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Research Article

The knowledge and perception of patients in Malta towards artificial intelligence in medical imaging

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ABSTRACT

Introduction: Artificial intelligence (AI) is becoming increasingly implemented in radiology, especially in image reporting. Patients' perceptions about AI integration in medical imaging is a relatively unexplored area that has received limited investigation in the literature. This study aimed to determine current knowledge and perceptions of patients in Malta towards AI application in medical imaging.

Methods: A cross-sectional study using a self-designed paper-based questionnaire, partly adapted with permission from two previous studies, was distributed in English or Maltese language amongst eligible outpatients attending medical imaging examinations across public hospitals in Malta and Gozo in March 2023.

Results: 280 questionnaires were analysed, resulting in a 5.83 % confidence interval. 42.1 % of patients indicated basic AI knowledge, while 36.4 % reported minimal to no knowledge. Responses indicated favourable opinions towards the collaborative integration of humans and AI to improve healthcare. However, participants expressed preference for doctors to retain final-decision making when AI is used. For some statements, a statistically significant association was observed between patients' perception of AI-based technology and their gender, age, and educational background. Essentially, 92.1 % expressed the importance of being informed whenever AI is to be utilised in their care.

Discussion: As key stakeholders, patients should be actively involved when AI technology is used. Informing patients about the use of AI in medical imaging is important to cultivate trust, address ethical concerns, and help ensure that AI integration in healthcare systems aligns with patients' values and needs.

Conclusion: This study highlights the need to enhance AI literacy amongst patients, possibly though awareness campaigns or educational programmes. Additionally, clear policies relating to the use of AI in medical imaging and how such AI use is communicated to patients are necessary.

RÉSUMÉ

Introduction: L'intelligence artificielle (IA) est de plus en plus utilisée en radiologie, en particulier dans les rapports d'images. La perception qu'ont les patients de l'intégration de l'IA dans l'imagerie médicale est un domaine relativement inexploré qui n'a fait l'objet que de peu d'études dans la littérature. Cette étude vise à déterminer les connaissances actuelles et les perceptions des patients de Malte à l'égard de l'application de l'IA à l'imagerie médicale.

Méthodologie: Une étude transversale utilisant un questionnaire papier auto-conçu, partiellement adapté avec l'autorisation de deux études précédentes, a été distribuée en anglais ou en maltais parmi les patients externes éligibles ayant subi des examens d'imagerie médicale dans les hôpitaux publics de Malte et de Gozo en mars 2023.

Résultats: 280 questionnaires ont été analysés, ce qui a permis d'obtenir un intervalle de confiance de 5.83 %. 42.1 % des patients ont indiqué avoir des connaissances de base en matière d'IA, tandis que 36.4 % ont déclaré n'avoir que des connaissances minimales, voire aucune connaissance. Les réponses indiquent des opinions favorables à l'intégration collaborative des humains et de l'IA pour améliorer les soins de santé. Toutefois, les participants ont exprimé leur préférence pour que les médecins conservent la prise de décision finale lorsque l'IA est utilisée. Pour certaines affirmations, une association statistique-

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ment significative a été observée entre la perception qu'ont les patients de la technologie basée sur l'IA et leur sexe, leur âge et leur niveau d'éducation. Essentiellement, 92.1 % des participants ont souligné l'importance d'être informés lorsque l'IA est utilisée dans le cadre de leurs soins.

Discussion: En tant qu'acteurs clés, les patients devraient être activement impliqués lorsque la technologie IA est utilisée. Il est important d'informer les patients sur l'utilisation de l'IA en imagerie médicale afin de cultiver la confiance, de répondre aux préoccupations éthiques et de veiller à ce que son intégration dans les systèmes de soins de santé corresponde aux valeurs et aux besoins des patients.

Conclusion: Cette étude met en évidence la nécessité d'améliorer les connaissances des patients en matière d'IA, éventuellement par le biais de campagnes de sensibilisation ou de programmes éducatifs. En outre, des politiques claires concernant l'utilisation de l'IA dans l'imagerie médicale et la manière dont cette utilisation est communiquée aux patients sont nécessaires.

