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A Short Review on Care for the Dying: A Needed Conceptual Shift

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Abstract

Palliative care aims to relieve carers of the responsibility of providing physical, psychological, and even spiritual care. Lack of healthcare infrastructure and resources to handle an ageing population is one of the most pervasive problems facing this type of care. A change in system management is required as a result of the load this ageing population is putting on the healthcare system. The Multi-Agent System (MAS) might be the solution to this problem. Programmers developed this type of computerised networking system to gather pertinent patient health data and enable the system to collaborate with other agents to determine the best course of action for disease management. A better synergetic mesh can also enable a multidisciplinary healthcare team to provide accurate and current information that will help them to formulate more educated plans of action for their patients. MASs could provide high-quality care and meet the expectations of a growing chronic illness population in the US, signalling a significant paradigm shift. The ageing population and its contributing variables, palliative care and the need for a multi-agent system, and clinical issues using examples from healthcare systems both within and outside of the United States will all be examined in this paper.

Keywords: Palliative care; Healthcare; Patient; Disease; Illness

Introduction

Palliative care is a medical speciality that was created in the 1960s to offer patients with serious and terminal diagnoses quality treatment and comfort, and it has since spread throughout the world [1]. By providing for physical, psychological, and even spiritual components of care, it is intended to lessen the burden of care on family members or friends. It may go along with the medical care given to those with conditions including cancer, HIV, and kidney illness. To address the patient's requirements, a team of doctors, nurses, mental health specialists, and clergy or other religious professionals collaborates. The value of palliative care is well understood, since it improves quality of life and symptom control [2]. Expanded palliative care for persons who suffer from chronic illnesses could help to address the chronic sickness epidemic that is now raging in the US [3]. There will undoubtedly be costs associated with this palliative care development, as well as a greater demand for palliative care workers. The Multi-Agent System (MAS), which uses a variety of agents to monitor patient health and make choices without human interaction, is intended to fulfil the needs of a rising population of people with chronic illnesses and to deliver high-quality treatment [4]. This strategy is created to make up for the higher resource costs, which could lessen the effects of extensive palliative care. This model as well as other clinical factors need to be assessed when making plans to enhance and broaden palliative care in the US and around the world. In order to make system-wide changes in practise as we move into the future decades, it is important to take into account the possibility of an ageing population that is afflicted by chronic illness, the need for a paradigm shift in the treatment of chronic illness via palliative care supported by a multi-agent system (MAS) of healthcare, and the advantages of a more holistic range of care. In the last few decades, there has been a noticeable rise in the prevalence of chronic disease in the United States. Nearly half of the population had at least one chronic illness in 2007. According to data from 2022, this statistic presently includes about 60% of Americans [5,6]. The United States is currently dealing with a chronic disease epidemic, which is indicated by the startling growth of an over 10% increase in just 15 years that is tied to a number of causes that have combined to form a cacophonous challenge. Increased lifespan brought on by better sanitation, vaccinations, and antibiotics, unhealthy lifestyle choices such as smoking, overeating, and prolonged sitting, and genetic predispositions to chronic disease are some of the reasons contributing to this epidemic. Males and females had birth expectancies in 2021 of 73.5 and 79.3, respectively [7,8]. These augmentations are the outcome of advancements in public health fields such as sanitation, nutrition, medicine, and many others [9]. Over the past 100 years, vaccinations have significantly increased life expectancy. The protection offered to people vaccinated is a critical resource in preventing infectious diseases before it can show symptoms. Both people who have not had any immunisations and those with compromised immune systems are covered by this protection [10]. While medications and immunisations have contributed to huge gains in life expectancy, they have also brought to light an issue that has lain dormant for a sizable portion of history: the exacerbation of chronic disease. The bad lifestyle practised in the US is another cause in the rise in chronic disease. The CDC advises against a number of high-risk factors for chronic disease, including smoking, drinking, and leading a sedentary lifestyle [11]. In the US, smoking rates have fallen from 20.9% in 2005 to 12.5% in 2020. In the US, drinking is around 50% of the population on average, and binge drinking is almost 17%. Between 2017 and 2020, there was 41.9% obesity prevalence in the US, with a 49.9% prevalence among non-Hispanic Black individuals. The prevalence of chronic disease is rising even as the US strives to treat these individual variables [12-15]. As a result, the healthcare system is put under a lot of pressure to provide care that is reactive rather than proactive. People with chronic ailments need more long-term therapy since chronic illnesses worsen gradually if left untreated. Palliative care, a field of medicine that provides interdisciplinary care for the symptoms associated with severe chronic illnesses, is one such long-term treatment. In the US, palliative

