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Revista de cercetare și intervenție socială

ISSN: 1583-3410 (print), ISSN: 1584-5397 (electronic)

Selected by coverage in Social Sciences Citation Index, ISI databases

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Revista de cercetare și intervenție socială, 2015, vol. 49, pp. 257-275

The online version of this article can be found at:
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Published by:

Expert Projects Publishing House



On behalf of:

„Alexandru Ioan Cuza” University,

Department of Sociology and Social Work

and

Holt Romania Foundation

REVISTA DE CERCETARE SI INTERVENTIE SOCIALA

is indexed by ISI Thomson Reuters - Social Sciences Citation Index
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Chronic Diseases – Medical and Social Aspects

Mihai ROCA¹, Ovidiu MITU², Iulia-Cristina ROCA³, Florin MITU⁴

Abstract

Chronic diseases result in an enormous burden of morbidity and mortality worldwide, projected to continuously increase over the next decades. Cardiovascular diseases, followed by cancers, chronic respiratory diseases and diabetes mellitus, represent the main causes of death caused by chronic conditions. The majority of chronic diseases are multifactor disorders, the main etiological role being played by various behavioral or environmental risk factors. Social factors such as education, employment status, income, familial and social stress have also a major role in determining chronic diseases, both directly and indirectly, by increasing the susceptibility to behavioral risk factors. Chronic pathology results in chronic symptoms which dramatically impairs the patient quality of life and working capacity, also resulting in a significant social and economic burden. Social problems develop with the progressive exercise capacity alteration, resulting in limited mobility, home-bounding, self-care disability and bed-bounding, the ultimate consequences being social isolation, family conflicts and even stigma. Chronic diseases prevention focuses on behavioral risk modifying, mainly implying specific social interventions, as long as most behavioral risk factors are represented by socially mediated activities. Considering the magnitude of the problems currently determined by chronic diseases, a coherent strategy for the management of these conditions, should be a high priority at both levels of society and health care systems. This strategy must provide an efficient risk control, the optimal medical care for the patient, by applying a holistic patient-centered approach, and specific social assistance.

Keywords: chronic disease, comorbidity, risk factor, social burden, social intervention, global health strategy.

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Introduction

Chronic diseases represent a major cause of morbidity and the largest cause of mortality throughout the world, generating a substantial economic and social burden (Yach, Hawkes, Gould & Hofman, 2004). *World Health Organization Global status report on noncommunicable diseases 2010* classified the most important causes of death, represented by cardiovascular diseases (48%) followed by cancers (21%), chronic respiratory diseases (12%) and diabetes (3%) (WHO *Noncommunicable diseases country profiles*, 2011). Global prevalence of the chronic diseases is projected to continuously increase over the next decades. This trend is alarming, considering that many of the chronic diseases are highly preventable: at least 80% of heart disease and 40% of cancer could be avoided by cost-effective interventions of reducing the prevalence of common risk factors such as smoking, sedentary life or unhealthy diet.

In this context, the prevention of chronic diseases became a global goal that needs comprehensive and integrated actions at country level, to be optimally accomplish (Epping-Jordan, Galea, Tukuitonga & Beaglehole, 2005). To elaborate an action plan targeting chronic diseases, the actual size of the problem have to be correctly acknowledge at the level of health care system as well as at the social level.

The global burden of chronic diseases

Cardiovascular diseases

Among chronic diseases, cardiovascular disorders continue to represent the leading cause of mortality (17 million deaths in 2002), mainly by ischemic heart disease and stroke (Yach *et al.*, 2004), although the cardiovascular death rate decreased in the last decades, especially in developed countries. In 2010, cardiovascular diseases accounted for 1 of every 3 deaths and coronary heart disease alone caused 1 of every 6 deaths (Go, Mozaffarian, Roger, Benjamin, Berry, Blaha, *et al.*, 2014). Heart failure remains a chronic condition particularly common in elderly, with a prevalence rising from 2-3% at age 65 to more than 80% at ages over 80, representing the most common reason for hospitalization for this age category (Hunt, Abraham, Chin, Feldman, Francis, Ganiats, *et al.*, 2005). Arterial hypertension represent a major risk factor for other cardiovascular diseases as heart failure, myocardial infarction and stroke. In 2000, 26.4% of the worldwide adult population had hypertension and 29.2% were projected to have this condition by 2025 (Kearney, Whelton, Reynolds, Muntner, Whelton & He, 2005).

Cancer

Cancer represent the second cause of death worldwide (WHO | Noncommunicable diseases country profiles, 2011). From the global burden of cancer, we have chosen the particular case of lung cancer, because this has an important feature: is largely determined by smoking, a risk factor commonly involved in various chronic diseases. Cigarette smoking represents the leading cause of lung cancer, accounting for about 80% to 90% of the cases (Alberg, Brock, Ford, Samet & Spivack, 2013). Depending on disease stage at diagnosis, 5 year survival rate varies markedly: from 52% to 24% and 4% corresponding to local, regional, and distant extension of the tumor, respectively (Howlader, Noone, Krapcho, Neyman, Aminou, Waldron, *et al.*, 2010).

Chronic respiratory diseases

From the global burden of respiratory diseases, the third cause of death in the world, we have chosen the particular case of chronic obstructive pulmonary disease (COPD), a disorder with particular features in terms of prevalence and risk factors. COPD is most frequently determined by tobacco smoking and is, among the other chronic disorders, one of the leading causes of morbidity and mortality (Vestbo, Hurd, Agustí, Jones, Vogelmeier, Anzueto, *et al.*, 2013). According to World Health Organization, 65 million people throughout the world had moderate to severe COPD and more than 3 million people died of COPD in 2005 (WHO | Burden of COPD, 2005). The COPD mortality continuously increased during the last decades. This was ranked as the sixth cause of death in 1990, being the fourth cause of death in the present and being projected to become the third cause of death in the word in 2020 (WHO | World Health Organization, 2000; Vestbo, Hurd, Agustí, Jones, Vogelmeier, Anzueto, *et al.*, 2013).

