI [54.6%, 67.2%] of participants had a favorable attitude. Publication pressure was significantly associated with research misconduct (AOR = 3.180; 95% CI: 1.017, 9.946). Participants above lecturer rank were 64.6% less likely to participate in plagiarism than those below lecturer rank (AOR = 0.354, 95% CI: 0.194, 0.648).

Conclusion: Research misconduct has profound implications, compromising the validity of scientific findings and eroding public trust in research. It distorts the evidence base needed for informed decision-making, potentially leading to harmful policy and clinical practices.

Key words: Research misconduct, Responsible Conduct of Research, Questionable Research Practices, Research Integrity

1. INTRODUCTION

1.1.Background

Research misconduct (RMC) refers to unethical or dishonest behavior within academic or scientific research. It includes various actions that violate the principles of integrity, honesty, and transparency. Common forms of RMC are plagiarism, fabrication, and falsification of data, all of which aim to mislead or manipulate the scientific community. Fabrication involves creating data or findings and recording or reporting them as if they were real, while falsification involves altering or omitting data or results, or interfering with research materials, equipment, or processes, resulting in an inaccurate research record. Plagiarism is the unauthorized use of another person's ideas, methods, results, or words (1–4). RMC undermines the credibility of scholarly work, jeopardizes the integrity of scientific findings, and can have widespread repercussions for the advancement of knowledge and the trust within the academic community (5).

Apart from RMC, authorship is a common form of Questionable Research Practices (QRPs) that is often overlooked and violated by researchers. Authorship misconduct includes individuals who agree to be listed as authors without making significant contributions, participating in only one aspect of the work, or including someone who made no contribution at all (6). The International Committee of Medical Journal Editors (ICMJE) outlines four strict criteria for authorship: substantial contributions to the work's conception; drafting or critically revising the content; final approval of the version to be published; and agreement to be accountable for all aspects of the work (3).

As discussed in the book "Responsible Conduct of Research" by Shamoo and Resnik, throughout history, science and research have been marred by unethical practices such as fabrication, falsification, and plagiarism, which impact both the scientific community and the general public. Examples include Galileo manipulating data on falling objects, Isaac Newton adjusting experimental results to fit his theories, Louis Pasteur prematurely announcing the effectiveness of his anthrax vaccine, and Andrew Wakefield falsely linking the measles, mumps, and rubella (MMR) vaccine to autism. Additionally, there was controversy surrounding the isolation of the AIDS virus, with American and French experts accusing each other of stealing strains and

claiming them as their own (7). In his article "Ethics and Clinical Research," published in the New England Journal of Medicine in 1966, Henry Beecher noted an increase in ethical lapses in terms of both frequency and variety (8).

The objective of this study was to evaluate the magnitude and determinants of research misconduct among faculty researchers engaged in biomedical and epidemiological studies with human participants at an academic institution in Ethiopia.

1.2.Problem statement

Research integrity issues in biomedical research significantly challenge the credibility and reliability of scientific findings in the field. Despite strict ethical guidelines and regulations, questionable research practices continue to occur, raising concerns about the accuracy, reproducibility, and transparency of biomedical studies. Ethical research conduct is governed by specific principles, similar to those in other professional practices (9–11). These principles encompass honesty, objectivity, carefulness, credit, and transparency. Honesty demands that researchers refrain from fabricating, distorting, or misrepresenting data in any scientific communication, including funding submissions, reports, and publications. This entails truthful reporting of data, results, methods, processes, publication status, research contributions, and conflicts of interest. The principle of credit pertains to avoiding plagiarism and ensuring fair acknowledgment for publications, patents, and other scientific and scholarly works (7).

Research misconduct has extensive consequences that extend beyond its impact on scientific integrity. Such unethical behavior has widespread effects that permeate society. According to the Organization for Economic Co-operation and Development (OECD) global science forum, four primary negative effects have been identified: "harm to individuals and society, direct harm to science itself, strained relationships among scientists, and damage to public confidence in science." The forum highlights that harm to both individuals and society can occur if unsafe techniques or products, such as medications or therapies, are introduced based on fraudulent research. Misleading results could also adversely affect society if they are accepted as accurate. Additionally, ethical issues arise in studies that impact individuals' health and well-being, such as clinical trials or toxicological studies, emphasizing scientists' responsibility to society, as emphasized in the book "On Being a Scientist." (12,13).

Internationally, numerous research endeavors have focused on investigating the magnitude, reasons, consequences, and methods of preventing RMC. For instance, studies like Fanelli's (2009) in PLOS ONE analyzed survey responses from scientists globally, estimating that approximately 2% of researchers confessed to falsifying or fabricating data on at least one occasion (4). A study by Ioannidis, J. P. A. (2016) published in PLOS ONE identifies publication bias and ethical shortcomings in the reporting of research results, illustrating systemic challenges that impact research integrity on a global scale (14). According to a study on research integrity practices among European researchers (2014), significant factors contributing to research misconduct include stringent publishing expectations and inadequate awareness, knowledge, and understanding, among other factors (15).

According to an essay focusing on sub-Saharan Africa, several authors suggest that LMICs, including sub-Saharan Africa, may frequently disregard research integrity norms, despite a lack of substantial evidence to support this claim. Therefore, empirical studies on research integrity are crucial to effectively address risky behaviors, promote responsible conduct, and uphold a transparent research environment (16). In an African study, factors such as pressure from funders, the pursuit of recognition, publication demands, and inadequate penalties for misconduct were identified as strongly influencing research misconduct (17). Similarly, Marwan F. and colleagues' study in the Middle East, including Egypt, highlights scientific misconduct as a significant issue in various Middle Eastern academic institutions (18).

Even though no study on RMC conducted in Ethiopia, analysis from the Retraction Watch database indicates the presence of unethical research methods in the country's universities and research institutions. As a result of RMC, several articles authored by Ethiopian researchers have been retracted from various journals. Rossouw et al. analyzed papers retracted between 2014 and 2018, focusing on entries with African authors or co-authors using the Retraction Watch database. Their findings revealed that biomedical and health sciences accounted for over 60% of the 245 retracted papers studied. Ethiopia was among the 17 African countries included in the database, with 5 (2.04%) of its authors' works retracted, while neighboring Kenya accounted for 2.45% of retractions (19).

The absence of research on this specific topic within the country does not mean the issue has never existed. The findings from the Retraction Watch database mentioned earlier indicate that

RMC is indeed present in the country's academic and research institutions (19). Due to a lack of empirical data on RMC across academic and research institutes in the country, which is also typical for most African countries, it is challenging to determine the extent and seriousness of the issue. Consequently, it is difficult to develop and implement effective measures to address such unethical behavior (2). Therefore, the current study aimed to identify the factors contributing to misconduct among researchers in Ethiopia, examine attitudes towards responsible research conduct, and assess the magnitude of such behaviors to address the gap in empirical evidence on this specific topic.

1.3.Rationale and Significance of the Study

To the best of our knowledge, the magnitude of RMC and QRPs had not been investigated among researchers in Ethiopia's academic and research institutions. Despite an extensive search for such studies, we could not find any Ethiopian research published in national or international journals addressing research misconduct. Therefore, the aim of this study is to evaluate the magnitude, attitudes, and factors associated with RMC and QRPs among faculty researchers who conduct biomedical and epidemiological studies involving human participants at an academic institution in Ethiopia.

This research project offers several valuable contributions. It enhances the theoretical understanding of research misconduct within academic settings and establishes baseline data for future studies, as it is likely the first of its kind in Ethiopia. The findings guide researchers in conducting more detailed, nationwide investigations. Additionally, this study provides preliminary empirical data for the Ministry of Education's research institutions and universities, aiding in the development of norms for responsible research conduct and instructional strategies to promote ethical attitudes. As Ethiopia’s initial assessment of research misconduct and its associated factors, the results support the advancement of ethical research practices and underscore that research misconduct poses a threat to ethical research globally, regardless of location or development level.

2. LITERATURE REVIEW

2.1.Research misconduct and Responsible Conduct of Research

Fabrication, falsification, and plagiarism (FFP), prevalent in behavioral and biomedical studies, constitute research misconduct, diverging from responsible conduct of research (RCR). Such unethical behaviors within the scientific community have extensive negative repercussions, including significantly devaluing scientific integrity, distorting information, squandering research funding, and tarnishing academic reputations. Conversely, RCR plays a crucial role in ensuring the safety of study participants, maintaining the credibility of scientists, and fostering advancements in knowledge (5,20–22).

According to the Office of Science and Technology Policy (OSTP) as referenced by the Office of Research Integrity (ORI), RMC is defined as “fabrication, falsification, or plagiarism in proposing, conducting, or evaluating research, or in summarizing research outcomes” (1). The World Health Organization (WHO), in addition to using the term "wrongdoing" in research, has expanded the standard FFP to include terms like piracy, sabotage, and improper construction of research protocols (23). D'Angelo, in his book ‘Ethics in Science’, categorized RMC into crimes against researchers, such as using another researcher's data without permission, and crimes against science, such as falsifying data and deliberate omission of known information (24). Due to the varied definitions and concepts of RMC across stakeholders, achieving a unified and comprehensive understanding remains challenging (18).

2.2.Prevalence of research misconduct and questionable research practices

According to a systematic review and meta-analysis conducted in 2021, the overall prevalence of RMC involving at least one instance of fabrication, falsification, or plagiarism (FFP) is 2.9% across 42 publications published between 1992 and 2020. The individual prevalence rates for fabrication, falsification, and plagiarism are 1.9%, 3.3%, and 3.2%, respectively (20). The study also indicates that the total prevalence of one or more questionable research practices (QRPs) is 12.5%. In a previous review using the same study design conducted in 2009, excluding plagiarism, the prevalence of fabrication or falsification was 1.97%, and up to 33.7% of participants admitted to engaging in other QRPs (4).

In two surveys conducted in Europe (Croatia, 2017 and Norway, 2022), the prevalence of plagiarism, falsification, fabrication, and authorship violations in the Croatian study are reported as 3.8%, 9.3%, 3.8%, and 25.3%, respectively, while the prevalence of these misconducts in the Norwegian study ranges from 0.2% to 0.3% (25,26). In a cross-sectional survey conducted in the Middle East in 2017, which involved participants from academic institutions in Egypt, Bahrain, and Lebanon, self-reported instances of fabrication are 9.7%, and instances of falsification (such as excluding 'outliers' and selectively choosing data that support their hypothesis) are reported as 18.9% and 22.1%, respectively. The reported frequency of these same misconducts committed by colleagues is even higher, ranging from 23.4% to 37.4% (18).

According to an exploratory survey of a convenience sample of researchers conducted in Nigeria in 2013, 68.9% of researchers admitted to participating in 'at least one of the eight listed forms of scientific misconduct.' Similarly, a cross-sectional survey among Kenyan investigators focused on HIV research indicates that 68.3% of respondents engaged in any misconduct (17,27). These findings from the African context are alarming in their own right and significantly exceed the prevalence reported in the meta-analyses and surveys conducted in the two European countries mentioned earlier.

2.3.Methodological issues in data collection

Methodologically, due to the sensitive nature of these studies and researchers' hesitancy to self-report misconduct or to report colleagues, the representativeness of data collected on RMC becomes challenging. Consequently, response rates in studies related to research misconduct (RMC) and questionable research practices (QRPs) are often low, potentially introducing non-response bias. For instance, response rates in RMC studies conducted in Norway, Kenya, and the Netherlands are reported as 23.4%, 17.3%, and 21.2%, respectively (26–28).

Due to this issue, self-administered questionnaires are commonly employed as data collection tools. Given the diversity in context, culture, and circumstances, various authors have conceptualized numerous tools with similar constructs. These questionnaires are developed and customized for specific settings (17,26,29–31). As noted by Were et al., perceptions of plagiarism can vary significantly between settings; while Western views may emphasize individual ownership of ideas as commodities, African and other collectivist perspectives

prioritize sharing (27). Similarly, Resnik et al. highlight that definitions of misconduct can vary between countries, leading to different interpretations and treatments of unethical behavior (32).

Two aspects need careful consideration regarding the three constructs of research misconduct (RMC): the severity of the consequences and the detectability of the behaviors if they occur. Fabrication and falsification carry significant implications as they endanger the safety and welfare of study participants. When researchers engage in such misconduct, they fabricate or alter data, impacting both participants and the broader population. Furthermore, detecting fabrication and falsification is more challenging compared to detecting plagiarism. Despite this, Omutoko highlights that African researchers often prioritize addressing plagiarism while overlooking the critical issues of fabrication and falsification (33).

