Tec Empresarial
P-ISSN: 1659-2395; E-ISSN: 1659-3359

THE ROLE OF ALLIED HEALTH PROFESSIONALS IN PATIENT REHABILITATION POST-DISEASE OUTBREAKS

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1.2 **Abstact**

Each wave of the COVID-19 pandemic has heightened the demand for tertiary, secondary, and primary rehabilitation services within healthcare and community settings. Many survivors experience persistent symptoms, indicating a pressing need for rehabilitation support (Salawu et al., 2020). Allied health professionals—including physiotherapists, occupational therapists, dietitians, speech and language therapists, psychologists, radiographers, podiatrists, orthoptists, paramedics, and rehabilitation assistants—play a crucial role in the multidisciplinary teams that deliver these services (M. van Biljon & van Niekerk, 2022). Early assessment of rehabilitation requirements guides the development of tailored programs, facilitating meaningful recovery and reducing the risk of long-term impairment (A. Faghy et al., 2021). This evaluation considers the contributions of these professionals to post-outbreak patient rehabilitation.

1.3 **Keywords 8 words**

Allied health professionals, consisting of a group of health-care workers distinct from medicine and nursing, support the diagnosis, recovery, and improved function and quality of life of patients following infection or illness. Disease outbreaks can significantly impact the rehabilitation of affected individuals. During the 2014–2016 Ebola outbreak, for example, the recent emergence of post-Ebola virus disease syndrome led to a cohort of patients requiring long-term physical and psychological rehabilitation before returning to functional lives. The widespread incapacitation caused by the recent COVID-19 pandemic has generated research interest into physical and psychosocial issues, including exercise-based rehabilitation programmes following infection to alleviate disease symptoms. Allied health professionals are actively involved in research and the delivery of post-infection rehabilitation, improving multidisciplinary responses to future outbreaks (A. Faghy et al., 2021) (Y. Kim et al., 2020).

1.4 1. Introduction

This review examines the role of allied health professionals in assessing and rehabilitating patients discharged after a disease outbreak. Globally, societies face unprecedented challenges from outbreaks such as COVID-19, Ebola, influenza, severe acute respiratory syndrome (SARS), and Middle East respiratory syndrome (MERS). In such epidemics, the role of allied health

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professionals in addressing patients' physical and psychological needs is essential, ensuring appropriate support post-discharge and efficient service delivery. Following successful management of infection and reduction of mortality, the focus shifts to quality of life among survivors. Despite effective treatment leading to discharge, many patients require comprehensive rehabilitation to achieve pre-infection health and quality of life.

1.5 2. Understanding Disease Outbreaks

A disease outbreak occurs when the prevalence of a particular disease exceeds normal expectations in a specific population or region. Types of disease outbreaks include pestilences, widespread infections, and epidemics (Y. Kim et al., 2020). Some outbreaks, such as the corona virus, Ebola, and influenza, gained widespread attention through social media and affected millions worldwide and beyond (A. Faghy et al., 2021).

2.1. Definition and Types of Disease Outbreaks

"A disease outbreak occurs when a particular infectious disease unexpectedly increases within a specific population or location over a short period of time. While the definition may vary across organizations, the focus remains the same: an abnormal increase in the number of cases within a defined population with geographical and temporal boundaries (Cheshmehzangi, 2020)."

The term outbreak encompasses situations where a "disease unexpectedly increases" within a population over a short time. Outbreaks are usually classified as one of the following categories, depending on the level of concern. An "outbreak" can refer to the more generic term indicating a group of cases within a population. The second level is a "cluster," which refers to a more unusual aggregation of a certain disease, closely grouped in time and place, but without reference to the expected number of cases. The last level is an "epidemic," which refers to an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area."

2.2. Historical Perspectives on Disease Outbreaks

Disease outbreaks present sudden occurrences of unexpected cases affecting a community or region, disrupting health provisions and societal function. Across history, such outbreaks—ranging from pestilence to influenza, SARS, Ebola, malaria, and COVID-19—have remade the fabric of daily life and world economies. Economic activity and other social functions often grind to a halt in efforts to contain new or recurring outbreaks, exposing individuals, healthcare systems, and populations to threats, not only from transmissible pathogens, but also from the rupture of nationwide care provision (A. Faghy et al., 2021). Allied health professionals play a pivotal role in addressing care gaps, focusing on symptom mitigation, reintegration, and rehabilitation. Their work is essential in overcoming the physical, psychosocial, and socioeconomic challenges that often prolong recovery and impact long-term well-being. Evaluating the role of allied health professionals in providing rehabilitation after disease outbreaks reveals the extent of their contribution to restoring health and functionality (Ruderman et al., 2006).