The major risk factors in chronic diseases

The majority of chronic disorders have multiple and complex etiology. Beyond the role of few genetically determined features, the main role in the etiology of chronic diseases is played by various behavioral or environmental risk factors. Very important features of these risk factors are controllability and modifiability. Controlling the risk factors is possible to prevent occurrence, promotion or evolution of most chronic diseases.

Tobacco smoking, high blood pressure, high level of cholesterol, obesity, diabetes and lack of physical activity represent known cardiovascular risk factors. However, different chronic diseases can share common risk factors. Thus, tobacco smoking is a risk factor involved in the etiology of both cardiovascular and respiratory chronic diseases. This is estimated to cause about 10% of

cardiovascular disease, 42% of chronic respiratory disease and 71% of lung cancer. Tobacco-attributable mortality was represented by 3 million deaths in 1990 but is projected to increase to 8.4 million deaths in 2020 (Murray & Lopez, 1997).

Raised blood cholesterol level is a major cardiovascular risk factor, with a prevalence of 13.8% in adults above 20 years of age, estimated to cause 2.6 million deaths annually (Go *et al.*, 2014).

Sedentary lifestyle results in a 20% to 30% increased risk of all-cause mortality, 3.2 million people dying each year due to physical inactivity, mainly by cardiovascular or metabolic diseases. Risks of cardiovascular and metabolic disorders are also associated in obesity, more than 2.8 million people dying each year as a result of being obese or overweight. Chronic alcohol consumption determines approximately 3.8% of all deaths in the world, each year. More than half of these deaths result from cardiovascular diseases, liver cirrhosis and cancers. Elevated level of blood pressure is responsible for 12.8% of all deaths, being a major risk factor for cardiovascular disorders (WHO | Global status report on noncommunicable diseases, 2010).

Social risk factors for chronic diseases

There is an enormous amount of information, resulted from research, on the significant relation between chronic diseases incidence and prognosis, and social factors such as: education, occupation, employment status, income, familial stress, social stress (Kaplan & Keil, 1993; Vestbo *et al.*, 2013). Psychological stress during childhood, determined by social and familial risk factors, results in a higher susceptibility to chronic diseases with aging. A study including 17,000 subjects proved a 1.5–2.0 fold greater incidence of cardiovascular diseases and premature mortality, among adults who were exposed to social and familial stress factors as children: familial violence, abuse, physical neglect, living in families with substance abusing members. (Miller, Chen & Parker, 2011; Anda *et al.*, 2009). There are overwhelming evidences of the deleterious effects of stress on the heart, particularly familial and social stress (Dimsdale, 2008). Various social factors appear to significantly influence the cardiovascular chronic diseases development, evolution and prognosis.

Socioeconomic status defined as individual's social position relative to other members of the society, presents an inverse association with cardiovascular disease risk, in high-income countries, as a result of the high prevalence of multiple behavioral and psychosocial risk factors in people with low socioeconomic status (Clark, DesMeules, Luo, Duncan & Wielgosz, 2009). The relation between social class gradient and the risk for ischemic heart disease was confirmed

by Whitehall Study, a survey of 17530 London civil servants. Comparing men from the lowest employment grade with those in the top (administrative) grade, resulted a 75% higher prevalence rate of ischemic heart disease in the first category. Furthermore, the seven year coronary mortality was 3.6 times higher in the lowest employment grade compared with those in the top (administrative) grade (Rose & Marmot, 1981).

A study conducted in Finland analyzed association of socioeconomic status with the risk of death from ischemic heart disease, the risk of cerebral stroke and cancer. Short education, low income and not being married status were identified as risk factors associated with an increased mortality by ischemic heart disease. Short education was also associated with a higher risk of cancer. This study also proved that unmarried men and men living in urban areas present an increased risk of cerebral stroke (Salonen, 1982). A study including a large sample of workingmen from Swedish population revealed the association between job characteristics and cardiovascular morbidity. Psychologically demanding jobs result in a significant risk increasing of developing ischemic heart disease (odds ratio 1.29, $p \leq 0.25$) and in a significant risk of cardiovascular mortality (relative risk 4.0, $p \leq 0.01$). Low decision latitude - expressed as low intellectual discretion, predicted the development of ischemic heart disease symptoms and signs (odds ratio 1.44, $p \leq 0.01$), while low personal schedule freedom increased the risk of cardiovascular death related to ischemic heart disease (risk ratio 6.6, $p \leq 0.0002$) (Karasek *et al.*, 1981).

The effect of social risk factor in influencing the development and evolution of chronic pathology was also observed in chronic respiratory diseases. A study on chronic obstructive pulmonary disease, on a population consisting of 14,223 subjects, aged 20-90, indicates that socioeconomic factors from early life, enhance the risk of developing chronic lung disease, independently of smoking, the most important risk factor of this disease. The research proved that education and household income are independently associated with lung ventilation impairment, the main functional indicator of disease severity. Education and household income were also significantly associated with hospital admission. Using a socioeconomic index combining information on education and income, the study proved relative risks (95% confidence intervals): for medium versus low socioeconomic index, of 0.47 (0.36-0.63) in men and 0.74 (0.55-1.02) in women; for high versus low socioeconomic index, of 0.35 (0.17-0.70) in men and 0.27 (0.10-0.73) in women (Prescott, Lange & Vesbo, 1999).

A significant part of the social risk factors role, in generating chronic diseases, is exerted indirectly, by determining behavioral risk factors as smoking, food or alcohol abusing.

Recent researches proved the relation between social anxiety and smoking. If among men, social anxiety was related to smoking dependence severity, among women on the other hand, this was related to daily smoking status. The

relationship between social anxiety and nicotine dependence severity is mediated by affiliative attachment and behavioral choice-melioration smoking motives (Buckner & Vinci, 2013).

