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SOCIOLOGY | REVIEW ARTICLE

Health literacy as a key for effective preventive medicine

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Abstract: *Background:* A preventive approach in health care aims to anticipate the natural history of the diseases and to define break points where the procedures may act to change future events, on the limit of the patient's free will. Patient is an active agent and the main responsible for his/her own health status. The way to achieve the best integration of the providers' prescriptions and the patients' decisions is through education, aiming to increase the literacy status. *Body of abstract:* Higher levels of literacy for health allow better health decisions, stronger commitment with them and superior levels of efficiency. Patients have to possess enough information enabling its incorporation in free and clear decision-making. In preventive approach, literacy contributes to maximize the profit of health investment and to rationalize the available resources by ceasing some old-fashioned and inadequate technologies, thus contributing to sustainability of health systems. *Conclusion:* The improvement of patients' health literacy is crucial. Higher literacy means better health outcomes, both in an individual point of view as for general population, in every levels of preventive approach. Thus, literacy is a relevant determinant of individual health and a public health priority.

Subjects: Health Promotion; Sociology of Health and Illness; Health Communication

Keywords: health literacy; personal autonomy; outcome assessment (health care); quality of health care

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The main interests in research are doctor-patient relationship, cardiovascular disease prevention and health literacy. He coordinates the metis project, a web based Portuguese platform aimed to provide good health information to general population, keeping scientific rigor based on best available evidence, and translated in a simple language, accessible to all people, unaccustomed to medical jargon (www.metis.med.up.pt).

PUBLIC INTEREST STATEMENT

The common sense tells us that it's better to prevent the diseases than to treat them. Prevention aims to find a specific point in lifetime, where the intervention leads to a change in natural history of the diseases, improving the health outcomes. The earlier the intervention, the greater the impact.

The limit is the scientific evolution allowing better technological approaches, and the will of the patients, respecting their own autonomy.

No drug works if patients don't take it, said Charles E. Koop. To adhere to the better options, patients need to understand the information and to integrate it in their routines, leading to development of attitudes and skills for their own health. On the other hand, in a world of continuous changing, the truth of yesterday may not confirm today, imposing constant evidence-based updates. Health literacy is, thus, a crucial determinant for health, allowing better decisions, stronger commitment with them and superior levels of efficiency.

1. Background

Prevention is a word derived from Latin *praevenio* which means to anticipate. The purpose of preventive medicine is to reduce the onset of disease that leads to suffering and premature death, through the implementation of a set of health-promoting strategies able to change the natural history of the diseases.

The division between what is prevention and treatment isn't completely clear. Asclepius, the ancestral Greek god of medicine, was born at a time when technological resources were scarce and people had to appeal to mysticism to explain the phenomena that they didn't understand. His daughters Hygeia and Panacea embodied the dichotomy that time over centuries didn't solve in full: If Panacea was the cure for all illness, Hygeia acted before the disease, preventing it. Like any parent's heart, equally divided among the children, Medicine (Asclepius) is a continuum of prevention and treatment on the timeline of diseases' natural history, operating complementarily with the same purpose.

This interaction is less apparent in acute diseases, especially the infections, the main cause of morbidity and mortality over the history. However, it successively became clearer from the second half of the last century, with the improvement of basic care to the population and the introduction of antibiotics, leading to an increase in life expectancy and consequent advent of multiple diagnoses related to degenerative changes. To avoid (prevent) cardiovascular disease (CVD), for instance, we need to treat effectively arterial hypertension, changing significantly the atherosclerotic process. However, we know that high blood pressure depends on the alimentary salt consumption, and acting at this point will prevent and treat hypertension and by this way interfere in the cardiovascular outcomes. In addition, there are several other factors with interest to this problem, acting at different levels of atherosclerosis, and making the interaction model more complex and difficult to divide in prevention or treatment.

Over the time, doctors developed a complex system of symbolic and semantic language. The current technological development established a rapid turnover of new information, making yesterday's knowledge almost history. If health providers have some difficulties about the precision of the concepts, it's simple to imagine that general population has many more doubts and misunderstandings.

As important as providing education, improving the capacity to process that information is crucial, converting it in attitudes and skills towards a better health, or, in other words, to improve health literacy (Ratzan & Parker, 2000).

In this article, we discuss the relevance of health literacy in preventive medicine as the foundation for strategies of investment and disinvestment in different approaches, equating it to a determinant of health.

2. Preventive medicine

In its definition, established in 1986 in the Ottawa Charter for health promotion (World Health Organization, 1986), preventive medicine focuses the empowerment of the healthy person to control the health determinants, both in an individual, community and environmental levels, towards to achieve the state of complete physical, mental and social well-being, allowing to improve his personal development to the maximum of available resources.

Health is thus a resource more than an end in itself, allowing the person to achieve his own goals. This context places the patient in the first line as the main responsible for the process. On the other hand, health providers act as the guardians for the implementation of best evidence-based available technology and as the leaders to provide education with the necessary information for the patients' free and clear decision-making across the different options they face. The organizational systems should dedicate to provide the basic conditions of life, fair and sustainable, with peace and social

tranquility, at the level of disposable income, work, housing, social security, education and health, including the food and drinking water supply, the sanitary hygiene, the universal access to care and to medicines, and the coordination of the different levels of healthcare (UNICEF, World Health Organization, 1978).

In this interactive model, the leadership of the health providers is crucial, leading each part to commit around the best strategies for the desired results.

