RE-EDUCATION AND TRANSFORMATION: THE ROLE OF THE PHYSIOTHERAPIST BETWEEN ACUTE AND DEGENERATIVE NEUROLOGICAL DISORDERS

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ABSTRACT
This paper explores the educational role of the physiotherapist in neurological disorders, focusing on re-education as a means of transformation and adaptation. Education is understood as a change involving values, knowledge and behaviours; in healthcare it becomes a strategic resource for managing chronic conditions, especially in Italy, given population ageing and the high prevalence of chronic disease. Drawing on andragogy and empowerment, the physiotherapist acts as a facilitator of change, guiding patients towards autonomy and conscious self-management. Two re-educational approaches are compared: in acute disorders such as stroke, the aim is to exploit the window of neuroplasticity to maximise functional recovery; in neurodegenerative diseases such as Parkinson's disease, the focus shifts to continuous adaptation and the preservation of residual abilities. Re-education thus emerges not as a return to a previous state, but as the creative building of new functional patterns.

KEYWORDS
Physiotherapy; therapeutic education; neuroplasticity; stroke; Parkinson's disease.

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1. Introduction

To understand the educational role played within healthcare, we need to start from the broader concept of education. The term describes a continuous and dynamic process aimed at the full development of the individual. Education is not limited to the transmission of knowledge: it entails a deep transformation that involves, above all, values, attitudes and behaviours, enabling individuals to face the challenges of life and to contribute to collective well-being (Avellino, 2024).

Seen from this perspective, education can be defined as a change: a process of adaptation that prepares the individual to respond to the changes that life imposes. In the case of illness, for instance, the physical and psychological change brought about by the disease makes education an essential tool for supporting patients as they become aware of their condition and learn to manage it autonomously.

This leads us to the concept of educational intervention, which can be defined as the set of intentional actions and tools adopted by a person acting as an educator in order to facilitate the growth and transformation of those to whom the action is addressed. It rests on the ability to guide others towards greater autonomy, fostering the acquisition of the skills and tools needed to understand and cope with everyday challenges. Its main purpose is to promote personal and social change, creating the conditions for each individual to express their full potential and to take an active and conscious part in the society to which they belong (Rangaswamy, 2022).

If we apply this definition to healthcare, we can state that the educational role is a crucial dimension of the health professions (Garino, 2020), closely linked to

health promotion and to the autonomous management of the change generated by disease. Let us now consider how certain factors, the context first of all, make the educational role of health professionals so important.

2. The epidemiological context in Italy

According to the 2024 ISTAT Report, the average age of the Italian population reached 46.6 years on 1 January 2024, up steadily from 42.3 years in 2004. The old-age index now stands at 199.8%, an increase of 64% over the last twenty years. About a quarter of the population (24.7%) is aged 65 or over, with a particularly marked growth in the number of people over 80 (ISTAT, 2024).

As regards chronic conditions, the most recent data show that 70% of Italian adults suffer from at least one chronic disease, while 42% of people over 75 live with three or more (Assolombarda, 2024). Among older people, as early as the 60–64 age group 59.3% have at least one chronic-degenerative condition, a share that rises to 86% among those over 75 (Pasetti & Vergolini, 2024). The most common diseases include arterial hypertension (56.8%), osteoarthritis and arthritis (49.8%) and osteoporosis (30.8%) (Ministero della Salute, 2024).

This epidemiological picture shows how chronic non-communicable diseases represent one of the main challenges for the Italian National Health Service: globally, they accounted for 80.5% of years lived with disability (YLDs) in 2019 (The European House – Ambrosetti, 2024). In Italy, musculoskeletal disorders are the leading cause of years lived with disability, followed by mental disorders, neurological disorders and diabetes.

The educational function of health professionals can therefore be regarded as a strategic element for improving the quality and effectiveness of interventions in chronic care.

