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ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ

Measuring radiographers' bioethics attitudes, behaviour, and knowledge Introducing a new tool

OBJECTIVE **To investigate the knowledge, attitudes, and behaviours of radiographers in relation to bioethical issues that arise during their daily professional practice. For this purpose, a new, dependable, and valid questionnaire was created. This research tool was employed in a nationwide survey that involved the participation of 180 radiographers, with 148 completed questionnaires (representing an 82.2% response rate).** METHOD **We developed a comprehensive questionnaire comprising 56 questions, organised into eight distinct sections. This questionnaire was then deployed on the Survey Monkey online platform, which aligns with the specific requirements for our pilot study. It was distributed to a randomly selected group of 40 Greek radiographers. We conducted exploratory factor analysis for each scale under study and performed reliability analysis using Cronbach's alpha.** RESULTS **The finalised questionnaire was categorised into eight sections, namely, "Basic bioethics knowledge", "Patient care", "Informed consent", "Discrimination", "Confidentiality", "Attitudes towards bioethics education", "Attitudes towards training outcomes" and "Attitudes regarding the impact of applying bioethics principles". Additionally, there was a ninth section comprising six demographic questions. All the results indicated that the new measurement tool demonstrated a high to acceptable level of reliability, with Cronbach's alpha values ranging from 0.505 to 0.841.** CONCLUSIONS **The questionnaire developed as part of this study stands as a valid and reliable instrument for capturing radiographers' knowledge, beliefs, and behaviours pertaining to ethical matters. Therefore, it was suitable to be used in the nationwide survey of the study.**

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Μέτρηση των στάσεων,
της συμπεριφοράς
και των γνώσεων των τεχνολόγων-
ακτινολόγων σχετικά
με τη Βιοηθική: Παρουσίαση
ενός νέου εργαλείου

Περίληψη στο τέλος του άρθρου

The rapid advancement of biotechnology during the 20th century ignited growing ethical discourse concerning what was deemed "right" or "wrong" within the realm of scientific possibilities. As scientific capabilities expanded into progressively sensitive areas of human life, the necessity for ethical evaluations of scientific interventions became increasingly pressing.[1,2] This discourse was particularly instigated by the applications of biotechnology in the context of human beings as the questions raised exceeded the capacity of existing ethical codes in the realm of health professions at that time.

One approach to confronting the ethical challenges arising from scientific progress involves the development of bioethical theories and principles aimed at providing solutions to the ethical dilemmas that emerge. In the field of clinical ethics, various methodologies are employed, such as applied philosophy of medicine, principlism, casuistry, and combinations of techniques for resolving ethical conflicts.[3] Ethics, as a branch of morality, offers diverse rational approaches to decision-making and behaviour, encompassing deontology, consequentialism/utilitarianism, principlism, and virtue ethics. Among the most recognised forms of biomedical principlism is the framework articulated by Beauchamp and Childress in 2001, introducing the principles of autonomy, beneficence, non-maleficence, and justice.[4] However, the mere presence of these theories and principles is insufficient to address the ethical dilemmas; the key lies in their correct application. Unfortunately, the practical implementation of these principles is not always straightforward.

Ethical principles should not be applied universally and uniformly. The choice of method and interpretation should be tailored to the specific case, considering factors such as time, place, and the individuals involved.[5] This implies that

responsible professionals or groups of professionals must possess the knowledge and skills required to successfully apply these principles in each unique scenario and make appropriate decisions on each occasion. Hence, it is imperative to investigate the level of knowledge, attitudes, and behaviours related to bioethics in everyday practice to effectively guide interventions when necessary.

Radiography professionals encounter a myriad of bioethical dilemmas in their daily work. These dilemmas arise from diverse diagnostic and treatment applications, including classical imaging, magnetic resonance imaging (MRI), computed tomography (CT) scans, angiography, coronary angiography, and radiotherapy. Ethical concerns revolve around how professionals interact with patients, the disclosure of pertinent information regarding procedures, and the management of radiation to achieve optimal imaging results with minimal radiation exposure.

