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REVIEW ARTICLE

Chronic Non-communicable Diseases, Pain, and Coping Strategies: An Overview

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Abstract:

Around the world, chronic diseases have impacted the health and quality of life of many individuals. These chronic non-communicable diseases (NCDs), such as cancer, diabetes, cardiovascular disorders, and lung disease, are expensive to treat, frequently require lifelong care, and worsen drastically if treatment is postponed or of poor quality. This phenomenon will place pressure on healthcare systems to adjust to meet these evolving demands by creating efficient preventive strategies. One of the key epidemiological trends of the current times is the rise of chronic and degenerative diseases. This study will provide an overview of chronic diseases and helps to provide a more detailed image of pain and coping strategies. This requires adapting health systems and health policies and a shift from disease-centered to people-centered approaches and population health measures.

Keywords: Disability, Mobility, Coping strategies, Pain, NCDs, YLDs.

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1. INTRODUCTION

Chronic health conditions (CHCs) represent public health and economic burden all across the world. A chronic condition "is a physical or mental health condition that lasts more than one year and causes functional restriction or requires ongoing monitoring or treatment" [1].

Chronic diseases have impacted the health and quality of life of many individuals worldwide [2]. These chronic non-communicable diseases (NCDs), such as cancer, diabetes, cardiovascular disorders, and lung disease, are expensive to treat, frequently require lifelong care, and worsen drastically if treatment is postponed or of poor quality.

Across the globe, NCDs are increasingly concentrated in low-income and middle-income countries, including Tunisia, and within these, increasingly among the middle class and poor people, who are most vulnerable to loss of wages and lack of quality healthcare.

It is not surprising that chronic diseases are the primary cause of disability globally and collectively represent the most costly challenge to health care systems [3]. It is well recognized that the prevalence of disability increases with age [4].

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The Global Burden of Disease Study 2013 evaluated "years living with disability" (YLDs: prevalence multiplied by a disability weightings factor) for a broad range of diseases and injuries in 188 countries [5]. The World Health Organization (WHO) has now set a target to reduce deaths from NCD in people aged < 70 years by 25% by 2025. Most low- and middle-income countries (LMICs) are currently not well equipped to respond to NCD. The majority of NCD research has been conducted in high-income countries. However, research resources allocated to NCDs in low- and middle-income countries (LMICs) are trivial [6, 7].

1.1. Current Problem

One of the key epidemiological trends of the current times is the rise of chronic and degenerative diseases. This phenomenon will place pressure on healthcare systems to adjust to meet these evolving demands by creating effective preventive strategies. The need for such strategies is enhanced by the fact that risk factors like cholesterol, tobacco, blood pressure and obesity are no more specified in industrialized countries; they are becoming more prevalent in developing nations, including Tunisia, where they double the burden of infectious diseases that have always afflicted poorer countries. Managing chronic conditions is a challenge for healthcare delivery systems worldwide, especially for low/middle-income countries (LMIC). Redesigning primary care to deliver quality care for chronic conditions is a need of the hour. However,

much of the literature is from the experience of high-income countries.

In this context, with the lack of research focused on this matter, the purpose of this study is to provide a more current overview of chronic diseases and more detailed information on pain and coping strategies. These insights will enable the quality of preventive treatment to be enhanced.

2. CHRONIC NON-COMMUNICABLE DISEASES (NCDs)

Chronic disease is defined as a disease slow in its progress (decades) and long in its continuance, as opposed to acute disease, which is characterized by a swift onset and short course. Medicine, public health, pharmaceutical industry, and educational systems have reduced infectious diseases and early life mortality, resulting in record average life spans for much of the human population. In place of infectious diseases, most people in the US now die of chronic diseases.

