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Technology in Healthcare: How Artificial Intelligence Will Revolutionize the Profession

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Abstract: *The topic of artificial intelligence is a hot topic in the U.S. healthcare system and, despite some uncertainties, continues to be increasingly integrated into healthcare delivery. Artificial intelligence can be used for several different purposes, including data storage, decision making, and image analysis. Critics of artificial intelligence in healthcare are skeptical of its ability to provide security of medical information and fear that it will eventually replace the need for human healthcare workers. Although the critics' skepticism may be founded, further research of artificial intelligence in healthcare shows that those fears are not based on fact. In actuality, artificial intelligence in healthcare has been proven to reduce healthcare expenditures, increase access, and improve quality of care and overall health outcomes. It is important for future healthcare providers to increase familiarity with artificial intelligence in order to effectively integrate it into practice, so that they may improve the health and well-being of future clients.*

Keywords: *Artificial intelligence; occupational role; quality of care*

Artificial intelligence is a computerized system that was developed to mimic human intelligence. Artificial intelligence continues to make technological advancements, which increases its utilization by different professions, especially those in healthcare. According to Marr (2018), healthcare professionals use artificial intelligence for a variety of reasons, including aiding in the diagnosis and treatment process of patients, medical record keeping, administrative tasks, and in the analysis of imaging. Healthcare professionals use artificial intelligence based on the belief that it helps decrease the probability of human error. However, some individuals are under the impression that continued progression and use of artificial intelligence will eventually lead to the replacement of human healthcare workers. Lynn (2019) states that the reliance on physicians and nurses for diagnoses will be replaced by advanced computers if preventative measures are not taken.

Healthcare Delivery

Whether positive or negative, the use of artificial intelligence directly influences the delivery of U.S. healthcare. Indeed, because there is no universal healthcare system in the U.S., the quality and quantity of healthcare delivery is highly dependent upon the health professional and the ability of organizations to obtain reimbursement (Shi & Singh, 2019). Cost of medical care in the U.S. runs high; therefore, not all individuals will receive the most effective and efficient treatment. Often times, insurance plans do not cover costs of particular health treatments and, independently, the individual cannot afford to pay for treatment out of pocket. The integration of artificial intelligence in healthcare will help solve this persistent problem in U.S. healthcare delivery. In support of this, Gill-Cox (2018) states the use of artificial intelligence in healthcare will lead to improvements in medical results by increasing the accuracy of treatments, which will eventually assist in decreasing medical expenses. However, according to Houlton (2018), although the incorporation of artificial intelligence into healthcare is seemingly more efficient and cost effective, artificial intelligence could cause more security issues with data sharing.

Population Impacted and National Community Issue

The transformation of healthcare delivery through the use of artificial intelligence will affect all individuals in the U.S. in some way, because all citizens will utilize the healthcare system at some point in their lives. Furthermore, the use of artificial intelligence in healthcare will also have a great impact on the access, cost, and quality of services, significantly influencing the ability of individuals to receive needed medical attention. Although almost all individuals will be affected by the integration of artificial intelligence into healthcare, the population who will be most impacted by this advancement in technology are healthcare professionals. Artificial intelligence is being increasingly incorporated into all areas of healthcare, and, due to the overwhelming evidence of the its benefits, professionals who lack the knowledge to effectively implement it in practice, or simply refuse to even do so, could negatively affect the overall well-being of the community. Indeed, Bhardwaj (2019) states that using artificial intelligence allows healthcare professionals to provide the "best possible healthcare services for their patients" (p. 2), which is what all healthcare professionals strive to accomplish. In contrast, the incorporation of artificial intelligence in healthcare also impacts healthcare professionals in regards to the fear of the replacement of human workers. However, according to Buch, Ahmed, and Maruthappu (2018), the purpose of the continual development of artificial intelligence is to aid healthcare professionals in the delivery of healthcare services, not replacement.

Thesis

The use of artificial intelligence to support medical practice provides a wide array of benefits for healthcare recipients, and has few consequences. Artificial intelligence is an important asset for improving quality of care, cost, and access in the United States healthcare system.