The primary objective of the present study is to develop a novel, specialised measurement tool capable of reliably and validly assessing the knowledge, attitudes, and behaviours of radiographers. This instrument aims to reflect the established education level and cultural perspective on bioethical issues within this professional group.

MATERIAL AND METHOD

The questionnaire design and validation process were meticulously undertaken through the following steps:

Study design

The team determined areas of interest, including knowledge of basic bioethical principles, patient care, patient information, discrimination, and confidentiality. These areas of focus were selected based on the primary bioethical issues that radiographers might encounter. These issues encompassed their beliefs and behaviours concerning discrimination (a critical concern in pluralistic societies) and their perceptions and actions related to patient care, encompassing radiation protection, ensuring informed consent, and more. Furthermore, it was considered vital to explore the participants' attitudes and beliefs regarding education in bioethics as this information would be invaluable when designing educational interventions, especially considering that in Greece, continuing education programmes are not mandatory, and their success depends on the participants' intention.

A comprehensive literature review was conducted. While numerous studies address bioethics among health professionals, particularly physicians and nurses, research on radiologists and radiographers is limited.[6–8] Very few of these studies focus on the daily attitudes, beliefs, and behaviours of radiographers.[9,10] Many studies emphasise the need for and level of education for healthcare professionals in bioethics.[11–15] Furthermore, there is an abundance of research regarding the development of tools to assess these parameters in other healthcare professionals.[16–19] No published measurement tools specifically designed for radiographers that covered all the study variables were identified. Consequently, the decision was made to construct a new and original measurement tool.

Over the course of four meetings, research questions were discussed, a literature review was conducted, and brainstorming sessions were held. All suggestions from team members were carefully considered. Following this process, the most appropriate questions were selected, rephrased, and incorporated into the questionnaires for each scale.

Eight scales were created based on the defined fields of interest, including the following: (a) Patient care (A): This scale examined radiographers' attitudes and behaviours during examinations and treatments. It consisted of seven questions (questions 22–28) that, following factor analysis, revealed two variables (A1 and A2) representing attitudes and daily practices, respectively. (b) Information (B): The second scale explored how radiographers inform patients about examinations and treatments (questions 35–39). Factor analysis revealed a variable reflecting behaviour. (c) Discrimination (C): The third scale focused on discrimination and included seven questions (questions 40–46). Factor analysis identified two variables, C1 (attitudes) and C2 (practices). (d) Confidentiality (D): The fourth scale was related to confidentiality and comprised four questions (47–50) that assessed attitudes. (e) Attitudes towards bioethics education (E): The fifth scale examined radiographers' attitudes towards education in bioethics and included three questions (53–55). (f) Attitudes towards the consequences of applying bioethical rules (F): The sixth scale investigated general attitudes regarding the impact of bioethics on radiographers' work, consisting of two questions (57 and 58). (g) Attitudes regarding the consequences of applying bioethical rules (G): The seventh scale delved further into radiographers' beliefs concerning the impact of bioethics on their daily practices. This category contained four questions (59–62). (h) General bioethical knowledge (H): This scale assessed the participants' knowledge of bioethical issues, including core bioethical concepts and principles. A panel of nine experts in the field of bioethics (comprising three members of the academic community, three postgraduate radiographers, and three doctoral candidates) rated the questions for relevance and comprehensibility. The highest-rated questions (questions 9–20) were selected, and the level of knowledge was determined based on the sum of correct answers.

RESULTS

Pilot study

The validation of the measurement tool was conducted on the Survey Monkey research platform, ensuring compliance with data privacy standards. The participants received

full written information about the purpose of the research and the assurance of data confidentiality and provided their consent. A pilot test was conducted with 40 radiographers and members of the Panhellenic Association of Radiological Technologists, who were randomly selected. These participants also formed part of the subsequent nationwide study. Data analysis and reliability assessments provided satisfactory results, which served as the foundation for reconfiguring questions by removing problematic ones, adding new questions, or rephrasing existing ones. It is worth noting that the questionnaire has been translated into English, but this version has not yet been evaluated, though it is one of the future research goals.