2.4.Factors affecting Responsible Conduct of Research

Several studies across different contexts suggest that a lack of "prior ethics training" is a factor that predicts researchers' involvement in research misconduct (RMC). These studies underscore the importance of ethics training in promoting research integrity (18,34–39). A qualitative study conducted in the United States in 2021 identified various factors influencing misconduct, such as pressure, incentives, competition, opportunities, and cultural considerations. However, the study, along with others like it, indicates that training in responsible conduct of research (RCR) may not consistently achieve the desired impact on research behavior or ethical decision-making (5,40–45).

Regarding the "behavioral influences" on research misconduct (RMC), a study conducted in Nigeria found that over half of researchers identified pressure from funders, the pursuit of recognition, publication pressures, and inadequate penalties for misconduct as having a significant impact on RMC (17). Another cross-sectional study in Nigeria, conducted in 2012 and focused on factors associated with RMC, revealed that 64.9% of respondents who cited inadequate awareness of research ethics admitted to committing at least one violation. Regarding academic rank, the Nigerian survey indicated that 31.9% of respondents below the rank of senior lecturer admitted to at least one instance of fabrication, falsification, or plagiarism (FFP), and among those who viewed ethics as a hurdle to publishing papers for promotion, 41.7% admitted to at least one FFP (2). Similarly, a survey in the Middle East linked a lack of "prior ethics

training" with behaviors such as circumventing research ethics regulations, fabrication, and falsification (18).

In Ethiopia, as outlined in the Ministry of Education's 2023 document, academic staff members who fail to publish at least one article as either a sole author or co-author within four years of their last promotion will be subject to the "publish or perish" policy (46). This policy is expected to exert significant pressure on researchers and academics to publish, potentially increasing the likelihood of engaging in research misconduct (RMC). Studies conducted in Nigeria and Kenya have highlighted the connection between RMC and the pressure to publish (17,27). Additionally, a global survey on publish-or-perish culture indicates that competition for jobs and resources is intensifying, and research productivity plays a crucial role in career advancement (47). According to the Council for International Organizations of Medical Sciences (CIOMS) in their latest guidelines on good governance practices for research institutions (2023), the "publish or perish" mentality increases the risk of scientific misconduct, which can have adverse consequences (48).

2.5.Anti-Plagiarism Policy at Addis Ababa University

Addis Ababa University has taken steps to address academic theft and plagiarism by developing an anti-plagiarism policy, although the policy's scope is limited to plagiarism and its effectiveness remains uncertain (49). Resnik et al. emphasize that institutional regulations play a crucial role in preventing and managing scientific misconduct in research (32).

Creating a policy framework is a positive step toward enhancing scientific and research integrity. However, focusing solely on plagiarism is inadequate and sends the wrong message that misconduct is limited to plagiarism alone. Plagiarism is just one aspect of research misconduct; fabrication and falsification are also significant issues. Many experts argue that these latter behaviors, termed "cardinal sins," are more severe and have broader consequences than plagiarism. For example, fabricating data in studies funded by the US federal government is not only unethical but also illegal (7). Most countries with national policies encompass all three elements of RMC QRPs in their definitions of misconduct (32). While institutional regulations play a crucial role, addressing misconduct comprehensively requires national efforts to prevent and manage these behaviors.

Research misconduct and questionable research practices are prevalent globally. Various academic studies and retractions of published articles illustrate the extent of these issues across multiple settings (19). Several factors, such as pressure to publish, insufficient training in responsible conduct of research (RCR), pressure from funders, and financial conflicts of interest, have been identified as predictors of research misconduct (RMC) among others (17,18,27,47).

2.6.Conceptual Framework

The conceptual framework for this study is developed based on a review of relevant literature concerning research misconduct and questionable research practices (2,17,18,27). Presented below is a framework that illustrates the relationships among baseline characteristics, behavioral influences, attitudes toward research misconduct (RMC) and questionable research practices (QRPs), and the resulting outcomes in terms of research integrity. Baseline characteristics are considered to potentially affect susceptibility to behavioral influences. These influences, in turn, are seen as mediating factors between baseline characteristics and outcomes. Ethical decision-making influenced by both baseline characteristics and behavioral factors collectively shapes the observed instances of research misconduct and questionable research practices. This framework offers a comprehensive perspective on the interconnected factors that impact research integrity, facilitating a deeper understanding of the multifaceted dynamics involved.

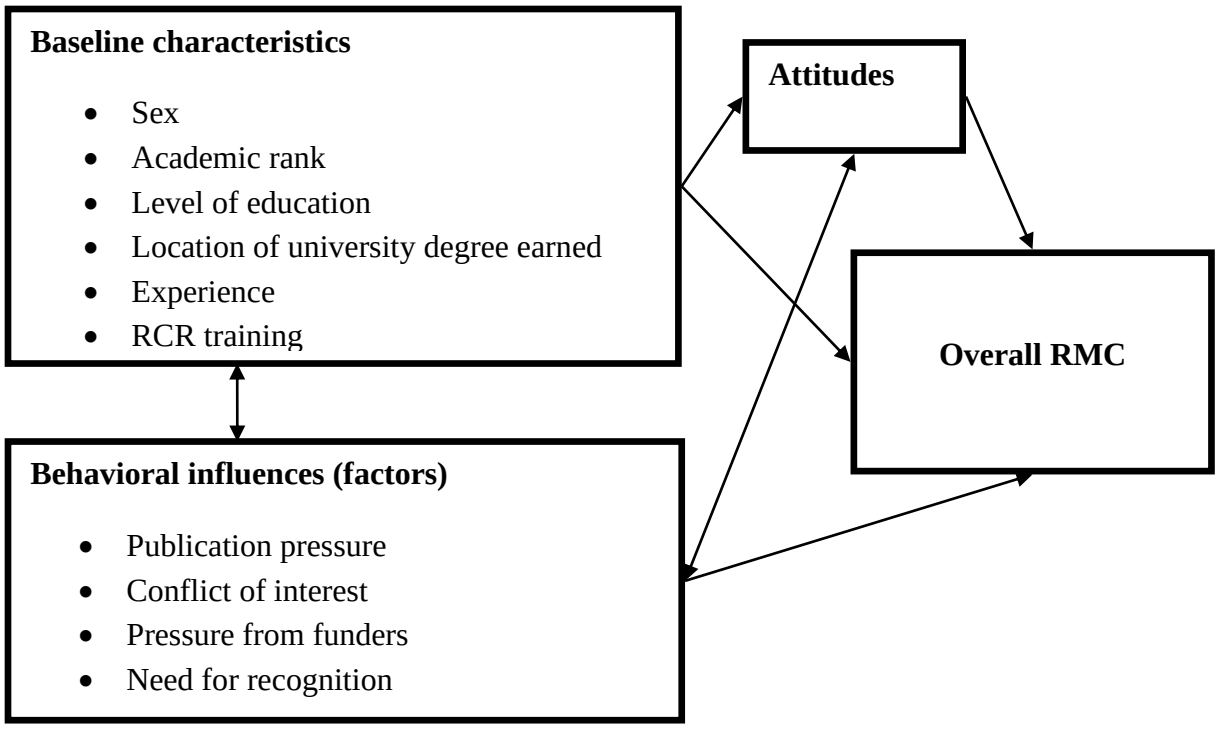

Figure 1 Conceptual framework based on literature review

3. OBJECTIVES

3.1.General objective

To assess the magnitude, attitudes and associated factors regarding research misconduct among researchers at a Public University in Ethiopia.

3.2.Specific objectives

1. To assess the magnitude of research misconduct among researchers
2. To assess the attitudes of researchers toward responsible conduct of research
3. To identify the factors associated with research misconduct

4. METHODS

4.1.Study setting

The research was conducted at a public university in Ethiopia from January to April 2024. This university houses a College of Health Sciences (CHS), which includes various schools and a teaching hospital. The CHS enrolls students across multiple health-related disciplines and employs hundreds of academic staff who engage in research activities. At present, the CHS provides both undergraduate and postgraduate programs.

4.2.Study design

An institutional-based cross-sectional study was conducted to investigate the magnitude, attitudes, and associated factors regarding RMC among researchers.

4.3.Population

4.3.1. Source Population

The target population for this study comprised all faculty members of the university's College of Health Sciences (CHS). The university was intentionally chosen for this study due to its academic excellence and strong reputation for research output and publication, aligning with the study's primary focus on assessing research misconduct.

4.3.2. Study Population

The study included faculty members from the CHS schools who were actively engaged in research and had at least one publication.

4.4.Eligibility criteria

4.4.1. Inclusion criteria

Faculty members with research experience and publications in local and international journals within the last five years were eligible for the study.

4.4.2. Exclusion criteria

Individuals who had not engaged in research and publication, along with faculty members who were unwilling to participate or did not give consent, were excluded from the data collection.

4.5.Sample size determination and sampling procedure

4.5.1. Sample size determination

For this study, sample sizes were calculated for each specific objective, and the largest sample size was used as the final sample size. The estimated prevalence of 68.9% for the first specific objective was derived from a previous study conducted in Nigeria (17). The prevalence of 52.8% for the second specific objective was obtained from a study in the Middle East (18). We used the Cochran formula for these two specific objectives (50). The sample size for the third specific objective, which focused on factors related to RMC and QRPs, was calculated using Epi Info by inputting the fraction of the outcome variable among unexposed and exposed individuals to certain factors, based on a prior study conducted in Nigeria (2). The estimated sample sizes are shown in Table 1 below.

$$n_0 = \frac{\left(Z_{\alpha/2}\right)^2 * (p)(q)}{(d)^2} \quad (4.1)$$

Where,

- ✓ n_0: the initial sample size,
- ✓ (p)(q): the estimate of variance = .21, where q = 1-p,
- ✓ $Z_{\alpha/2}$: reliability coefficient for the desired confidence interval of 95% = 1.96,
- ✓ d: acceptable margin of error for proportion being estimated = .05,
- ✓ The anticipated response rate was estimated at 88.7%, based on a previous study conducted in Nigeria, as no similar studies have been done in this country (17). To account for non-response, one of the recommended approaches is to use response rates from prior similar studies (51).

1. Using the formula provided above (4.1), the sample size for the first specific objective was calculated based on the assumption of p = 68.9%, which was derived from a prior study conducted in Nigeria (17), as no similar research has been done on this topic in Ethiopia.

$$n_0 = \frac{(1.96)^2\ (0.689)(0.311)}{(0.05)^2} = 329$$

2. Sample size determination for the second objective considered attitudes towards various issues in research misconduct, such as concerns about misconduct magnitude, data dishonesty, reporting misconduct, publication pressures, and declaring conflicts of interest. These proportions were 73.8%, 52.8%, 87.1%, 69.0%, and 87.5%, respectively, based on a previous study in the Middle East (18). The proportion, 52.8%, was used for the sample size calculation to ensure adequacy.

- By substituting the values into the formula (4.1) provided earlier, the sample size calculated for attitudes was $n_0 = 383$.

3. Sample size calculation for the third objective, which focused on selected associated factors, was performed using Epi-info 7 under the assumptions of a two-sided confidence level of 95%, power of 80%, and ratio of 1.

Table 1 *Sample size calculation for selected associated factors in admitting at least one wrongdoing, 2024* (2)

No.	Factors	P1 = proportion of RMC among those responding 'Yes' to selected factors	P2 = proportion of RMC among those responding 'No' to selected factors	Sample size (n)
1	Inadequate knowledge of research ethics	64.9%	46.7%	254
2	Inability to correctly identify all listed criteria for ethical research	62.7%	40.8%	180
3	Ranks below senior lecturer	31.9%	10.0%	124

Thus, the largest sample size was determined to be $n_0 = 383$. Since this exceeds 5% of the total population (836 * 0.05 = 42), the final sample size was adjusted using Cochran's correction formula, as outlined in reference (50).

$$n_1 = \frac{n0}{1 + \frac{n0}{N}} \quad (4.2)$$

Where,

- ✓ n_0: the initial sample size = 383
- ✓ n_1: final sample size, due to the initial sample size being > 5% of the population
- ✓ N: total population = 836

By substituting the values into the correction formula (4.2) provided above, the minimum sample size (adjusted) was determined to be 263.

$$n_1 = \frac{383}{1+\frac{383}{836}} = 263$$

Bartlett et al. recommended using response rates from previous studies of the same or similar populations to address non-response rates. Therefore, adjusting for a response rate of 88.7% from a prior study in Nigeria, the final sample size was calculated as n_1= 263/0.887 = **297** (51).