1.6 3. The Importance of Rehabilitation

The frequent occurrence of disease outbreaks has led to many survivors with ongoing clinical problems. Rehabilitation is therefore indispensable. Ensure proper rehabilitation for physical as

well as psychological problems (Swarnakar & Lal Yadav, 2022). Allied health professionals undertake many assistive tasks in this context, ranging from the initial patient examination to the formulation of suitable rehabilitation programs. Finally, they provide the desired care to the sick in collaboration with other experts (Chuang et al., 2022).

Disease outbreaks occur frequently and adversely affect human well-being. Survivors often face persistent clinical challenges. Rehabilitation is therefore vital to restore health and productivity. The process should address both physical and psychological dimensions. Allied health professionals are instrumental in this effort; their responsibilities span initial patient assessments, the design of tailored rehabilitation plans, and the coordination of therapeutic interventions alongside other specialists.

3.1. Physical Rehabilitation

Effective rehabilitation, which is supported by an interdisciplinary team of allied health professionals, is frequently required following any serious disease outbreak (Salawu et al., 2020). The term allied health professional includes, but is not limited to, those trained in airway clearance, functional rehabilitation, and other specialised techniques or methods (Chuang et al., 2022). Multidisciplinary tele-rehabilitation is, therefore, a viable means of assessing, monitoring and supporting patients as they recover. Allied health professionals must often work collaboratively to meet the wide-ranging needs of patients, and a well-planned and implemented programme is required to optimise outcomes.

Following any serious disease outbreak, patients will often undergo a comprehensive assessment by an allied health professional. The key objective of the initial evaluation is to identify individual needs and formulate an effective rehabilitation strategy. A programme aligned to this strategy can then be tailored to the specific needs of the patient. Allied health professionals may need to engage with primary care and General Practice to ensure the continued delivery of treatment options. Early intervention is usually necessary to maximise recovery, with close monitoring facilitating adaption and enhancement. Multidisciplinary engagement often helps to expedite the scheduling of various assessments and therapies.

A well-conceived programme is likely to feature a range of specific rehabilitation techniques and modalities designed to meet the identified individual needs. Allied health professionals will often use their specialist knowledge and skills to support each stage of the rehabilitation process. Optimised programmes are subject to continuous review with appropriate modifications introduced to better align the interventions to the evolving stage of recovery. Multidisciplinary collaboration is also important, especially when the treatment options extend beyond the scope of a particular area of expertise. The period of convalescence following an outbreak is invariably a time of significant patient vulnerability at both a physical and psychosocial level, and the overarching intent of any rehabilitation programme must, therefore, be to mitigate these effects and promote a return to prior levels of function and well-being.

Disease outbreaks, which include epidemics and pandemics, are often characterised by their relatively sudden onset, unexpected scale, and wide-ranging consequences. The degree of disruption to the standard provision of health and rehabilitation services may be substantial as, for

example, when patients are discharged after only a short period of inpatient care in order to provide surge capacity. The overall priority of all allied health professionals must be the optimisation of rehabilitation delivery under these unusual and often difficult circumstances.

3.2. Psychosocial Rehabilitation

Psychosocial rehabilitation comprises interventions designed to address psychological and social challenges encountered during or following health conditions. Chronic illnesses often impair individuals' capabilities to manage everyday tasks independently, sustain employment, or participate fully in community life. For example, in the decades subsequent to a significant international health crisis, studies observed an elevated incidence of psychological distress within the general population (Kwabena Ameyaw et al., 2020). Disease outbreaks frequently induce societal disruptions that challenge mental well-being. In these periods, psychosocial rehabilitation efforts aim to address impediments affecting the normal functioning and development of healthy, independent community members.

