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PERCEIVED ETHICAL COMPETENCIES IN DOCTORAL RESEARCH IN THE HEALTH FIELD

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ABSTRACT

Introduction Ethical competencies of researchers contribute to ensuring scientific integrity, professional responsibility, and the protection of study participants. The aim of this study was to assess the perceived ethical competencies of doctoral students conducting research in the health field.

Materials and methods This paper presents a comprehensive cross-sectional study. Out of the total number of doctoral students (N=416), 274 participants completed the online questionnaire (response rate: 65.9%). The study questionnaire contained statements related to ethical competencies, self-assessed on a Likert scale. Data analysis included descriptive statistics and association tests (χ^2, t-test, Mann–Whitney).

Results The overall mean score of perceived ethical competencies was 4.01, indicating a high level of confidence in respondents' own abilities. The highest scores were reported for competencies related to protecting the confidentiality of participants' data, honest reporting of research results, and obtaining informed consent. Participants who had received training in research ethics reported significantly higher mean scores compared to those without such training ($p < 0.05$).

Conclusions Doctoral students report a high level of perceived ethical competencies; however, gaps remain in the areas of regulatory framework knowledge and methodological aspects of research, suggesting the need to strengthen targeted training in research ethics.

Keywords Ethical competencies, doctoral students, doctoral education, biomedical research.

COMPETENȚE ETICE PERCEPUTE ÎN CERCETAREA DOCTORALĂ DIN DOMENIUL SĂNĂTĂȚII

Introducere Competențele etice ale cercetătorilor contribuie la asigurarea integrității științifice, a responsabilității profesionale și a protecției participanților la studii. Scopul studiului constă în evaluarea competențelor etice ale doctoranzilor care realizează cercetări în domeniul sănătății.

Materiale și metode Prezenta lucrare reprezintă un studiu transversal integral. Din numărul total de doctoranzi (N=416), 274 de persoane au completat chestionarul, distribuit online (rata de răspuns 65,9%). Chestionarul studiului a conținut afirmații privind competențele etice, autoevaluate pe o scală Likert. Analiza datelor a inclus statistici descriptive și teste de asociere (χ^2, t-test, Mann–Whitney).

Rezultate Scorul mediu general al competențelor etice percepute este de 4,01, indicând un nivel ridicat de încredere în propriile abilități. Cele mai mari scoruri au fost raportate pentru competențele privind protejarea confidențialității datelor, prezentarea onestă a rezultatelor și obținerea consimțământului informat. Participanții care au beneficiat de instruire în etica cercetării au înregistrat scoruri medii semnificativ mai mari comparativ cu cei neinstruiți ($p<0,05$).

Concluzii Doctoranzii raportează un nivel ridicat al competențelor etice percepute, însă există lacune privind cunoașterea cadrului normativ și a aspectelor metodologice în cercetare, ceea ce sugerează necesitatea consolidării formării punctuale în etica cercetării.

Cuvinte-cheie Competențe etice, doctoranzi, studii de doctorat, cercetare biomedicală.

INTRODUCTION

Researchers' ethical competencies are a fundamental component of ethical research management, ensuring adherence to the principles of integrity and professional responsibility in the conduct of scientific studies. Developing and strengthening researchers' ethical competencies throughout their professional careers is an important goal for institutions with health research units. It is important for ethics education to begin at the start of a research career. Today, doctoral schools in the biomedical sciences worldwide design and implement comprehensive curricula in which advanced theoretical knowledge and practical professional skills are developed alongside researchers' ethical competencies. In the field of health, ethical competencies are of particular importance, as studies can have a direct impact on people's lives and health. Without these competencies, research risks producing distorted results, damaging the reputation of institutions, and endangering study participants or the communities being studied (1).