Validity check

To ensure the questionnaire's validity, exploratory factor analysis (EFA) was chosen as it represents a prototype measurement instrument.[20,21] EFA was conducted independently for each scale. In the realm of factor analysis, there are two primary categories: EFA and confirmatory factor analysis (CFA).

The crucial distinction between them is that in EFA, the researcher does not hold any prior assumptions regarding the number or nature of factors, while in CFA, the researcher seeks to confirm a pre-existing factor structure.[22] Given this disparity, EFA is more suitable for questionnaires characterised by a high degree of originality, while CFA is typically employed for well-established, pre-weighted questionnaires. As the questionnaire in this study exhibits an exceptionally elevated level of originality, it was deemed most appropriate to conduct EFA. Additionally, among the future research goals is the conduction of CFA of the instrument. Furthermore, the study included reliability analysis using Cronbach's alpha both for individual factors and for each scale.[23]

Categorical principal component analysis (CATPCA) was conducted, specifically for binary categorical items, to estimate the Cronbach's alpha score for one of them.[24,25]

Before employing EFA, it was crucial to ascertain that the data was suitable for factor analysis. To this end, two tests were performed: the KMO (Kaiser-Meyer-Olkin)[26] test and Bartlett's test of sphericity.[27] The KMO values were all greater than or equal to 0.5 for all scales, and Bartlett's test of sphericity resulted in a statistically significant p-value of 0.000 (tab. 1). Thus, the data was deemed adequate and suitable for factor analysis.

Table 1. The data set's adequacy for factor analysis.

Scales	KMO measure of sampling adequate	Barlett's test of sphericity (value)
A	0.662	0.000
B	0.730	0.000
C	0.729	0.000
D	0.557	0.000
E	0.663	0.000
F	0.500	0.000
G	0.749	0.000

KMO: Kaiser-Meyer-Olkin test

Factor analysis

Subsequently, principal component analysis (PCA)[28] was conducted. The PCA showed that for scales A and C, the optional factor structure consisted of two variables explaining 52.86% and 55.06% of the total variance, respectively. Introducing a third variable was not productive since their eigenvalues were less than 1.

The same procedure was applied to scales B, D, E, F, and G. For these scales, the optional factor structure comprised only one variable, explaining 48% (B), 40.45% (D), 69.49% (E), 69.49% (F), and 61.61% (G) of the total variance, respectively. No second variable was selected for these scales as their eigenvalues were less than 1.

For scales A and C, which included two variables, a rotation method had to be selected. Based on the presence and strength of correlations between variables, a direct oblimin rotation was conducted in the Statistical Package for Social Sciences (SPSS), as seen in table 2. For correlations between variables with factor loadings greater than 0.32, a direct oblimin rotation was used. For those with lower values, varimax rotation was applied.[29] The results for scale A are presented in table 3 and those for scale C in table 4. Variables with loadings less than 0.45 were not included in the tables.

Table 2. Correlation estimation between variables. Extraction method: Principal component analysis rotation method: Oblimin with Kaiser normalization.

Component	A		C	
	1	2	1	2
1	1.000	0.65	1.000	0.250
2	0.65	1.000	0.250	1.00
Direct Oblimin rotation				

Table 3. A scale. Pattern matrix. Extraction method: Principal component analysis rotation method: Varimax with Kaiser normalization.

Scale items (number)	Component	
	1	2
22	0.410	
23		0.810
24	0.721	
25	0.785	
26	0.702	
27	0.745	
28		0.796

Table 4. C scale. Rotated component matrix. Extraction method: Principal component analysis.

Scale items (number)	Component	
	1	2
40	0.587	
41		0.770
43	0.774	
44	0.747	
45	0.695	
46	0.430	0.583

Reliability analysis

The procedure was concluded by conducting reliability analysis[30,31] for all variables and scales through Cronbach's alpha calculations. This process indicated that the new measurement instrument demonstrated good to acceptable reliability. Scale F showed good reliability (α >0.8), while scales A, B, C, E, and G, as well as the underlying variable A1 exhibited sufficient reliability (α >0.7). Scale D exhibited low but still acceptable reliability (α=0.505). Finally, the underlying variables A2 and C2 did not demonstrate good reliability, although the values for A and C exhibited completely sufficient reliability (tab. 5).

