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Chapter

Expectations and Ethical Dilemmas Concerning Healthcare Communication Robots in Healthcare Settings: A Nurse's Perspective

Yuko Yasuhara

Abstract

This chapter describes expectations and ethical dilemmas concerning healthcare communication robots (HCRs) from a nurse's perspective. Ethical dilemmas in nursing settings are wide-ranging. When HCRs are introduced to long-term facilities and hospitals for patient communication, new kinds of ethical dilemmas may arise. Using interviews with healthcare providers, I examined the potential ethical dilemmas concerning the development and introduction of HCRs that may interact with older adults. This analysis was based on four primary issues from the nurses' perspective. Since HCRs will be used in healthcare settings, it is important to protect patient rights and maintain their safety. To this end, discussion and collaboration with an interdisciplinary team is crucial to the process of developing these robots for use among patients.

Keywords: healthcare communication robots, ethical dilemmas, nurse's perspective

1. Introduction

Japan's declining birthrate and aging population are becoming increasingly serious issues. Indeed, the shrinkage of the working population continues unabated [1]. The Ministry of Health, Labour and Welfare [2] reported a future shortage of anywhere from 60,000 to 270,000 nurses in 2025. This shortage might make it difficult to provide sufficient patient care, especially for older adults who need long-term care [3].

Beyond this, as of early November 2020, coronavirus disease 2019 (COVID-19) became a major threat to global public health. Globally, the number of patients with COVID-19 is approximately 52 million [4]. Notably, COVID-19 is caused by the SARS-CoV-2 virus, which spreads among people, mainly when an infected person is in close contact with others [5]. Significantly, many COVID-19 clusters have been reported in clinical settings, including long-term facilities.

In Japan, the Ministry of Health, Labor and Welfare [6] recommends that people employ basic strategies to prevent the spread of infectious diseases, including COVID-19. These include hand washing, proper cough etiquette, wearing a mask,

and avoiding group gatherings in poorly ventilated spaces. Although potential vaccines are under development, it remains necessary to make lifestyle changes that extend to human interaction, recognizing the possibility that new infectious diseases may gain prevalence in the future.

Robots are attracting attention as a countermeasure for such serious situations. Of the various forms of human interaction, communication with others is important as it helps improve the quality of life (QOL) and sociality of older adults and patients with dementia. Accordingly, healthcare communication robots (HCRs) have the potential to support the needs of patient dialog as an alternative to healthcare providers, thereby preventing infections and addressing staff shortage situations.

Using HCRs for patient care is a collaborative process that requires not only engineers but also healthcare providers, such as nurses, who have a mandate to protect patient rights and maintain safety. Indeed, it is necessary to consider potential issues that may arise from this development. Thus, this paper discusses expectations and ethical dilemmas in relation to HCRs from the perspective of nurses.

2. Expectations from healthcare communication robots

Communication with others is important because it is satisfying and fosters a sense of connection. Especially, conversation with others achieves mutual understanding through shared experiences and feelings. However, in Japan, community relationship networks are becoming degraded by the progressively aging society and the trend of nuclear families, which have become serious local problems. Particularly among older adults who have lived alone or had physical functional disorder, social activity and conversation with others tend to decrease.

Notably, long-term facilities have seen a rise in dementia patients, and the behavioral and psychological symptoms of dementia (BPSD) may cause irritability and restlessness among patients [7]. When nurses care for older adults and patients with dementia, it is important that they take time to listen to them to provide appropriate, high-quality care in a way that suits the patient [8].

However, the staffing of nurses in long-term facilities and nursing homes for older adults is lower than in acute care hospitals [9]. Due to this shortage of healthcare providers, it might be burdensome for staff to take sufficient time for dialog with older adults [10, 11].

Clearly, the quality of care for older adults may be suffering because of labor shortages, especially in long-term care settings. This quality of care may be expected to improve when healthcare workers have HCRs as partners. Moreover, HCRs may also provide patients with the opportunity to talk, even in situations where an infectious disease such as COVID-19 is concerned.