The concept of ethical competence has been defined by several authors (2; 3), but in most cases the concept refers to knowledge and attitudes that encourage certain moral practices or behaviors. In the context of research ethics, ethical competence can be understood as a set of knowledge, skills, and attitudes that enable researchers to identify ethical dilemmas and apply ethical principles and norms in the design and conduct of studies at all stages of research (4). Ethical competence involves a combination of theoretical knowledge, practical skills, and attitudes that enable researchers to make sound and responsible decisions in complex situations, ensuring the integrity of the scientific process and the protection of study participants (5). Ethical competencies enable researchers to contribute to evidence-based research practices, influence clinical practice, and strengthen public trust in science. Based on the above, the development of ethical competencies in health research is a strategic necessity for any institution with research units.

Research ethics training programs are developed and implemented globally, often with the aim of strengthening local capacity to ensure ethical conduct in health-related research. At the same time, international research findings suggest that research ethics education programs have become more effective over the past decade, contributing to improvements in participants' knowledge, skills, and ethical attitudes. The greatest impact is achieved when training uses active teaching methods, involves multiple instructors with complementary expertise, incorporates case studies, and provides practical opportunities to apply ethical principles. (6; 7) In the Republic of Moldova, doctoral education in the field of health has been in the process of adapting to international standards for more than a decade. There is a curriculum in research ethics and methodology, but no study has been conducted on the level of ethical competence among doctoral students.

The objective of this study was to assess the perceived ethical competence of doctoral students conducting research in the health field. While perceived ethical competence does not necessarily correspond to objectively measured competence, self-assessment provides valuable insight into researchers' confidence in applying ethical principles, identifies perceived educational needs, and informs the development of targeted training interventions. Self-perceived competence is widely recognized in educational and professional development research as an important determinant of motivation, engagement, self-regulated learning, and professional behavior (8).

MATERIALS AND METHODS

Study Design

To achieve the stated objective, a cross-sectional study was conducted – a design frequently used in educational, social, and biomedical research because it provides an overview of the phenomenon under study and facilitates comparative analysis among subgroups, especially when similar studies are lacking (9; 10).

Study Population and Sample

The target population of the study consisted of doctoral students in the Doctoral School of Medical Sciences. The entire active population of doctoral students, comprising 416 individuals (data provided by the Doctoral School office in February 2025), was invited to participate in the study. A total of 274 individuals actually participated, resulting in a response rate of 65.9%, which is considered adequate for online surveys (11).

Data Collection Instrument

The data collection tool is a questionnaire consisting of 11 questions designed to collect sociodemographic data and 15 closed-ended questions designed to assess the respondents' perceived ethical competencies (the items were developed based on international ethical standards in biomedical research, such as the provisions of the Declaration of Helsinki (12). The conceptual framework of the questionnaire consisted of statements with responses on a 5-point Likert scale. For each statement, respondents rated their own level of competence on a scale from 1 to 5, where 1 means *not at all prepared* and 5 means *fully prepared*. It should be noted that the questionnaire used in this study is a subsection of a broader research instrument, developed and validated as part of the research project "Ethical Management of Health Research." (13)

Data Collection Procedure

The study data were collected online using the Google Forms platform.

Statistical Analysis

For each item in the questionnaire, mean scores (including standard deviations) were calculated, and the competencies with the lowest and highest mean values were highlighted. The use of means for ordinal Likert-type data can be considered an acceptable approximation in studies with moderate sample sizes (14). In this study, means and standard deviations were used for descriptive purposes to facilitate interpretation and comparison across items, an approach frequently applied in educational research and in the assessment of self-reported competencies (15). At the same time, combining these with nonparametric methods allowed for a robust interpretation of the results. The literature also supports the view that aggregate scores derived from multiple items measuring the same construct can be analyzed using parametric statistics, particularly in the case of moderate- or large-sized samples (14, 16). The competencies with the lowest reported mean scores were analyzed using nonparametric Chi-square (χ^2) association tests to determine their relationships with the variable "formal training in research ethics." The analysis of differences between groups (those trained vs. those not trained in research ethics) was conducted using both the t-test for independent samples and the nonparametric Mann–Whitney U test, which is appropriate for ordinal data, to validate the robustness of the results. The effect size for the nonparametric tests was estimated using the r coefficient ($r = Z/\sqrt{N}$). All statistical analyses were performed using Excel (for Microsoft 365) with the Real Statistics add-in, with a significance level set at $p < 0,05$.