Keywords: Artificial intelligence; Person-centred care; Communication; Knowledge; Perception

Introduction

In the medical field, radiology is leading the way in adopting AI technologies [1]. The literature employs various terminologies to define AI and its fundamental principles [2]. According to an independent high-level expert group appointed by the European Commission in 2018, AI "refers to systems that display intelligence behaviour by analysing their environment and taking actions-with some degree of autonomy to achieve specific goals" [2].

There are numerous speculations about the extent to which AI will be integrated in medical imaging and the potential changes it will bring to the workforce. AI has the potential to optimise different aspects of the medical imaging workflow, including image reporting and triaging of examinations, improving diagnostic accuracy, reduce radiation doses and decrease time in post-processing images [3,4]. Moreover, AI has the potential to decrease report turnaround time, facilitate earlier disease detection, personalise treatments and enhance staff productivity and efficiency, amongst others [5-7].

Various AI-based algorithms have shown promising potential in detecting and characterising abnormalities, leading to improved clinical outcomes through more personalised approaches [3]. Nevertheless, the pace of clinical adoption of AI based algorithms has been gradual due to factors such as differing attitudes towards new technologies, inadequate training, and medico-legal issues [3].

While AI has the potential to provide substantial improvements in various aspects of medical imaging, limited research has been conducted to explore patients' attitudes and perceptions of the use of AI in radiology [8]. Existing studies conducted amongst patients indicate that the general public's understanding of AI is limited and often influenced by factors such as media coverage and technological experience [9]. Given that patients are the primary beneficiaries of healthcare AI innovations, understanding their opinions, values, and needs becomes crucial [10]. This knowledge helps to ensure that AI advancements are embraced by patients and implemented ethically to enhance patient care [10].

The aim of this study was to investigate existing knowledge of AI concepts amongst patients in Malta and how they perceive AI applications in medical imaging. In order to fulfil the aim of this research study, the following objectives were set:

- To conduct a prospective study by distributing a questionnaire to patients scheduled for a CT, Mammography, MRI, Nuclear Medicine, PET-CT, Ultrasound and/or X-ray examination at a local general public hospital in Malta and at a local general public hospital in Gozo.
- To statistically analyse the data regarding patients' perceptions of AI in medical imaging and compare it with existing literature.
- To compare and statistically analyse the perception towards AI-based technology between genders, age groups, and participants of diverse educational backgrounds.

Given that there is limited published research investigating patient's views and perspectives on AI use in medical imaging, it is hoped that the findings will contribute to the knowledge base to provide a basis upon which future decisions about AI implementation in medical imaging are better aligned with patients' perceptions and preferences.

Methods

Study design

Ethical approval was sought and obtained from the Faculty of Health Sciences Research Ethics Committee (Ref No: FHS-2022–00361) to conduct this prospective survey study amongst a convenience sample of patients attending various medical imaging examinations in public hospitals in Malta or Gozo.

While participation was completely voluntary, those patients meeting the following inclusion criteria were invited to participate in the study: (a) outpatients of any gender, aged 18 or above, and legally competent to consent to participate in this study; (b) patients who could read and write in Maltese or English; (c) patients who had scheduled appointments for non-emergency CT, Mammography, MRI, Nuclear Medicine,

PET-CT, Ultrasound, and X-ray examination at a local general public hospital in Malta or Gozo during March 2023.

Data collection procedure

In line with ethical permission granted, eight intermediary radiographers acting on behalf of the researchers, distributed an information sheet and a paper-based questionnaire (in English or Maltese) to eligible patients after they had registered at the respective Medical Imaging Department (MID) reception.

A Quick Response (QR) code was included at the beginning of the paper-based questionnaire, allowing participants to access an online replica of the questionnaire on the SurveyMonkey platform. The inclusion of a QR code was primarily motivated by marketing literature that shows that QR codes are a simple and effective method for increasing user engagement [11], given the prevalence of smartphones and tablets. However, all participants also had the option of filling in the questionnaire using the traditional pen-and-paper method.

After completing the questionnaire, participants were instructed to submit the questionnaire in the designated collection boxes located within the MID, as indicated by independent intermediaries who were not affiliated with the study. For those who opted for online completion of the questionnaire using the QR code, participants were required to click 'Done' upon completing the questionnaire.