Table 2 *Sample proportion for each school in college of health sciences, 2024*

Schools	**Number**	**Sample proportion**
Clinical Schools	675	240
Non-clinical Schools	161	57
Total	**836**	**297**

4.5.2. Sampling procedure

We used a probability sampling approach to select respondents, employing a lottery method to ensure random selection and representativeness of our sample. Some participants were unavailable during data collection, so we replaced them with other available individuals using the same random selection process. This approach maintained the randomness and representativeness of our sample. The sample size of 297 was distributed across each school based on the proportionate population size in each of the four disciplines, considering individuals with at least one publication. Each department's share was calculated by dividing 297 by the total population of 836 and multiplying by 0.35. Study units were then selected from each department using a simple random sampling procedure. This sampling procedure is illustrated schematically in Figure 2.

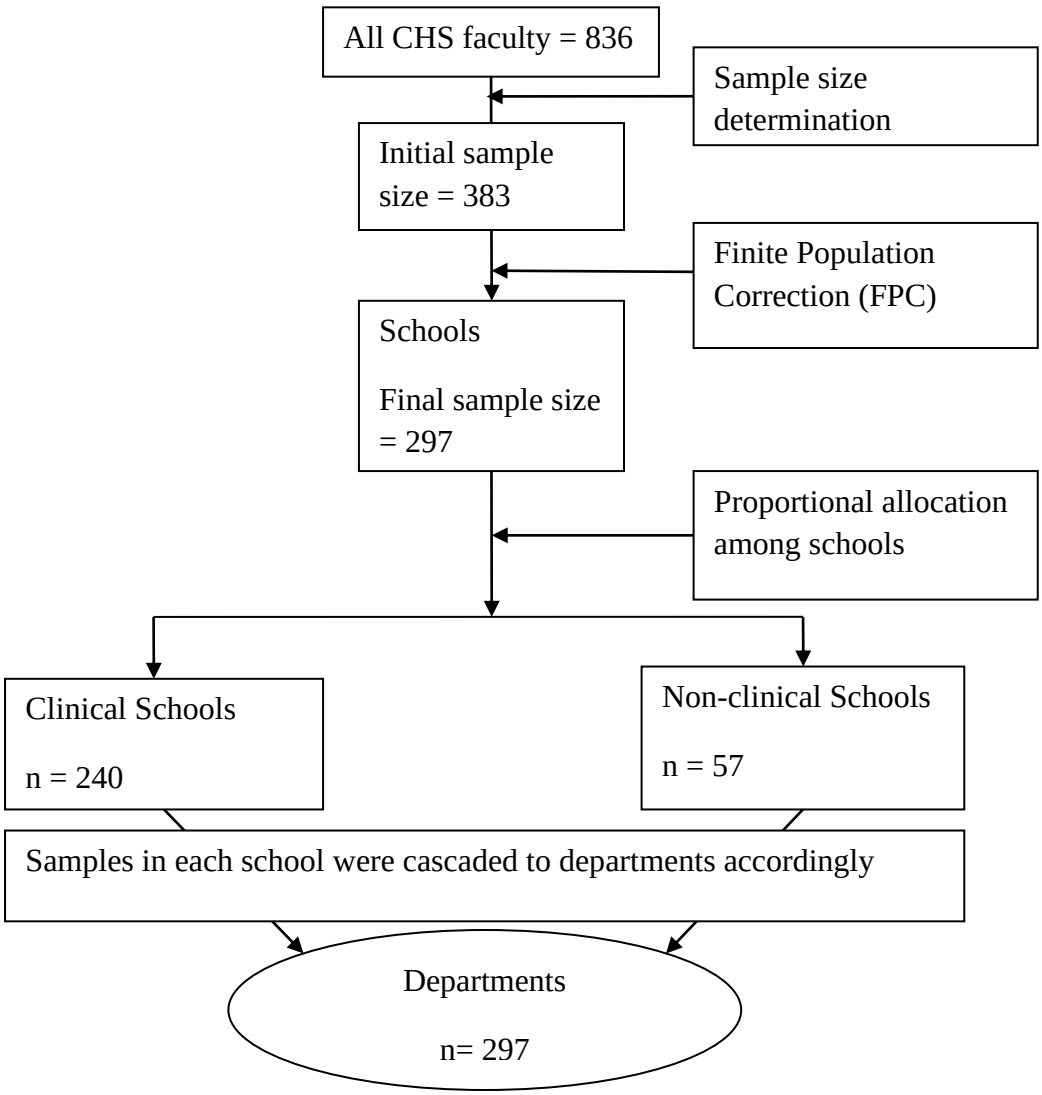

Figure 2 Schematic presentation of sampling procedure

4.6.Variables of the study

4.6.1. Independent variables

- **Baseline characteristics**: sex, academic position, highest degree earned, prior training on research ethics.
- **Behavioral influences (Factors)**: pressure from funders, need for recognition, publication pressure, unclear definition of what constitutes misconduct, insufficient censure for misconduct, and financial conflict of interest.

4.6.2. Dependent variables

- **RMC**: circumventing RE regulations, plagiarism, and fabrication and falsification
- **QRPs**: authorship misconduct and conflict of interest

4.7.Measurement and instruments

The questionnaire was structured into four sections based on the study participants' demographic information, general attitudes toward responsible conduct of research, influencing factors on behavior, and self-reported frequency of engaging in research misconduct. Instances of research misconduct were categorized into five composite categories: circumventing research ethics regulations, fabrication and falsification, plagiarism, authorship misconduct, and conflict of interest. The questionnaire was adapted from a study titled "Reliability and validation of an attitude scale regarding responsible conduct in research" conducted among researchers in the Middle East. The original study reported a Cronbach's alpha of 0.75, indicating good reliability. Additionally, the tool's validity was assessed through measures of convergent and concurrent validity (30). Given that the survey respondents were educated and involved in research, the questionnaire was administered in English.

4.8.Operational definitions

- In this study, "**Research Misconduct (RMC)**" encompasses actions such as circumventing research ethics regulations, plagiarism, fabrication, and falsification. Participants' responses are classified as either "Never" or "One or more times," with those answering "One or more times" regarded as having engaged in the specified RMC (18).
  - ✓ **Circumventing RE regulations**: Conducting research involving human participants without prior approval from a REC, not obtaining proper informed consent from participants, and use of confidential information about research participants without their authorization.
  - ✓ **Plagiarism**: is publishing results that belong to someone else, using someone else's words or ideas without giving proper credit, and submitting a manuscript to a journal that was already published in another Journal.
  - ✓ **Fabrication**: defined as making up research data and reporting them.
  - ✓ **Falsification**: changing research data and dropping "outliers" without mentioning, and selecting only those data that support researcher's hypothesis.

- In this study, "**Questionable Research Practices (QRPs)**" are defined as including authorship issues and conflicts of interest. Participant responses are grouped into two categories: "Never" and "One or more times." Those who indicate "One or more times" are deemed to have engaged in the specified QRP (18).
    - ✓ **Authorship misconduct**: is defined as giving authorship to someone who has not made a substantive contribution and/or allowing one's name to be put on papers with little or no contribution, and denying authorship credit to someone who has made a substantive contribution.
    - ✓ **Conflict of interest**: is aware of a conflict of interest but failed to disclose it, compromising the rigor of a study's design or methodology and inappropriately altering or suppressing research results in response to pressure from a commercial or not-for-profit funding source.
    - ✓ In this study, "Overall Research Misconduct (Overall RMC)" is defined as including both RMC and QRPs (18).
- In this study, **Attitude toward Responsible Conduct of Research** is assessed using a five-point Likert scale that ranges from strongly agree to strongly disagree. Responses were categorized as either "favorable" or "unfavorable" based on their mean score (18).

4.9.Data collection procedure

Data collection occurred from January 22 to March 8, 2024, utilizing a paper-based, self-administered questionnaire. Facilitators' role was limited to distributing and collecting the questionnaires, ensuring participants' confidentiality and privacy. Secretaries from each department were recruited and trained in questionnaire distribution and collection, emphasizing the importance of maintaining participants' anonymity and confidentiality due to the sensitive nature of the study topic.

4.10. Quality assurance

Data quality was ensured by employing standardized and reliable data collection tool and techniques. A previously validated questionnaire, whose factor structure had been established through exploratory factor analysis in earlier research, was utilized (30). Furthermore, to uphold methodological rigor, the principal investigator conducted a comprehensive two-day training session for data collectors and supervisors. This training covered the study's objective, data

collection procedures, and ethical considerations. Before commencing the actual data collection, the tool was pretested at a non-sampled university to assess its reliability, which was confirmed to be satisfactory. Throughout the data collection phase, immediate supervisors in the field and the principal investigator reviewed all collected data for completeness and consistency. Data entry was performed using Epi Data version 3.1 by the principal investigator. Prior to analysis, the principal investigator conducted checks for missing values and outliers to further ensure data quality and reliability.

4.11. Data management and analysis

Respondents were asked about the frequency of various misconduct behaviors, with response options including "Never," "Once or twice," or "Three or more times" for self-reported misconduct (RMC, QRPs, & Overall RMC). To ensure suitable categorization and sufficient data for analysis, these responses were transformed into dichotomous choices: "Never" and "One or more times" (52). Each type of self-reported misconduct was individually measured and categorized into one of the previously mentioned five research misconduct composites. Additionally, the magnitude of self-reported misconduct was calculated for each composite category.

Data from paper questionnaires were collected, entered into Epi-Data 3.1, and subsequently transferred to SPSS version 27. Descriptive analyses summarized demographic frequencies and percentages. Bivariate analysis was utilized to explore relationships between the composite scores of misconducts and factors such as age, gender, prior ethics training, graduate school attended, and academic position.

For composite scores, multivariable analysis models were constructed. Independent variables identified as significant in bivariate analysis at a p-value threshold of 0.25 were included in the binary logistic regression model. This approach ensures that relevant factors are not overlooked, which can happen when using stricter thresholds like 0.05 in logistic regression modeling (53). A p-value < 0.05 was considered significant for covariates in the final multivariate analysis. Odds ratios (OR) with confidence intervals (CI) and corresponding p-values were calculated.

Regarding "attitude" items, responses were corded on a five-point Likert scale ranging from strongly agree to strongly disagree. Responses of "strongly agree" and "agree" were grouped

together as "favorable," while the remaining responses were categorized as "unfavorable". Descriptive analysis summarized the distribution of responses between these two categories (18). Furthermore, crosstab was employed to summarize the relationships between favorable and unfavorable attitudes and misconduct composites.

4.12. Ethical considerations

Prior to filling out the questionnaire, participants were informed of the study's purpose via a one-page information sheet and written informed consent. Due to the sensitive nature of the data acquired and the possibility for dignitary harm, the name of the institution was blinded and the names of schools were anonymized. The self-administered questionnaire had not included any questions about personal identifiers that could potentially reveal participants' identities, and questionnaires were collected in such a way that no third party or even the researchers could link specific respondents to completed questionnaires in order to ensure complete anonymity. The research ethics committee of the institution had issued ethical clearance prior to data collection with reference number SPH/296/2024. As detailed in the accompanying information sheet, participants were informed that no incentives or direct benefits were provided for their participation, and they were informed that the study's findings would be disseminated to relevant stakeholders. Respondents were not obligated to answer questions and could withdraw from the study at any time without consequence. Participants who chose not to participate were assured that their decision would not result in any harm.

4.13. Dissemination plan

The study results will be shared with the institution and submitted for publication in national and international journals, ensuring the confidentiality and anonymity of both participants and the institution. Additionally, the findings will be presented at various workshops and peer conferences.

5. RESULT

5.1.Participants' baseline information

A total of 297 questionnaires were distributed, with 244 completed, resulting in 82% response rate. Table 3 shows the demographic and professional characteristics of participants in the present study. Almost half of the participants (49.6%) ranged in age from 25 to 34 years. Male participants comprised 66.8%, while females made up 33.2%. More than half (50.8%) were Assistant Professors, and lecturers accounted for 29.1%. Additionally, 49.6% of participants held MD/PhD degrees, while 31.1% held M.Sc./MPH/other degrees. Most participants (90.2%) received their most recent degree from Ethiopian universities. In terms of school affiliation, 78.3% were from clinical schools.