The Japanese government has already supported the introduction of HCRs to facilities for the elderly (such as nursing homes) as well as healthcare facilities [12] and hospitals [13]. While HCRs are still being developed and introduced in certain facilities, there are no HCRs specialized for older adults and patients with dementia [14]. Hence, it is necessary to improve the application that enables dialog with members of these demographics and to enhance the safety and features of the robots [15].

The development of HCRs capable of dialog and therapeutic communication is a future goal. Here, "dialog" is not just a conversation, but the recognition and respect for each other's values and establishing a relationship of trust.

This speaks to the larger need for the development of HCRs that can interact with the elderly, increase conversation opportunities for them, satisfy their desire

for approval, maintain their sociality and sense of purpose, and improve their QOL. Furthermore, by collecting information from the cloud database of these robots, healthcare providers may be able to determine whether urgent or immediate care is necessary, allowing them to listen to the patients more intensely.

The acute care field is marked by the responsibility to care for patients suffering from threatening infectious diseases such as COVID-19. The risk of infection is very high for medical staff [16], who must find a way to take care of patients within the boundaries of time constraints, while also striving to prevent getting infected. Unsurprisingly, most medical staff find it difficult to take enough time to listen to patients' feelings, particularly when they are fighting the fear of COVID-19 infection [17, 18]. Thus, patients with COVID-19 may lose the opportunity to express themselves because they have limited time to talk to their medical staff and limited visits with family and friends.

Traditional (human) nurses are accustomed to listening to a patient's voice. However, in an emergency, HCRs may be able to note a patient's anxiety and complaints and provide them with appropriate care in response. If the HCR can be linked with information from thermography and electronic medical records, it will also be possible to observe simple physical conditions among patients. Thus, the HCR may also serve as an alternative to care supporters for people who have been in shelters for long periods due to large earthquakes, etc.

3. Ethics required of nurses

As recent years have seen the rapid development of robots and artificial intelligence (AI), ethical codes and guidelines have been issued by related academic societies largely in the engineering field [19, 20]. Ethical studies concerning AI and robots are also underway. UK-RAS network describes that the ethical concerns raised by robotics and autonomous systems (RAS) depend on their capabilities and domain of usage of Robotics, there are ethical issues such as Bias, Deception, Employment, Opacity, Safety, Oversight, and Privacy [21]. Of course, ethics are crucial to healthcare because healthcare workers must recognize dilemmas: using good judgment to make decisions informed by their values but also governed by the law.

A nurse, a type of healthcare provider, is a person who engages in providing care to persons with injuries and/or illnesses, and/or postpartum women, and/or assists in the provision of medical treatment under the license of the Ministry of Health, Labour and Welfare (Article 5 of the Act on Public Health Nurses, Midwives, and Nurses). Based on the Nursing Code of Ethics of the International Council of Nurses (ICN) [22], and the Japanese Nursing Association (JNA) [23], nurses are required to provide care while respecting human life, dignity, and rights according to the law.

However, just as patients are unique and vary in age and condition, nurses have their own cultural, religious, moral, and professional values. Thus, there are often conflicting values, disagreements, and ethical conflicts in nursing settings.

Ethical dilemmas in nursing settings are far-reaching. From time to time, nurses make ethical decisions by taking a variety of information into account to determine the best choice for the patient. Nurses can take appropriate actions when faced with an ethical dilemma by understanding and applying ethical guidelines such as the American Nurses Association's Code of Ethics [24], the ICN Code of Ethics for Nurses [22], and the JNA Code of Ethics [23].

In Japan, decisions about ethical dilemmas are informed by the six principles of ethics (Beneficence, Non-maleficence, Autonomy, Veracity, Justice, and Fidelity)

Beneficence: Actions that consider the welfare of others and include attributes like kindness and charity.
Nonmaleficence: Actions that prevent or inflict minimal harm to others.
Autonomy: Recognizing the individual's right to self-determination and decision-making.
Veracity: Interacting with others in a truthful, trustworthy, and accurate manner.
Justice: Treating others with fairness and with equal degree of respect and concern.
Fidelity: Being loyal and faithful to patients who trust the nurse.