RESULTS

An analysis of the respondents' sociodemographic characteristics reveals a predominantly female profile, with women accounting for 72.6% of the sample (95% CI: 67.1%–77.6%), with a median age of 35 years and an interquartile range (IQR) of 32–39 years. In terms of career trajectory, most respondents are in the early stages of their research careers, with 73.4% reporting 0–5 years of experience in scientific work (95% CI: 67.8%–78.5%). Regarding training in research ethics, 72.6% of participants (95% CI: 67.1%–77.6%) stated that they had previously received specific training, which was primarily delivered through formal teaching sessions (courses or institutional academic modules).

The ethical competencies assessed in the study were those related to: 1) knowledge of and application of the principles of the Declaration of Helsinki in research; 2) knowledge and application of national regulations and legislation governing research involving human participants; 3) competencies in formulating feasible study objectives and a valid methodology; 4) adherence to the principle of fairness in recruiting research participants; 5) identifying and minimizing risks to study participants; 6) providing accurate and complete information to participants and obtaining informed consent; 7) protecting the confidentiality of study participants' data; 8) preparing the application and submitting it to the research ethics committee; 9) seeking advice from colleagues or the ethics committee in situations involving ethical dilemmas; 10) reporting issues related to research ethics and integrity; 11) honestly presenting research results; 12) citing sources correctly and avoiding plagiarism in scientific publications; 13) applying ethical principles of authorship in research; 14) managing conflicts of interest in research; 15) effectively managing data in the study.

As a result of the descriptive analysis of all assessed perceived competencies, an average score of 4.01 points was found, which demonstrates the respondents' increased confidence in their own ethical skills in research. The highest scores were recorded for the following competencies: *Knowledge of and adherence to the principle of protecting the confidentiality of study participants' data* (M = 4.28, SD = 0.81); *Honest and complete presentation of research results* (M = 4.22, SD = 0.85); *Accurate and complete information provided to study participants and obtaining valid informed consent* (M = 4.20, SD = 0.82). The lowest scores were recorded for the following competencies: *Knowledge of and application of the principles of the Declaration of Helsinki in research* (M = 3.71, SD = 0.95); *Knowledge and application of national regulations and legislation governing research involving human participants* (M=3.77, SD=0.92); *Formulation of feasible study objectives and valid methodology* (M=3.79, SD=0.87).

We hypothesized that the ethical skills with the lowest scores might be associated with the level of training in research ethics, and to test this hypothesis, we conducted bivariate association analyses between these variables. Thus, *regarding knowledge and application of the principles of the Declaration of Helsinki*, we found noticeable descriptive differences in the distribution of responses between those who had taken courses in research ethics and those who had not. Those who had taken courses tended to select scores of 4 and 5 (well-prepared and fully prepared) more frequently, while those without such training tended to select scores of 3 and 4 (moderately prepared and well-prepared) more frequently (Figure 1).