The educational dimension of the health professional's role has also been recognised by the World Health Organization, which stresses the importance of training practitioners who are able to educate patients in prevention and in the informed management of disease. According to the WHO, "therapeutic patient education (TPE) is a structured, person-centred learning process that supports individuals living with chronic conditions to self-manage their own health by drawing on their own resources, supported by their carers and families. It brings together several interventions and is considered part of the broader family of self-management support interventions" (World Health Organization [WHO], 2023).

The concept of health education therefore goes beyond the mere transfer of information. It presupposes the ability to establish an empathic and collaborative relationship with the patient and to build a shared learning pathway that takes account of their needs, experiences and resources. According to the principles of andragogy, the discipline that studies learning and education in adulthood (Pagani, 2024), the individual – turned into a patient by illness – is an active co-protagonist of the educational process, and thus of the healing process, rather than a passive recipient of instructions. The concept of andragogy, developed by Malcolm Knowles from the late 1960s onwards, marked a paradigm shift in adult education. Knowles (1968) defines andragogy as "the art and science of helping adults learn", clearly distinguishing it from traditional pedagogy. According to this model, adults learn differently from children: they need to understand why they are learning (the need to know), they bring with them a wealth of experience that forms the basis for new learning, and they are motivated mainly by internal factors such as self-fulfilment and quality of life (Knowles, 1996). In healthcare, this approach means recognising the patient as an active co-protagonist of their

own care pathway rather than as a passive recipient of medical instructions. The literature offers several examples of how the health education that professionals provide to patients can be a key factor in the management of chronic conditions. Recent studies have shown that educational interventions aimed at self-management produce significant benefits in disease management and pain reduction in patients with diabetes and obesity (Correia et al., 2022), chronic low back pain[2] (Sidiq et al., 2024) and headache (Mingels et al., 2024).

3. Patient empowerment as an educational strategy

Patient empowerment is a central element of modern therapeutic education. Defined as the process through which patients acquire the ability to take control of their own health (Castro et al., 2016), empowerment is a transformation that involves autonomy, competence, resilience and self-efficacy (Tatta et al., 2023). According to the framework proposed by Vainauskienė and Vaitkienė (2021), patient empowerment operates through several interconnected levels, integrating cognitive, emotional and behavioural factors. In chronic disease, empowerment interventions have proved effective in improving not only clinical outcomes but also patients' psychological state, interpersonal relationships and health behaviours. In particular, empowerment works by strengthening self-efficacy, which mediates the relationship between educational interventions and self-management behaviours (Wang & Geng, 2019). In physiotherapy, this approach translates into the ability to guide patients towards greater decision-making and practical autonomy,

[2] Low back pain is defined as pain located in the lumbar region, i.e. below the costal margin and above the inferior gluteal folds, with or without radiation to the lower limbs. It can be classified as specific, when it can be attributed to an identified pathology such as a fracture, or non-specific, when it is not associated with any recognisable pathological cause.

encouraging them to take responsibility for their own body and for the management of their condition. Therapeutic patient education, as defined by the WHO (2023), is "a structured, person-centred learning process that supports individuals living with chronic conditions to self-manage their own health". This process is not limited to the transfer of information: it requires an empathic and collaborative relationship, capable of valuing the individual's resources and the context in which the patient lives.

4. The educational role of the physiotherapist

Article 1 of the Ministerial Decree of 14 September 1994, No. 741, which sets out the professional profile of the physiotherapist (Decreto Ministeriale n. 741/1994), defines the physiotherapist as follows:

> *"[…] the health professional, holding a university diploma qualifying for practice, who carries out, independently or in collaboration with other health professionals, prevention, treatment and* ***rehabilitation*** *interventions in the areas of motor function, higher cortical functions and visceral functions resulting from pathological events of various aetiologies, congenital or acquired. […] independently practises therapeutic activity for the functional re-education of motor, psychomotor and cognitive disabilities using physical, manual, massage and occupational therapies […]" (our translation).*

The evolution of physiotherapy has progressively emphasised the educational dimension of the profession. Recent surveys of physiotherapists show that patient education is regarded as an integral and fundamental component of clinical practice (Snook et al., 2022). However, there are also significant barriers to the effective implementation of this educational role, including lack of time, limited pedagogical skills and difficulty in adopting a truly patient-centred approach (Forbes et al., 2017).