In recent times, non-communicable diseases (NCDs), including cardiovascular disease (CVD), diabetes, chronic obstructive pulmonary disease (COPD), and cancer, have evolved into an emerging global pandemic, with disproportionately higher incidences in developing countries [8]. The World Health Organization (WHO) estimated that in 2020, NCDs accounted for 80 percent of the global disease burden, causing seven out of every 10 deaths in developing countries, about half of them were premature deaths under the age of 70 [2]. It is estimated by WHO that the worldwide burden of NCDs will rise by 17% over the coming decade and by 27% in the African region [2].

The NCDs that are garnering global attention are CVD, diabetes, COPD, and cancer. Smoking, inappropriate diet, sedentary lifestyle and alcohol are the four most prevalent modifiable risk factors for NCDs. Mental health has only been recently included by the WHO in NCDs.

3. PAIN

The word “pain” originates from the word “poena,” which means punishment in Latin. The most valid definition of the pain concept was given by the International Association for the Study of Pain (IASP) in 1979 and was recently revised (Table **1**).

According to this definition, pain is “an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage.” Pain is always a personal experience that is influenced to varying degrees by biological, psychological, and social factors. Pain, although serving an adaptive role, may have adverse effects on function and social and psychological well-being [9].

The IASP definition of pain has been widely adopted by health professionals and pain researchers throughout the world and has been adopted by several professional, governmental and non-governmental organizations, such as the World Health Organization (WHO).

Although subsequent revisions and updates have been made to the list of associated pain terms (1986, 1994, 2011), the IASP definition of pain itself has remained unchanged. In recent years, several discussions have been made, and other modifications have been suggested. As a response to the ongoing discussion, The IASP president, Judith Turner, formed a Presidential Task Force in the spring of 2018 to “evaluate IASP’s current definition of pain and the accompanying notes” and to recommend whether they “should be retained or changed based on current evidence-based knowledge.” A 14-member task force was formed that comprised individuals from several nations who had broad expertise in clinical and basic science related to pain. The task force deliberated over a nearly 2-year period (2018–2020).

Chronic pain is described as persisting pain, which may either be ongoing or re-occurring. Its duration and intensity can have a negative impact on the patient's wellness, functional level and overall life quality [10]. Therefore, it is essential to develop better approaches to the assessment, treatment and management of chronic pain to meet individual patient goals in order to optimize their functionality and life quality.

3.1. Exercise

Exercise is perhaps the most routinely advised self-management approach. Available evidence indicates that physical activity and exercise are interventions that have minimal adverse effects and can improve pain intensity, physical function and, consequently, the quality of life [11]. In this regard, the application of preventive strategies, such as physical exercise within the scope of personalized medicine, has been encouraged [12].

Table 1. A word matrix comparing the current IASP definition of pain with other proposed revisions, and the task force’s initial and revised final definitions.

Current [7, 8]	**Unpleasant**	**Sensory and Emotional**	**Experience**	**Associated with Actual or Potential Tissue Damage or Described in Terms of Such Damage**
[9]	Unpleasant	Sensation		That has evolved to motivate behavior which avoids or minimizes tissue damage, or promotes recovery
[10]	Distressing	with sensory, emotional, cognitive and social components	Experience	Associated with actual or potential tissue damage
[11]	Mutually recognized	Somatic	Experience	That reflects a person’s apprehension of threat to their bodily or existential integrity
[12]	Unpleasant	Sensory and emotional	Experience	That results from actual or potential tissue damage or is of the same kind or similar to such an experience.

(Table 1) contd.....

Initial IASP task force proposition, 2019	Aversive	Sensory and emotional	Experience	Typically caused by actual or potential tissue injury (or resembling that caused by)
Revised IASP task force definition, 2020 [7]	Unpleasant	Sensory and emotional	Experience	Associated with actual or potential tissue damage or resembling that associated with

While the efficacy of exercise and the level of evidence supporting it varies by disease, there are direct and indirect benefits of exercise for most chronic pain patients. Effective exercise regimens involve education and cognitive restructuring to foster both behavioral activation and reconceiving the meaning of pain, with the aim of progressively reversing the vicious cycle of pain, inertia, sedentary lifestyle, and worsening disability. Long-term, consistent and individualized therapeutic approaches based on exercise are most likely to improve pain and function [13]. Contrary to medications, exercise generally has no negative side effects, has very low costs, addresses multiple health issues at once, and has additional potential benefits, such as enhanced mood or cognitive capacities [14].