Categorical principal component analysis

Within the research, a knowledge test regarding basic knowledge of bioethics rules was performed, corresponding to scale H. CATPCA was conducted to assess the reliability of this scale, which consisted of 12 questions (9–20). The results of this analysis indicate a Cronbach's alpha value of 0.701. In conclusion, for scale H, the reliability is deemed sufficient (α >0.7).

DISCUSSION

Imaging professionals play a crucial role in the healthcare field, prioritising the care and well-being of patients and their loved ones. Like other healthcare professions, radiographers adhere to ethical professional standards and codes of conduct to guide their actions. Bioethics serves as the framework for establishing guidelines regarding appropriate behaviours towards patients and colleagues. These guidelines encompass various aspects, including communication with patients, respect, justice, informed consent, confidentiality, safety, and effective collaboration with other healthcare professionals. Ethical considerations extend to decision-making, assistance in diagnosis, and education.

One notable concern revolves around how radiogra-

Table 5. Reliability analysis for total scales through Cronbach's alpha calculation.

Variables	Initial items	Initial Cronbach's alpha	Remain items	Cronbach's alpha
A	22, 23, 24, 25, 26, 27, 28	0.549	24, 25, 26, 27	0.727
A1	22, 24, 25, 26, 27	0.706	24, 25, 26, 27	0.727
A2	23, 28	0.471	23, 28	0.471
B	35, 36, 37, 38, 39	0.662	35, 36, 37, 38	0.745
C	40, 41, 42, 43, 44, 45, 46	0.702	40, 41, 42, 43, 44, 45, 46	0.702
C1	40, 43, 44, 45	0.692	40, 43, 44, 45	0.692
C2	41, 42, 46	0.528	41, 42, 46	0.528
D	47, 48, 49, 50	0.496	47, 48, 49	0.505
E	53, 54, 55	0.763	53, 54, 55	0.763
F	57, 58	0.841	57, 58	0.841
G	59, 60, 61, 62	0.791	59, 60, 61, 62	0.791

phers manage the use of radiation with patients. Are their values aligned with the principles of radiation protection and sound management? Do cultural or personal values, professional standards, or their knowledge of bioethics and science influence their actions?

Additionally, the ethical challenge of communicating information about the examination or treatment process to patients is crucial. Should radiographers inform patients about potential rare side effects, even if such occurrences are infrequent? Could this information sometimes function as a deterrent, preventing patients from undergoing necessary examinations and causing harm?

Moreover, radiological examinations and treatments often necessitate the cooperation of patients. Radiographers are entrusted with explaining procedures, addressing patient fears, and earning their trust to ensure a successful examination or treatment. All these processes must strictly adhere to ethical values and professional conduct rules.

The significance of a proper radiological examination or treatment for the course and outcome of a disease, as well as healthcare quality cannot be underestimated. Therefore, research into the knowledge, attitudes, and behaviours of radiographers is paramount to develop interventions that enhance their knowledge and skills when needed.

It is important to notice that the education of radiographers across Europe exhibits variation and heterogeneity.[32] In many European countries, such as Greece, bioethics is integrated into university-level curricula. In Greece, the only university faculty offering radiographer education, classified as level 6 according to the National Qualifications Framework (NQF), includes mandatory courses in ethics and patient communication. It is worth noting that the inclusion of an ethics course in the curriculum is recent, dating back to 2001. Consequently, many professionals currently in practice may not have received relevant training.

Additionally, some radiographers' assistants receive education at level 5 based on the NQF, providing a lower level of education compared to university-educated radiographers. While they do receive training in ethics, this is limited. These radiographer assistants perform tasks like radiographers within Greek healthcare organisations. Thus, relevant educational programmes are particularly important.

In addition, a review of the current literature reveals emerging ethical dilemmas, particularly in the treatment of patients with COVID-19, highlighting the need for ongoing training for healthcare professionals.[33] Rapid advancements in the sciences bring forth new bioethical challenges, including those related to m-Health[34] and artificial intelligence.[35,36] While most studies have focused on students, all underscore the importance of education on bioethics issues and decision-making.