The proportion of individuals with prior research ethics training was 66.0%. Most participants (59.0%) had 1-5 years of research experience, while 19.3% had over 10 years. In terms of publication history, 55.7% had published 1-5 papers, and 26.2% had published more than 10. In their most recent publication, 61.1% were co-authors, and 38.9% were first authors.

Table 3 *Sociodemographic Characteristics of participants at Baseline, 2024 (n = 244)*

Characteristic		**n (%)**
Age	25-34	121 (49.6)
	35-44	85 (34.8)
	45-54	21 (8.6)
	55-64	11 (4.5)
	65 and over	6 (2.5)
Sex	Male	163 (66.8)
	Female	81 (33.2)
Academic position (Rank)	Lecturer	71 (29.1)
	Assistant Professor	124 (50.8)
	Associate Professor	17 (7.0)
	Professor	8 (3.3)
	Other (Research Assistant & Technician	24 (9.8)
Highest Degree Earned	Bsc degree	12 (4.9)
	MSc/MPH/other degree	76 (31.1)
	MD/PhD	121 (49.6)
	Post-doctoral/Sub-specialty	35 (14.3)
Place of recent degree earned	Ethiopia	220 (90.2)
	Abroad	24 (9.8)

Prior training on research ethics	Yes	161 (66.0)
	No	83 (34.0)
Experience in conducting research (years)	1-5	144 (59.0)
	6-10	53 (21.7)
	>10	47 (19.3)
Number of publications	1-5	136 (55.7)
	6-10	44 (18.0)
	>10	64 (26.2)
Role in the last publication	First author	95 (38.9)
	Co-author	149 (61.1)
School	Clinical schools	191 (78.3)
	Non-clinical schools	53 (21.7)

5.2. Respondents' Self-Report of Misbehaviors

As shown in Table 4, the frequency and percentage of occurrences of misconduct composite and associated misbehaviors reported by respondents are broken down by category. Key findings for the study can be summed up as follows.

5.2.1. RMC related misbehaviors

According to the study, 17.2% of respondents did not obtain proper informed consent, and 14.8% used confidential information without authorization. Regarding plagiarism, 20.9% used others' ideas without credit, 10.7% submitted a manuscript to multiple journals, and 9.4% published others' results. For fabrication and falsification, 15.2% fabricated data, 14.3% altered data without disclosure, 26.2% selected data to support hypotheses, and 23.0% dropped outliers without mentioning.

5.2.2. QRPs related misbehaviors

Among respondents, authorship misconduct was prevalent, with 37.3% giving authorship to those who contributed minimally and 23.0% allowing their name to appear on papers where they contributed little. There was also a significant conflict of interest, with 17.6% failing to disclose conflicts, 13.1% compromising study rigor as a result of funding pressure, and 7.8% altering or suppressing research results inappropriately as a result of funding pressure.

Table 4 *Respondents' self-report of misbehaviors grouped within defined misconduct composites (n = 244)*

Misconduct composite and associated misbehaviors	n (% of total) Never	n (% of total) One or more times
Circumventing RE regulations		
Conducting research involving human participants without prior approval from a Research Ethics committee	214 (87.7)	30 (12.3)
Not obtaining proper informed consent from participants	202 (82.8)	42 (17.2)
Use of confidential information about research subjects without their authorization	208 (85.2)	36 (14.8)
Plagiarism		
Publishing results that belong to someone else	221 (90.6)	23 (9.4)
Using someone else's words or ideas without giving proper credit	193 (79.1)	51 (20.9)
Submitting a manuscript to a journal that you already published in another Journal	218 (89.3)	26 (10.7)
Fabrication and falsification		
Making up research data (fabrication)	207 (84.8)	37 (15.2)
Changing research data without mentioning it	209 (85.7)	35 (14.3)
Dropping "outliers" without mentioning it	188 (77.0)	56 (23.0)
Selecting only those data that support your hypothesis	180 (73.8)	64 (26.2)
Authorship misconduct		
Giving authorship to someone who has not made a substantive contribution	153 (62.7)	91 (37.3)
Denying authorship credit to someone who has made a substantive contribution	223 (91.4)	21 (8.6)
Allowing your name to be put on papers to which you have made little contribution	188 (77.0)	56 (23.0)
Conflict of interest		
Aware of a conflict of but failed to disclose it	201 (82.4)	43 (17.6)
Compromising the rigor of a study's design or methodology in response to pressure from a commercial or not-for-profit funding source	212 (86.9)	32 (13.1)
Inappropriately altering or suppressing research results in response to pressure from a commercial or not-for-profit funding source	225 (92.2)	19 7.8)

5.3. Attitudes Regarding Certain Issues in Responsible Conduct in Research

The result revealed a strong consensus among participants on the importance of addressing research misconduct, reporting unethical behavior, declaring conflicts of interest, and mentoring trainees. However, there was a clear discomfort in discussing ethical issues, which could impede efforts to improve research integrity (see Table 5).

Table 5 *Attitudes regarding Certain Issues in Responsible Conduct of Research among Public University Researchers, Ethiopia, 2024 (n = 244)*

Question	n (% of Total) Strongly agree	n (% of Total) Agree	n (% of Total) Neutral	n (% of Total) Disagree	n (% of Total) Strongly disagree
I am concerned about the amount of misconduct	84 (34.4)	110 (45.1)	34 (13.9)	13 (5.3)	3 (1.2)
The responsibility for the scientific integrity of a study lies with the principal investigator only	16 (6.6)	34 (13.9)	22 (9.0)	90 (36.9)	82 (33.6)
Investigators should report instances of research misconduct	134 (54.9)	94 (38.5)	9 (3.7)	4 (1.6)	3 (1.2)
Investigators should declare conflicts of interest to the appropriate officials	154 (63.1)	76 (31.1)	10 (4.1)	-	4 (1.6)
I should monitor my trainees' work to ensure that they are developing into responsible researchers	162 (66.4)	73 (29.9)	7 (2.9)	-	2 (0.8)
I feel uncomfortable talking with fellow researchers about ethical behavior	21 (8.6)	33 (13.5)	33 (13.5)	89 (36.5)	68 (27.9)

5.4.Perceived Influences of Factors on Issues in Responsible Conduct of Research

Table 6 shows participants perception toward RCR. Concerning publication pressure, 56.1% considered it moderately influencing while 34.4% considered it strongly influencing. Participants perceived that financial conflicts of interest play a role in RMC, with 46.3% believing it had some influence, while a similar proportion (45.9%) perceived it had strong influence. Regarding pressure from funders, 45.5% of participants perceived it had some influence while 39.3% viewed it had strong influence. Insufficient censure of misconduct was viewed as an influence in committing research misconduct, with 54.9% believed it has some influence, while 34.4% perceived it has a strong influence. In summary, based on the results, participants overwhelmingly believed that these factors had some influence on researchers' misconduct, although to varying degrees.

Table 6 *Perceived Influences of Factors on Issues in Responsible Conduct of Research in a Public University, Ethiopia, 2024 (n = 244)*

	n (% of Total) No influence	n (% of Total) Some influence	n (% of Total) Strong influence
Publication pressure	23 (9.4)	137 (56.1)	84 (34.4)
Financial conflict of interest	19 (7.8)	113 (46.3)	112 (45.9)
Pressure from funders	37 (15.2)	111 (45.5)	96 (39.3)
Need for recognition	25 (10.2)	132 (54.1)	87 (35.7)
Insufficient censure for misconduct	26 (10.7)	134 (54.9)	84 (34.4)

5.5.Self-report of at least one misconduct for each composite

As shown in Table 7, authorship misconduct was the most common type of misconduct, with 47.5% of participants admitting to it, 95% CI [41.1%, 54.0%]. Falsification was the second most reported, with 38.9% of respondents admitting involvement, 95% CI [32.8%, 45.4%]. Fabrication was the least frequently reported misconduct at 15.2%, 95% CI [10.9%, 20.3%].

Table 7 *Self-report of at least one misconduct for each composite in a Public University, Ethiopia, 2024 (n = 244)*

Misconduct composite	**n (%)**
Circumventing research ethics regulations	71 (29.1)
Plagiarism	65 (26.6)
Fabrication	37 (15.2)
Falsification	95 (38.9)
Authorship misconduct	116 (47.5)
Conflict of interest	62 (25.4)

5.6.Self-report of at least one misconduct for misconduct totals

Table 8 provides a summary of self-reported RMC, QRPs, and overall misconduct. The findings reveal that 38.9% of respondents admitted to engaging in RMC, 95% CI [32.8%, 45.4%], while 28.3% reported QRPs, 95% CI [22.7%, 34.4%]. Regarding overall misconduct, which includes both RMC and QRPs, 37.7% of respondents reported at least one instance, 95% CI [31.6%, 44.1%].

Table 8 *Self-report of at least one misconduct for Misconduct Totals in a Public University, Ethiopia, 2024 (n = 244)*

Overall misconduct	**n (%)**
Research misconduct total	95 (38.9)
Questionable research practices total	69 (28.3)
Overall misconduct (Any misconduct within any composite)	92 (37.7)

5.7.Attitudes Towards Responsible Conduct of Research and Self-Reported Involvement in Research Misconduct

The crosstab in Table 9 reveals that self-reported involvement in research misconduct is closely linked to unfavorable attitudes towards the responsible conduct of research. Overall, 61.1%, 95% CI [54.6%, 67.2%] of participants had a favorable attitude towards RCR. Specifically, those who never engaged in misconduct tend to have more favorable attitudes towards RCR, with percentages ranging from 54.4% to 88.6%. In contrast, those who engaged in misconduct one or more times exhibit higher rates of unfavorable attitudes, with percentages ranging from 48.4% to 78.9%.

Table 9 *Attitudes Towards Responsible Conduct of Research and Self-Reported Involvement in Research Misconduct in a Public University, Ethiopia, 2024 (n = 244)*

Variables	Categories	Attitude	
		Favorable n (%)	Unfavorable n (%)
CRE	Never	116 (77.9)	57 (60.0)
	One or more times	33 (22.1)	38 (40.0)
Plagiarism	Never	113 (75.8)	66 (69.5)
	One or more times	36 (24.2)	29 (30.5)
Fabrication	Never	132 (88.6)	75 (78.9)
	One or more times	17 (11.4)	20 (21.1)
Falsification	Never	100 (67.1)	49 (51.6)
	One or more times	49 (32.9)	46 (48.4)
Authorship misconduct	Never	81 (54.4)	47 (49.5)
	One or more times	68 (45.6)	48 (50.5)
Conflict of interest	Never	122 (81.9)	60 (63.2)
	One or more times	27 (18.1)	35 (36.8)
RMC	Never	102 (68.5)	47 (49.5)
	One or more times	47 (31.5)	48 (50.5)
QRP	Never	116 (77.9)	59 (62.1)
	One or more times	33 (22.1)	36 (37.9)
Overall misconduct	Never	105 (70.5)	47 (49.5)
	One or more times	44 (29.5)	48 (50.5)

5.8. Factors Associated with RMC Composites

Table 11 shows that, after purposeful selection of variables in bivariate analysis, covariates with the cutoff value of p <.25 were selected for the multivariate analysis (53). A logistic regression model was used to assess the relationship between RMC composites (circumventing research ethics regulations (CRE), plagiarism, fabrication, and falsification (FF), authorship misconduct, conflict of interest (COI), Research Misconduct-Total, and overall RMC (RMC and QRPs)) and

the predictor variables selected in the bivariate analysis. We measured the logistic regression model's goodness of fit. The model's accuracy rate was improved when specific predictor variables were included for each composite above.

The Omnibus Test of Model Coefficients measures the model's ability to predict the outcome variable significantly. The model exhibits significant prediction performance at the 0.05 level for all of the criterion variables listed above, indicating that it is statistically significant. Alternatively, the Hosmer and Lemeshow Test compares observed and predicted values to see if the model fits the data correctly. Furthermore, for the composites listed above, the model has good fit because the Hosmer and Lemeshow test failed to reject the model appropriateness hypothesis ($p > 0.05$), showing adequate model fit.

