

Acceptance of Artificial Intelligence in Supporting Cancer Patients

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Abstract. ASCAPE Project is a study aiming to implement the advances of Artificial Intelligence (AI), to support prostate cancer survivors, regarding quality of life issues. The aim of the study is to determine characteristics of patients who accepted to join ASCAPE project. It results that participants of the study mainly originate from higher-educated societies that are better informed about the potential benefits of AI in medicine. Therefore, efforts should be focused on eliminating patients' reluctance by better informing them on the potential benefits of AI.

Keywords. Artificial Intelligence, Prostate cancer, Quality of Life

1. Introduction and Background

Recent breakthroughs in Artificial Intelligence (AI) and Big Data analytics provide opportunities to improve many aspects of healthcare. AI is playing a growing role in oncology, including screening and diagnosis [1]. Many cancer patients endure side effects from the disease or its treatment, which can significantly reduce their health-related quality of life (QoL) [2]. Prostate cancer (PCa) is the second most common neoplasm in men, with over 336.000 new diagnoses annually, in Europe [3]. ASCAPE Project is an international study aiming to implement the advances of Artificial Intelligence (AI), in order to support prostate cancer survivors, regarding QoL issues [4]. An AI-based platform was created and trained on large retrospective datasets, regarding QoL issues of prostate cancer patients. The aim of this platform is to provide clinicians with accurate predictions about the emergence of QoL issues in cancer survivors, and suggest appropriate interventions, based on prospective patient data, obtained from

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medical records, questionnaires, and wearables. This approach was thoroughly communicated and explained to all eligible patients, by providing them with a written consent form. However, a significant number of cancer patients in our Department, refused to take part in this project. The aim of the current study is to determine characteristics of cancer survivors who accepted to join the ASCAPE project.

2. Methods and Materials

All PCa patients undergoing radical prostatectomy, regardless of participating in the ASCAPE project or not, were asked to answer questions regarding their baseline demographic characteristics, and regarding their perception on the use of internet, smartphone applications and AI in general.

Test for normal distribution was performed using Shapiro-Wilk statistical test. In case of continuous data where normal distribution was followed, paired T-test was used for comparison, while in case of non-normally distributed data, a non-parametric test was used. More specifically, when two groups were compared, Wilcoxon rank-sum test was used, while in case of more than 2 groups, Kruskal-Wallis test was utilized. To compare binary/categorical variables, chi-square test was used, with Yate's continuity correction applied as appropriate. Statistical significance was set at $p=0.05$. All statistical analyses were performed using R (R statistical software, Vienna, Austria) [5].

3. Results and Discussion

The mean age of participants in the study was 65 years of age (± 4.9), while for non-participants was 71 years (± 6.5). Reasons for refusal were phone compatibility issues in 62% of cases, and personal reasons in the rest 38%. The analysis revealed that education level was a significant factor affecting participation, since 70% of non-participants had completed secondary level of education, as opposed to 75% of participants who reported acquiring a university degree ($p\text{-value}<0.001$). The place of residence was also a significant factor, with 81% of participants and 44% of non-participants, living in a Metropolis ($p\text{-value } 0.004$) (Figure 1). In addition, 53% of non-participants were not aware of AI as an entity and consequently, its uses in medicine, compared to 17% of participants in the project (Figure 2). An additional interesting result from the analysis was, that 75% of participants reported use of a smartwatch in their daily life routine, in contrast to 88% of non-participants who did not use a smartwatch ($p\text{-value}<0.001$). It is common knowledge that AI and its applications has been a source of skepticism and concern over the years, regarding its capabilities, outcomes and trust of people towards it[6]. As our study shows, societies that are higher-educated, present more trust and acceptance towards AI, as people are more familiar with its potential advantages in medicine, are better informed about technological advancements and as a result, they do not perceive AI with fear of the unknown. On the contrary, patients that originate from remote societies, with poorer- education levels, have less interaction with technology, and that still remains the case for the Greek society in many occasions [7]. As a consequence, accepting AI is hard to achieve in these patients, even though the potential benefits by its use, are hard to disregard.

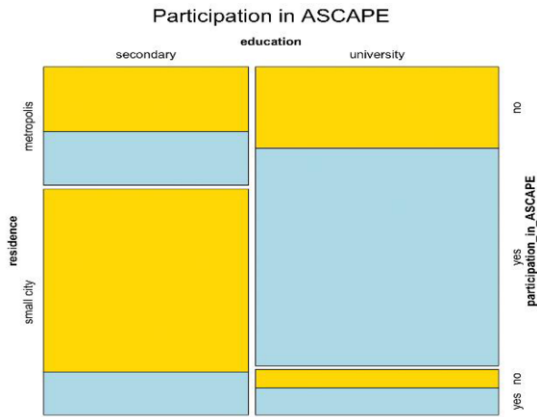


Figure 1. Patient characteristics regarding their participation in ASCAPE or not. (yes=blue/yellow=no)

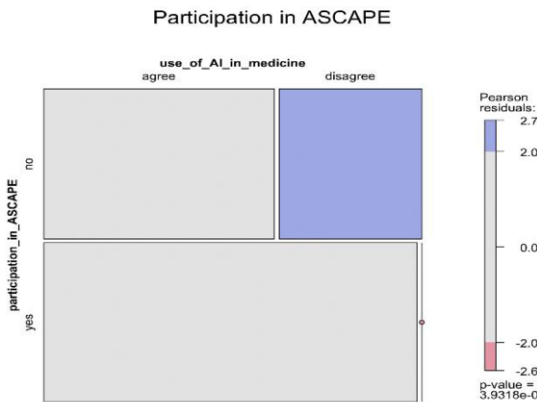


Figure 2. Patient acceptance of AI use in medicine and participation in ASCAPE.

4. Conclusion

The use of AI for assessment and improvement of QoL in cancer patients is promising. There are still social barriers against its widespread implementation, focusing mainly on poor-educated and remote societies easier. Therefore, efforts should focus on eliminating participants’ hesitance and fear, by informing them on the applications and uses of artificial intelligence, and highlighting the potential benefits.

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References

- [1] Hazarika I. Artificial intelligence: opportunities and implications for the health workforce. *Int Health*. 2020;12:241–245.
- [2] Nardin S, Mora E, Varughese FM, et al. Breast Cancer Survivorship, Quality of Life, and Late Toxicities. *Front Oncol*. 2020;10:864.
- [3] R. Siegel, K. Miller and A. Jemal, “Cancer statistics,” *CA Cancer J Clin*. 2020
- [4] Tzelves L, Manolitsis I, Varkarakis I, Ivanovic M, et al. Artificial intelligence supporting cancer patients across Europe-The ASCAPE project. *PLoS One*. 2022 Apr 21;17(4):e0265127.
- [5] R Core Team (2021). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.
- [6] Karran AJ, Demazure T, Hudon A, Senecal S, et al. Designing for Confidence: The Impact of Visualizing Artificial Intelligence Decisions. *Front Neurosci*. 2022 Jun 24;16:883385.
- [7] Boulouta, Konstantina. (2010). THE EFFECTS OF TECHNOLOGICAL CHANGE IN THE SOCIAL ENVIRONMENT OF GREECE.