In the United States, one study explores ways to enhance the training of healthcare professionals in bioethics[37] through a national survey conducted at hospitals. These programmes are deemed crucial for maintaining healthcare quality. Notably, a study found that a significant percentage of survey respondents, including radiologists, had never read the American Medical Association Code of Medical Ethics or the American College of Radiology Code of Ethics. It revealed that ethics education was often insufficient during medical school and residency.[6] Another study emphasised the need for support to facilitate learning ethical competence, promoting the ability to manage ethical problems and determine the best strategies.[38]

The measurement instrument developed in this study aims to assess the existing level of knowledge among radiographers and guide appropriate training efforts. It also contributes to the cultivation of a culture of bioethics for radiographers, through education, where necessary.

As demonstrated, the new measurement instrument exhibits good to acceptable reliability and validity, rendering it a suitable tool for assessing radiographers' knowledge, attitudes, and behaviours related to bioethics, as well as their attitudes towards bioethics education.

The most significant advantage of this study is the questionnaire's elevated level of validity and reliability. The questionnaire achieved a high response rate of 82.2% in the main nationwide research. The sample consisted of 180 randomly selected Greek radiographers, providing valuable insights into their beliefs, perceptions, behaviours, and knowledge concerning bioethics in their daily practice.

Nonetheless, there were limitations to this study, such as the questionnaire's length, which might have affected the response rate. Variable D exhibited acceptable but questionable reliability, warranting reassessment in future research. Factors A2 and C2 demonstrated suboptimal reliability, suggesting the need for reconsideration in future studies. Specifically, it might be necessary to remove factor A2 in future research.

The contribution of this study to clinical radiographers is the identification of knowledge gaps in bioethics issues. This knowledge can motivate the revision of misconceptions, perceptions, and practices. The study also highlighted the areas on which a bioethics training programme for radiographers should focus. Such training programmes should be conducted regularly to address all aspects of bioethics and address new challenges.

ΠΕΡΙΛΗΨΗ

Μέτρηση των στάσεων, της συμπεριφοράς και των γνώσεων των τεχνολόγων-ακτινολόγων σχετικά με τη Βιοηθική: Παρουσίαση ενός νέου εργαλείου

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ΣΚΟΠΟΣ Η διερεύνηση των γνώσεων, των στάσεων και των συμπεριφορών των τεχνολόγων-ακτινολόγων (ΤΑ) σε σχέση με βιοηθικά ζητήματα που προκύπτουν κατά την καθημερινή επαγγελματική τους πρακτική. Για τον σκοπό αυτόν δημιουργήθηκε ένα νέο αξιόπιστο και έγκυρο ερωτηματολόγιο. Το εν λόγω ερευνητικό εργαλείο χρησιμοποιήθηκε σε πανελλαδική έρευνα στην οποία συμμετείχαν 180 ΤΑ, με 148 συμπληρωμένα ερωτηματολόγια (που αντιστοιχούν σε ποσοστό ανταπόκρισης 82,2%). **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Αναπτύχθηκε ένα εκτενές ερωτηματολόγιο που περιλάμβανε 56 ερωτήσεις οργανωμένες σε οκτώ διαφορετικές ενότητες. Το ερωτηματολόγιο αυτό αναρτήθηκε στη διαδικτυακή πλατφόρμα Survey Monkey, η οποία πληροί όλες τις προδιαγραφές για τη διεξαγωγή της αναλυτικής μελέτης. Διανεμήθηκε σε μια τυχαία επιλεγμένη ομάδα 40 Ελλήνων ΤΑ. Πραγματοποιήθηκε ανάλυση παραγόντων για κάθε ενότητα που μελετήθηκε και διενεργήθηκε ανάλυση αξιοπιστίας με τη χρήση του Cronbach's alpha. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Το τελικό ερωτηματολόγιο αποτελείται από οκτώ ενότητες και συγκεκριμένα: «Βασικές γνώσεις Βιοηθικής», «Φροντίδα ασθενούς», «Ενημερωμένη συγκατάθεση», «Διακρίσεις», «Εχεμύθεια», «Στάση έναντι της εκπαίδευσης στη Βιοηθική», «Στάση σχετικά με τα αποτελέσματα της εκπαίδευσης» και «Στάση σχετικά με την επίδραση της εφαρμογής των αρχών της Βιοηθικής». Επί πλέον, υπάρχει μια ένατη ομάδα με 6 ερωτήσεις σχετικά με δημογραφικά στοιχεία. Όλα τα αποτελέσματα κατέδειξαν ότι η αξιοπιστία του νέου εργαλείου μέτρησης κυμαίνεται από αποδεκτή έως πολύ καλή (Cronbach's alpha: 0,505–0,841). **ΣΥΜΠΕΡΑΣΜΑΤΑ** Το ερωτηματολόγιο που αναπτύχθηκε σε αυτή τη μελέτη συνιστά μια έγκυρη και αξιόπιστη επιλογή για την καταγραφή των γνώσεων, των πεποιθήσεων και των συμπεριφορών των ΤΑ σχετικά με ηθικά ζητήματα. Έτσι, είναι κατάλληλο για να χρησιμοποιηθεί στην πανελλαδική έρευνα της μελέτης.