Questionnaire design

Permission was sought from Clements et al. [12] and Ongena et al. [8] to make use, modify and adapt questions from previously conducted research and incorporate these within the self-designed questionnaire developed for this study (Appendix A). Additionally, to accommodate the country's bilingual nature, a translated version of the questionnaire was also made available in the Maltese language.

The finalised questionnaire comprised 21 questions, divided into four sections. Most questions included in the finalised questionnaire were close-ended, dichotomous, multiple-choice, and Likert scale rating questions. Section A gathered demographic information about participants. Section B focused on assessing patients' awareness and knowledge of AI. Given that some individuals may not consider AI a routine technology, a definition of AI was included in this section. Section C explored patients' perceptions towards AI application in radiography through a series of statements. Section D comprised three questions which sought to determine whether patients would like to be informed should AI be used in their diagnostic or treatment plan, their willingness to anonymously share health data, and their perception of AI's impact on Maltese healthcare.

Validity, reliability and pilot study

Content validation of the questionnaire was performed by three academics with extensive research experience and a diagnostic radiographer with over fifteen years of clinical experience. When independently rating the relevance of each question with the study aims, adequate content validity was confirmed by the resultant mean I-CVI of 0.95. To assess the questionnaire's reliability, intra-rater reliability was used, whereby one statement addressing the same attribute was slightly reworded and repeated within the questionnaire, aiming to elicit the same response [13]. Kendall's tau test was used to evaluate this, with a p-value of <0.001 indicating satisfactory intra-rater reliability.

Prior to commencing the actual larger-scale data collection, a pilot study was undertaken whereby the questionnaire was distributed by intermediary radiographers to 38 patients, representing 10 % of the target population. Analysis of the responses revealed that patients generally understood the questions, and only minor typographical modifications were made to the questionnaire.

Data analysis

The International Business Machines Corporation-Statistical Package for the Social Sciences (IBM SPSS Statistics) version 28.0 was used for all statistical analyses. Both descriptive and inferential statistics were used. Descriptive statistics were utilised to organise, summarise and simplify the data [13]. The Friedman test was used to compare mean rating scores between a number of related statements. The Kruskal Wallis test was utilised to compare mean rating scores between groups of participants, categorised by gender, age-group and educational background.

Results

Sample

During the designated four-week data collection period, 305 questionnaires were gathered. However, after careful evaluation, 25 questionnaires were found to be incomplete and were therefore excluded. Consequently, 280 questionnaires were included in the final data analysis. Following power sampling analysis, the sample size of 280 was estimated to provide a confidence interval of 5.83 % when considering a 95 % confidence level.

Most of the questionnaires (92.5 %, n=259) were filled out using pen and paper, while a smaller proportion (7.5 %, n=21) were completed electronically using the provided QR code.

Table 1 presents an overview of the demographic characteristics of participants in this study. Out of the 280 respondents, 57.9 % of respondents were females, while 42.1 % were males. 43.9 % of participants fell within the 35–54 age range, followed closely by 42.1 % aged 55 and above. 13.9 % of participants were aged between 18 and 34 years. The study sample displayed a diverse range of educational levels and included patients attending for a range of different imaging examinations, as seen in Table 1. In relation to participants' technological skills, 61.1 % of participants reported having good technological skills, 26.8 % rated their technological skills as average,

Table 1
Demographics of participants.

Variable	Category	Frequency (N)	Percentage (%)
Gender	Female	162	57.9
	Male	118	42.1
Age	18–34	39	13.9
	35–54	123	43.9
	55+	118	42.1
Highest level of education	Primary	16	5.7
	Secondary	69	24.6
	Post-secondary	65	23.2
	Graduate	72	25.7
	Postgraduate- (including Masters and PhD levels)	58	20.7
Reason for attending outpatient radiology services	CT	45	16.1
	Mammography	24	8.6
	MRI	39	13.9
	Nuclear Medicine	48	17.1
	PET-CT	21	7.5
	Ultrasound	53	18.9
	X-ray	50	17.9
Technological skills	Poor	34	12.1
	Average	75	26.8
	Good	171	61.1

while a smaller percentage (12.1 %) considered their technological skills to be poor.