Between chronic disease and chronic multimorbidities

As a global trend, assessed in 2005, prevalence and mortality of chronic diseases increases with age, reaching the maximum under the threshold of 70 years. Although the total lost years of healthy life due to chronic diseases increases with age, this parameter is lower for the population above 60 years than in adults aged 30–59 years. The population under 70 years includes more than 80% of the burden of chronic diseases (Strong, Mathers, Leeder & Beaglehole, 2005).

A chronic disease almost never develop alone but most frequently together with one or more other chronic comorbidities. Vogeli *C et al.* assessed the situation of chronic comorbidities within United States population, finding a large and growing number of persons who have multiple co-occurring chronic conditions (Vogeli, Shields, Lee, Gibson, Marder, Weiss, *et al.*, 2007). In 2005, 21% of Americans had more than one chronic condition, the risk increasing with aging: 62% of Americans over 65 have multiple chronic conditions (Robert Wood Johnson Foundation, 2002). The presence of multiple comorbidities associated to a baseline chronic disease, usually results in a significant worsening for patient quality of life, frequency of acutization/decompensation and global prognosis (Ekici & Ekici, 2010). To describe clearer the importance of comorbidities associated to chronic diseases, we will exemplify the cases of chronic heart failure and COPD, two major pathological entities with significant implications in terms of comorbidities. Data from National Hospital Discharge Survey, including a total of 47,404,700 hospital discharges of patients with COPD, during 1979 to 2001, frequently reported comorbidities as the reason of hospital admission: hypertension 17%, cardiac disease 25%, diabetes 11%, pneumonia 12% (Holguin, Folch, Redd & Mannino, 2005). In a study including more than 45,000 COPD patients, heart failure was the leading cause of hospital admission, followed by myocardial infarction and stroke (Sidney, Sorel, Quesenberry, DeLuise, Lanes & Eisner, 2005).

Furthermore, the associated comorbidities can be more frequent causes of death than the baseline chronic disease itself. A Canadian study including 2,553 deaths in COPD patients, have found that cardiovascular diseases, more specifically ischemic heart disease, resulted in 19.6 per 1,000 person-years deaths, compared with COPD which resulted in 15.5 per 1,000 person-years death (Huiart, Ernst & Suissa, 2005). Thus, patients with diagnosis of COPD, associating multiple comorbidities, need more frequently hospital admission, have longer hospital stay and have higher in-hospital mortality (Baty, Putora, Isenring, Blum &

Brutsche, 2013). Comorbidities are highly prevalent conditions also in chronic heart failure, more frequently in older patients. A cross-sectional study of 122,630 individuals above 65 years old, with a diagnosis of chronic heart failure, demonstrated that a subgroup including nearly 40% of them, had at least 5 non-cardiac comorbidities, the risk of hospitalization strongly increasing with the number of chronic conditions associated to heart failure (Braunstein, Anderson, Gerstenblith, Weller, Niefeld, Herbert & Wu, 2003). The most prevalent comorbidities associated in heart failure were coronary artery disease (50%), hypertension (50%), diabetes (20–30%), COPD (20–30%), anemia (20–30%), all of these causing a significant impact on both, clinical aspect and prognosis (Dahlström, 2005).

An important issue impacting the management of chronic diseases concerns the clinical pattern, reflected by symptoms and signs. A major problem is determined by the low specificity of some clinical symptoms or signs, which are classically considered essential, in the semiology of chronic diseases. Thus, symptoms such as decreasing of exercise capacity, fatigue or dyspnea, are met in a myriad of chronic diseases. For instance, dyspnea may occur in chronic respiratory diseases, as COPD, but also in chronic heart diseases, the most specific cardiac cause being heart failure (Roca, Verduri, Corbetta, Clini, Fabbri & Beghé, 2013). Although more rarely, coronary artery disease may manifest not in its classical form, as angina pectoris, but as dyspnea which may appear as a painless equivalent of angina (Cheng, 2007). Other problem results from the insidious pattern of symptoms occurrence, a common aspect in the early stages of the most chronic diseases. This is particularly important in old individuals, they frequently neglecting such clinical symptoms and signs, or considering these as normal in the context of aging.

The natural history of chronic diseases usually results in a baseline clinical trend represented by a certain level of symptoms severity which is often apparently stable or very slowly increasing over the years or decades. The clinical transition from a certain stage of the disease, to the next, frequently occurs very insidious, along large periods. However, the baseline clinical trend is punctuated by acute clinical events, exacerbations or decompensations, consisting in acute worsening of the symptoms. The acute events represent a major feature of the chronic diseases. By clinical worsening and frequency, acute events cause a significant influence on chronic disease long term course and prognosis. The patient's quality of life is also determined by both disease baseline severity and acute events frequency and severity (The Merck Manual). To exemplify the challenging issues resulting from the coexistence of much comorbidity, here we will present the specific situation of the patient with the association of two highly prevalent diseases: COPD and chronic heart failure. COPD is a disease having as the main pathophysiological mechanism the airflow limitation, clinically manifesting by dyspnea, the cardinal symptom of this chronic disorder. Dyspnea results in

exercise capacity limitation, which represents the most important determinant of quality of life altering in COPD patients. The disease is characterized also by exacerbations, acute clinical events represented by worsening of patient's respiratory symptoms, beyond day to-day variations. Thus, the clinical course of disease is represented by a linear trend, periodically interrupted by dramatic rises in severity of symptoms, determined by exacerbations. Although the severity of the disease was assessed many years by spirometric measurement of airflow limitation, this parameter is not well correlated neither with clinical severity (dyspnea), nor with the risk of exacerbation. Therefore, all these three parameters are currently used to assess severity, risk and prognosis of COPD patient (Vestbo *et al.*, 2013). Even so, there is not a rigorous model which could reliably determine the risk of exacerbation or the functional trend during chronic evolution. The issues are even more complicated in the COPD patients with coexisting chronic heart failure. Dyspnea, the cardinal symptom of COPD represents one of the main symptoms in chronic left heart failure, too. The intensity of dyspnea reflects the severity of heart failure and results in exercise capacity limitation, one of the major determinants of the quality of life in heart failure, similar to COPD. The natural history of chronic heart failure is determined by a progressive decline of the ventricular function with a progressive clinical worsening (dyspnea), lasting many years and ending by death (McKee, Castelli, McNamara & Kanne, 1971). This linear trend of chronic heart failure is periodically interrupted by acute decompensation represented by clinical worsening, mainly dyspnea. In this perspective, the clinical course in patient associating COPD and heart failure is mainly represented by the sum of respiratory and cardiac dyspnea (Roca *et al.*, 2013). However, the resulting dyspnea is not an algebraic sum, presenting a more complex and unpredictable trend, comparing with trend of the two terms taken apart. Clinical exacerbation may be determined by exacerbation of any of the two associated diseases, or by the simultaneous exacerbation of these. Furthermore, the exacerbation of COPD may trigger the decompensation of heart failure and, the decompensation of heart failure may trigger the exacerbation of COPD (Beghé, Verduri, Roca & Fabbri 2013).