Λέξεις ευρετηρίου: Διακρίσεις, Εχεμύθεια, Ιατρική ηθική, Φροντίδα ασθενούς

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SUPPLEMENT I

Questionnaire

1. Sex

Male ☐   Female ☐

2. Age *(in years)*

20–30 ☐   30–40 ☐   40–50 ☐   50+ ☐

3. Education category (please select the higher category that applies to you)

Secondary ☐   Technological ☐   University ☐

4. Postgraduate studies (please select the higher level that applies to you)

Master's degree ☐   PhD ☐   Post doc ☐   I don't have a master's degree ☐

5. Professional experience *(in years)*

0–10 ☐   11–20 ☐   21–30 ☐   30–40 ☐

6. Work department

X-ray ☐   Radiotherapy ☐   CT or MRI ☐   Nuclear medicine ☐   Other ☐

7. Is there a code of ethics for Greek radiographers?

Exist ☐   Not exist ☐   I don't know ☐

8. The code of conduct and the code of deontology applicable to a profession, are

The same ☐   Different ☐   I don't know ☐

	Right	Wrong
9. The term "Bioethics" encompasses external regulations (outside the health organization)		
10. The term "Bioethics" encompasses internal regulations (inside the health organization)		
11. The term "Bioethics" encompasses feelings and beliefs		
12. The term "Bioethics" encompasses legal issues and judicial decisions		
13. The term "therapeutic privilege" refers to the patient's right to treatment		
14. The term "therapeutic privilege" means the right of a doctor to make treatment decisions on behalf of the patient		
15. The term "therapeutic privilege" means a doctor's right to make treatment decisions for a patient when the patient is unable to make decisions for themselves		
16. The term "therapeutic privilege" refers to the right of a health professional to withhold information from the patient if they believe that disclosing it would have an adverse effect on the patient's health		
17. The autonomy of a patient includes the principle of informed consent		
18. The autonomy of a patient encompasses fundamental human rights		
19. The patient's autonomy includes their right to make decisions independently		
20. The autonomy of a patient encompasses their right to receive treatment		

21. Confidentiality between a patient and a healthcare professional is

Necessary without any exceptions ☐   Necessary and there are exceptions ☐   Not necessary ☐

22. I believe in always striving to do what is in the best interest of the patient

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

23. My primary belief is to avoid causing harm to the patient

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

24. I always restrict the radiation field when conducting radiographic procedures

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

25. I always seek clinical information in the patient's referral

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

26. I consistently implement all the radiation protection practices I am aware of and have access to

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

27. I adjust exposure factors according to established practices in the medical literature

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

28. I adjust exposure factors based on my personal belief in the value of radiation protection

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

29. My personal values guide me in the use of radiation protection practices

Not at all ☐   Slightly ☐   Moderately ☐   Very ☐   Completely ☐

30. The well-being of the patient guide me in the use of radiation protection practices

Not at all ☐   Slightly ☐   Moderately ☐   Very ☐   Completely ☐

31. The quality of the medical image guide me in the use of radiation protection practices

Not at all ☐   Slightly ☐   Moderately ☐   Very ☐   Completely ☐

32. The ethical rules of the profession guide me in the use of radiation protection practices

Not at all ☐   Slightly ☐   Moderately ☐   Very ☐   Completely ☐

33. I believe that every patient should be fully informed about their health status, regardless of the potential for adverse health outcomes