Prolonged crisis situations involving infectious disease outbreaks increase individuals' susceptibility to a range of psychological and social issues, including distress, mood disorders, and anxiety. Such mental health conditions, prevalent in these scenarios, often emerge in conjunction with respiratory compromise and other physiological symptoms. Concurrent mental health conditions can exacerbate physical conditions, thereby complicating medical treatment and recovery processes. In these contexts, psychosocial rehabilitation addresses the multifaceted challenges resulting from outbreaks that negatively impact overall community well-being, thereby facilitating the restoration of community homeostasis and support networks.

Following the peak of a public health crisis, policymakers and health professionals frequently seek immediate interventions to assist affected individuals in resuming typical daily functioning and employment. Psychological disorders such as post-traumatic stress disorder, anxiety, and depression commonly affect survivors of infectious diseases after large-scale outbreaks. For instance, certain rapid-acting cognitive-behavioural therapies—such as those validated by the RAPID model—demonstrate efficacy in preventing the emergence of these psychological conditions.

3.3. Long-term Impact of Rehabilitation

Patients face physical and psychosocial consequences after experiencing a disease outbreak (Salawu et al., 2020). Physical impacts affect several organ systems, including respiratory, cardiovascular, neurological, musculoskeletal, cognitive, and mental health, hence delimiting patients' autonomy, functionality, and socialization. Likewise, psychosocial aspects are related to negative emotions such as fear, uncertainty, anxiety, and depression, which are worsened by bartering genetic material, social isolation, and financial loss. If consequences are not addressed, it may lead to an overall decline in psychological functioning and, consequently, to chronic emotional disorders that impact the recovery process (Müller et al., 2023). Post-outbreak rehabilitation programs aim to address those impacts and to provide a gradual and flexible return to daily activities and work after a hospital discharge. Such programs support the recovery as a whole and help patients resume normal, independent functions. A comprehensive program would

consider all rehabilitation needs, including preexisting conditions and the type and characteristics of the disease to maximize the recovery potential. The intervention has to be continuous and long enough to revert all the effects brought by the outbreak. At least six to eight consecutive weeks proved, based on patients discharged from a hospital environment, effective in improving physical, psychological, nutritional, and work aspects. Results revealed an improvement in the physical performance and in psychosocial disorders, an increase in the cognitive level, and an enhancement of the ability to return to work.

1.7 4. Role of Allied Health Professionals

The World Health Organization defines allied health professions as an umbrella term for health professionals distinct from medicine and nursing who provide services related to the identification, evaluation, and prevention of diseases and disorders; dietary and nutrition services; rehabilitation; and health systems management (A. Faghy et al., 2021). Allied health professionals with a major role in post-disease-outbreak rehabilitation include physiotherapists, occupational therapists, speech-language pathologists, and diagnostic radiographers.

Physiotherapy is a healthcare profession concerned with the outcome of injury or illness and the quality of life of people of all ages through physical examination and diagnosis of physical abnormality, the prognostic evaluation of movement potential, and the improvement or maintenance of physical function and movement (Y. Kim et al., 2020). Physiotherapists utilise the performance of skilled investigative, manual and neuro-physical techniques, therapeutic activity and exercise, mechanical and electro-physical aids and devices, and the application of education and advice as the basis of their practice.

Occupational therapy is a healthcare profession whereby practitioners assess and evaluate, treat, and provide rehabilitation to enable patients to perform everyday activities and work through diagnosis, physical injury or illness, or emotional or developmental trauma. Occupational therapists combine physical and social sciences, the creative arts, and philosophy in assessing and implementing interventions that enable people to promote independent function and prevent further physical, emotional, and social disability. Intervention can also focus on ways of reducing the impact of the patient's environment or the level of care required by the patient.

Speech and language therapy consists of the assessment, diagnosis, and treatment of speech, language, communication, and swallowing disorders in patients of all ages who are cognitively able to participate effectively in treatment. The scope of practice is broad-ranging and includes non-verbal and verbal communication, speech, expressive and receptive language, fluency and rhythm, disordered voice, cognitive-communication, feeding, eating and swallowing disorders, health promotion, and public health. Most normal speech and language ability can be acquired through therapy, but not all disorders are amenable to total recovery.

Diagnostic radiography is concerned with imaging the anatomy and physiology of the human body using X-rays or other imaging techniques; evaluation involves consultation with other members of the healthcare team and the use of diagnostic images; and rehabilitation refers to the reduction in the therapeutic radiation dose to healthy tissue when undertaking radiotherapy.