The pattern of acute events periodically occurring during the course of chronic diseases is often perceived as fluctuating. Death may occur in any clinical exacerbation or decompensation of the disease. This results in a hardly predictable prognosis, often missing a real terminal phase which can be replaced by sudden death. The course of disease is differently in cancer, particularly in lung cancer patients. In this case the chronic disease is more clearly delineated and the prognosis is more predictable, including the terminal phase, as shown in *Figure 1* (Hauser & Bonow, 2011).

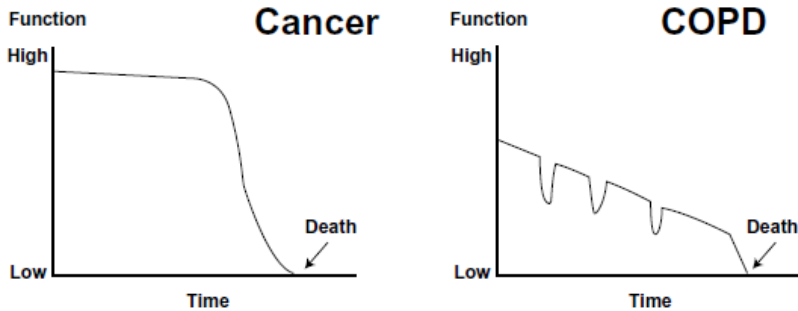


Figure 1. Long term clinical trend in cancer and other chronic diseases (COPD, heart failure) which associate acute exacerbations (*Consultation on a Strategy for Services for Chronic Obstructive Pulmonary Disease (COPD) in England*)

These differences are important for health care providers which have to correctly decide the moment when to introduce palliative care in the patient's care program. However, the clinical data demonstrate also some similarities between the course of chronic heart disease and cancer: a similar number of specialist consultations, similar levels of comorbidities and a similar risk to die at home (McKinley, Stokes, Exley & Field, 2004). Also the patients' experience of living with heart failure or cancer, and the perspective of dying is completely different: patients with cancer have a more clear understanding of their condition and prognosis, talking more explicitly about death; patients with heart failure are more frequently affected by frustration, social isolation, and the stress of receiving a complex medication regimen (Murray, Boyd, Kendall, Worth, Benton & Clausen, 2002).

Social consequences of the chronic diseases

Beyond the mortality increasing effect, chronic diseases result in a significant burden of disability, which is responsible for multiple social consequences. The World Bank/WHO Global Burden of Disease Study designed a composite measure of the burden of each major disease or injury, estimating the fraction of both, attributable mortality and disability: Disability-Adjusted Life Year (DALY). The DALYs for a specific chronic disease represents the sum of years lost because of premature mortality and years of life lived with disability, adjusted for the severity of disability. This composite measure represents a useful instrument for social burden of chronic diseases assessment. According to the projections, chronic diseases as ischemic heart disease and chronic obstructive pulmonary disease will be the first and the fifth leading cause of DALYs lost worldwide in 2020, respectively (Murray & Lopez, 1996; Vestbo *et al.*, 2013).

One of the most common consequences occurring in the evolution of chronic diseases is exercise capacity alteration. In both chronic cardiovascular pathologies, such as heart failure, and chronic respiratory pathologies, such as chronic obstructive pulmonary disease, exercise capacity declines slowly and continuously, throughout the chronic evolution of the disease. In the early stages of the chronic diseases, exercise capacity limitation becomes evident only in strenuous levels of exercise. In the middle stages of the diseases, exercise capacity alteration appears as a walking speed or distance limitation, with deleterious consequences on physical work capacity and even on some recreational activities. Beginning with these consequences, exercise capacity limitation becomes a social problem, whose severity continuously increases. In the advanced and terminal stages of chronic diseases, the social problem develops as the severe exercise capacity alteration results in effects such as home-bounding, self-care disability and bed-bounding. These effects result in significant alteration of the quality of life, complete disability of the patient, with loss of working capacity, social isolation, family conflicts and even stigma. Furthermore the patient develops increased care necessities within the family and needs for specialized health care services. Usually these necessities result in socioeconomic issues in family or at the level of health care system.

A special socioeconomic issue generated by chronic diseases is represented by the alteration of the work capacity. This results in reduced work output, absenteeism, and early retirement in case of permanent disability. These effects have a significant impact on work productivity. In the United States, productivity losses related to personal health problems, cost employers \$1,685 per employee per year, 71% explained by reduced performance at work. Health-related work absence accounts for 6% of all health-related lost productive time (Stewart, Ricci, Chee & Morganstein, 2003). Indirect costs of poor health in chronic diseases may be several times higher than direct medical costs and affect all employers, even those who avoid direct medical costs by not funding health insurance (CDC - Workplace Health - Business Case - Reasons for Investing - Productivity). Although previous studies have found that poor health by chronic diseases leads to early retirement, data from the Health and Retirement Study indicate that chronic illness leads to fewer assets accumulation during working years and consequently later retirement (Miah & Wilcox-Gök, 2007). Beyond work limitations determined by exercise capacity impairment, workers with chronic diseases associate limitations determined by subjective health complains such as pain or fatigue, and a lot of psychological problems: a negative self-image, fear that colleagues could consider them unfairly favored, hopelessness related to employability, anxiety, depression. The unpredictable long-term trajectory of many chronic diseases as well as day-to-day symptoms variability arises feelings of uncertainty, making work planning difficult. Chronic diseases such as ischemic heart disease or

chronic obstructive pulmonary disease result in subjective symptoms without objective signs and may create credibility problems for co-workers or the supervisor.