Recent studies have shown that short educational interventions can significantly improve the skills of physiotherapists, and of physiotherapy students, in therapeutic patient education. The adoption of structured frameworks, such as the one proposed by the WHO for TPE, and the integration of andragogical principles into everyday practice are key strategies for overcoming these barriers (Grbavac et al., 2024; Mingels et al., 2024).

5. Rehabilitation and re-education: from definition to the evolution of the concept

Rehabilitation is a collaborative, multimodal and person-centred process. It integrates interventions aimed at improving individual capacities, specifically addressing body structures and functions, activities and participation, as well as the contextual factors that affect performance. Its main goal is to optimise the person's overall functioning so that they can manage the consequences of disease (Levack et al., 2015). Within this framework lies re-education, the core around which the work of relearning, adaptation and construction of new functional patterns develops.

But what do we mean by re-education? Historically, the term was not used in rehabilitation but rather in custodial, school or social settings, with the aim of "correcting" behaviours considered deviant or inappropriate. The concept reflected a normative and standardised approach, centred on the imposition of rules and on conformity to predefined models, with no regard for individual subjectivity and resources. Only in the twentieth century, with the progress of physical medicine and rehabilitation, was the term gradually adopted in healthcare, where it acquired a more inclusive and patient-centred meaning (Wade, 2015).

Today the term “re-education” suggests, in its very etymology, the idea of a return to education: not a simple restoration of the original condition, but a redefinition of the patient’s abilities and skills. In clinical practice this approach is essential, since the consequences of a disease, an injury or a degenerative condition often make a complete return to the previous state of health impossible. Re-education thus becomes a creative process aimed at building a “parallel path”, a new balance that allows patients to lead a life that is still full and rewarding.

6. Different re-educational approaches in physiotherapy

If we were to outline the main areas of rehabilitation in which physiotherapists work, we could reduce them to two: orthopaedic and neurological. Let us start from the general picture before moving on to the details. Neurological rehabilitation is a multidisciplinary therapeutic approach aimed at improving functions impaired by neurological diseases or injuries. It draws on the principle of neuroplasticity, that is, the capacity of the nervous system to reorganise and adapt, in order to restore or compensate for motor, cognitive and psychological abilities. Orthopaedic rehabilitation, by contrast, focuses mainly on the recovery of impaired musculoskeletal function. Its aim is to improve strength, mobility and joint stability, supporting a safe and efficient return to daily or sporting activities (George et al., 2024).

6.1 Re-education in the neurological patient: acute and neurodegenerative conditions compared

The distinction between neurological and orthopaedic rehabilitation is not only a matter of fields of intervention: it also reflects different ways in which the

physiotherapist guides the re-education process. While in neurology the focus is on neuroplasticity, orthopaedic rehabilitation works mainly on biomechanics, concentrating on the restoration of musculoskeletal function.

The common thread, however, remains the same: re-education as a process that does not simply aim to "go back", but to create new possibilities for adaptation. This principle, applied differently depending on the disease and the context, becomes particularly evident in neurology, on which we focus here, since neurological conditions have the greatest impact on the patient's life. Below we compare two neurological conditions with different characteristics: an acute event (stroke) and a neurodegenerative disease (Parkinson's disease). The re-educational approach changes profoundly depending on the condition at hand; let us see how these differences take shape.

6.2 The acute neurological condition: stroke

In the case of stroke[3], re-education is a pathway designed to make the most of the window of opportunity offered by the brain's neuroplasticity. Immediately after the acute event, the nervous system goes through a phase of heightened receptivity to change (the reactive phase), during which neural connections can be reorganised to compensate for functional losses. This makes the re-educational approach particularly dynamic and intensive in the early phase, since every day gained is crucial to maximising recovery.