What comes to your mind when you hear the word 'artificial intelligence'?

An open-ended question was included in the questionnaire whereby participants were asked to write down what comes to mind when they hear the word AI. 212 participants provided an answer to this question, with the main terms or phrases provided being illustrated in Fig. 1.

Current knowledge of AI

When patients were asked to rate their knowledge about AI on a scale of 1 (no knowledge) to 5 (very good knowledge), most participants (42.1 %) reported having basic knowledge of AI. Additionally, 36.4 % of participants indicated having minimal or no knowledge of AI.

Patients' awareness of AI programs in medical imaging

Most patients (61.1 %, n=171) indicated that they were aware of the existence of computer/AI programs capable of analysing their scan images and issuing the result instead of the radiologist. Conversely, 38.9 % indicated a lack of awareness about this.

Accountability

Patients were asked to indicate who they think should be held responsible if the result of their scan was to be issued entirely by a computer program and the program overlooked an important medical condition or made an incorrect diagnosis. The findings revealed that most patients felt that the hospi-

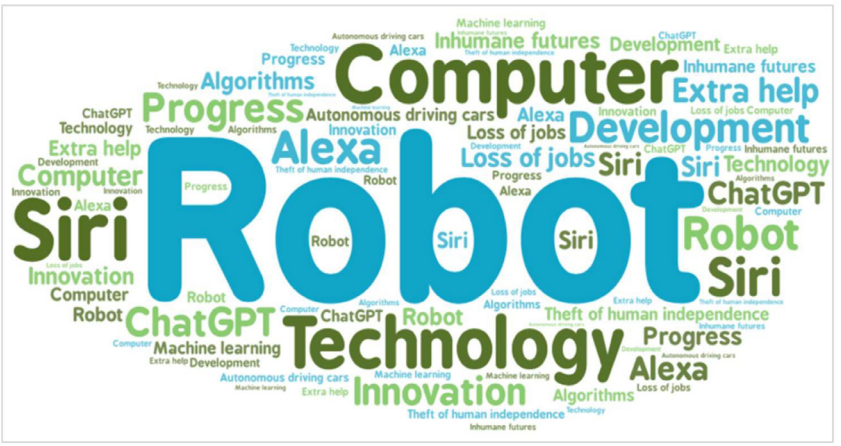

Fig. 1. Word cloud depicting participants' most common responses to the question: 'What comes to your mind when you hear the word AI?'.

Table 2
Friedman test.

	Mean	Std. Deviation
A doctor (radiologist) is more accurate than a computer in evaluating X-ray or scan images	3.37	.884
I wonder how it is possible that a computer can give me the results of an X-ray or scan without interference of humans	3.08	1.066
I think replacement of doctors by artificial intelligence will happen in the near future	2.99	1.109
I think replacement of doctors by artificial intelligence will happen in the far future	2.96	1.068
Even if computers are better in evaluating X-ray or scan images, I still prefer a doctor	3.89	.893
I would never trust a computer to give me the results	3.11	1.049
A computer is more accurate than a doctor (radiologist) in evaluating X-ray or scan images	2.85	.942
I think artificial intelligence programs can recommend reliable treatment options	3.38	.933
When artificial intelligence is used, I am concerned that my health information will be used for other purposes without my knowledge and authorisation	3.05	1.175
Artificial intelligence can prevent errors made by doctors	3.44	.943
Even when computers are used to evaluate X-ray or scan images, humans should always take the final decision	4.40	.730
Humans and artificial intelligence can complement each other to improve health care delivery	4.49	.742
I am concerned that artificial intelligence programs can result in medical errors	3.21	.900
Evaluating X-ray or scan images with artificial intelligence will reduce healthcare waiting times	3.85	.872
Computers can deal with personal health data more carefully than doctors	3.09	.926
I still prefer a doctor even if computers are better at analysing X-ray or scan images	3.68	.901
When an artificial intelligence program can predict that I will get a disease in the future I want to know no matter what	3.78	.999

$X^2(16) = 1070.35$, $p < 0.001$.

tal (60.7 %) and the company that developed the AI program (56.4 %) should bear the most responsibility. 21.1 % of the patients felt that the referring doctor should be held responsible. 19.3 % of patients felt that the radiologist should be considered accountable. A small percentage (3.2 %) even held themselves accountable.