Table 1.
Six principles of ethics [25–27].

(**Table 1**) [25, 26]. These principles are familiar to nurses. Even after making ethical decisions, nurses reflect on those decisions and strive to increase their ethical sensitivity daily.

When HCRs are introduced to long-term facilities and hospitals, different ethical dilemmas might occur.

If the HCRs, in the near future, can use dialog to make autonomous decisions regarding patients, and serve to replace a human nurse, relevant ethical discussions must precede this change. For instance, one would logically consider the questions of whether HCRs can have a sense of ethics like human nurses, and whether the former can make ethical decisions in the midst of ethical conflicts within nursing settings.

4. A nurse's perspective on ethical dilemmas regarding healthcare communication robots

Our research currently uses the humanoid robot, Pepper (SoftBank Robotics Corp.) [28], in a long-term facility to develop an application for healthcare robots that can communicate with older adults based on principles of care. It also seeks to evaluate a program that can be run in a clinical context (developed by the Xing Company). However, in the implementation of this strategy, the communication function of Pepper's application has proven deficient.

It is important to understand the present HCRs' competency as well as other factors that may enhance this application, making it suitable for use among older adults. To explore HCR-related issues in healthcare settings, we interviewed five healthcare providers (nurses, caregivers, and physiotherapists) at three facilities about current usage issues with Pepper. From these results, I examined ethical dilemmas from the nurse's perspective concerning the development and introduction of HCRs that can interact with older adults. This analysis was based on four issues: burden on staff and insufficient support system, inadequate communication function, leakage of personal information and violation of right to privacy, and guaranteeing the safety and security of HCRs.

4.1 Burden on staff and insufficient support system

The complexity of the robot's operation, the ambiguity of the HCR support system, and the burden of preparation and cleanup of HCRs are some of the issues faced by the staff while working with HCRs. Pepper weighs approximately 30 kg (around 66 lbs.), stands 120 cm (approximately 47 inches) tall [28], and requires extra staff to prepare it for use and clean it. In addition, there are other issues related to its operational complexity and unclear support system (e.g., where to

check when the robot freezes). These issues sometimes occur due to the application's up-data. In many cases, a specific healthcare staff member accustomed to handling such equipment is in charge of making the introduction, placing additional burden on that staff member. At such times, staff support is required to facilitate interactions and conversations between humans and robots [29].

When HCRs are used in healthcare settings, it is important to avoid increasing the human burden and preventing the traditional nurse from being deprived of time to care for the patient. This is related to the ethical principle of justice. Nurses must decide the just or fair allocation of healthcare resources [25, 26]. With the introduction of robots, the principles of beneficence (providing good nursing to all patients), non-maleficence (avoiding harm caused from using HCRs), and justice (providing proper and fair nursing to all patients) should not come at the cost of staff conflict. Undue burden placed upon nurses, such as the aforementioned HCR handling and use requirements, may incline nurses to put an end to the introduction of robots in healthcare settings as they cannot provide adequate care and ensure the patient's safety. Indeed, convenience (which includes appropriate sizing) and generous support are key for HCR use. It is also necessary to have functions that can be used by medical professionals who are not well versed in robotics and/or engineering.

4.2 Inadequate communication function

A human nurse naturally changes the manner (speed, volume, delivery, tone) and content of their speech depending on the patient, the nurse's personal experience, and various other factors. Conversely, the current HCRs cannot change how they talk to patients. Thus, older adults and patients with dementia may give up the conversation, feel discouraged, and/or experience negative emotions because the timing of HCRs' utterances and the content of the response may be insufficient and the conversations may be unengaging. This has implications for the ethical principle of non-maleficence.

The challenge here is to set the goals for the HCRs' dialog function to include the examination of word choice (including the determination of inappropriate words). Clearly, the dialog function will rapidly improve in the future. However, traditional nurses are currently better placed to provide care to patients based on nursing ethics and while exercising professional responsibility.