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care refers to high-level treatment provided by a multidisciplinary team with an emphasis on curative goals. While hospice care and palliative care share many similarities, their approaches to comfort measures are fundamentally different. This is mainly because most therapeutic efforts have been given up. It has been demonstrated that palliative and hospice care enhances medical care and quality of life during end-of-life procedures. The issue of how these individuals with chronic illnesses will be cared for is becoming more important as a result of increased life expectancy and its contributing causes. Data indicates that the prevalence of chronic illness will continue to rise notwithstanding the size of the costs incurred for their care. Therefore, in order to tackle this spreading disease, a new medical system or one that is strengthened with a more potent synergistic factor-is absolutely necessary. The Multi-Agent System (MAS) may be a contender for this job. The addition of another layer of synergism to the healthcare system may be made possible by MASs, which enables a system of agents to forecast the actions required to improve the patient's health and to be updated in real time at a central location. By utilising this approach, existing resources might be substantially augmented and made more effective, reducing the increasing expenses associated with establishing palliative care as a standard of care for the management of chronic disease.

The specific mechanisms that a multi-agent system functions and interacts within are a subject unto themselves and are outside the purview of this review. The topic is thoroughly covered in the essay "A Roadmap of Agent Research and Development" by N. Jennings et al. Multi-agent systems are computerised networks that employ agents to compare and track pertinent patient health data, and then proactively or reactively make adjustments to the patient's advantage without requiring human interaction. The "agents" mentioned in this paradigm are lone computer programmes that have the ability to act on and correct course towards a predetermined objective or range, as programmed. These agents have a wide range of capabilities as determined by the programming they were given, but they all need to possess three qualities: friendliness, proactiveness, and responsiveness. In order to address an issue, an agent's ability to interact with other agents, doctors, and patients is referred to as sociobility. Being proactive means having the ability to foresee when action will be required and take steps to prepare for it. The ability to recognise the targeted environment and make adjustments is referred to as responsiveness. The main benefit and utility of multi-agent systems is their capacity to engage with other entities and find a solution to a specified problem through collaboration, coordination, and negotiation. Multiple agents can work together in multi-agent systems to provide a more comprehensive range of care, utilise resources more effectively, and lower the cost of the system they are involved in. MASs improve the ability of healthcare system partners to solve complicated problems in order to effectively care for varied patient groups. Approximately 20% of Americans will be above the age of 65 by 2030. A more economical platform for making healthcare decisions is therefore becoming more and more necessary. Due to the quantity of stakeholders necessary to reach a consensus on a medical course of action, multi-agent systems offer solutions for a variety of healthcare sectors, including organ transplantation and palliative care. Patients, doctors, medical institutions, governments, and medical insurance companies are just a few of the numerous stakeholders in healthcare. Interoperability, a significant obstacle throughout healthcare systems, is addressed by MASs. The coordination of several people with various abilities and functions is necessary to solve problems in the healthcare industry, and the necessary information is spatially dispersed across various locations. It would be highly advantageous for all agents and knowledge to be significantly coordinated in order to deliver the best treatment feasible. The level of interoperability that results from this collaboration surpasses that of the existing systems. A space for action coordination and information exchange is created through interoperability. By using MASs in the healthcare industry, all parties involved in different duties can be monitored and coordinated to come up with a comprehensive solution to a patient's issue. As a result, they can be a practical answer for many different healthcare management, coordination, control, and modelling issues. Particularly with regard to health information systems, it quickly turns into more of a necessity than an option.

Conclusion

The US population is ageing and will continue to do so, which will put further burden on the healthcare system. Palliative care services driven by MASs might meet the needs of an ever-increasing chronic illness-stricken population while also delivering high-quality healthcare if they were adopted as a standard of care for people with chronic illnesses. As the number of people with chronic diseases rises, the adoption of MASs may prove to be a critical paradigm change in healthcare. While numerous efforts have been made to stop chronic disease before it starts, it is crucial that individuals who are currently afflicted with it receive more treatment. Given the positive results of several studies proving the advantages of MASs as a medical norm, this model merits additional research and even implementation as an essential system of healthcare that may dramatically improve our overall wellness as a country.

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Conflict of Interest

Author declares no conflict of interest.

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