4.1. Definition and Scope of Allied Health Professions

Allied health professions encompass a diverse range of health-related disciplines recognized by the Malaysian Allied Health Professions (AHP) Act 2016 and registered under the Allied Health Professions Council Malaysia. Examples include physiotherapy, occupational therapy, radiography, dietetics, and speech-language therapy. Practitioners specialize in diagnosis and management of various conditions, services that are primarily delivered outside acute hospital settings (Mageswary Lapchmanan et al., 2024).

4.2. Key Allied Health Professionals in Rehabilitation

The rehabilitation of patients affected by disease outbreaks necessitates a complex multidisciplinary approach, with allied health professionals playing a vital role in managing patients post-discharge (Décary et al., 2022). Key allied health professionals involved in clinical rehabilitation comprise physiotherapists; occupational therapists; dietitians; psychologists; speech and language therapists; and other allied health practitioners, including podiatrists, orthoptists, and paramedics (Salawu et al., 2020).

1.8 **5. Assessment and Planning**

Assessment and planning constitute the initial stages of effective rehabilitation, essential for allied health professionals assisting patients in the aftermath of disease outbreaks. Allied health practitioners conduct a comprehensive evaluation of patient needs to ascertain the types and degrees of impairment, forming the foundation for the development of a rehabilitation program specifically tailored to each individual. The resulting care plans specify aims and objectives; further consideration is given to the appropriate professional specialists, interventions, settings, timing, and anticipated duration. Allied health professionals exercise their expertise to advise patients on the most suitable programs to promote recovery and support the achievement of optimal health and functioning (Décary et al., 2022) (Y. Kim et al., 2020).

5.1. Initial Assessment of Patients

The initial assessment of patients upon discharge from hospital or quarantine camp involves a comprehensive review of the course of the disease outbreak, including length of stay, symptoms experienced, organ-specific effects, significant interventions, and medications taken. This information enables the formulation of patient-centred rehabilitation priorities and expectations applicable across various disease-related conditions.

The review also encompasses any rehabilitation received in hospital or the community, detailing the type of therapist or professional support involved, the frequency and nature of interventions, and an indication of treatment effectiveness according to the patient's perspective. This assessment informs collaborative discussions with other allied health professionals, such as physiotherapists, social workers, and health psychologists, to prepare a shared brief. The resulting summary of rehabilitation needs establishes the basis of the rehabilitation programme and serves as a key indicator for ongoing collaborative events during the rehabilitation process.

5.2. Developing Rehabilitation Plans

Following assessment, allied health professionals develop rehabilitation plans aligned with their specialized skills and the patient's identified deficits and limitations. These plans specify

achievable short-, medium-, and long-term functional goals to restore health and well-being. Timely initiation of rehabilitation is crucial; delays increase the risk of long-term disability, complicate care arrangements, and diminish professional confidence. Each professional then determines the appropriate techniques and modalities to meet the agreed objectives. A multidisciplinary team collaborates to integrate discrete programme components effectively.

1.9 6. Implementation of Rehabilitation Programs

Patients undergoing rehabilitation after disease outbreaks frequently present with multifaceted impairments, necessitating a comprehensive, multidisciplinary approach. Allied health professionals typically employ a range of integrated techniques to address these challenges. Physiotherapists focus on relearning everyday movements, enhancing exercise tolerance, and improving mobility; occupational therapists concentrate on restoring social and vocational roles; psychologists provide cognitive and psychosocial support; nutritionists advise on dietary intake; and speech and language therapists manage communication difficulties and swallowing problems. Such interventions align with World Health Organization (WHO) guidance, recommending standardized, patient-oriented rehabilitation with regular assessments of vital signs, laboratory data, pulmonary function, fatigue, dyspnoea, pain, mobility, cognition, and mental health (Chuang et al., 2022).

The complexity of rehabilitation demands collaborative teamwork, combining the specialist skills of individual therapists while adopting a broad multidisciplinary perspective. Rehabilitation plans should be tailored to the physiologic impairments, activity limitations, participation restrictions, and individual needs and preferences of each patient. Approaches to implementation vary according to national and regional contexts: initial management often begins with inpatient therapy following hospital discharge, supported by enhanced community services; alternatives include day clinic, outpatient, or home-based rehabilitation. In all settings, interprofessional cooperation among nurses, physicians, specialists, therapists, and social workers enables comprehensive care that addresses the diverse and evolving requirements of patients throughout the recovery period (Salawu et al., 2020).