Even during the clinical trials for HCR development, nurses must protect patients' rights. Patients should not be harmed; they should not experience negative feelings or feel discouraged by HCRs (the principle of non-maleficence). Nurses should ensure that patients receive the best care from HCRs and human nurses (the principle of beneficence). Furthermore, it is particularly important to solicit patients' opinions concerning their willingness or desire to interact with the HCRs (principle of autonomy); they should be permitted the personal liberty to determine their own decisions on whether to receive care from HCRs [25, 26]. Nurses give top priority to the safety of the subject and thereby play an advocacy role. Therefore, if patient rights and their ethical principles are violated, nurses may need to halt the promotion of robot development.

4.3 Leakage of personal information and violation of right to privacy

The third issue involves the collection of patient information stored in the cloud server or body of HCRs, and how this information is managed. Indeed, HCRs need to store information to a cloud server for improved functioning. A cloud server allows for information input from various sources, along with simultaneous

compilation and analysis [30]. This is significant, as there is a lot of information in the dialog between patients and HCRs.

The guidelines regarding AI and robots have included effective policies such as protection and promotion of human rights, safety, and privacy [19, 20, 31]. Nevertheless, in the near future, when HCRs use the cloud server to store big data collected from their patients, an information leakage accident may occur [32]. This issue could, for instance, arise due to some malfunction during the development stage.

The right to privacy does not have a legal basis in Japan. However, the right to privacy is recognized under the law of precedent as part of the pursuit of happiness referred to in Article 13 of the Constitution. In addition, personal information, in principle, cannot be provided to a third party (Article 23), except in cases where the allowance is based on laws and regulations (Article 23–1).

Nurses also have a duty to protect patients' privacy as a component of patient care (Article 42–2 of the Act on Public Health Nurses, Midwives, and Nurses). As stated in the code of nurse ethics, "Nurses should honor confidentiality and strive for the protection of personal information, while using appropriate discretion in the sharing of this information" [32]. Hence, it is important to safeguard against personal information leakage from HCRs or iCloud servers (the principles of fidelity, and non-maleficence).

4.4 Guaranteeing the security/safety of healthcare communication robots

The fourth issue is the need to ensure the safety of interactive robots. In healthcare settings, there are hazardous things that might result in daily medical accidents or incidents. A medical accident involving a nurse may happen while providing nursing care or while assisting medical treatment that involves medical interventions [33]. Healthcare institutions continue to improve their policies and framework to secure organization-wide safety [34]. Nurses consistently make patient safety a top priority (the principles of non-maleficence: avoiding harm caused by HCRs, and beneficence: providing better nursing to all patients). This consideration entails predicting potentially dangerous patient behavior and performing other forms of safety and risk management (the principle of non-maleficence).

Presently, there are no reported medical accidents due to the use of HCRs. Unless there is a guarantee that accidents due to patient falls or contact will not occur, and that the safety of nurses and medical staff will be ensured, the introduction of HCRs should not be viewed passively.

For instance, we must consider whether HCRs that can interact with older adults and patients with dementia need a self-propelled function and/or humanoid figures, and whether these things would enhance patient safety. Moreover, different cases must be studied along with the safety-related responsibilities they present.

5. Conclusion

This chapter discusses expectations and ethical dilemmas concerning the use of HCRs that will interact with patients in medical and welfare settings in the future. These considerations have been made from the nurses' perspective.

Conversation with others is important to human beings. However, appropriate reactions and responses are complex, not just for HCRs, but also for traditional nurses. This means that, HCRs require improved functions, including specifications concerning appropriate listening practices, conversation, behavior, etc.

Furthermore, nurses must continue to protect the rights and safety of patients in all instances and at all times. Thus, HCRs should not be allowed to infringe on these principles in healthcare settings.

In the future, HCRs may serve as patient interlocutors. Their conversation program may include AI with an interactive or transactive dialog function and the capacity to make decisions concerning ethical conflicts. To this end, discussion and collaboration with an interdisciplinary team is crucial to the process of developing these robots for use among patients.

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Conflicts of interest

The authors declare no conflicts of interest.

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