Other social problem in individuals with chronic comorbidities, especially at older age, is the substantially lower employment rates, as a result of health selection, resulting in lower opportunities on the labor market (Varekamp, van Dijk & Kroll, 2013). Social isolation of chronically ill individuals represents a serious problem in society. The lack of needed social contacts is a major source of discomfort and frustration, and can lead psychological problems and health problems aggravation. Many factors are involved, including limited mobility caused by exercise capacity alteration and disabilities, socially undesirable disabilities, lack of employment, lack of transportation, changes of social roles, and emotional and psychological stress (Holley, 2007). Although not so prevalent as social isolation, stigma represents an experience also reported by people with chronic diseases. Usually stigma results from observable effects of illness such as exercise capacity alteration, struggle to breath, disability, which are common signs in chronic cardiovascular and respiratory diseases. Stigma may also be associated with cases of ill individuals who are responsible for the disease occurrence. As an example, respiratory and cardiovascular chronic diseases caused by smoking are considered “self-inflicting” conditions (Albrecht, Walker & Levy, 1982). A historic example of stigma associated to chronic pulmonary disease patients was generated by health professionals, by classification of clinical phenotypes in “pink puffer” and “blue bloaters”, expressions which, by their very nature, stigmatized patients. (Johnson, Campbell, Bowers, Nichol, 2007).

Social interventions in chronic disease prevention

Epidemiological data presented above, prove the overwhelming importance of behavioral risk factors, such as smoking, sedentariness and unhealthy eating habits, in the etiology of chronic diseases. However, chronic diseases represent one of the last effects of behavioral risk factors. Beyond the medical problem, these factors have a broad impact on society, affecting the quality of life of individuals and communities, cost of public services and also the economic performance. From this perspective, social marketing seems to play a key role in supporting the people’s decisions and actions to determine their own well-being and health (Lister, Mcvey, French, Stevens & Merritt, 2008).

The most prevalent and significant behavioral risk factors, such as smoking and alcohol consumption are also represented by socially mediated activities. Social-learning concept is used to describe drinking habits on the continuum from abstinence to alcoholism, the “social drinker” representing the center point on this line. Drinking habits develop under the laws of learning, and under the influence of specific social processes, such as modeling. Since the development of this

behavioral risk factor involves social processes, it seems natural that any effective strategy of maladaptive alcohol drinking habit prevention or treatment should include social interventions and techniques such as social modeling (Collins & Marlatt, 1981). Certainly, these principles are also applicable for the other major behavioral risk factors.

In the last years we have assisted to a major change of concept in the management of chronic diseases, from control strategies focused on disease treatment, to strategies focused on disease prevention (Epping-Jordan *et al.*, 2005). Primary prevention, based on behavioral risk modifying, seems to be the most natural measure. However, giving the major social implications of behavioral risk factors, the concept change in the management of chronic disease also means a shifting of the interventions, from health care domain, to social domain.

World Health Organization has a significant role to play in promoting these interventions all over the world. As an example, WHO Framework Convention on Tobacco Control identified the most efficient social interventions for the optimal control of this behavioral risk factor (WHO Framework Convention on Tobacco Control; WHO report highlights tobacco use and social inequity). These interventions include: (1) Reducing availability of tobacco products, by implementing tobacco taxes, eliminating illicit trade, and prohibiting sales to minors; (2) Shifting attitudes toward health as a core value by incorporating tobacco control into the global development agenda; (3) Increasing the prevalence of smoke-free workplaces, restaurants, and other public places; (4) Banning tobacco advertising, promotion, and sponsorship; adding graphic picture warnings on tobacco products; and promoting tobacco-free role models; (5) Supporting partnerships with community groups and organizations thus tobacco control interventions are linked with community development and empowerment of lower socioeconomic groups. Some of these interventions could be adapted for the control of the other risk factors, which determine chronic diseases.

Management of chronic diseases

Most of the chronic diseases are not curable but treatable and, more important, many of these are preventable disorders. These cardinal features of chronic diseases determine the main directions in the epidemiological and clinical management.

Other important characteristic is the underdiagnosis of the chronic diseases. In England, 835,000 people have been diagnosed with COPD but the real burden of the disease in this country is estimated to over 3 million (Consultation on a Strategy for Services for Chronic Obstructive Pulmonary Disease (COPD) in England). Other researches have proved that even among people newly diagnosed

with severe COPD, only 46.8% reported a known diagnosis of respiratory disease before (Shahab, Jarvis, Britton & West, 2006). Recently published data confirm the same situation of underdiagnosis and undertreatment in people with familial hypercholesterolaemia (Nordestgaard, Chapman, Humphries, Ginsberg, Masana, Descamps, *et al.*, 2013). The epidemiological and clinical particularities of chronic diseases result in special requirements for the management strategies. World Health Organization recommended an integrated strategy based on population level health promotion and risk reduction, as the main approaches for chronic disease management. This strategy have to be designed by many specific programs for the control of each chronic disease, adapted to the patient's needs, risk level and stage of severity (Gröne & Garcia-Barbero, 2001). Chronic multimorbidities result in complex management problems underlining the necessity of an interdisciplinary approach.

The management of chronic diseases is currently based on clinical guidelines. The problem of the most current guidelines is that these are developed as disease-specific guidelines and don't include information on the full spectrum of health risks and comorbidities that may be associated with the baseline disease. The correct management of chronic multimorbidities requires more than simply applying the sum of separate disease-oriented guidelines, corresponding to every component disease. Instead of developing new guidelines, taking into account all possible combination of comorbidities, would be better to apply a holistic patient-centered approach, to ensure the continuity of care and also to integrate all the patient's psycho-social domains (van Weel & Schellevis, 2006).