6.1. Techniques and Modalities Used

A wide range of rehabilitation techniques is used for patients after outbreaks of diseases or viruses. These include exercise therapy, electrotherapy, thermotherapy, and patient education. Exercise therapy focuses on improving patients' cardiovascular health, strength, endurance, flexibility, mobility, and balance. Various forms—such as strength, aerobic, balance, circuit, walking, and respiratory exercises—are tailored to patients' preferences, rehabilitation goals, and health status. An electrical modality involving a low-frequency microcurrent, known as Microcurrent Point Stimulation (MPS), promotes natural tissue repair, reduces inflammation, and alleviates pain by stimulating the body's healing processes.

Thermotherapy employs therapeutic and cryo packs to alter tissue temperatures, aiming to assist healing; heat improves circulation, while cold reduces inflammation and pain. Patient education addresses challenges commonly experienced post-outbreaks, including fever, breathlessness, cough, reduced mobility, pain, fatigue, and anxiety. Education aims to alleviate symptoms,

improve function, dispel misconceptions, and enhance quality of life (Chuang et al., 2022). An interdisciplinary approach—integrating clinical psychology, physiatry, and clinical nutrition—is vital to care for individuals with post-outbreak impairments and disabilities (Décary et al., 2022).

6.2. Interdisciplinary Collaboration

Allied health professionals form a treatment team to support a patient's recovery. The treatment team offers the right therapies at the right time throughout a patient's rehabilitation path, including when patients transition from hospital to home and from paediatric to adult care. Allied health professionals in the hospital or community also need to work together to deliver consistent, optimistic, person-centred care during discharge and on the journey to full recovery (W. M. van Grootel et al., 2024).

1.10 7. Challenges Faced by Allied Health Professionals

Disease outbreaks, the rapid increase in the number of cases of a particular disease in a given area, present profound challenges for implementation of rehabilitation and restoration of functional status (A. Faghy et al., 2021). Recovery is hindered further by chronic underfunding, simultaneous resourcing of multiple competing services, and restriction of access for many vulnerable clinical groups. Demand for allied health professionals soars as countries seek to support the increasing number of individuals who experience protracted periods of ill-health and long-term disability. Post-infection rehabilitation acknowledges that impairments occurring during COVID-19 illness may require complex interventions by an interdisciplinary team at varying intervals throughout the recovery process. Exposure to an infectious outbreak can generate widespread psychological distress, affect general well-being, and lead to mental health-related issues for survivors, families, colleagues, and the wider community. To promote the rehabilitation, recovery and restoration of patients following an infectious disease outbreak it is paramount to understand the role of allied health professionals during this process.

7.1. Resource Limitations

Rehabilitation professionals often encounter resource limitations when treating patients recovering from disease outbreaks. Capacity constraints persist in healthcare facilities, leading to shortages of equipment, personal protective equipment (PPE), and specialized staff required for immediate and extensive access to rehabilitation services (R. Levin et al., 2020). Such limitations affect a spectrum of providers, including allied health professionals. These strains may result in delayed initiation or reduced intensity of rehabilitative care, adversely impacting functional recovery. Continued resource shortages risk further declines in patient outcomes and impede progress toward discharge, especially for those who could otherwise receive earlier return-home services (A. Faghy et al., 2021).

7.2. Psychological Barriers

Post-outbreak rehabilitation poses multiple challenges for allied health professionals, particularly psychological barriers. These vocational groups often encounter patients exhibiting so-called "thought and feeling" disorders. Allied health professionals themselves are susceptible to psychosocial barriers and psychological distress due to high work demands, stress, and fatigue. The interviewees believed that the current psychological care for trauma patients is insufficient,