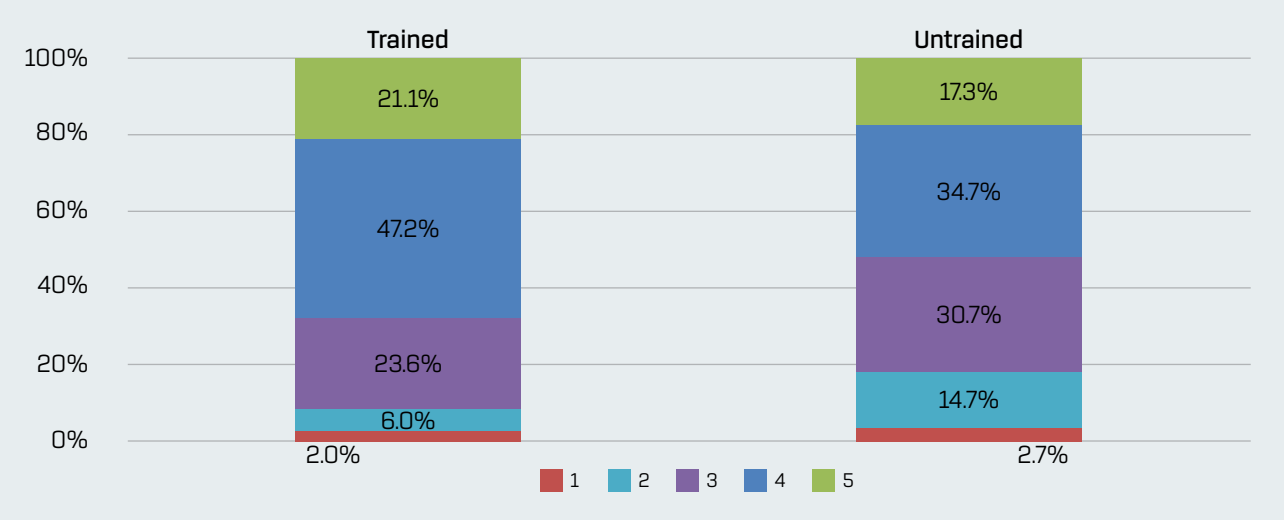

Figure 1. Distribution of responses regarding knowledge of and adherence to the Declaration of Helsinki in research, by level of training in research ethics (%).

However, application of the chi-square test did not reveal a statistically significant association between the variable "training in research ethics" and respondents' perceptions of their own level of preparedness in applying the Declaration of Helsinki ($\chi^2(4) = 8.36$, $p = 0.079$, Cramer's $V = 0.175$).

Regarding *knowledge and application of national regulations and legislation governing research involving human participants*, respondents with training in research ethics most frequently selected score 4 (43.7%), followed by 5 (25.6%) and 3 (25.1%); while very few selected a score of 1 (0.5%) or 2 (5%). In contrast, those without training in research ethics were more likely to select scores of 3 (34.7%) and 4 (36.0%); score 5 was selected comparatively less often (13.3%); and scores of 2 (13.3%) and 1 (2.7%) are selected more frequently in this group compared to those who have received training (Figure 2). Application of the chi-square test did not reveal a statistically significant association between these analyzed variables ($\chi^2(4) = 13.75$, $p = 0.08$, Cramer's $V = 0.11$).

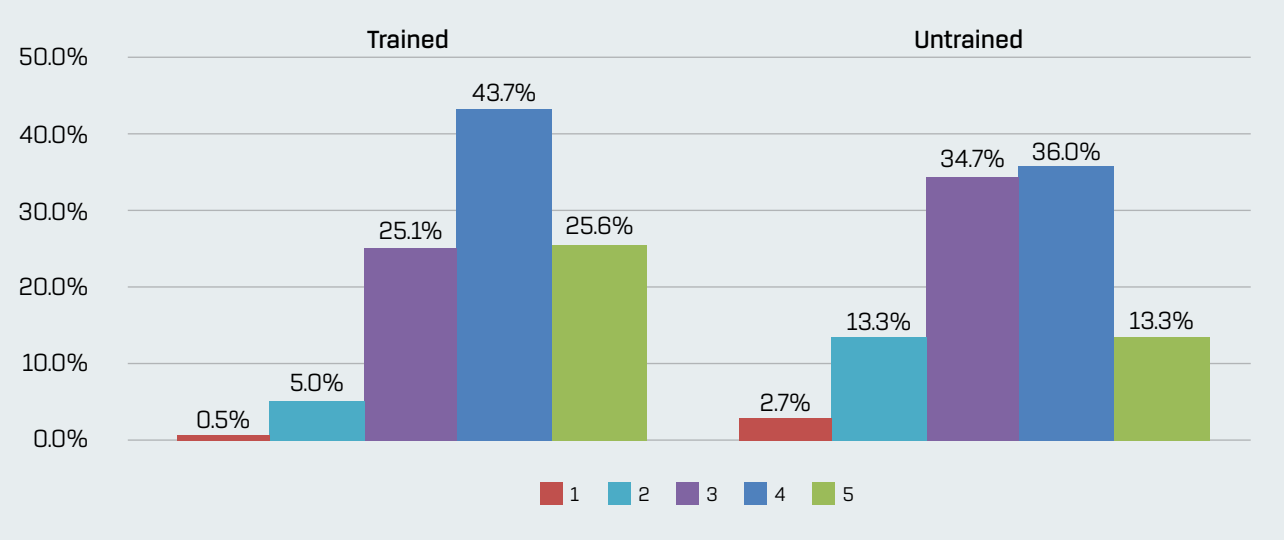

Figure 2. Distribution of responses regarding the application of national regulations and legislation in research, by level of training in research ethics (%).