The main components of a strategy designed to manage chronic diseases should be primary and secondary prevention and risk control. This measures have to address the most important risk factors commonly involved in chronic diseases (Patterson & Chambers, 1995). Thus, smoking cessation is proved as the first measure in COPD prevention, given that smoking is known as a risk factor in 85% of COPD cases. Furthermore, smoking cessation seems to be the single most effective and cost-effective way, not only in reducing the risk of developing COPD but also in stopping its progression. However, access to smoking cessation services is currently limited in both community and hospital settings (Vestbo *et al.*, 2013; National Respiratory (COPD) Framework, 2008). Therefore, coherent policies towards smoking cessation services are mandatory to be integrated in any strategy for chronic disease management, not only in COPD, but also in cardiovascular diseases and other smoking related disorders. Although the pharmacological resources available for chronic disease treatment are continuously developing and its result in a certain level of symptom control, diminishing the disease related alteration of the quality of life, frequently these interventions have an insignificant influence on disease trajectory. Thus, in COPD none of the existing medications currently used have been shown to modify the long-term decline in lung function that is the hallmark of this disease (Vestbo *et al.*, 2013).

On the other hand, from the clinical research emerge a growing number of evidences regarding the benefits of rehabilitation programs, in both respiratory and cardiovascular chronic diseases. These programs are based on many specific interventions, including sessions of structured exercise. Ischemic heart disease represent an important indication for cardiac rehabilitation, including the situation after coronary revascularization procedure (Kwan & Balady, 2012). COPD represent one of the most important respiratory pathologies where there is a firm indication for pulmonary rehabilitation (Harrison, Goldstein, Desveaux, Tulloch & Brooks, 2014). Cardiovascular and pulmonary rehabilitation are currently acknowledged by all international guidelines as key components of the chronic disease management, resulting in functional optimization, a better control of the symptoms and an improvement in the quality of life (Vestbo *et al.*, 2013). In the last stages of many chronic diseases the patient may be housebound, depressed or socially isolated, becoming dependent on health care services. However this problem may be diminished or delayed if the patient is informed, educated and empowered for the self-management of this disease (National Respiratory (COPD) Framework, 2008). Although not all chronic diseases' course results in a clear terminal phase, palliative care have to occupy its rightful place in patient care. It is critical to recognize the palliative care place, not only as end of life care, but also as a concurrent with life-prolonging therapeutic interventions, from the moment when is diagnosed a life-limiting disorder. Thus, palliative care expands the traditional medical goals of curing illness and prolonging life, emphasizing the patient-centered goals of reducing symptom burden, improving quality of life, and supporting the hopes of patients with severe chronic diseases and their families to cope with the uncertain prognostic, assisting their decision making process (Bekelman, Hutt, Masoudi, Kutner & Rumsfeld, 2008). Palliative care facilitates patient autonomy, addressing not only physical suffering but also emotional, social, and spiritual needs. These goals are achieved by correctly informing and communicating with patients. These measures significantly increase patient well-being and satisfaction with treatment, diminishing the frequent disease associated anxiety (Bekelman *et al.*, 2008). An optimal palliative care has to involve not only medical care, but equally psychological, social and spiritual assistance.

Conclusions

The increasing medical and social burden of chronic diseases is currently underestimated and ignored throughout the world. This situation begins with the defective control of the risk factors, continuing with the underdiagnosis and undertreatment of various chronic diseases. Furthermore, chronic pathogenic entities usually don't appear separate, but these aggregate in clusters of multimorbidities, aggravating the epidemiological and clinical problems determined by

chronic diseases alone. Beyond the medical care problem, chronic diseases result in both an enormous economic burden and a challenging social issue. The solution of these problems seems to be a coherent strategy for chronic diseases management, designed to provide an efficient risk control and to ensure the optimal patient care in an integrated health care system, applying a holistic patient-centered approach.

Acknowledgement

This paper was supported by the project: *Strategic partnership to improve the quality of scientific research in universities of medicine through doctoral and postdoctoral scholarships – DocMed.Net_2.0* (POSDRU/159/1.5/S/136893), project co-funded by European Social Fund through Sectoral Operational Programme for Human Resources Development 2007 – 2013.

References

- Alberg, A.J., Brock, M.V., Ford, J.G., Samet, J.M. & Spivack, S.D. (2013). Epidemiology of lung cancer: Diagnosis and management of lung cancer, 3rd ed: american college of chest physicians evidence-based clinical practice guidelines. *Chest*, 143, e1S–e29S.
- Albrecht, G.L., Walker, V.G., Levy, J.A. (1982). Social distance from the stigmatized. A test of two theories. *Soc Sci Med*, 16, 1319–1327.
- Anda, R.F., Dong, M., Brown, D.W., Felitti, V.J., Giles, W.H., Perry, G.S., Valerie, E.J., Dube, S.R. (2009). The relationship of adverse childhood experiences to a history of premature death of family members. *BMC Public Health*, 9, 106.
- Baty, F., Putora, P.M., Isenring, B., Blum, T. & Brutsche, M. (2013). Comorbidities and burden of COPD: a population based case-control study. *PLoS ONE*, 8, e63285.
- Beghé, B., Verduri, A., Roca, M. & Fabbri, L.M. (2013). Exacerbation of respiratory symptoms in COPD patients may not be exacerbations of COPD. *European Respiratory Journal*, 41, 993–995.
- Bekelman, D.B., Hutt, E., Masoudi, F.A., Kutner, J.S. & Rumsfeld, J.S. (2008). Defining the role of palliative care in older adults with heart failure. *International Journal of Cardiology*, 125, 183–190.
- Braunstein, J.B., Anderson, G.F., Gerstenblith, G., Weller, W., Niefeld, M., Herbert, R. & Wu, A.W. (2003). Noncardiac comorbidity increases preventable hospitalizations and mortality among Medicare beneficiaries with chronic heart failure. *Journal of the American College of Cardiology*, 42, 1226–1233.
- Buckner, J.D., Vinci, C. (2013). Smoking and Social Anxiety: The Roles of Gender and Smoking Motives. *Addict Behav*, 38, 2388–2391.
- CDC - *Workplace Health - Business Case - Reasons for Investing – Productivity*. <http://www.cdc.gov/workplacehealthpromotion/businesscase/reasons/productivity.html> (accessed 01.12.14).