Relationship

Connection to Course Content

Whether private-based or government controlled, the purpose of insurance is to provide coverage for healthcare services that would otherwise be unaffordable. However, despite efforts from the Affordable Care Act to make insurance more affordable for everyone, not every U.S. citizen is insured (Shi and Singh, 2019). According to Shi and Singh (2019), the creation of new, more advanced technology and the practice of defensive medicine are two factors that contribute to the increase of price in healthcare service and delivery. Furthermore, in addition to a lack of affordability, the absence of universal healthcare coverage and the continual increase in price are two reasons why healthcare in the U.S. is becoming even less accessible. However, Houlton (2018) states that the use of artificial intelligence in healthcare could actually save money by decreasing the use of resources in the health system while also improving client outcomes.

Another contributor to inaccessibility in the U.S. healthcare system is the maldistribution of medical professionals. Indeed, the distribution of primary care physicians in rural areas is less than the population distribution, meaning there are not enough primary care physicians to provide equitable care for all individuals who live in rural areas of the country (Shi & Singh, 2019). To resolve this recurrent problem in U.S. healthcare, the incorporation of artificial intelligence is proven to decrease the practice of medical maldistribution. Additionally, according to Bresnick (2018), the use of artificial intelligence in healthcare will expand access of care in underserved regions. Bresnick (2018) states that "artificial intelligence could help mitigate the impacts of severe deficit of qualified clinical staff by taking over some of the diagnostic duties typically allocated to humans" (para. 21). Indeed, the ability of artificial intelligence to perform some of the duties previously performed by medical professionals creates a modification in the daily occupations of healthcare workers.

As a nation, the U.S. is striving to increase access, decrease cost, while also simultaneously increasing the quality of care. The incorporation of artificial intelligence into U.S. healthcare helps contribute to the desired increase in quality of care received by the clients. The Institute of Medicine defines quality as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (as cited in Shi and Singh, 2019, p. 518). Artificial intelligence utilization in healthcare is still being studied. Although there is a paucity of research in regards to the ability of artificial intelligence to produce superior health outcomes, the limited research does show that artificial intelligence can improve other aspects of healthcare, which demonstrates its ability to also make improvements to quality of care. According to Bhardwaj (2019), "with the availability of digital medical data collected by current technology solutions and high-performance technology at low costs, AI solutions can significantly improve the quality of medical services" (p. 2). Similarly, Mesko, Hetenyi, and Gyorffy (2018) state that the capability of artificial intelligence to improve the conditions of the physicians and the work environment will eventually lead to an overall improvement in quality of care.

Application to Occupational Science

Artificial intelligence in healthcare greatly affects the way individuals in the U.S. healthcare system perform their daily occupations. Before the development of artificial intelligence, individuals relied solely on healthcare professionals to provide diagnosis and treatment. Now, advanced forms of artificial intelligence have the ability to accurately diagnose certain diseases and conditions. According to Marr (2018), a Stanford University study found that artificial intelligence algorithms were capable of detecting the presence of skin cancer at the same level of accuracy as humans. Furthermore, artificial intelligence can also detect signs of cardiac arrest with 93% accuracy by analyzing an individual's speech compared to 73% accuracy for humans (Marr, 2018). Artificial intelligence is also making progress towards medical treatment. Indeed, Diprose and Buist (2016) state that "in the same way as making a diagnosis, the process is largely algorithmic. As a result, there is growing use of treatment…that range from simple information resources to intelligent algorithms that suggest patient-specific evidence-based treatment recommendations" (p. 74). Despite this, the fears of healthcare professionals remain, as the use of artificial intelligence is reducing their responsibilities, which may ultimately lead to their replacement or the need for human healthcare workers at all, diminishing their valued role in society.