failing to fully address different trauma characteristics and periods. Medical staff lacked knowledge about professional psychological care contents and methods and, due to routine work, were not proactive in involving patients in psychological care. Attitudes of nurses, influenced by their clinical experience and training, impact their behavior. Training methods like role-play enhanced knowledge and skills in social psychological support strategies, with effects lasting six months. Managers should utilize workshops, simulations, case analysis, and online or offline training to strengthen psychological support for trauma patients and their families. Recognizing that training effects may be more evident during follow-up, providing practice opportunities is crucial. Families of trauma patients often experience deep psychological distress and seek timely counseling. Nurses may feel overwhelmed and helpless when caring for trauma patients, partly due to limited timely medical services. Managers should guide trauma nurses to enhance moral courage and resilience in handling emotional challenges (Leng et al., 2022). Healthcare workers are subjected to increased stress during health crises, with reports of fear, emotional distress, and PTSD linked to outbreaks like the Middle East respiratory syndrome coronavirus (MERS-CoV) and severe acute respiratory syndrome (SARS). Two percent of allied health professionals report employment-related stress. Understanding current stress levels is crucial to prepare for long-term psychological effects such as depression and PTSD, which often occur in waves during a pandemic. The social support services group reported feeling less stressed, possibly due to better peer networks and mental health awareness. Early identification and intervention of mental health symptoms are essential to prevent long-term psychopathology, especially when resources are limited. Screening for psychological symptoms during and after a pandemic is vital to provide timely support. Greater access to mental health support correlates with lower stress levels, highlighting the importance of psychosocial support in mitigating psychological impacts during COVID-19 (Coto et al., 2020).

7.3. Stigma Associated with Disease

Disease-related stigma is a phenomenon that can significantly influence the course of an outbreak when it is left unaddressed at an early stage . While a general amount of anxiety during an outbreak is to some degree to be expected, stigma usually arises from a lack of knowledge coupled with fear. Because society is likely to view individuals who are potentially infected as a threat even if that threat is not well-understood, stigma can even be directed toward anyone who remotely resembles a person who is likely to be infected, such as those from particular parts of a country or a particular ethnic or religious group. Furthermore, infected individuals with heavy symptom loads are more likely to be stigmatized than those with mild flu-like illness due to the visibility of symptoms and likely association with severity of disease. Stigma is also likely to affect those who were in contact with an infected individual, such as healthcare workers or family members.

1.11 8. Case Studies

China recorded over 236.8 million COVID-19 cases by April 2023, with additional outbreaks elsewhere, highlighting the persistent threat of pandemics (Chuang et al., 2022). Mobilizing multidisciplinary teams, including allied health professionals, to provide functional restoration services is essential. Allied health roles encompass assessment, planning, and the implementation

of interventions across physical and psychosocial domains. Timely and appropriate rehabilitation depends on the available workforce, supporting the restoration of optimal functioning. Various barriers can hinder the delivery of essential services. Case studies illustrate the deployment of allied health professionals during pandemics such as COVID-19, Ebola, and influenza. The challenges faced and methods applied are discussed in relation to the overall framework described in preceding chapters (M. van Biljon & van Niekerk, 2022).

8.1. Case Study 1: Rehabilitation after COVID-19

Coronavirus disease 2019 (COVID-19) is a respiratory infection with symptoms such as fever, cough, fatigue, shortness of breath, and loss of taste and smell. The disease can also affect the nervous system, including the brain. Recovery from the acute illness varies from days to months, with some individuals experiencing long-term symptoms—referred to as "long COVID"—including fever, pseudoparalysis, severe weakness, abnormal laboratory values, organ failure, and psychological disorders. The severity of dysfunction depends on age and comorbidity. Evidence from the Severe Acute Respiratory Syndrome (SARS) pandemic suggests physical and psychological dysfunction can persist for over 1 year, underscoring the importance of multidisciplinary rehabilitation (Chuang et al., 2022).

Rehabilitation encompasses measures assisting individuals who experience, or are likely to experience, disability. The rehabilitation aims for the highest possible independence and functioning, addressing the physical, sensory, intellectual, psychiatric, psychological, and social-spiritual components of health. Allied health professionals play a pivotal role across all rehabilitation phases—from initial assessment through program implementation. Patient evaluation precedes tailored treatment planning, with early intervention considered crucial. An individualized, multidisciplinary approach is essential, as patients may present with multiple dynamic deficits necessitating a broad spectrum of expertise.