- Cheng, T.O. (2007). Acute dyspnea on exertion is an angina equivalent. *International Journal of Cardiology*, 115, 116.
- Clark, A.M., DesMeules, M., Luo, W., Duncan, A.S., Wielgosz, A. (2009). Socioeconomic status and cardiovascular disease: risks and implications for care. *Nat Rev Cardiol*, 6, 712-722.
- Collins, R.L., Marlatt, G.A. (1981). Social modeling as a determinant of drinking behavior: Implications for prevention and treatment. *Addictive Behaviors*, 6, 233–239.
- Consultation on a Strategy for Services for Chronic Obstructive Pulmonary Disease (COPD) in England. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/213840/dh_113279.pdf. (accessed 09.28.14).
- Dahlström, U. (2005). Frequent non-cardiac comorbidities in patients with chronic heart failure. *European Journal of Heart Failure*, 7, 309-316.
- Dimsdale, J.E. (2008). Psychological stress and cardiovascular disease. *J Am Coll Cardiol*, 51, 1237-1246.
- Ekici, M. & Ekici, A. (2010). The Correlations Between the Presence of Comorbidities, Psychological Distress and Health-Related Quality of Life, in: Preedy, V.R., Watson, R.R. (Eds.), *Handbook of Disease Burdens and Quality of Life Measures*. Springer New York, pp. 3475–3488.
- Epping-Jordan, J.E., Galea, G., Tukuitoranga, C. & Beaglehole, R. (2005). Preventing chronic diseases: taking stepwise action. *The Lancet*, 366, 1667–1671.
- Go, A.S., Mozaffarian, D., Roger, V.L., Benjamin, E.J., Berry, J.D., Blaha, M.J., *et al.* (2014). Executive summary: heart disease and stroke statistics—2014 update: a report from the American Heart Association. *Circulation*, 129, 399–410.
- Gröne, O. & Garcia-Barbero, M. (2001). Integrated care: a position paper of the WHO European Office for Integrated Health Care Services. *International Journal of Integrated Care*, 1, e21.
- Harrison, S.L., Goldstein, R., Desveaux, L., Tulloch, V. & Brooks, D. (2014). Optimizing nonpharmacological management following an acute exacerbation of chronic obstructive pulmonary disease. *International Journal of Chronic Obstructive Pulmonary Disease*, 9, 1197–1205.
- Hauser, J.M., Bonow, R.O. (2011). Chapter 27 - Heart Failure and Palliative Care, in: Librach, L.L.E.L. (Ed.), *Palliative Care (Second Edition)*. W.B. Saunders, Saint Louis, pp. 391–404.e2.
- Howlander, N., Noone, A.M., Krapcho, M., Neyman, N., Aminou, R., Waldron, W., *et al.* SEER Cancer Statistics Review, 1975-2008, National Cancer Institute. Bethesda, MD. §WWW Document. URL http://seer.cancer.gov/csr/1975_2008. (accessed 09.21.14).
- Holley, U.A. (2007). Social isolation: a practical guide for nurses assisting clients with chronic illness. *Rehabil Nurs*, 32, 51-56.
- Holguin, F., Folch, E., Redd, S.C. & Mannino, D.M. (2005). Comorbidity and mortality in COPD-related hospitalizations in the United States, 1979 to 2001. *Chest*, 128, 2005–2011.
- Huiart, L., Ernst, P. & Suissa, S. (2005). Cardiovascular morbidity and mortality in COPD. *Chest*, 128, 2640–2646.

- Hunt, S.A., Abraham, W.T., Chin, M.H., Feldman, A.M., Francis, G.S., Ganiats, T.G., *et al.* (2005). ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Update the 2001 Guidelines for the Evaluation and Management of Heart Failure): Developed in Collaboration With the American College of Chest Physicians and the International Society for Heart and Lung Transplantation: Endorsed by the Heart Rhythm Society. *Circulation*, 112, e154–e235.
- Johnson, J.L., Campbell, A.C., Bowers, M., Nichol, A.-M.. (2007). Understanding the Social Consequences of Chronic Obstructive Pulmonary Disease. *Proc Am Thorac Soc*, 4, 680-682.
- Kaplan, G.A., Keil, J.E. (1993). Socioeconomic factors and cardiovascular disease: a review of the literature. *Circulation*, 88, 1973-1998.
- Karasek, R., Baker, D., Marxer, F., Ahlbom, A., Theorell, T. (1981). Job decision latitude, job demands, and cardiovascular disease: a prospective study of Swedish men. *Am J Public Health*, 71, 694-705.
- Kearney, P.M., Whelton, M., Reynolds, K., Muntner, P., Whelton P.K. & He, J. (2005). Global burden of hypertension: analysis of worldwide data. *The Lancet*, 365, 217–223.
- Kwan, G. & Balady, G.J. (2012). Cardiac Rehabilitation 2012 Advancing the Field Through Emerging Science. *Circulation*, 125, e369–e373.
- Lister, G., Mcvey, D., French, J., Stevens, C.B., Merritt, R. (2008). Measuring the Societal Impact of Behavior Choices. *Social Marketing Quarterly*, 14, 51-62.
- McKee, P.A., Castelli, W.P., McNamara, P.M. & Kannel, W.B. (1971). The Natural History of Congestive Heart Failure: The Framingham Study. *New England Journal of Medicine*, 285, 1441–1446.
- McKinley, R.K., Stokes, T., Exley, C. & Field, D. (2004). Care of people dying with malignant and cardiorespiratory disease in general practice. *British Journal of General Practice*, 54, 909–913.
- Miah, M.S., Wilcox-Gök, V. (2007). Do The Sick Retire Early? Chronic Illness, Asset Accumulation, and Early Retirement. §WWW Document. URL <https://commons.lib.niu.edu/xmlui/handle/10843/13288> (accessed 09.09.14).
- Miller, G.E., Chen, E., Parker, K.J. (2011). Psychological Stress in Childhood and Susceptibility to the Chronic Diseases of Aging: Moving Towards a Model of Behavioral and Biological Mechanisms. *Psychol Bull*, 137, 959-997.
- Murray, C.J., Lopez, A.D. (1996). Evidence-based health policy—lessons from the Global Burden of Disease Study. *Science*, 274, 740-743.
- Murray, C.J. & Lopez, A.D. (1997). Alternative projections of mortality and disability by cause 1990–2020: Global Burden of Disease Study. *The Lancet* 349, 1498–1504.
- Murray, S.A., Boyd, K., Kendall, M., Worth, A., Benton, T.F. & Clausen, H. (2002). Dying of lung cancer or cardiac failure: prospective qualitative interview study of patients and their carers in the community. *British Medical Journal*, 325, 929.
- National Respiratory (COPD) Framework. (2008). §WWW Document. URL http://www.-irishthoracicsociety.com/images/uploads/file/draft_respframework_oct_000.pdf (accessed 09.09.14).