3.2. Interdisciplinary Chronic Pain Management

Pain is a dynamic outcome of a combination of biological, psychological and social factors. With the introduction of the biopsychosocial model of pain, greater therapeutic and cost-effective interdisciplinary chronic pain management programs have been stimulated. Accordingly, guidelines have advocated interdisciplinary treatment, optimally utilizing an individualized care plan with a shared decision model [10, 15].

Clinical trials and guidelines generally recommend an individualized, multimodal, interdisciplinary therapeutic approach, which may incorporate pharmacotherapy, psychotherapy, integrative treatments, and invasive procedures [16]. Evidence shows that such programs generally yield positive physical and psychosocial outcomes for patients [17]. A number of studies have also noted a decrease in medication use for pain, including the study in which researchers examined (1) analgesic use before and after participation in an interdisciplinary pain management program and its relationship to functioning and (2) psychological processes associated with analgesic use. The use of opioids was linked to poorer functioning at baseline. Participation in an interdisciplinary pain management program was associated with a reduction in opioid dose and the number of analgesic classes consumed. Reduction in analgesic use was related to enhanced functioning. Psychological inflexibility was linked to higher doses of opioid medication and the use of more classes of analgesics. Psychological flexibility appears relevant to explaining analgesic use. Future research could focus on addressing this process to enhance tapering outcomes [18].

Interdisciplinary pain management programs (PMPs) that are based primarily on cognitive-behavioral concepts are potentially ” the preferred treatment for individuals suffering from persistent pain affecting their quality of life” [19].

4. COPING STRATEGIES

Non-communicable diseases are the primary challenge for healthcare systems. Management of the risk factors is critical in the management of NCDs. Their management requires a variety of strategies from various perspectives and at multiple levels, including the individual and national levels. Modern strategies for the management of non-communicable diseases must be oriented towards the individual level, where the subject is in charge of his or her health by simply adopting a healthy lifestyle. It is necessary to link modern scientific achievements and innovative decisions with regard to the rationality of nutrition and the positive effects on people's health. Both governments and international organizations should raise public awareness about people’s health and their environment to make the world a safer and healthier place [20]. It is within this framework that the World Health Organization is moving towards a comprehensive NCD strategy that takes into account the national situation of each country. One of the objectives of the strategy is to reduce exposure to modifiable NCD risk factors and underlying social determinants in order to create healthy environments. This can be achieved by reducing tobacco use, harmful alcohol consumption, unhealthy eating habits, and sedentary lifestyles. The WHO recommends effective interventions based on a cost-effectiveness ratio of $100 per year. Other goals identified in this strategy include managing these diseases and encouraging quality research and development for NCD control [21].

Checkley et al. reported on NCDs' management in low and middle-income countries [22]. The majority of LMICs do not have the extensive health systems of high-income countries, so they cannot simply copy the systems that have emerged in high-income countries. LMICs can take inspiration from high-income countries, but they must design their own systems that emphasize primary care, the reliance on community health workers, and perhaps the use of mobile technology. It is essential to document individual, social, national and global measures to prevent NCDs.

At the individual level, there are several low-cost and highly effective strategies to prevent NCDs.

4.1. Sports Activities

Environmental and societal changes are impacting the level of physical activity in public. In modern society, urbanization, increased use of motorized transportation, and mechanization are the primary contributors to the change in physical activity patterns globally. Technological advances are impacting physical activity levels by decreasing much of the physical work. Sedentary leisure time has become appealing due to computers, cell phones, and electronic entertainment. In this paradigm, low-income countries are more physically active through walking, biking, and manual work. High-income countries are not as physically active due to sedentary leisure, which is a result of new technologies. Additionally, it is

expected that middle- and low-income countries will also reduce their physical activity levels as a result of the technological shift [23].