Losing a valued occupational role can contribute to a loss of an individual's occupational identity, which can cause great emotional distress (Walder & Molinuex, 2017). However, even with all of its benefits, artificial intelligence lacks the capability to fulfill all of the responsibilities of a healthcare professional. Indeed, certain tasks, such as communication and making final treatment decisions are beyond the capability of artificial intelligence (Diprose & Buist, 2016). Although artificial intelligence can perform many functions of a human healthcare professional, it will not be able to independently take over all duties of a healthcare professional; therefore, healthcare professionals will be able to maintain their occupational identity and highly valued role by continuing participation in their meaningful, everyday occupations. Absolutely, participation in meaningful occupation is an essential component of maintaining health and well-being for individuals. According to Clark et al. (1997, as cited in Ekelman, Bazyk, & Bazyk, 2013), participation in meaningful occupation improves a person's mental and physical health and overall satisfaction with life.

The purpose of artificial intelligence in healthcare is not to replace the need for human workers. On the contrary, artificial intelligence is meant to act as a support system for the healthcare professional so that they may be able to perform effectively and improve the quality of life of their clients. To accomplish this, healthcare professionals can help improve the

quality of life of their clients through the enforcement of client-centered practice. Client centeredness in healthcare includes treatment of the client, not just the disease. In order for the client to receive effective treatment, the client must trust the medical professional to do what is best for them; therefore, building rapport is an integral part of the client-professional relationship. Good client-professional rapport has been proven to produce better client compliance, satisfaction, and health outcomes (Al Ali & Elzubair, 2016). However, building rapport is only possible in human relationships; therefore, if rapport leads to better health outcomes and it can only be achieved through human interaction, human healthcare professionals are still an essential component of healthcare delivery, despite the capabilities of artificial intelligence.

How it Applies to Future Role as a Healthcare Professional

Although artificial intelligence has the capability of providing beneficial support for the healthcare professional, it is only beneficial to a professional if they possess an understanding of artificial intelligence and are comfortable using it. Artificial intelligence, if placed in the hands of an individual who lacks the comfort required for proper utilization, can result in detrimental outcomes. The continual emergence of artificial intelligence as an integral part of healthcare can be a difficult concept for seasoned healthcare professionals to grasp due to their many years of practice without the use of such advanced technology. According to Pearl (2018), the biggest barrier to the utilization of artificial intelligence is the value of doctor intuition over the use of evidence-based solutions. Presently, artificial intelligence is mainly utilized in hospital settings; however, as the advancements in artificial intelligence continue to progress, it is expected expand its utilization to other aspects of healthcare, including rehabilitative and habilitative services, such as occupational therapy. As a future occupational therapist, the main focus of my practice should be to meet the goals of the client. If artificial intelligence is able to assist in the effectiveness and efficiency of treatment, it would be in the client's best interest to utilize that technology. Therefore, it is important to understand and be comfortable with the use of different forms of artificial intelligence, so I may be better equipped to promote the health and well-being of clients. Indeed, according to Mesko et al. (2018), "AI is not meant to replace medical professionals, but the ones using AI will probably replace the ones that don't" (p. 4).

Relevance

Relevance to Current Healthcare Policies

The U.S. healthcare system, although not completely controlled by the government, implements health policies. According to Shi and Singh (2019), health policy is "the aggregate of principles, stated or unstated, that…characterize the distribution of resources, services, and political influences that impact the health of the population" (p. 538). One of the most important U.S. health policies, the Affordable Care Act, deals with price and quality of care. The U.S. has struggled and continues to struggle with aligning affordability with quality of care (Shi & Singh, 2019). Although the U.S. is a leading nation in regards to technological advancements in healthcare, it is also considered one of the most expensive (Shi & Singh, 2019). Each new technological advancement helps to improve the quality of care received in the U.S., but it also necessitates an increase in healthcare costs for the consumer. With the integration of artificial intelligence in healthcare, one may think a rise in quality will promote a rise in cost. However, on the contrary, the utilization of artificial intelligence has been proven to help lower consumer costs in healthcare. Indeed, the implementation of artificial intelligence in healthcare will not only lead to faster, more efficient care, but also a decrease in costs for providing care (Mesko et al., 2018). Buch et al. (2018) agrees, stating that the use of artificial intelligence provides greater efficiency and cost-effectiveness.