Patients' preference for the disclosure of AI involvement in their diagnostic or treatment plan

A significant majority of participants (92.1 %) indicated that they would like to be informed when an AI program is involved in determining their diagnostic or treatment plan. Only a small minority (7.9 %) preferred not to be informed.

Comfort with AI having a role in the diagnostic interpretation of medical images

Participants were asked to rate their comfort levels on a five-point Likert scale ranging from 1 (very uncomfortable) to 5 (very comfortable) for two different scenarios. Firstly, patients were asked to rate their comfort level should their scan images be interpreted, and results issued *entirely by a computer* without any input from the radiologist. The results revealed that 42.1 % of participants felt uncomfortable or very uncomfortable. 33.2 % expressed a neutral stance. Only 24.7 % of participants indicated they would be comfortable or very comfortable with this approach.

Secondly, participants were requested to rate their comfort levels with having a *collaborative intelligence scenario*, whereby a computer program assists the radiologist in analysing the scan images and provides recommendations. Only 6.8 % of participants felt uncomfortable and very uncomfortable. Most participants (76.4 %, n=214) indicated they would be comfortable or very comfortable with such a collaborative intelligence scenario. 16.8 % expressed a neutral stance.

Patient perception of AI in medical imaging

The Friedman test (Table 2) was used to compare mean rating scores (Likert scale) between a number of related statements. The mean rating score ranged from 1 to 5, where 1 corresponded to 'strongly disagree', and 5 corresponded to 'strongly agree'. The Friedman test showed statistical significance when comparing the mean ratings of the statements regarding patients' agreement or disagreement towards the usage of AI in medical imaging. The p-value (p<0.001) was smaller than the 0.05 level of significance, indicating that the participants' mean rating scores vary significantly.

The highest mean rating score provided by participants was for the statement: 'Humans and artificial intelligence can complement each other to improve health care delivery' (4.49). Similarly, the statement 'Even when computers are used to evaluate X-ray or scan images, humans should always take the final decision', resulted in a relatively high mean rating (4.40). The statement 'A computer is more accurate than a doctor (radiologist) in evaluating X-ray or scan images' (2.85) had the lowest mean rating score, indicating the least agreement.

Association between participants' demographic characteristics and their perceptions of AI in medical imaging

The Kruskal Wallis test was used to compare mean rating scores provided to a statement between groups of participants as clustered by gender, age-group, or educational background. Findings revealed that when compared to male responses, females demonstrated lower levels of trust in AI (p=0.037) and a higher preference for doctors (p=0.035). Moreover, the findings suggest that older patients prefer the presence of a doctor

(p=<0.001) and exhibit uncertainty about computers or AI making decisions on their own (p=0.010). While there is an overall preference for doctors amongst participants of different educational levels, those with a higher education level may be more open to the idea of relying on computers.

Discussion

Of the 280 participants, only 42.1 % (n=118) claimed to have basic knowledge about AI. Essentially just over a third of participating patients (36.4 %, n=102) indicated having minimal to no knowledge about AI. These findings align with the conclusions drawn by Aggarwal et al. [14] who found that patients generally report low levels of knowledge about AI. As suggested in previous publications, educational initiatives and awareness campaigns should be developed aimed at improving patients' AI literacy [10].

A noteworthy finding is that more than half of the respondents (61.1 % n=171) indicated awareness of computer/AI programs capable of analysing their scan images and issuing the result instead of the radiologists. This finding differs significantly from that reported by Clements et al. [12] who distributed a survey amongst adult outpatients attending medical imaging examinations at a tertiary academic hospital in Melbourne (n=283). Their study reported that 62.9 % were unaware of the existence of such AI programs. One potential explanation for this discrepancy could be attributed to the difference in the timings of the research studies. The survey by Clements et al. [12] was administered to patients towards the end of 2018, while this questionnaire was distributed in 2023. From 2018 onwards there have been significant advancements in AI technology and a corresponding increase in media coverage [15]. Therefore, it is plausible that understanding, and awareness of AI might have increased over the intervening years.