Yes ☐   No ☐

34. I believe that providing information is not necessary when the patient does not appear to want to know

Right ☐   Wrong ☐

35. When the examination involves unpleasant experiences (such as pain or discomfort), I provide the patient with detailed information about what to expect

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

36. I always inform the patient about all the contraindications of the examination to which he is about to undergo

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

37. I always inform the patient about all possible side effects of the examination, or the preparations involved, including short-term and long-term effects

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

38. I always inform relatives when there is poor communication with the patient, especially in cases involving elderly individuals, children, people with intellectual disabilities, or patients without the ability to communicate effectively

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

39. It is not necessary for the patient to know all the details in order to undergo an examination

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

40. I feel more comfortable when interacting with patients who share the same religious beliefs as me

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

41. My behaviour is not influenced by the patient's sexual orientation

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

42. I serve patients of both sexes with equal willingness

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

43. The physical appearance of a patient plays a role in how I manage their care

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

44. I try to provide my best care when interacting with patients who have name recognition or high financial standing

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

45. I prefer not to provide healthcare services to patients who have committed illegal acts

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

46. I sometimes feel resentful when I need to communicate with a disabled patient, and communication is challenging due to their disability

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

47. During work breaks, I discuss with colleagues incidents that have had an impact on me in some way

Never ☐   Rarely ☐   Sometimes ☐   Often ☐   Always ☐

48. When treating a patient who is a prisoner, I inform the accompanying guard about the patient's state of health

Never ☐   Rarely ☐   Sometimes ☐   Often ☐   Always ☐

49. I discuss with family and friends about interactions with public figures who visit the laboratory for examination or treatment

Never ☐   Rarely ☐   Sometimes ☐   Often ☐   Always ☐

50. I inform the relatives about the results of the examination, without the patient's consent being necessary

Never ☐   Rarely ☐   Sometimes ☐   Often ☐   Always ☐

51. My general behaviour as a health professional is mainly influenced by

My personal morality ☐   My religious beliefs ☐   My professional ethics ☐
The instructions of the department ☐   My experience ☐

52. How much do you agree with the following statement: "My knowledge on bioethics issues is sufficient"

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

	Strongly disagree	Disagree	Neither agree, nor disagree	Agree	Strongly agree
53. The acquisition of knowledge on bioethics issues is interesting					
54. The acquisition of knowledge on bioethics issues is necessary					
55. The acquisition of knowledge on bioethics issues is unnecessary					

56. Choose how much each of the following sources has contributed to your information on bioethics issues

	Not at all	Slightly	Moderately	Very	Completely
Seminars					
Discussion/presentation by an expert in bioethics					
Discussion with colleagues					
Lessons in school or university					
Internet, books, or article					
I am not aware of such issues. I based on my experience and beliefs					

57. How much do you agree with the statement: "Continuing training in bioethics would lead to a higher quality of service provision"

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

58. How much do you agree with the statement: "Knowledge of the principles and rules of bioethics is useful in everyday professional practice?"

Strongly disagree ☐   Disagree ☐   Neither agree, nor disagree ☐   Agree ☐   Strongly agree ☐

	Not at all	Slightly	Moderately	Very	Very much
59. To what extent do you believe that the application of bioethics principles improves time management in healthcare or related settings?					
60. To what extent do you believe that the application of bioethics principles influences the quality of treatment results or the overall image of healthcare practices?					
61. To what extent do you believe that the application of bioethics principles contributes to cost-saving in healthcare?					
62. To what extent do you believe that the application of bioethics principles contributes to radiation protection in healthcare?					