One of the main concerns about the incorporation of artificial intelligence in healthcare is its ability to securely store medical information. Security of medical information is an important aspect of the Health Insurance Portability and Accountability Act (HIPAA). Human Health Services (2015) states that HIPAA was put into place in order to protect the personal health information of individuals, including the information on electronic medical records. Violation of HIPAA by healthcare professionals will result in appropriate disciplinary actions including immediate dismissal from a position. Consequently, it is important for healthcare professionals to maintain complete security of all health-related information. According to Zhavoronkov et al. (2019), "the transfer of medical records from paper to electronic formats could increase the chances of individuals accessing, using, or disclosing sensitive personal health data" (p. 63). However, Zhavonronkov et al. (2019), continues to state that efforts are being made to ensure the security of individual health records and information. Therefore, although security of health information is a valid concern when referring to the use of artificial intelligence in healthcare, healthcare professionals are aware of the concern and take extra precaution to ensure the privacy of their client's medical information, in order to not violate HIPAA or their credibility as professionals.

Implication and Consequences to Healthcare Delivery

The use of artificial intelligence in healthcare has the capability of improving the lives many, whether it be client or healthcare worker. Artificial intelligence improves the lives of healthcare professionals by lessening responsibility and promoting efficiency. According to Tizhoosh and Pantanowitz (2018), "AI software tools, if exploited and implemented well, have the possibility of handling laborious and mundane tasks and simplifying complex tasks" (p. 4). Greater efficiency of healthcare delivery not only positively affects the lives of healthcare professionals, but also the lives of clients, due to improvements in overall quality of care. Indeed, the incorporation of artificial intelligence in healthcare is improving many aspects of the U.S. health delivery system, such as cost, quality, and access, and is most effective with proper utilization and management. Although this technology is mainly being utilized in larger, wealthier facilities, such as hospitals, according to Buch et al. (2018), the use of artificial intelligence in healthcare is ideal for areas in which human healthcare professionals are scarce. Additionally, Buch et al. (2018) states that artificial intelligence can improve upon wait times and cost efficiency in healthcare. As artificial intelligence continues to improve and develop, it should also expand its utilization to other areas of healthcare delivery, such as

rehabilitation. As a future health professional that focuses on rehabilitation, I can see how artificial intelligence could be beneficial for rehabilitation, particularly in its ability to increase efficiency and limit the probability of human error. The incorporation of artificial intelligence to other areas of healthcare will similarly help to improve access, cost, and quality for the U.S. healthcare system.

Although there are apprehensions about the integration of artificial intelligence into the U.S. healthcare system, the benefits overwhelmingly outweigh the concerns. The dispute about artificial intelligence replacing the need for human healthcare workers seems to be a valid concern; however, studies show that although artificial intelligence can perform many tasks of a healthcare professional, there are certain tasks that can only be accomplished by a human. Indeed, artificial intelligence cannot accomplish all aspects of treatment such as communication, touch, and empathy (Mesko et al., 2018).

Another concern about the integration of artificial intelligence into healthcare is the issue of data security. The privacy of medical information is an important aspect of client trust; therefore, it is taken very seriously by healthcare professionals. Although, in general, the use of technology poses a threat to any type of security, healthcare professionals take extra care to ensure the privacy of clients, which includes making sure artificial intelligence is a secure place to store personal medical information.

Conclusion

Artificial intelligence is a great asset for U.S. healthcare professionals. The U.S. strives to improve healthcare delivery by continually attempting to increase quality and access to care, while simultaneously attempting to decrease healthcare costs. The incorporation of artificial intelligence in U.S. healthcare is helping improve cost, access, and quality of healthcare delivery. Artificial intelligence continues to improve the efficiency, accuracy, and cost-effectiveness of healthcare; however, the utilization of artificial intelligence in healthcare is limited to larger, wealthier facilities such as hospitals. To utilize artificial intelligence in healthcare effectively, the U.S. must expand the use of artificial intelligence to other areas of healthcare, so that more individuals may access all the benefits artificial intelligence can offer. Indeed, the expansion of artificial intelligence to all areas of healthcare will lead to a happier, healthier nation.

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