Rank in academia, age, and attitude toward scientific integrity are all significant predictors of circumventing research ethics regulations (CRE). Thus, respondents with a lecturer rank or higher have a 53.3% lower likelihood of CRE than those with a lower rank [($p < 0.029$, AOR = 0.467, 95% CI: 0.235, 0.926)]. The likelihood of CRE is 75.1% lower for older participants (35 and above) [($p < 0.001$, AOR = 0.249, 95% CI: 0.112, 0.555)]. Regarding attitude towards responsibility for scientific integrity, participants who disagree have a 77.0% less likelihood of CRE than participants who agree that scientific integrity is primarily the responsibility of the PI [($p < 0.001$, AOR = 0.230, 95% CI: 0.108, 0.492)].

Table 10 *Bivariate and Multivariate Analysis to Identify Factors Associated with misbehaviors among Researchers in Public University in Ethiopia, 2024 (n = 244)*

Variables	**Categories**	**RMC Composites**		**COR (95% CI)**	**AOR (95% CI)**
		Never n (%)	**One or more times n (%)**		
Academic rank vs. **CRE**	Below lecturer	54 (31.2)	41 (57.7)		1
	Above lecturer	119 (68.8)	30 (42.3)	.332 (.188, .587)	.467 (.235, .926)*
Academic rank vs. **Plagiarism**	Below lecturer	57 (31.8)	38 (58.5)		1
	Above lecturer	122 (68.2)	27 (41.5)	.332 (.185, .596)	.354 (.194, .648)*
Academic rank vs **FF**	Below lecturer	46 (31.7)	49 (49.5)		1
	Above lecturer	99 (68.3)	50 (50.5)	.474 (.280, .803)	.499 (.288, .863)*
Academic rank vs **RMC-Total**	Below lecturer	47 (31.5)	48 (50.5)		1
	Above lecturer	102 (68.5)	47 (49.5)	.451 (.266, .767)	.475 (.271, .832)*
School affiliation vs **Overall RMC**	Non-clinical	40 (26.3)	13 (14.1)		1
	Clinical	112 (73.7)	79 (85.9)	2.170 (1.090, 4.322)	2.063 (1.014, 4.197)*
School affiliation vs. **Plagiarism**	Non-clinical	47 (26.3)	6 (9.2)		1

	Clinical	132 (73.7)	59 (90.8)	3.501 (1.419, 8.641)	3.457 (1.372, 8.715)*
School affiliation vs **FF**	Non-clinical	39 (26.9)	14 (14.1)		1
	Clinical	106 (73.1)	85 (85.9)	2.234 (1.138, 4.383)	2.153 (1.074, 4.316)*
School affiliation vs **CoI**	Non-clinical	46 (25.3)	7 (11.3)		1
	Clinical	136 (74.7)	55 (88.7)	2.658 (1.131, 6.247)	2.597 (1.082, 6.235)*
School affiliation vs **RMC-Total**	Non-clinical	42 (28.2)	11 (11.6)		1
	Clinical	107 (71.8)	84 (88.4)	2.997 (1.455, 6.175)	2.847 (1.347, 6.021)*
Publication pressure vs. **Overall RMC**	No influence	19 (12.5)	4 (4.3)		1
	Influences	133 (87.5)	88 (95.7)	3.143 (1.034, 9.549)	3.180 (1.017, 9.946)*
Publication pressure vs. **FF**	No influence	19 (13.1)	4 (4.0)		1
	Influences	126 (86.9)	95 (96.0)	3.581 (1.180, 10.874)	3.971 (1.262, 12.493)*
Publication pressure vs. **RMC-Total**	No influence	19 (12.8)	4 (4.2)		1
	Influences	130 (87.2)	91 (95.8)	3.325 (1.095, 10,099)	3.578 (1.123, 11.404)*
Attitude towards declaring CoI vs. **Overall RMC**	Agree	147 (96.7)	83 (90.2)		1
	Disagree	5 (3.3)	9 (9.8)	3.188 (1.034, 9.828)	4.609 (1.228, 17.294)*

Attitude towards responsibility for scientific integrity lies solely with PI vs. **Overall RMC**	Agree	24 (15.8)	26 (28.3)		1
	Disagree	128 (84.2)	66 (71.7)	.476 (.254, .893)	.436 (.225, .845)*
Attitude towards responsibility for scientific integrity lies solely with PI vs. **CRE**	Agree	25 (14.5)	25 (35.2)		1
	Disagree	148 (85.5)	46 (64.8)	.331 (.163, .593)	.230 (.108, .492)*
Attitude towards responsibility for scientific integrity lies solely with PI vs. **FF**	Agree	22 (15.2)	28 (28.3)		1
	Disagree	123 (84.8)	71 (71.7)	.454 (.242, .852)	.476 (.245, .927)*
Attitude towards responsibility for scientific integrity lies solely with PI vs. **Authorship RMC**	Agree	19 (14.8)	31 (26.7)		1
	Disagree	109 (85.2)	85 (73.3)	.478 (.253, .904)	.397 (.201, .782)*
Attitude towards responsibility for scientific integrity lies solely with PI vs. **CoI**	Agree	30 (16.5)	20 (32.3)		1
	Disagree	152 (83.5)	42 (67.7)	.414 (.214, .803)	.440 (.221, .875)*
Attitude towards the amount of misconduct vs. **Plagiarism**	Agree	135 (75.4)	59 (90.8)		1
	Disagree	44 (24.6)	6 (9.2)	.312 (.126, .772)	.359 (.142, .910)*
Age vs. **CRE**	Younger (25-34)	73 (42.2)	48 (67.6)		1
	Older (35 & above)	100 (57.8)	23 (32.4)	.350 (.196, .626)	.249 (.112, .555)*
Age vs. **Authorship RMC**	Younger (25-34)	66 (51.6)	55 (47.4)		1

	Older (35 & above)	62 (48.4)	61 (52.6)	1.181 (.714, 1.952)	.490 (.245, .980)*
Education level vs. **COI**	Undergraduate	4 (2.2)	8 (12.9)		1
	Graduate	178 (97.8)	54 (87.1)	.152 (.044, .523)	.158 (.043, .572)*
Research experience vs. **Authorship RMC**	1-5 years	80 (62.5)	64 (55.2)		1
	>5 years	48 (37.5)	52 (44.8)	1.354 (.812, 2.259)	2.134 (1.031, 4.416)*

1 = indicates reference group, *Significant association at $p < 0.05$, AOR: Adjusted odds ratio, COR: Crude odds ratio

The composite plagiarism is highly influenced by academic level, attitude toward misconduct, and school affiliation. Participants above lecturer rank are 64.6% less likely to participate in plagiarism than those below lecturer rank [($p < 0.001$, AOR = 0.354, 95% CI: 0.194, 0.648)]. Participants who agree with the statement that they are concerned about wrongdoing are 64.1% less likely to commit plagiarism than those who disagree [($p < 0.031$, AOR = 0.359, 95% CI: 0.142, 0.910)]. Researchers in clinical schools are around four times as likely to plagiarize as those in non-clinical schools [($p < 0.009$, AOR = 3.457, 95% CI: 1.372, 8.715)].

Academic rank, attitude toward scientific integrity, perceived publication pressure, and school affiliation are all strong predictors of composite fabrication and falsification. Participants above the position of lecturer are substantially less likely to fabricate or falsify than those below it [($p < 0.013$, AOR = 0.499, 95% CI: 0.288 - 0.863)]. Participants who disagree with a belief that scientific integrity is primarily the responsibility of the Principal Investigator (PI) are less likely to fabricate or falsify data [($p < 0.029$, AOR = 0.476, 95% CI: 0.245, 0.927)]. When participants view pressure to publish as influential, they are significantly more likely to fabricate and falsify [($p < 0.018$, AOR = 3.971, 95% CI: 1.262, 12.493)]. Researchers in clinical schools are twice as likely as their non-clinical counterparts to make up or falsify their findings [($p < 0.031$, AOR = 2.153, 95% CI: 1.074, 4.316)].

With regard to authorship misconduct, research experience and attitude toward scientific integrity have significant associations. Participants with more than 5 years of research experience are twice as likely to engage in authorship misconduct as those with fewer than 5 years of experience [($p < 0.041$, AOR = 2.134, 95% CI: 1.031, 4.416)]. Participants who disagree that the Principal Investigator (PI) is fully responsible for scientific integrity are around 60.3% less likely to commit authorship misconduct [($p < 0.008$, AOR = 0.397, 95% CI: 0.201, 0.782)].

Education level, attitude toward scientific integrity, and school affiliation all have a significant association with the composite conflict of interest (COI) among study participants. Participants with a postgraduate degree are 84.2% less likely than those with first degree to engage in a conflict of interest [($p < 0.005$, AOR = 0.158, 95% CI: 0.043, 0.572)]. Participants who disagreed that the PI was solely responsible for scientific integrity were 56.0% less likely to engage in conflicts of interest than those who agreed [($p < 0.019$, AOR = 0.440, 95% CI: 0.221, 0.875)]. Clinical school researchers are about three times more likely to be involved in conflicts

of interest than non-clinical school researchers [($p < 0.033$, AOR = 2.597, 95% CI: 1.082, 6.235)].

Academic rank, perceived publication pressure, and school affiliation all contribute to RMC Total (FFP). Participants above the lecturer rank are less likely to engage in RMC than those below it [($p < 0.009$, AOR = 0.475, 95% CI: 0.271, 0.832)]. Participants who view publication pressure as influential are roughly four times more likely to engage in RMC than those who do not [($p < 0.031$, AOR = 3.578, 95% CI: 1.123, 11.404)]. Researchers in clinical schools are around three times more likely to commit RMC than researchers in non-clinical schools [($p < 0.006$, AOR = 2.847, 95% CI: 1.347, 6.021)].

Furthermore, the study found that school affiliation, publication pressure, attitude toward scientific integrity, and attitude toward disclosing conflicts of interest all have statistically significant relationships with overall RMC score (RMC + QRPs) with ($p < .046$, $p < .047$, $p < .014$, & $p < .024$), respectively. Researchers from clinical schools are twice as likely to commit overall RMC as those from non-clinical schools [AOR = 2.063; 95% CI (1.014, 4.197)]. The likelihood that participants feel publication pressure and believe it is influential in involving them in overall RMC is three times more than that of participants who experience no pressure to publish at all [AOR = 3.180; 95% CI (1.017, 9.946)]. Respondents who disagree that the principal investigator bears sole responsibility for scientific integrity are less likely to engage in research misconduct [AOR = .436; 95% CI (.225, .845)]. When compared to those who agree, participants who disagree that PIs should report conflicts of interest to the relevant authorities are roughly five times more likely to be involved in the overall RMC [AOR = 4.609; 95% CI (1.228, 17.294)].

6. DISCUSSION

The results of this study emphasize the significance of maintaining integrity in research and RCR within health-related fields. As the first investigation of its kind in Ethiopia, this study revealed significant occurrences of RMC, including data manipulation, selective reporting, and intellectual theft, which threaten the trustworthiness and reliability of research. By systematically analyzing these occurrences, the study highlights the pervasive nature of such unethical practices and their detrimental impact on public trust in health research. These results prompt an urgent call for reinforced ethical standards and robust oversight mechanisms to ensure the integrity of future research endeavors. The discussion will examine the interpretations of these findings, suggest possible measures to reduce misconduct, and highlight the importance of education and policy in promoting a culture of ethical research practices.

As noted by Felaefel et al., comparing misconduct rates across studies is challenging due to differences in study methodologies and operational definitions of misconduct (18). Variations in researchers' awareness and reporting methods also affect the magnitude estimates of RMC and QRPs. Despite these inconsistencies, certain patterns are evident, such as the common occurrence of fabrication and falsification, with our study reporting a higher magnitude, similar to findings from studies conducted in Kenya and the Middle East (18,27).

Our study identified a significant magnitude of research misconduct among participants, though it was comparatively lower than findings reported in studies from Nigeria, Kenya, and the Middle East (17,18,27). The variability in reported rates of misconduct across different studies can be attributed to several factors. Firstly, variations in sample sizes impact statistical power and result variability, potentially influencing the observed magnitude of misconduct. Secondly, differences in participants' levels of research experience and education may affect their understanding of what constitutes misconduct and their susceptibility to engaging in such behaviors (4). This is demonstrated in our study by the fact that the majority of participants had fewer than five years of experience in research and were more likely to engage in research misconduct compared to their senior colleagues. Finally, the Singapore statement on integrity in research highlights the importance of considering cultural and institutional contexts in promoting research integrity and understanding the variability in reporting and actual rates of research misconduct across different settings (54).