For instance, encouraging people to participate in sports activities is the most effective factor that can easily influence the prevention of NCDs and is also quick and cost-effective [20].

4.2. Nutrition

Since nutrition is a common risk factor for most NCDs, health care specialists should raise awareness of the nutritional value of the patients' food and emphasize the significance of didactics, internships and workshops within daily practice [24]. Scientific advances provide a wealth of new evidence to identify several key dietary priorities for cardiometabolic health. These include food-based priorities for more fruits, nonstarchy vegetables, nuts, legumes, fish, vegetable oils, yogurt, and whole grains, and fewer processed (sodium-preserved) meats and foods higher in refined carbohydrates and salt [25]. Red meats should be minimized to prevent diabetes mellitus; butter should be used occasionally but not emphasized; and other foods (e.g., unprocessed poultry and eggs) should be consumed in moderation according to personal preference. Coffee and tea can be enjoyed, with possible (but not yet confirmed) benefits; and alcohol, if consumed, should be moderate (up to 1 drink/d for women and 2 drinks/d for men). Harmful additives, in particular sodium, trans fat, and added sugar, will generally be lower in such diets and must be further minimized through strong policy actions [25].

4.3. Lifestyle

The main NCDs are cardiovascular diseases (CVDs), cancers, chronic pulmonary diseases, and diabetes mellitus (DM), which all share the same behavioral risk factors, such as physical inactivity, unhealthy diet, tobacco use, and harmful use of alcohol [26]. Lifestyle changes in favor of healthier behavior are of great relevance for the prevention and treatment of such NCDs [27].

4.4. Modern Technologies

Modern technologies, such as electronic devices, allow structured surveillance of relevant health parameters and monitoring of patients with NCD. For instance, self-diagnostic mobile health apps (referred to as mHealth apps) and wearable technology devices are rapidly expanding in the mainstream consumer electronics market, generating a wealth of prospective data for researchers seeking to explore the mechanism of disease [26]. Furthermore, smartphone technology has been emphasized because of its possibility to monitor and follow up on patients' health from anywhere at any time [28].

For diabetes, using apps seems to improve lifestyle factors, especially decreasing $HbA_{1c.}$ Several major challenges remain. Further pilot and feasibility studies are required to identify which emotional and behavioral traits and patient demographics benefit most from mobile health monitoring [26].

Whereas, nationally and globally, there is a need to invest in research and evaluation to develop a solid evidence base for NCD control plans, implementation of guidelines (based on national context and global evidence), development of national targets and indicators based on WHO guidelines, and establishment of a monitoring and accountability framework for NCD prevention and monitoring action plans [29].

CONCLUSION

Currently, one of the major epidemiologic trends is the increase in chronic and degenerative diseases. Referring to WHO, in the next ten years, it is estimated that the global NCD burden will increase by 17% and in the African region by 27% [2]. This phenomenon will put pressure on healthcare systems to adapt to meet these changing demands by creating efficient preventive planning. This requires adapting health systems and health policies and a shift from disease-centered to people-centered approaches and population health measures.

The purpose of this document is to provide a more current overview of chronic diseases and more detailed information on pain and coping strategies. These insights will enable the quality of preventive treatment to be enhanced.

LIST OF ABBREVIATIONS

NCDS	=	Non-Communicable Diseases
CHCS	=	Chronic Health Conditions
YLDS	=	Years Living with Disability
WHO	=	World Health Organization
LMICS	=	Low and Middle-Income Countries
CVD	=	Cardiovascular Disease
COPD	=	Chronic Obstructive Pulmonary Disease
IASP	=	International Association for the Study Of Pain
PMPS	=	Pain Management Programs

CONSENT FOR PUBLICATION

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CONFLICT OF INTEREST

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