When patients were asked what is the first word that comes to their mind when they hear the word AI, most participants wrote the word 'robot'. This emphasis on robotic imagery underscores a broader societal perception that AI operates similarly to mechanised beings capable of autonomous decision-making. Such perceptions, which are often influenced by media depictions, may impact how individuals view AI's role in healthcare and other sectors. Therefore, educating the general public about the various applications of AI, beyond its portrayal in popular media, is crucial in fostering understanding and acceptance of AI technologies. Other responses to this open-ended question included 'computer', 'technology', 'innovation' and 'future'. Some participants expressed concern about AI 'theft of human independence' and 'loss of jobs.'

When patients were asked how they would feel about AI interpreting their scan images and issuing the result without a radiologist's involvement, only a quarter (24.7 %) expressed that they would be comfortable or very comfortable. In contrast, most participants (76.4 %) indicated they would be comfortable or very comfortable with a collaborative intelligent scenario. Similar findings were reported in the study by Clements et al. [12] whereby patients rated their comfort in their scans reported solely by AI a mean of 3.5/7 (SD 1.8), p<0.0001 and scans reported in part by AI and in part by a radiologist a mean of 5.4/7 (SD1.6) (SD 1.6), p<0.0001. These results further emphasise that patients are less comfortable with the prospect of AI analysing scan images and issuing results without the radiologist's input. Nevertheless, patients exhibit a positive attitude towards the collaborative integration of humans and AI, recognising their complementary roles to enhance healthcare delivery.

Another important finding pertains to the assignment of responsibility in cases where a computer program issues patients' scan results without a radiologist's input, and the computer program either overlooks an important medical condition or provides a wrong diagnosis. When AI systems transition from being merely support tools to making autonomous decisions about diagnosis and prognosis, a significant medicolegal issue arises of who is liable for the clinical decision made by an AI system, particularly if a wrong diagnosis or prognosis is made [16]. To date, no courts have established laws related to legal accountability in situations where AI systems act autonomously and make an error [17]. The diversity in responses obtained underscores the significance of addressing ethical considerations about responsibility and the need for legal frameworks and clear guidelines as the utilisation of AI in medical imaging becomes increasingly widespread [12].

To gain insights into patients' perceptions on AI implementation in medical imaging, a number of statements were presented to participants using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). From the mean rating scores, the highest agreement was noted for the statement: 'Humans and artificial intelligence can complement each other to improve health care delivery'. Indeed, existing literature has suggested that patients prefer a collaborative approach combining both clinicians and technology as a form of hybrid intelligence, rather than either working in isolation [18].

Similarly, participants expressed a strong preference for humans taking the final decision, even when computers are used to evaluate scan images (4.40). This preference aligns with the findings reported by Ongena et al. [8]. whereby this statement had a mean rating score of 4.35. These findings also support those reported by Haan et al. [19] who conducted semi-structured face-to-face interviews with 20 outpatients undergoing chest and abdomen CT. Patients in this study expressed a lack of trust in AI's ability to make independent diagnoses and firmly believed that radiologists should retain ultimate decision-making authority instead of blindly relying on the outcome presented by an AI algorithm [19].

Similar feelings were expressed in this study, as the mean rating score provided to the statement 'A computer is more accurate than a doctor (radiologist) in evaluating X-ray or scan images' (2.85) was the lowest. Indeed, this score is relatively low on a 5-point Likert scale, implying that the respondents generally disagreed with this statement, which indirectly also shows an element of consistency in their general feelings towards the use of AI. The preference for radiologists over AI systems, despite the potential advantages of AI, such as not getting tired, not

taking sick leave or vacation leave, and not being hampered by burnout or environmental interruptions [20], can be attributed to several key factors. It could be argued that radiologists' extensive training and clinical experience enables them to make more informed interpretations of medical images, taking into account the clinical context and the patient's history [8]. Additionally, patients often value the physician-patient interaction and the ability to communicate directly with a physician who can explain findings, discuss implications, and provide reassurance [21]. This interaction may improve satisfaction and adherence to clinical recommendations and prescribed treatments [21].