Services prioritise patient safety, appropriate Social Distance, conservation of personal protective equipment (PPE) and clean equipment, feasibility, and the long-term provision of rehabilitation for survivors after discharge. Allied health roles span the entire rehabilitation period, addressing the broad impacts of COVID-19 efficiently and effectively (Y. Kim et al., 2020).

8.2. Case Study 2: Rehabilitation after Ebola

The Ebola virus disease (EVD) outbreak in West Africa from 2014 to 2016 resulted in more than 11,300 fatalities, with survivors facing considerable physical, neurological and psychosomatic complications. EVD is a viral haemorrhagic fever caused by viruses of the Filoviridae family that are transmitted via body fluids. Epidemics of these diseases have predominantly occurred in Africa and are usually characterised by high case fatality rates. Despite the reoccurrence of outbreaks in recent years, there remains limited evidence on effective rehabilitation interventions for post-EVD patients.

The wide range of physical and psychological impairments that survivors of EVD experience means that multidisciplinary rehabilitation is necessary. Allied health professionals such as occupational therapists, physiotherapists and speech and language therapists play an integral role in assessing and treating these patients. The aim of rehabilitation must be twofold: firstly, to

prevent complications and secondly, to facilitate safe and timely discharge. Recovery from the severe forms of the disease can be long and often complicated by residual issues including muscle wasting, joint pain and contractures, chest pain, persisting abdominal pain and breathlessness. In addition, some survivors have a manifestation mimicking the post-polio syndrome. Furthermore, like patients following COVID-19 infection, many survivors have considerable psychological sequelae.

8.3. Case Study 3: Rehabilitation after Influenza Outbreaks

The role of allied health professionals in rehabilitating patients after influenza infection is illustrated through a case study of an outbreak among a military community in Sudan in 2019. Allied health professionals develop multi-system treatment and rehabilitation programmes to support recovery in post-acute and recovery phases. Allied health professionals were involved in initial logistic support for those impacted by the influenza outbreak, prioritizing rest, hydration and paracetamol. Active rehabilitation began once a patient was free of flu symptoms; the delayed commencement of rehabilitation was required to minimize the risk of cross-infection. Respiratory physiotherapy techniques including ACBT (active cycle of breathing technique), deep breathing exercises and noise expiratory training were used to enhance the clearance of airway secretions and promote lung expansion, whilst strength and endurance training targeted the musculoskeletal system. Rehabilitation enabled a progressive increase in the level of physical activity, promoted high levels of adherence and prevented abrupt termination of physical activity, which could have exacerbated post-viral fatigue and initiated a relapse or a post-viral syndrome (Chuang et al., 2022).

The role of allied health professionals after the influenza outbreak is described. Post-viral fatigue necessitated patient assessment to determine functional limitations and develop personalized rehabilitation programmes that included respiratory physiotherapy and physical training. Early intervention is critical to recovery; however, in a military community, a pragmatic approach mandated that the commencement of active rehabilitation was delayed until a patient was free of symptoms (Rapin et al., 2022).

1.12 **9. Future Directions in Rehabilitation**

In the pastoral context, rehabilitation holds considerable promise even when the outbreak pathway is relatively short, such as in the Ebola Virus Disease (EVD) outbreak of 2013–2016 in West Africa (Swarnakar & Lal Yadav, 2022). The authors highlight the need for rehabilitation and the multidisciplinary skills of allied health professionals to enable those affected to recover their lives and return to participation in their communities. In the case of the COVID-19 pandemic, the importance of rehabilitation is well recognised across the allied health professions. Indeed, the World Health Organization predicts a tsunami of rehabilitation needs connected with this pandemic, many of which will remain years after the pandemic itself is resolved. Allied health professionals have a major role to play in meeting these needs. In parallel with recognising rehabilitation as a major challenge, the COVID-19 pandemic has also highlighted opportunities to enhance the methods of delivering these services. The International HL-PIVOT Network, a multidisciplinary global coalition of experts in health and built environments that work across

academic, clinical and public sectors at local and international levels (A. Faghy et al., 2021) , offers insights into future directions for rehabilitation following a disease outbreak. These align with the descriptions of allied health professional roles that are found in any standard allied health textbook, yet bring together the diverse range of disciplines that might be pooled for the rehabilitation process and link the rehabilitation specialists with others whose knowledge is vital to protecting public health and preventing future outbreaks. The Network emphasises the need for an integrated and formalised interdisciplinary team approach to plan and deliver rehabilitation programmes after disease outbreaks. It notes the relationships between the requirements for rehabilitation and the training required to equip personnel with the skills needed for the challenges they face, a theme echoed by others (Salawu et al., 2020). Given the scale of change needed to manage and respond to a pandemic of the COVID-19 nature, the international coalition framework therefore sets out possible ways forward in responding to the many aspects of a disease outbreak in the realm of prevention, protection, support and rehabilitation.