A descriptive analysis of the differences between the *trained* and *untrained* groups, with regard to perceived competence in formulating feasible study objectives and valid methodology, reveals that scores of 4 and 3 predominate in both groups. Among those who *received training*, 47.7% gave a score of 4, and 24.1% gave a score of 3. In the group that *did not receive training*, 44.0% of respondents gave a score of 4, and 32.0% gave a score of 3. Those with training in research ethics more frequently select a score of 5 (21.6%) than those in the group without training – 16.0% (Figure 3). An analysis of the association between the variables using the chi-square test of independence did not reveal any statistically significant relationships ($\chi^2(4) = 2.47$, $p = 0.64$, Cramer V =0.09).

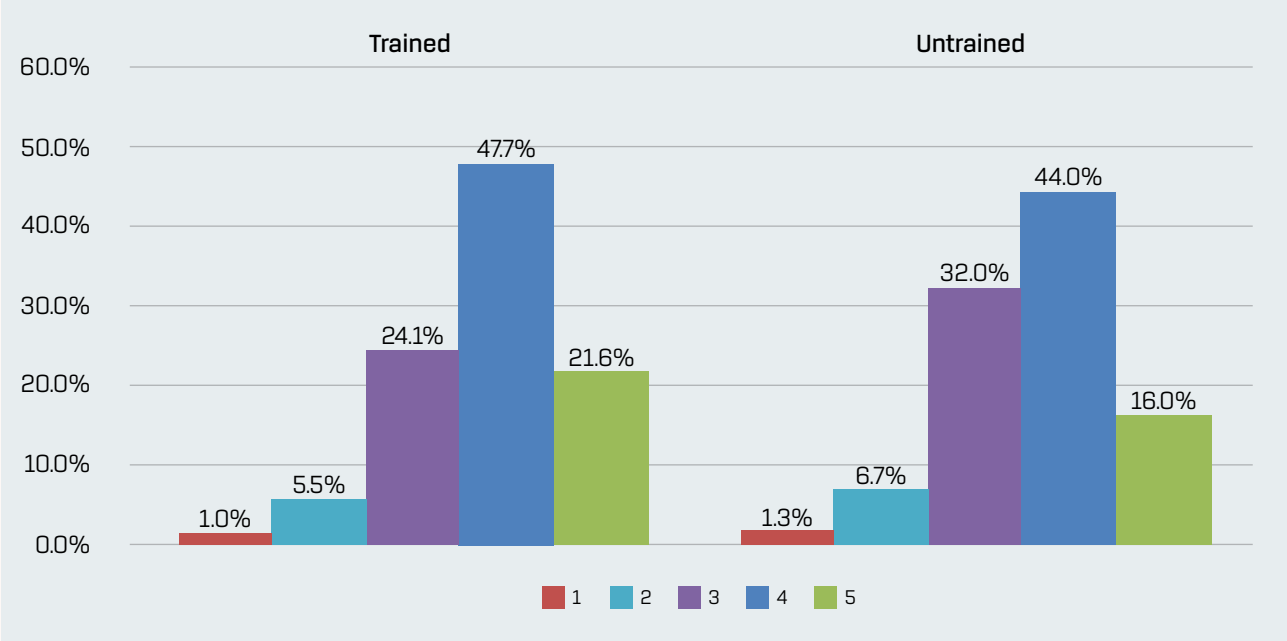

Figure 3. Distribution of responses regarding the formulation of feasible study objectives and valid research methodology, by level of training in research ethics (%).