The multivariable analysis showed that publication pressure significantly associated with overall research misconduct. Pressure to meet publication targets may lead researchers to compromise ethics or engage in unethical practices. This finding aligns with the "publish or perish" culture in academia, which continuously pressures scholars to produce scholarly output. Current academic rules and regulations, such as those outlined by the Ethiopian Ministry of Education, impose publication quotas on academic staff (46). Similarly, the CIOMS guideline on good governance practices for research institutions (2023) affirms that a "publish or perish" mentality increases the likelihood of scientific misconduct (48). Our results are also in line with earlier investigations that identified publication pressure as a strong predictor of research misconduct (17,18,27,47,55–58).

There was a negative association between participants' age and involvement in misconduct, indicating that older participants were less likely to circumvent research ethics regulations compared to younger ones. This finding aligns with previous studies conducted in the Middle East and the U.S.A (18,55)**.** Conversely, participants with more research experience or publications were twice as likely to engage in authorship misconduct as those with fewer years of experience. This suggests that as researchers gain more experience, the likelihood of committing misconduct, such as authorship wrongdoing, increases. Therefore, it is reasonable to conclude that the likelihood of committing authorship misconduct is higher for more experienced researchers (55).

The present study's lack of statistical significance between prior ethics training and research misconduct reflects a common pattern in the literature, which has produced conflicting findings about the effectiveness of ethics instruction. According to studies conducted by prominent scholars, training in research ethics, including RCR instructions, may not always have the expected impact on research behavior or ethical decision-making (5,40–45). Conversely, other studies have shown that prior ethics training strongly predicts lower research misconduct and benefits trainees (18,34–39). The inconsistent findings across studies highlight the complexities of research ethics training and suggest that traditional techniques may not always be adequate in addressing the multidimensional nature of research misconduct. Further exploration of the effectiveness of ethics training is crucial to understanding the underlying factors contributing to these inconsistencies.

The study may be limited by self-reporting biases, which are common in surveys addressing sensitive topics like research misconduct. Its cross-sectional design restricts the ability to establish causation between factors, necessitating caution in interpreting the findings. Furthermore, depending on self-reported data might lead to social desirability bias, leading participants to underreport or misrepresent their involvement in misconduct. As the first study of its kind in the country, there are no comparable studies for reference. Despite these limitations, the study's findings are crucial for guiding efforts to enhance research integrity and effectively combat misconduct.

Despite the valuable findings of this study, several questions remain unanswered, highlighting the need for further research. Although the study identified factors associated with research misconduct, the interactions and relative importance of these factors are still unclear. Future longitudinal studies could explore temporal associations to better understand the causal mechanisms behind research misconduct. Additionally, while this study used quantitative methods, qualitative methods might offer a more in-depth understanding of researchers' motivations and views regarding unethical behavior. The participants were primarily sampled from an academic institution, raising concerns about the generalizability of the findings to other types of research institutions. To address this limitation, future studies should include researchers from a wider range of sectors and geographical regions.

7. CONCLUSION AND RECOMMENDATIONS

7.1. Conclusion

As indicated by the higher magnitude of our findings, research misconduct often remains unnoticed or unaddressed, worsening its harmful effects on both the scientific community and society as a whole. It has profound implications, compromising the validity of scientific findings and eroding public trust in research. It distorts the evidence base needed for informed decision-making, potentially leading to harmful policy and clinical practices. Additionally, misconduct can result in significant financial losses and resource wastage, as well as damage the reputations of institutions and individuals involved. Ultimately, it hampers scientific progress and undermines the ethical foundations of research, which are essential for advancing public health and societal well-being.

7.2. Recommendations

- This study basically advises that the institution consider developing an all-encompassing policy against RMC & QRPs, which includes fabrication, falsification, and authorship misconduct in addition to plagiarism.

Furthermore, the following recommendations are forwarded:

- Our study revealed that participants exhibited discomfort in discussing ethical issues with colleagues, suggesting a need for fostering open dialogue to encourage researchers to freely address ethical concerns, thus enhancing transparency and accountability.
- Encourage collaborative research initiatives and interdisciplinary collaboration to reduce publication pressures and foster a culture of shared responsibility for research integrity.
- Develop systems for regularly monitoring publication procedures to ensure compliance with ethical standards, such as authorship guidelines.

Specific to RCR instructions, the following recommendations are forwarded:

- It is critical to reconsider the approach to research ethics training in light of the current study's result that it had no meaningful impact in preventing research misconduct despite the fact that many participants had prior training.

- To improve research ethics training within the institution, it is recommended that it be more targeted, participatory, and adapted to the needs of researchers. The training may include case studies, discussions of ethical dilemmas, and practical techniques for promoting research integrity.
- A refresher session or advanced training module may also serve to reaffirm ethical principles and keep researchers up to date on emerging research integrity challenges. Researchers can be better prepared to respect ethical norms and reduce misconduct risks if the institution enhances the quality and relevance of research ethics training.

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9. APPENDICES

9.1.Information sheet and consent form

Title: Magnitude and Factors Associated with Research Misconduct at Public University in Ethiopia: a Cross-Sectional Survey

Name of principal investigator: Habtamu Belay

Name of the organization: Addis Ababa University, College of Health Sciences, School of Public Health

Name of the Sponsor: Addis Ababa University

Instruction: The investigator developed this information sheet and consent form with the goal of studying the magnitude, attitudes, and associated factors about research misconduct among researchers at Public University in Ethiopia. The researcher is an MPH student in Health Research Ethics at Addis Ababa University's School of Public Health.

Purpose: The overall objective of this research is to assess the magnitude, attitudes, and associated factors regarding research misconduct among faculty researchers at a Public University in Ethiopia.

Procedure: In order to assess the magnitude, attitude, and factors regarding RMC, I call on your sincere cooperation and willingness to take part in this project. If you are willing to participate in this project, you need to understand and give written consent. Then, you will be asked to give your response by filling out the questionnaire yourself.

Why you are chosen: because you are a faculty member in the university's college of health sciences and involved in research prior to and during the study period.

Confidentiality: We will keep all information you provide us confidential to the best of our ability. Please keep in mind that the information gathered in this assessment will be utilized to inform program design, educational initiatives on research ethics, and institutional policy. Data in aggregate form can be shared through reports, websites, posters, conferences, and journals. Only anonymized and aggregated data will be shared.

Voluntary participation: Your participation in this study is entirely voluntary. You have the freedom to refuse to participate or to say no. Participation in this study is NOT a program requirement. If you agree to participate, you may change your mind and withdraw at any moment and this will not affect your status as a faculty member in your respective department.

Possible Risks/Discomforts: There are no known risks associated with this research. You can skip any questions you don't want to answer, and you can exit the survey at any point if answering any of the questions makes you feel uncomfortable.

Possible Benefits: There are no immediate benefits to taking part in this study. However, the information you will share with us, as well as information gathered from other study participants, may help the university and relevant stakeholders in designing educational initiatives related to research ethics as well as informing the formulation of a comprehensive research misconduct policy in academic and research institutions.

Compensation: We will not compensate you for participating in this survey.

Length of survey: Thank you in advance for taking the time to complete this survey. It will take you about 15-20 minutes to complete.

Should you have any concerns or questions, please contact the following:

Habtamu Belay - PI

AAU-CHS, SPH

yellowdavidstar@gmail.com

+251 913218408

IRERC of AAU-CHS

chs.irb@aau.edu.et.

+251 11896 1396

If you are clear with the information given and willing to participate in this study, you are kindly asked to sign the consent form attached below.

Consent Form

I am oriented about the objective of the study. I have been informed that all of my information will be kept confidential and used solely for this study. I have been well informed that the data collection is anonymous and a unique identifier will be used. I fully understand that I can participate in the study voluntarily and can refuse or withdraw anytime, or I can jump some questions about which I do not feel comfortable. I've also been told to take my time understanding the study and deciding whether or not to participate.

I certify that I have read and understood all the information in this consent form, including the nature and purpose, the potential benefits, and the possible risks associated with participating in this study.

Do you agree to participate?

□ Yes

□ No

Signature: _____

Date: _____

Name of data collector: _____

Signature: _____

Date: _____

9.2.Questionnaire

Magnitude and Factors Associated with Research Misconduct at a Public University in Ethiopia: a Cross-Sectional Survey

Section one: Baseline characteristics of the study participants

Code No.	Questions	Options	Remark
101	**Age**	1. 25-34 2. 35-44 3. 45-54 4. 55-64 5. 65 and over	
102	**Sex**	1. Male 2. Female	
103	**Academic position (Rank)**	1. Lecturer 2. Assistant Professor 3. Associate Professor 4. Professor 5. Other (Research Assistant & Technician)	
104	**Highest Degree Earned**	1. Undergraduate 2. MSc/MPH/other degree 3. MD/PhD 4. Post-doctoral/Sub-specialty	
105	**Place of recent degree earned**	1. Ethiopia 2. Abroad	
106	**Prior training on research ethics**	1. Yes 2. No	
107	**Experience in conducting research (years)**	1. 1-5 2. 6-10 3. >10	
108	**Number of publications**	1. 1-5 2. 6-10 3. >10	
109	**What was your role in the last publication**	1. First author (PI) 2. Co-author	

Section two: GENERAL ATTITUDES TOWARD RCR

Please indicate which option best represents your views and beliefs about research misconduct

Code No.	Attitudes	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
201	I am concerned about the amount of misconduct					
202	I think the responsibility for the scientific integrity of a study lies with the principal investigator only					
203	Investigators should report instances of research misconduct					
204	Investigators should declare conflicts of interest to the appropriate officials					
205	I should monitor my trainees' work to ensure that they are developing into responsible researchers					
206	I feel uncomfortable talking with fellow researchers about ethical behavior					

Section three: PERCEIVED INFLUENCES OF FACTORS ON ISSUES IN RCR

How much do you think each of the following contribute to RMC?

Code No.	Factors	No influence	Some influence	Strong influence
301	Publication pressure			
302	Financial conflict of interest			
303	Pressure from funders			
304	Need for recognition			
305	Insufficient censure for misconduct			

Section four: RESPONDENTS' SELF-REPORT OF THE FREQUENCY OF THEIR RESEARCH MISCONDUCT **(IN THE LAST FIVE YEARS)**

Have you ever been involved in:

Code No.	RCR practices			
Circumventing research ethics regulations:		**Never**	**Once or twice**	**Three or more**
401	Conducting research involving human participants without prior approval from a Research Ethics Committee			
402	Not obtaining proper informed consent from participants			
403	Use of confidential information about research subjects without their authorization			
Plagiarism:				
404	Publishing results that belong to someone else			
405	Using someone else's words or ideas without giving proper credit			
406	Submitting a manuscript to a journal that you already published in another Journal			
Fabrication and Falsifying:				
407	Making up research data (fabrication)			
408	Changing research data without mentioning it.			
409	Dropping "outliers" without mentioning it			
410	Selecting only those data that support your hypothesis			
Authorship misconduct:				
411	Giving authorship to someone who has not made a substantive contribution			
412	Denying authorship credit to someone who has made a substantive contribution			
413	Allowing your name to be put on papers to which you have made little or no contribution			
Conflict of interest:				
414	Aware of a conflict of interest but failed to disclose it			

415	Compromising the rigor of a study's design or methodology in response to pressure from a commercial or not-for-profit funding source			
416	Inappropriately altering or suppressing research results in response to pressure from a commercial or not-for-profit funding source			

Thank you for participating in this survey

9.3. Curriculum Vitae

HABTAMU BELAY HAILU

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Bishoftu

PERSONAL DETAILS

Date of Birth : 28/06/1982
Nationality : Ethiopian
Sex : Male

SKILLS

Empathy, Problem solving, Decision making, Team player, Basics of computer science and application (Word, Excel, Power Point and related), SPSS software, Teaching skill, Student guidance.

REFERENCE

Telahun Teka Wolde (MD, MPH) - "College of Health Sciences, AAU, Member, National Research Ethics Review Board, Senior National Advisor: Bioethics, Ministry of Education "
Professor of Pediatrics and Bioethics (Adjunct)
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Assistant Professor of Water and Public Health
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ACHIEVEMENTS & AWARDS

Gold medalist for being the top scorer, with CGPA 4.0, among the 2021 graduates of Ethiopian Defense University.

Certificate for serving as a Hygiene Officer at the United Nations mission, United Nations Interim Security Force for Abyei (UNISFA).

At the beginning of the Covid-19 pandemic, I have volunteered as a sanitarian in one of the Covid centers in Addis Ababa.