9.1. Innovations in Rehabilitation Techniques

The COVID-19 pandemic highlighted the urgent need for rapid development of alternate models of rehabilitation delivery and innovative use of technology. Tele-health provides a mechanism to provide a range of rehabilitation interventions when patients and clinicians cannot meet face to face, either due to shielding from communication isolation or because patients have been discharged home. The United Kingdom's National Health Service (NHS) rapidly supported the implementation of telerehabilitation, and some hospitals and clinical services have matured these interventions to the point where substantial proportions of patients receive telehealth interventions across their rehabilitation journey. Allied health professions that had previously been slow to adopt tele-health have made greater use of the technology and often kept it alongside face-to-face interactions. In the UK, establishing tele-health as a remedy for the COVID-19 pandemic has been so successful that it is now regarded as a routine component of patient care. However, implementing tele-health in established clinical rehabilitation practice will require the refinement of clinical policies and governance, and strategies to circumvent inequalities in access to equipment and internet access. The COVID-19 experience has demonstrated that tele-health offers an acceptable and effective approach when delivered alongside a spectrum of face-to-face clinical contacts (Saverino et al., 2021).

9.2. Policy Recommendations

The role of allied health professionals in patient rehabilitation following disease outbreaks has become increasingly critical. Allied health professionals including physiotherapists, speech-language therapists, dietitians, psychologists, occupational therapists, and social workers play a pivotal role in the treatment and care of patients affected by epidemic or pandemic diseases such as COVID-19, Ebola, and Influenza. Effective intervention in both physical and psychosocial rehabilitation by these professionals substantially enhances the likelihood of improved patient outcomes (Décary et al., 2022).

Following exposure to an epidemic or pandemic, individuals frequently experience adverse physiological and psychosocial effects that require rehabilitation. Allied health professionals

provide initial patient assessments and deliver multidisciplinary rehabilitation programs tailored to specific needs. Various techniques and modalities facilitate recovery, underscoring the importance of collaborative approaches to address complex post-disease conditions (M. Negm et al., 2022). Despite the importance of comprehensive rehabilitation services, several challenges impede allied health professionals. Limited resources, psychological factors, and stigma related to the disease can constrain the effectiveness of intervention and hinder patient participation. Addressing these barriers is essential to maximize the impact of rehabilitation efforts and ensure that patients receive optimal care (A. Faghy et al., 2021).

9.3. Training and Education for Allied Health Professionals

Practising allied health professionals require up-to-date training as a prerequisite of conducting effective patient rehabilitation programmes. Professionals allied to medicine function in a patient's rehabilitation across the physical, psychological and social domains. In the period after disease outbreaks, rehabilitation programme implementation addresses needs arising from the infectious disease may have struggled in addressing; needs that persist after medical management. Allied health professionals on the frontline, entrusted with these roles, must enhance their knowledge and update their skills to increase patient recovery success during rehabilitation (Scheiber et al., 2021).

1.13 10. Conclusion

Allied health professionals play a crucial role in providing rehabilitation services to patients recovering from a disease outbreak. With a diverse range of clinical health care professions, allied health professionals offer valuable expertise to a comprehensive rehabilitation team (Décary et al., 2022). Their extensive knowledge of rehabilitation services and patient challenges enables them to effectively support recovery processes. Rehabilitation addresses the physical, psychosocial, and occupational impairments experienced by patients post-outbreak. By assisting the health and social care systems during the extraordinary demand of outbreak recovery, allied health professionals contribute to prompt and efficient recovery processes. To offer effective rehabilitation support, allied health professionals conduct thorough assessments to tailor their interventions to each patient's specific needs. Collaboration with medical professionals allows them to develop and implement rehabilitation plans that complement ongoing treatment and care.

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