When it comes to the replacement of doctors by AI in the near (2.99) and far (2.96) future, on average, participants were leaning towards disagreeing with these statements. This perspective is consistent with current healthcare trends, which suggest that although AI is being increasingly integrated into healthcare, it is not expected to replace humans in the foreseeable future [22].

Indeed, the history of automation demonstrates that, generally, jobs are not lost; instead, roles are reshaped [15]. For example, radiologists might shift their focus from repetitive tasks to areas involving patient interaction, research, and teaching [22]. Moreover, there exists an opportunity for interdisciplinary collaboration between AI experts and radiologists to design and develop AI applications in radiology [22]. While AI is not expected to replace radiologists, it is expected that "radiologists who use AI will replace those who don't" [22].

From this study, it was also found that certain demographic characteristics, such as being male, having higher educational levels, and being younger, were associated with higher levels of trust in AI and a stronger belief in the ability of AI programs to provide reliable treatment recommendations.

These demographic features align with previous studies, which have reported similar trends. Clements et al. [12] and Yakar et al. [23] found that female patients tend to prefer human involvement over AI more than males. Additionally, Ongena et al. [8] and Yakar et al. [23] reported that individuals with lower educational levels are less likely to trust AI in healthcare. Furthermore, Clements et al. [12] highlighted that those with low technology use favour human over AI intervention more than those with higher technological use. Nevertheless, despite this observed trend, all participants unanimously agreed that even if computers demonstrate superior performance in evaluating scan images, they still prefer the involvement of a doctor. This finding suggests that patients view AI as a supportive tool rather than a substitute for doctors.

When it comes to the potential involvement of AI in their diagnostic or treatment plan, most participants (92.1 %) expressed a preference for being informed about the usage of AI. This finding aligns with the study conducted by Ongena et al. [8] which highlighted patients' desire for comprehensive and transparent information about every aspect of their diagnostic process, particularly how their imaging data are obtained and processed.

Presently, there is no agreed-upon ethical consensus on whether informed consent should explicitly include the disclosure of the use of an AI algorithm [24]. Consequently, a pertinent question arises regarding the extent to which patients should be informed if, for example, their treatment decisions were derived by AI [24]. While patients may not require a detailed understanding of how AI functions to engage in healthcare decision-making [25], explainability holds significant value in establishing patients' trust, promoting patient empowerment and autonomy, transparency and obtaining informed consent [24].

For this reason, healthcare professionals have a vital role to play, especially when it comes to explaining the concept of AI to patients. According to a recent online survey by Rainey et al. [26] conducted amongst radiographers working in the United Kingdom, 57 % of diagnostic radiographers felt they lacked adequate training in AI. This lacuna in AI knowledge amongst radiographers has also been identified in similar national surveys conducted in Australia and Ireland [26]. These consistent findings highlight the urgent need to address this knowledge gap and provide the necessary training to upskill the current workforce.

Study limitations

The questionnaire was only distributed amongst outpatients and therefore we must recognise that our findings are not necessarily representative of the entire population of patients attending for medical imaging examinations. Similarly, we acknowledge that while the underrepresentation of the 18–34 patient age group limits the generalisability of our findings, our findings still provide a good reflection of the age groups who are most likely to undergo medical imaging examinations. In this regard, we believe our study provides useful insights into the prevailing state of patients' knowledge and perception of AI in medical imaging in Malta, which can guide future research and interventions.

Conclusion

AI is a mainstream topic in radiology [21] and is expected to play a significant role in the future of medical imaging. While acknowledging the potential of AI to enhance healthcare outcomes by complementing human expertise, this study's findings indicate that patients exhibit a strong preference for doctors, exhibit less trust in AI, consider radiologists' replacement by AI unlikely, and believe that humans should always take the final decision, even in the presence of AI technology. Furthermore, most participants indicated they would like to be informed whenever an AI program is involved in their diagnostic or treatment plan. Understanding user perception is important to facilitate the successful integration of AI applications into clinical practice. Patients are important stakeholders and, therefore, must be kept at the forefront of all decisions when evaluating and implementing any new technology to promote trust amongst the general public.

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Supplementary materials

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