- Nordestgaard, B.G., Chapman, M.J., Humphries, S.E., Ginsberg, H.N., Masana, L., Descamps, O.S., *et al.* (2013). Familial hypercholesterolaemia is underdiagnosed and undertreated in the general population: guidance for clinicians to prevent coronary heart disease. *European Heart Journal*, eht273.
- Patterson, C. & Chambers, L. (1995). Preventive health care. *The Lancet*, 345, 1611–1615.
- Prescott, E., Lange, P., Vestbo, J. (1999). Socioeconomic status, lung function and admission to hospital for COPD: results from the Copenhagen City Heart Study. *Eur Respir J*, 13, 1109-1114.
- Robert Wood Johnson Foundation, 2002. Partnership for Solutions. Chronic Conditions: Making the Case for Ongoing Care. sWWW Documentt. URL <http://www.rwjf.org/content/dam/farm/reports/reports/2010/rwjf54583>. (accessed 09.09.14).
- Roca, M., Verduri, A., Corbetta, L., Clini, E., Fabbri, L.M. & Beghé, B. (2013). Mechanisms of acute exacerbation of respiratory symptoms in chronic obstructive pulmonary disease. *European Journal of Clinical Investigation*, 43, 510–521.
- Rose, G., Marmot, M.G. (1981). Social class and coronary heart disease. *Br Heart J* 45, 13–19.
- Salonen, J.T., 1982. Socioeconomic status and risk of cancer, cerebral stroke, and death due to coronary heart disease and any disease: a longitudinal study in eastern Finland. *J Epidemiol Community Health*, 36, 294-297.
- Shahab, L., Jarvis, M.J., Britton, J. & West, R. (2006). Prevalence, diagnosis and relation to tobacco dependence of chronic obstructive pulmonary disease in a nationally representative population sample. *Thorax*, 61, 1043–1047.
- Sidney, S., Sorel, M., Quesenberry, C.P., DeLuise, C., Lanes, S. & Eisner, M.D. (2005). COPD and incident cardiovascular disease hospitalizations and mortality: Kaiser Permanente Medical Care Program. *Chest*, 128, 2068–2075.
- Stewart, W.F., Ricci, J.A., Chee, E., Morganstein, D. (2003). Lost productive work time costs from health conditions in the United States: results from the American Productivity Audit. *J Occup Environ Med*, 45, 1234-1246.
- Strong, K., Mathers, C., Leeder, S. & Beaglehole, R. (2005). Preventing chronic diseases: how many lives can we save? *The Lancet*, 366, 1578–1582.
- The Merck Manual. URL <http://www.merckmanuals.com/professional/> (accessed 09.19.14).
- Van Weel, C. & Schellevis, F.G. (2006). Comorbidity and guidelines: conflicting interests. *The Lancet*, 367, 550–551.
- Varekamp, I., van Dijk, Kroll, L.E. (2013). Workers with a chronic disease and work disability. Problems and solutions. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz*, 56, 406-414.
- Vestbo, J., Hurd, S.S., Agustí, A.G., Jones, P.W., Vogelmeier, C., Anzueto, A. *et al.* (2013). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. *American Journal of Respiratory and Critical Care Medicine*, 187, 347–365.
- Vogeli, C., Shields, A.E., Lee, T.A., Gibson, T.B., Marder, W.D., Weiss, K.B., *et al.* (2007). Multiple Chronic Conditions: Prevalence, Health Consequences, and Implications for Quality, Care Management, and Costs. *Journal of General Internal Medicine*, 22, 391–395.

- WHO (2005). *WHO Framework Convention on Tobacco Control*. http://www.who.int/fctc/text_download/en/ (accessed 09.28.14).
- WHO (2010). *Global status report on noncommunicable diseases 2010*. http://www.who.int/nmh/publications/ncd_report2010/en/ (accessed 09.28.14).
- WHO (2011). *Noncommunicable diseases country profiles 2011*. http://www.who.int/nmh/publications/ncd_profiles2011/en/ (accessed 09.28.14).
- WHO (2013). *WHO report highlights tobacco use and social inequity*. <http://www.tobaccodisparities.org/index.php/policies-and-practice/101-who-report-highlights-tobacco-use-and-social-inequity> (accessed 09.28.14).
- WHO (2014) World Health Organization. <http://www.who.int/whr/2000/en/statistics.htm> (accessed 09.28.14).
- WHO (2014). *Burden of COPD*. <http://www.who.int/respiratory/copd/burden/en/> (accessed 09.17.14).
- Yach, D., Hawkes, C., Gould, C.L. & Hofman, K.J. (2004). The global burden of chronic diseases: overcoming impediments to prevention and control. *Journal of the American Medical Association*, 291, 2616-2622.