EXPERIENCE

February 2021 - Present
Ethiopian Defense University, College of Health Sciences
Graduate Assistant
Supervising students in public health department of Defense University during their project work and community attachment.

I am also serving as a laboratory assistant in the Public Health laboratory.

September 2010 - September 2017
Ethiopian Defense University, College of Health Sciences
Technical assistant
Technical assistant in Public Health department, Environmental Health section.

EDUCATION

2021
Ethiopian Defense University
Environmental Health, BSc.
CGPA 4.0

2010
Ethiopian Defense University
Environmental Health, Diploma
CGPA 3.9

PUBLICATION

Contributing author: Construct validity of the Amharic version perceived stress scale (PSS-10) among Defense University students, BMC Psychiatry.

CURRICULUM VITAE (Primary Advisor)

I. PERSONAL DATA

Telahun Teka Wolde, male, born in Addis Ababa, Ethiopia, 20th April 1957, an Ethiopian national, married, with languages Amharic (native), English (fluent) French (conversational)

Present Home Address: NifasSilk Lafto, Worreda 10, H.No.1006, Addis Ababa, Ethiopia

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Private Box: P.O. Box 405 Addis Ababa, ETHIOPIA

II. EDUCATION:

- Certificate in Pediatric Bioethics, Children's Mercy Hospital, Kansas City, Missouri, USA (2020)
- Diploma in Virtual Leadership Development-online course sponsored by Intra-health International (IH) from USA, for Ethiopian Staff (2008)
- BTh in Bible Theology, (Honors) Addis Ababa Bible College & Global University, Missouri, USA (2007)
- Post Graduate Diploma in International Research Ethics University of Cape Town, South Africa (2006)
- MPH University Libre Bruxelles, School of Public Health Brussels, Belgium (1990)
- Specialty Certificate in Pediatrics and Child Health Addis Ababa University Faculty of Medicine (1987)
- Doctor of Medicine, Addis Ababa University Faculty of Medicine (1981)

III. ACADEMIC EXPERIENCE and APPOINTMENTS

- Member of Ethiopian Professors Council in Academia, Research, Industry and the Diaspora (CEPARID) (2021 –
- Fellow of Ethiopian Academy of Sciences since 2015
- Clinical Trainer, Educator and Researcher: Gondar University and Addis Ababa University (1983– 2010) (25+ years)
- 2019 Professor (Adjunct) of Pediatrics and Child Health, St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia
- 2020 Professor (Adjunct) of Pediatrics and Child Health, Yekatit 12 Medical College, Addis Ababa, Ethiopia
- 2021 Professor (Adjunct) of Community Health, School of Community Health, College of Health Sciences, Addis Ababa University
- Professor of Pediatrics and Child Health (2009-
- Provide theoretical and clinical practical hands-on training in all areas of Pediatrics and Child Health to nurses, medical students and pediatrics residents. The teaching focused areas were:

- Infectious diseases (Childhood diarrhea, HIV/ART, PMTCT)
- Pediatrics Clinical Nutrition
- IMNCI, Integrated Management of Childhood and Newborn Illnesses.
- Emergency Newborn care and ETAT
- Vaccinology (Immunization), Mid-Level Management, IIN
- Medical Ethics and Research Ethics

IV. PROFESSIONAL EXPERIENCE:

1. Senior National Advisor: Bioethics, Chair, National Health Research Ethics Review Committee, Ministry of Science and Higher Education
2. National Quality Strategy Advisor, Seconded by IHI for Healthcare Services Quality Directorate, FMOH (2018 – 2019)
3. Senior Technical Assistance, Seconded by JSI for Clinical Services Directorate, and Primary Health Care, FMOH (2016-2017)
4. Project Manager, Maternal, Infant, Young, Child Nutrition, MIYCN Program: Global Alliance for Improved Nutrition, Ethiopia Office (2015-2016)
5. Senior Nutrition and HIV Specialist and Country Project Manager Food and Nutrition Technical Assistance Project (FANTA II and III)/FHI360 (2011 – 2014)
6. Quality Improvement Lead Advisor, Nutrition and HIV (September – December 2011)
7. Pediatrics Quality Improvement Project conducted by Ethiopian Pediatric Society on ETAT on 10 hospitals (July 2012-April 2014)
8. Consultant and Trainer for National Newborn corner revitalization and Establishment of Neonatal Intensive Care Units (NICU) (2011 -2014)
7. Pediatric HIV and PMTCT advisor: Intra-Health International Country Office, Ethiopia (2007- 2009)
8. Consultant Pediatrician (2000…)

V. MAJOR RESPONSIBILITIES IN RESEARCH ETHICS ACTIVITIES

- Support Ethics and Research Directorate, Ministry of Science and Higher Education, (MoSHE), January 2020 -
- Development of National Health Research Ethics Review Guideline
- Development of National Research Ethics Review Guidelines for different science disciplines (Animal Health, Agriculture - plant, Environment and Engineering and Technology)
- Technical support to provide training on research ethics
- Support Ethics and Research Directorate, Mo Education

VI. MAJOR RESPONSIBILITIES IN HEALTH PROGRAMS AND SYSTEMS

- Support Human Resource Development Directorate, MOH Nov.-Dec.2019
- Development National Compassionate, Respectful and Caring Health Services Implementation Strategy 2020/21-2024/25 November 2019
- Technical support on writing code of ethics for a professional association or society

- Technical support in the development and harmonization of one single "Code of ethics" for all health professionals
- Support Clinical Services Directorate, MOH Nov.-Dec.2019
- Development Healthy Ageing Strategy: The Health Sector Response 2020 – 2025 Ethiopia, Ministry of Health December 2019
- Support Healthcare Services Quality Directorate, MOH as National Quality Strategy Advisor, Seconded by IHI for Duration April 2018 – April 2019
- Support directorate and actively engaged in planning, review meetings, supervision
- Organizing TWG, Quality Summit, QED MNH, High impact training
- Development of QI implementation guideline, and active engagement in the development of Quality bulletin
- Senior Technical Assistant Seconded by JSI Duration: September 2016 – August 2017
- Development of technical documents. Example: Using a mentorship model to localize the Practical Approach to Care Kit (PACK): From South Africa to Ethiopia. This was a very important document adapted for primary health workers at health centers and primary hospitals in Ethiopia
- Maternal Infant and Young Child Nutrition (MIYCN) Project Manager (March 2015 – June 2016) Global Alliance for improved Nutrition. Duration: March 2015-June 2016

Duties and Responsibilities:

- Accountable for the overall management of the Ethiopian MIYCN Portfolio with primary project management, reporting technical and financial documentation responsibilities for all GAIN, donor and Government of Ethiopia requirements.
- Streamline the joint the complementary food and MNP projects with GAIN MIYCN strategies by regular engagement with key partners FMOH, FMHACA, EPHI, UNICEF and MI
- Manage the integrated MIYCN program and ensure that appropriate public and private delivery channels are identified and properly tested to optimize the reach of multi-nutrient product
- Closely follow up with project partners responsible for implementing and technical assistant and undertake regular supervision to ensure the smooth running of the project with clear project deliverables and reporting system
- Collaborates with the Country Manager, Initiative Director and Portfolio Management and Delivery team on program strategy, communications and implementation of all project components including effective performance management of sub-contractors and technical consultants.
- Collaborates with the policy & advocacy team and country manger to develop key government partnerships and facilitate stakeholder alignment
- Ensures the timely drafting and execution of partnership agreements with stakeholders such as Ministry of Health and partners
- Engage key government sectors including the regulatory body to develop, revise and harmonize appropriate policies, directives, standards and guidelines on multi-nutrient supplements and products

- Explore existing and support the development of new public and private delivery channels to increase take-up of complementary food
- Collaborates with partners to educate and influence key opinion leaders, health professionals and associations on the importance of optimal feeding and complementary food products

Senior Nutrition and HIV Specialist and Country Project Manager

Food and Nutrition Technical Assistance Project (FANTA)/FHI360 Duration: January 2011 – August 2014 (3 years and 7 months)

Duties and Responsibilities:

- Represent FANTA in all meetings at Federal Ministry of Health (FMOH) USAID, PEPFAR, and UN agencies and implementing partners on nutrition and HIV
- Country manager of FANTA, actively involved in strategic decision, development of annual planning, budgeting, implementing and monitoring in consultation with FANTA HQ (based in Washington DC) and in close collaboration with FMOH
- Support the Federal Ministry of Health (FMOH) of Ethiopia in integrating nutrition in HIV services with nutrition assessment care and support (NACS) approach
- Work with FMOH, regional health bureau and HIV/AIDS program implementing partners in developing and supporting strategic and operational capacity in nutrition and HIV (conducting training, developing guideline and training materials)
- Active lead in the development of Nutrition PROFILE Estimates of 2012 of Ethiopia with close participation of FMOH, FANTA HQ and partners working on nutrition including UN Agencies (UNICEF, WHO, WFP, FAO)
- Active lead in the development of Nutrition Advocacy Creative briefs using PROFILE Estimates of 2012 for targeted audience and support FMOH to roll out the National Nutrition Program.
- Active involvement and provision of technical support in all technical working groups at FMOH that include: National Nutrition Technical Working group, Fortification steering committee, Infant and young child feeding (breastfeeding, complementary feeding), severe acute malnutrition, maternal nutrition, micronutrients
- As FANTA program manager, we were engaged in program evaluation of urban gardening in alleviating malnutrition and increasing income among families with HIV.
- Timely preparation of reports, quarterly, semiannual and annual to USAID Mission and FANTA HQ.

Quality Improvement Lead Advisor (September – December 2011)

Duties and Responsibilities:

- In collaboration with University Research Co., LLC, (URC) and myself representing FANTA agreed to determine the best way to improve the quality of nutrition services for PLHIV given existing and planned QI initiatives in Ethiopia.

- Starting with situational assessment, QI approach was introduced by providing basic QI training for selected six health care facilities to health workers, two from each Amhara, Oromia and Addis Ababa regions respectively.
- Seven steps of integrating nutrition into HIV care and quality improvement processes were introduced. Following this basic information, team building exercise with team formation and resulting in action plans for respective sites were conducted.
- Each facility took the lessons on QI problem identification and analysis and used tools like Pareto and fish bone models. Each health facility was able to identify specific QI problems which were specific to their respective facility.
- Testing and implementing changes were tried by all teams in all six sites and it was found that each facility was using PDSA (Plan, Do, Study, Act) model. At supervision and coaching, all sites were receptive to new approach and implementations were carried out as per their plans in the second round of learning sessions.
- This pilot QI approach revealed that health facilities can easily take the knowledge and skill promptly and if compounded with sustainable coaching, there will definitely be a qualitative difference in the nutrition care and support services to PLHIV.
- It was later scaled up to satellite health facilities with effective transfer of skills and knowledge in learning sessions as well as with close monitoring and evaluation.
- We were able to develop check lists and indicators for further supervision and scale up of QI activities. The overall activities took over a year.

Pediatrics quality improvement project ETAT

- Ethiopian Pediatric Society (represented by me) Federal Ministry of Health (Medical services department) in collaboration with WHO/CAH worked on improving the quality of pediatric hospital care through introducing standard pediatric triage and emergency care, standard case management protocols and reorganization of the service delivery points.
- As of July 2012, pediatrics quality referral care was implemented in 10 hospitals and substantial improvement was documented in 6 of the 10 hospitals through implementation of quality pediatrics emergency service based on combined national and WHO standards. As of march 2013, this initiative was expanded to 13 public hospitals (including 6 university hospitals).
- Under this initiative, capacity building support was given to 23 hospitals, standard text book and emergency equipment were distributed to all public hospitals, panel discussion was conducted for pediatricians throughout the country and National Emergency triage assessment and treatment manual is under publication. Currently FMOH/MSD is working to scale up the pediatrics QOC to 50 public hospitals.

Consultant for National Newborn corner revitalization and Establishment of Neonatal Intensive Care Units (NICU) (Starting 2011-)

Duties and Responsibilities:

- This was a concerted project of FMOH, UNICEF and Ethiopian Pediatric Society (EPS). I represent Ethiopian Pediatric Society and hiring part time consultant jointly did the hard work of developing the project in consultation with experts from UNCEF. The pilot activity took place in 100 health centers in 2011. It was later scaled up in additional 800 health centers in 2012-2013. Now it is being scaled up in additional 800 health centers until end of 2015. The activities include baseline and end-line assessments, developing of national training materials, conducting hands on training, establishment of newborn corners, supervision, review meeting etc.…
- Taking the experience and the opportunity and commitment of FMOH and partners, EPS is now also the prime lead in the implementation of neonatal intensive care units (NICU) in all hospitals by training nurses as prime health care providers. Currently training is being conducted for 50 hospitals from all corners of the country.