The study also compared the average scores of the two groups – trained and untrained – for all 15 assessed competencies. Accordingly, by applying the *t-test for independent samples*, a statistically significant difference was found between the two groups ($t(274) = 2.29$, $p = 0.023$). The *trained* participants achieved slightly higher mean scores ($M = 4.06$) than the *untrained* participants ($M = 3.84$). The statistically significant difference was also confirmed by the nonparametric Mann–Whitney test ($U = 6553$, $p = 0.039$). The values of the *r* coefficient (calculated based on the Mann–Whitney test) range from 0.13 to 0.19, indicating that training in research ethics has a positive impact on perceived skills, but this impact is only small to moderate.

Thus, although the hypothesis that *formal training* in research ethics would positively influence the perceived competencies that received the lowest scores was not statistically confirmed, the overall findings (across all competencies assessed) indicate that training in research ethics contributes moderately to increased confidence and perceived competence, even though the impact on specific skills may be limited.

DISCUSSION

The results indicate that doctoral students believe they possess ethical competencies above the average (M=4.01, on a scale of 1 to 5), which reveals a high level of self-confidence. The differentiated analysis, however, reveals a divide between procedural competencies (*maintaining confidentiality*, obtaining *informed consent, and honest presentation of research results*), which appear to be well internalized, and normative-legal and methodological competencies, where confidence is lower. A high perception of competence can influence an individual's ability to effectively tackle complex tasks and maintain a high level of engagement and performance, according to self-determination theory (17). At the same time, a high level of self-perceived competence may suggest a *ceiling effect* and should be interpreted with caution, as it can be influenced by psychological factors such as a) social desirability bias, i.e., the tendency of individuals to respond to questionnaires in a socially acceptable manner, rather than truthfully, and/or positive self-deception (self-deceptive enhancement), whereby individuals sincerely perceive their competencies in a favorable light (18; 19). Furthermore, the literature shows that individuals with limited experience in a field may tend to overestimate their abilities. This phenomenon is known as the Dunning–Kruger effect and occurs when a lack of knowledge impairs the ability to make a realistic self-assessment of one's performance (20). Thus, the high level of perceived ethical competence identified among doctoral students may suggest an increased confidence in their ability to conduct research responsibly, even if this perception does not always reflect their actual level of competence. Therefore, further studies are needed to assess realistic ethical competencies in doctoral research in the field of health.

The analysis of the study data does not identify a statistically significant association regarding the impact of research ethics training on the level of confidence in the perceived competencies that received lower scores. However, this (statistically moderate) association is detected using the t-test for independent samples, comparing the overall mean scores of *trained* and *untrained* respondents, which confirms that research ethics education plays a beneficial role in increasing perceived confidence in ethical competencies in doctoral research. The fact that this association is only moderate highlights the need to strengthen the training component in research ethics for researchers. Several authors (21; 22) emphasize that in order to develop the ability to interpret and apply ethical rules in various contexts, research ethics training must include case studies, problem-based scenarios, mentoring, and interactive methods, while maintaining a connection to the basic norms and regulations in the field.

CONCLUSIONS

The study found an above-average level of confidence in doctoral students' own ethical competencies, which is significantly associated with training in research ethics. This finding is relevant in the context of self-determination theory, which considers the perception of competence to be an important resource for professional engagement and performance. At the same time, although formal training has a positive impact on self-assessment, this effect is only moderate and not strong enough to reduce perceived competence gaps in certain areas, such as knowledge of and application of international and national regulatory frameworks in research, including the ability to formulate feasible scientific objectives and valid methodologies. This imbalance suggests the need to strengthen theoretical and practical training on the international and national regulatory framework in research, as well as on the methodological design of research. At the same time, the high mean values

reported for several competencies may suggest the presence of a possible ceiling effect, characterized by a concentration of responses at the upper end of the assessment scale, which may limit data variability and the sensitivity of statistical analyses.

CONFLICT OF INTEREST

None declared.

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ETHICS APPROVAL AND PARTICIPANT CONSENT

The study was approved by the Research Ethics Committee of *Nicolae Testemițanu* State University of Medicine and Pharmacy in the Republic of Moldova, Minutes No. 70, dated August 08, 2024. Implicit consent was obtained.

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