One of the most common consequences of stroke is hemiparesis, that is, a loss of control and strength in one side of the body (the arm and leg on the same

[3] Stroke is a clinical syndrome characterised by the sudden onset of focal neurological deficits, such as muscle weakness, speech difficulties or visual disturbances, caused by a cerebrovascular disorder. It is mainly classified into two types: ischaemic stroke, due to vascular occlusion, and haemorrhagic stroke, caused by the rupture of a blood vessel with consequent cerebral haemorrhage.

side). Consider a patient who, as a result of the stroke, has lost the use of the dominant arm: they could be enrolled in a *constraint-induced movement therapy* (CIMT) programme (de Azevedo et al., 2022). This technique consists in restraining the healthy limb, forcing the brain to reactivate the neural circuits linked to the affected limb. Through repetitive and motivating activities, the patient learns new ways of using the impaired limb, even if these do not exactly reproduce the original movements. Alongside interventions targeting the upper limb, post-stroke rehabilitation also includes the recovery of sit-to-stand ability, a skill that is fundamental for autonomy in daily activities. Specific training, based above all on the repetitive practice of the movement, has been shown to improve both the speed of rising to stand and the symmetry of weight-bearing between the two legs (Pollock et al., 2014).

Another distinctive aspect is education in the strict sense. It accompanies patients as they come to understand their new abilities and learn to manage the limitations caused by the disease. This means teaching strategies for tackling tasks that were once simple and taken for granted, such as grasping a glass or getting up from a chair, safely and independently. In many cases, the physiotherapist introduces adaptive devices, such as grip aids, which become an integral part of the re-education process. Patients do not merely relearn motor patterns: they adapt them to their new functional context, striking a balance between the recovery of lost abilities and the discovery of new strategies.

6.3 The degenerative neurological condition: Parkinson's disease

In Parkinson's disease, a neurodegenerative condition characterised by the progressive loss of dopaminergic neurons (Poewe et al., 2017), the re-

education process differs from the one adopted in acute conditions such as stroke. Whereas stroke calls for intensive intervention to exploit the window of greatest neural plasticity, re-education in Parkinson's disease focuses on continuous adaptation and on preserving residual abilities over time, despite the inevitable progression of the disease. It is therefore based on the management of an evolving process, in which the patient must be constantly educated to cope with new or worsening symptoms of a condition whose progression cannot be halted.

In a patient in the early stage of the disease, for example, interventions will focus on improving fine motor skills, balance and coordination. Techniques such as *dual-task training* (performing motor tasks while carrying out cognitive ones) help to improve gait and the ability to respond to environmental stimuli. In a patient at an advanced stage, on the other hand, re-educational approaches will aim at preserving simple motor gestures.

7. Conclusions

In this paper we have explored the educational role of health professionals, with a particular focus on the physiotherapist, highlighting re-education as the common thread of a transformative process. Education, understood as a change involving values, knowledge and behaviours, becomes an indispensable tool for facing the change imposed by disease. Starting from a historical reflection, we have seen how the concept of rehabilitation has evolved from a strictly biomedical approach to a more holistic one, able to consider the patient in all their complexity (Tomassini et al., 2025). In this context, re-education emerges as the core of rehabilitation: a creative process that does not merely restore the previous state, but seeks to build new operational, functional and

sustainable patterns for the patient. The comparison between acute neurological conditions, such as stroke, and chronic neurodegenerative ones, such as Parkinson's disease, has highlighted distinct yet complementary re-educational approaches.

Looking ahead, the educational role should be further integrated into the training of physiotherapists, with modules devoted to pedagogical strategies and to the patient-centred approach (Avellino, 2025; Calaprice, 2022). In addition, innovative technologies such as virtual reality and telerehabilitation could strengthen educational work, making it more accessible and effective. The main challenge remains that of balancing functional recovery with the promotion of patient autonomy, helping patients become co-protagonists of their own care pathway. Only in this way can re-education become a tool capable of restoring dignity and quality of life, even in the face of difficult and complex health conditions.

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