Pediatric HIV and PMTCT advisor: Intra-Health International Country Office, Ethiopia

Duration: 2007 Sept.-April 2009 (1 year and 6 months)

Duties and responsibilities:

- Provide technical support on pediatric HIV to all Intra-health staff and project officers working in five regions (PMTCT implementers) that include training, mentoring, supervision and monitoring
- Specific areas of PMTCT, early infant diagnosis, breastfeeding, milk substitutes, alternative feedings etc.…Interpretations of new evidences and analyzing position papers and recommendations from UNICEF and WHO. Provide support country level guidance and policy formulation in breast feeding.
- Strengthen the capacity of frontline health workers in collaboration with regional program officers in basic and refresher trainings on Integrated Management of Child hood Illness (IMCI) which had also components of breastfeeding, complementary feeding, nutrition counseling as an entry point for screening for pediatric HIV
- Strengthen all PMTCT trainings with special section on “Feeding in the context of PMTCT” and “Counseling techniques”
- Support FMOH in the development and revision of national PMTCT guideline and training materials
- Development of data collecting tools, implementation, reporting and active participation in review meetings. Support regional program officers in the analysis and interpretation of data.
- Provide technical advice and give all the support to the country director on pediatric HI, breastfeeding, complementary feeding and breast milk substitutes issues.

- Develop counseling tools, job aids and provide in-service TOT trainings (Nutrition and HIV included) for health workers that provide service to PLHIV.
- Develop training tools and counseling materials on: Mother Support Group (MSG) in collaboration with experts at Intra-health which was later accepted by FMOH. MSG was the frontline volunteers in PMTCT activities which were critical in supporting PLHIV, midwives and nurses. The section on feeding and breastfeeding were controversial and were addressed according to their level of understanding.

VII. TECHNICAL SUPPORT TO GOVERNMENT MINISTRIES

1. Ministry of Health (MOH)

   - Chairperson of National Polio Expert Committee

   - Vice Chairperson of National Immunization Technical Advisory Group

   - Member of Technical working group on Child Survival

   - Member of Task force for Newborn Survival

   - Participate in working groups on nutrition, immunization etc. when necessary.

2. Ministry of Science and Technology (MOST), Ministry of Science and Higher Education (MoSHE), Ministry of Education

- Chairperson, National Ethical Clearance Committee, National Council of Health Sciences, ESTC (2002-2005).
- Chairperson of National Research Ethics Review Committee (NRERC) (2015- 2022)
- Member of the National Research Ethics Review Board (NRERB) 2023- present
- 2009 – Present: Professor of Pediatrics and Child Health
- 2005- 11, Chairperson and Member of Bioethics Unit, Faculty of Medicine, AAU.
- Served in different capacities in various committees in both Universities, that include:
- 2002- 2006 Member of Faculty Research and Publication Committee
- 2007-2008 Member of Addis Ababa University Senate Research and Publication Committee.

International Research Fellow (1994-1996) at the International Center for Diarrheal Disease Research, Bangladesh

1. EXTERNAL EXAMINER: Served for in country medical colleges and Moi University, Kenya
2. CO-PRINCIPAL INVESTIGATOR: Rotavirus surveillance, WHO/FMOH/EPHI and participated in Africa and Global conferences on Rota virus
3. TRAINER AND FACILITATOR IN RESEARCH ETHICS: Facilitator PABIN/SIDCER Health Research Human Participant Protection, GCP and SOP Training for Institutional Ethics Review Committees for Universities and Research Institutes in country and abroad, namely Tanzania, Zanzibar (Feb. 4-9, 2008)

VIII. OTHER RESPONSIBILITIES: (associations and research ethics)

- General Secretary of Ethiopian Medical Association: (-1997-2003). Represented EMA in Tunisia, Israel, UK, USA, Finland
- President, Ethiopian Pediatric Society (2011 - 2015). Represented EPS in South Africa and Australia.
- Member of the Steering Committee, Pediatrics AIDS Treatment for Africa (PATA), Cape Town, South Africa (2006- present)
- Member of International AIDS Society-USA (2006 – present)
- Associate Member of International Society for Infectious Diseases (ISID) (2006 – present)
- Life member of Ethiopian Red Cross Society (2000….)
- Life member of Ethiopian Public Health Association
- Member of Editorial Board of Ethiopian Medical Journal (2012-15).
- Participant in international fora on research ethics in South Africa, Malawi, Uganda, USA. Attended 5th Global Forum on Bioethics Research, Paris, France.
- Active member of the Pan African Bioethics Initiative (PABIN) and ETBIN (Ethiopian Bioethics Initiative)
- Member of African Ethics Working Group (AEWG) 2017 – present
- Participant in 10th Annual National Research Ethics Conference (ANREC) 9th -11th July 2018, Uganda, Kampala Serena Hotel.

IX. PUBLICATIONS: Over 35 publication and publications since 2000 include:

1. Golam H. Rabbani, Telahun Teka, Badiuz Zaman, N. Majid, Makhduma Khatun, George J.Fuchs. Clinical Studies in Persistent Diarrhea: Dietary Management with Green Banana or Pectin in Bangladeshi Children. Gastroenterology 2001; 121:554-60.
2. Golam H.Rabbani, Telahun Teka, Shyamal Kumar Saha, Badiuz Zaman, Naseha Majid, Makhduma Khatun, Mohammed A. Wahed, George J.Fuchs. Green Banana and Pectin Improve Intestinal Permeability and reduce Fluid Loss in Bangladeshi Children with Persistent Diarrhea. Digestive Diseases and Sciences, 2004;49(3), 475-484.
3. Berhane Byene, Ayele Gebremariam, Telahun Teka, Zenebe Melaku, Bekure Tsegaye, Damene Alieyu, Oyewole Femi, Almaz G/Senbet. Regional Distribution of Acute Flaccid Paralysis Cases in Ethiopia in 2000-2002. Japan Journal of Infectious Diseases, 2004; 57, 72-73.
4. Telahun Teka, Sileshi Lulseged. (EDITORIAL) Living by the Code in Clinical Research, Ethiopian Medical Journal, 2005;43 (2).
5. Solomie Jebessa, Telahun Teka. Knowledge and attitude towards mother to child transmission of HIV and its prevention among post-natal mothers in Tikur Anbessa and Zewditu Memorial Hospitals, Addis Ababa.Ethiop.J.Health Dev. 2005;19(3):211-218.
6. Haileeyesus Adamu, Tekola Endeshaw, Telahun Teka, Achamyelesh Kifle, Beyene Petros. The prevalence of intestinal parasites in paediatric diarrhoeal and non-diarrhoeal patients in Addis Ababa hospitals, with special emphasis on opportunisitic

parasitic infections and with insight into the demographic and socio-economic factors. Ethiop.J.Health Dev.2006;20(1):39-46.
7. D.Teshome, T.Telahun, D.Solomon, I.Abdulhamid. A study on birthweight in a teaching-referral hospital, Gondar, Ethiopia. Cent Afr J Med 2006; 52(1/2):8-11.
8. Christa L. Fischer Walker, Zulfiqar A. Bhutta, Nita Bhandari, Telahun Teka, Farhana Shahid, Sunita Taneja, Robert E.Black. Zinc Supplementation for the Treatment of Diarrhea in Infants in Pakistan, India and Ethiopia. Journal of Pediatric Gastroenterology and Nutrition, 2006; 43: 357-363.
9. Christa L. Fischer Walker, Zulfiqar A. Bhutta, Nita Bhandari, Telahun Teka, Farhana Shahid, Sunita Taneja, Robert E.Black. Zinc during and in convalescence from diarrhea has no demonstrable effect on subsequent morbidity and anthropometric status among infants < 6 mo of age. American Journal of Clinical Nutrition 2007; 85: 887-94.
10. Endale Tefera, Telahun Teka, Milliard Derbew. Neonatal gastrointestinal surgical emergencies: A 5-year review in a teaching hospital, Addis Ababa, Ethiopia. Ethiop Med J 2007; 45 (3): 251-56.
11. Jeremy Sugarman and Participants in the Partnership for enhancing human research protection Durban workshop. Ethical oversight of multinational collaborative research: Lessons from Africa for building capacity and for policy. Research Ethics Review 2007; 3(3):84-86.
12. Hagos Biluts, Damen Haile Mariam, Telahun Teka. Evaluation of Standards of Informed Consent Formats in Research Proposals Approved by Faculty of Medicine, Addis Ababa University. Ethiop Med J 2009;47 (3):227-32.
13. T.Teka, T.Desta, A.Isheak, S.Demamu. Incidence of neonatal morbidity at Gondar town, Ethiopia. Cent Afr J Med 2009;55(1/4) 8-10.
14. Mulugeta Melkie, Mahlet Yigeremu, Paulos Nigussie, Shawel Asrat, Tatek Gebreegziabher,Telahun Teka, Samuel Kinde. Robust reference intervals for liver function test (LFT) analytes in newborn and infants. BioMed Central Research Notes 2012, 5;493.
15. Mulugeta Melkie, Mahlet Yigeremu, Paulos Nigussie,Telahun Teka, Samuel Kinde. Is the difference in neonatal blood glucose concentration of caesarian and vaginally delivered term infants requiring separated reference intervals? BioMed Central Research Notes 2012, 5;519.
16. Mulugeta Melkie, Mahlet Yigeremu, Paulos Nigussie,Telahun Teka, Samuel Kinde. Establishing reference intervals for electrolytes in newborns and infants using direct ISE analyzer. BioMed Central Research Notes 2013, 6;199.
17. Almaz Abebe, Telahun Teka, Tassew Kassa, Mapaseka Sehari, et al Hospital-based Surveillance for Rotavirus Gastroenteritis in Children Younger than 5 years of age in Ethiopia: 2007-2012.Pediatr Infect Dis J 2014;33: S28-S33.
18. Alamz Abebe, Berhane Beyene, et al, Telahun Teka. Impact of rotavirus vaccine introduction and genotypic characteristics of rotavirus strains in children less than 5 years of age with gastroenteritis in Ethiopia: 2011–2016. Vaccine 2018.09.048.
19. Yibeltal Mekonnen, Charlottee Hanlon, Solomon Emyu et al, Telahun Teka. Using a mentorship model to localise the Practical Approach to Care Kit (PACK): From South Africa to Ethiopia. British Medical Journal Global Health 3(Suppl 5) ·2018.
20. Alison Tumilowicz, Jean-Pierre Habicht, Mduduzi N.N. Mbuya et al, Telahun Teka Wolde. Bottlenecks and predictors of coverage and adherence outcomes for a

micronutrient powder program in Ethiopia. Maternal Child Nutrition. 2019;15(S5) 12807. https://doi.org/10.1111/mcn.12807

X. GUIDELINE DEVELOPMENT FOR MOH

1. Ethiopian primary health care clinical guidelines 2018
2. National Compassionate, Respectful and Caring Health Services Implementation Strategy 2020/21-2024/25 November 2019
3. Healthy Ageing Strategy: The Health Sector Response 2020 – 2025 Ethiopia, Ministry of Health December 2019

XI. LETTERS OF MERIT

- Minister of Science and Higher Education, Ethiopia
- Minister of Science and Technology, Ethiopia
- Minister of Health and Chairperson of Addis Ababa University Board, Ethiopia
- State Minister and Department Head of Health, Ministry of Science and Technology, Ethiopia
- Director, Division Director, Head Training Department: International Center for Diarrhoeal Diseases Research, Bangladesh
- Dean of Faculty of Medicine, Addis Ababa University
- Dean and Assistant Dean Gondar College of Medical Science, Gondar University.

XII. REFERENCES

1. Bogale Worku, MD, Professor of Pediatrics, Executive Director of Ethiopian Pediatric Society. Mobile +251-911-201423, Email: bogaleworku@gmail.com
2. Yemane Berhane, MD, PHD, Professor of Epidemiolgy and Public Health, Director Addis Continental Institute of Public Health, Mobile +251 911219785, Email: yemaneberhane@gmail.com
3. Afework Kassu Gizaw, PhD (Prof), Director, Armaur Hansen Research Institute, Ministry of Health, Mobile +251-911-207865, Email: afeworkkassu@yahoo.com