Social Robots in Healthcare

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Introduction and Background

An important and new development in technology is the integration of social robots into healthcare environments. A social robot is any virtual or physical device that harnesses the ability to interact with both humans and non-humans in a real-world setting (Ragno et al, 2023). Within healthcare, social robots can be used for patient care, patient rehabilitation, patient companionship, or medical aid. Social robots are typically placed in hospitals, nursing homes, and even patients' private homes. The idea of robots potentially replacing humans in vital areas of healthcare is definitely cause for some concerns, including ethical, legal, security, and social issues. The purpose of this abstract is to analyze this new development in technology and explain some of the overall concerns that surround it.

Potential Benefits

One of the benefits of social robots is the wide variety of patients that they can provide care to, including adults, children, and even animals. This reduces the amount of work for health-care providers, as robots can be placed into a wide variety of settings. A study by Bouchard and co-authors shows that healthcare providers view social robots as beneficial for aiding patients who have heart failure (Bouchard et al., 2023). According to Gonzalez and co-authors, these robots were first proven to be extremely useful in healthcare during the Covid19 pandemic (Gonzalez et al., 2021). Social robots are currently being made even more human-like, as they aid patients with multiple illnesses and diseases, acting as caregivers or potentially even members of families. They can aid individuals, resulting in the need for fewer human services, leading to a feeling of more independence. Research shows that social robots have aided both adults and children alike in fighting diseases like cancer, autism, diabetes, and dementia

(Gonzalez et al., 2021). While social robots provide many benefits in healthcare, their usage also raises several issues.

Legal and Ethical Issues

One of the ethical issues being the lack of humanity between their human interactions. Humans are naturally able to read facial expressions and express emotions. Robots, however, do not feel emotions, so they cannot relate to human emotions, raising the issue that they will not be able to approach interactions with humanity, a basic but extremely important task. Another ethical issue involving social robots is the risk of children receiving care from them. Social robots can be unpredictable and potentially uncontrollable, so allowing children to receive their care poses a substantial risk. A legal issue is the concern of privacy, as robots come into close contact with countless individuals and are also used in public. There is a big concern that patient data recorded by social robots could be released to individuals who do not legally have the right to that information (Ragno et al., 2023). According to the 10 rules of netiquette, this idea relates to rule number 8, respecting the privacy of others.

Security and Social Concerns

Similarly to the legal issue, a security concern regarding to social robots is data security. Social robots collect patients' personal data and information, which concerns individuals as to whether that information will be kept private or not. According to research done by Elendu and co-authors, there should be a method of encryption which keeps patient data secure while it is being transmitted and stored (Elendu et al., 2023). Another security issue is the potential lack of control of robots. It is possible to have malfunctions or technology failures, which could possibly lead to a loss of control of robots, not knowing what harm they could potentially cause. A

prevalent social concern revolving around social robots is the potential loss of healthcare jobs. There has been a rise in the use of robots as nurses, leading to a fear of future unemployment for nurses and other healthcare workers (Farhud and Zokei, 2021). Similarly, research suggests that eventually robots will be able to do human jobs better than humans, which will change the workforce (Walker, 2024).

Future Research

As far as future research, an extensive list of risks still needs to be addressed when it comes to social robots in healthcare before the legal, ethical, social and security concerns can be subdued. Further research should be done to figure out how to get the most efficient from social robots while still protecting the interests and privacy of patients and providers, as this technology continues to develop (Bouchard et al., 2024). Social robots still need a lot of revision, but they have the potential to change healthcare for the better.

References

Bouchard, K., Liu, P. P., Dautenhahn, K., Fiedorowicz, J. G., Afrin, J., Dans, M., McGuinty, C., & Tulloch, H. (2023). Cardiology professionals' views of social robots in augmenting heart failure patient care. *European Heart Journal - Digital Health*, *5*(1), 69–76. Retrieved January 25, 2025, from https://doi.org/10.1093/ehjdh/ztad067

This article explores the perspectives and thoughts of professional doctors in a healthcare setting. Perhaps the most important perspectives needed on social robots are from doctors themselves and they know the task that needs to be done in caring for patients. Participants of this study completed an interview and questionnaire addressing whether or not they thought social robots are a good fit for healthcare, specifically with heart failure patients.

Elendu, C., Amaechi, D. C., Elendu, T. C., Jingwa, K. A., Okoye, O. K., John Okah, M., Ladele, J. A., Farah, A. H., & Alimi, H. A. (2023). Ethical implications of AI and robotics in healthcare: A Review. *Medicine*, *102*(50). Retrieved January 25, 2025, from https://doi.org/10.1097/md.0000000000036671

This article touches on how their recent developments in AI and robotics in healthcare have been met with a number of ethical implications, the most important being privacy and security. As well as social implications, including trust or lack thereof. Robots can be beneficial to healthcare, but certain needs should be met in order for that to be the case.

González-González, C. S., Violant-Holz, V., & Gil-Iranzo, R. M. (2021). Social Robots in hospitals: A systematic review. *Applied Sciences*, *11*(13), 5976. Retrieved January 20, 2025 from https://doi.org/10.3390/app11135976

This article takes a deep dive into the benefits of social robots in hospitals helping children and elderly people. It also addresses the concerns people have about robots including their design, their possible lack of restraint, ability to cause damage, and more. Another important topic this article touches on is exactly what social robots are used for in the hospital setting.

Ragno, L., Borboni, A., Vannetti, F., Amici, C., & Cusano, N. (2023). Application of social robots in Healthcare: Review on characteristics, requirements, Technical Solutions. *Sensors, 23*(15), 6820. Retrieved January 20, 2025, from https://doi.org/10.3390/s23156820

This article goes into the implications of social robots in healthcare. It talks about ethical and security issues, as well as how those issues are being combatted and or fixed. It explores the usage of several types of robots in healthcare and what they are used for.

Schäfer, A., Esterbauer, R., & Kubicek, B. (2024). Trusting robots: a relational trust definition based on human intentionality. *Humanities & Social Sciences Communications, 11*(1), 1412. Retrieved January 23, 2025, from https://doi.org/10.1057/s41599-024-03897-3

This article relates to the social concerns of my topic as it talks about how everyday society views robots. There can be a lack of trust in robots due to lack of control, feeling vulnerable, risks posed, and more. This article talks about ways to develop more trust between humans and robots as they are becoming so much more common in all aspects of life.

The core rules of netiquette. The Core Rules of Netiquette -- Excerpted from Netiquette by Virginia Shea -- Albion.com. (n.d.). Retrieved January 27, 2025, from http://www.albion.com/netiquette/corerules.html

This source holds the 10 rules of netiquette which promote health and positive interactions online. I used this source to relate some of the rules to the concerns around the development of social robots in healthcare.

Walker, P. G. A. (2024). Artificial Intelligence (AI) Law, Rights & Ethics. *The International Lawyer, 57*(2), 171-306. Retrieved Jan 24, from http://mutex.gmu.edu/login?url=https://www.proquest.com/scholarlyjournals/artificial-intelligence-ai-law-rights-amp-ethics/docview/3070769186/se-2

This source is related to my topic as it talks about some of the most important advances in technology today are those in robotics. This source touches on multiple legal and ethical issues that are being faced when it comes to robotics law. Another important topic this article touches on is how a multitude of people can possibly lose their jobs too due to these advancements. This was an interesting point to me because it could lead to more research about job replacement in the healthcare system, for example, therapists, companion workers, and more.