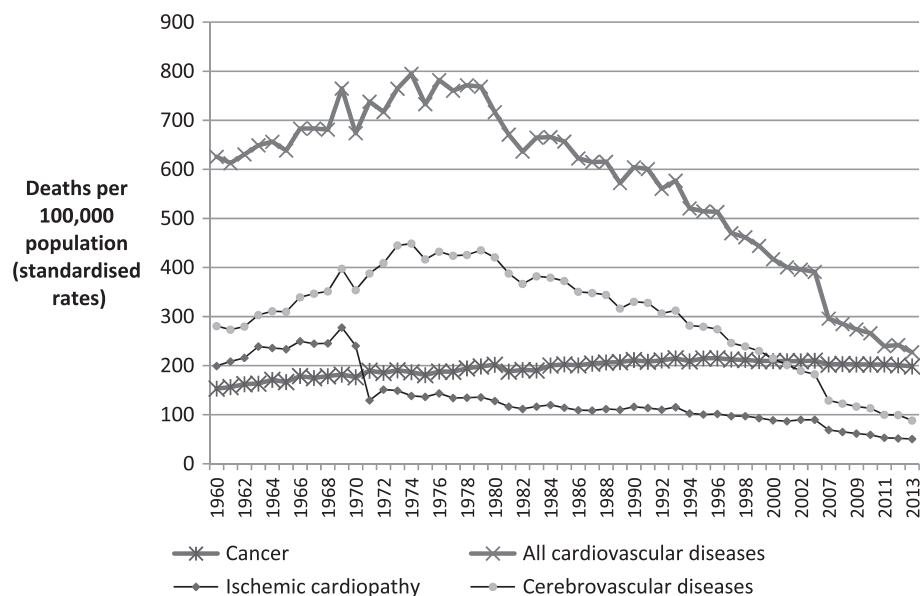
Health providers are expected to be able to conduct the patients to the most appropriate decision in each case, based on the best available evidence, filtered by their own clinical experience and respecting the autonomy of the patients in their values, their expectations and their freely expressed wills (Sackett, 2000). This patient centered medicine has health-enhancing results, with optimization of cost-effectiveness of care (McCormack & Loewen, 2007).

It's rather easy to see this relationship in acute diseases' episodes, where the symptoms are quickly running and the results of treatment are visible in a short term. On the contrary, this isn't so evident in the chronic illness, and even less when we talk about prevention.

Immunization is a good example. When measles was a high prevalent disease, with many deaths and disabled (acute disease), it was easy to persuade the population about the benefit of vaccination leading to achieve very high vaccination coverage rates. The success of the preventive measure led to the virtual disappearance of the disease in Western countries. Paradoxically, this triumph is the main threat at present. Nowadays, the susceptibility to measles isn't perceived in the same way, and we assist to the growth of the movements against the vaccine, based many times in false myths or in the likelihood of adverse events, seeming to forget the risk associated with an infection by the virus of measles (Santos & Hespanhol, 2013).

Another example is the CVD, where the substantial investment made was accompanied by a relevant decrease in morbidity and in mortality (Figure 1). In Portugal, the mortality rate for CVD decreased almost 3 times since 1980–2010, following the implementation of the primary health care network in 1979. The national programs for hypertension management and diabetes were the first to be implemented by health authorities, with the corresponding budget supply. At the same time, oncological diseases didn't benefit from the same amount of care and showed an inverse evolution. We have no doubt about the importance of better management of cardiovascular risk factors to the

Figure 1. Mortality rate for diseases of the circulatory system and cancer in Portugal (1960–2013), according to data from the OECD (OECD Health Statistics 2015, www.oecd.org/els/health-systems/health-data.htm).



reduction of the number of myocardial infarctions and strokes. We are therefore concerned about the decline of investment in outpatient care since 1054 US\$ per capita in 2010–941 US\$ in 2015, observed in Portugal, with direct repercussion in Primary Health Care (Organization for Economic Co-operation and Development—OECD, 2017). Similarly as in the immunization program, the success in management of CVD can weaken the concern about it, leading to the worsening of current situation.

The health belief model explains that the likelihood of a behavior change depends on one's feelings that the condition is negative and a threat for himself, on the feelings that the negative condition can be avoided, and on a positive expectation about the intervention efficacy and self-adequacy (Glanz, Rimer, & Viswanath, 2008). In both examples above, the epidemiological evolution led to a decrease in the perception of susceptibility, allowing the rational for weighing the benefits and the damages hangs to the overvaluation of the direct and indirect costs, although the known effectiveness of available preventive interventions. This raises concern as the official data confirm the increase in the number of new cases of disease following the disinvestment in prevention (Simms, Rowson, & Peattie, 2001).

On the other hand, there's a net return of investment in health prevention. A reduction of 5% on the values of cholesterol or blood pressure can result in savings of up to EUR 100 million per year. Reducing 1% in cardiovascular risk for primary care population would lead to annual cost savings of more than 40 million euros, with marked decrease of cardiovascular morbidity and mortality and a gain of 98,000 QALYs (quality adjusted life years) (Barton, Andronis, Briggs, McPherson, & Capewell, 2011). The 2008 report from the *Trust for America's Health* estimated a return of 6.2 US\$ for each dollar invested in prevention by 10–20 years (Levi, Segal, & Juliano, 2008).

However, unfortunately, available resources aren't unlimited, and it matters to understand how we can intervene to maintain and strengthen the levels of protection from the disease with current constraints. The health belief model may help to find our answer, when it points out the socio-economic situation and literacy as the modifiable factors of behavior's shaping, along with some not modifiable variables as gender, age, ethnicity and personality (Glanz et al., 2008).

The health literacy, understood as “the capacity to obtain, process and understand basic health information, as well as the knowledge of the services needed to make appropriate health choices”, Ratzan and Parker (2000) is the key to the acquisition of skills that promote changing contexts. Improving literacy is a public health priority (Nutbeam, 2000) which can promote a better rationality in allocation of available resources, with profit for the individual and for society.

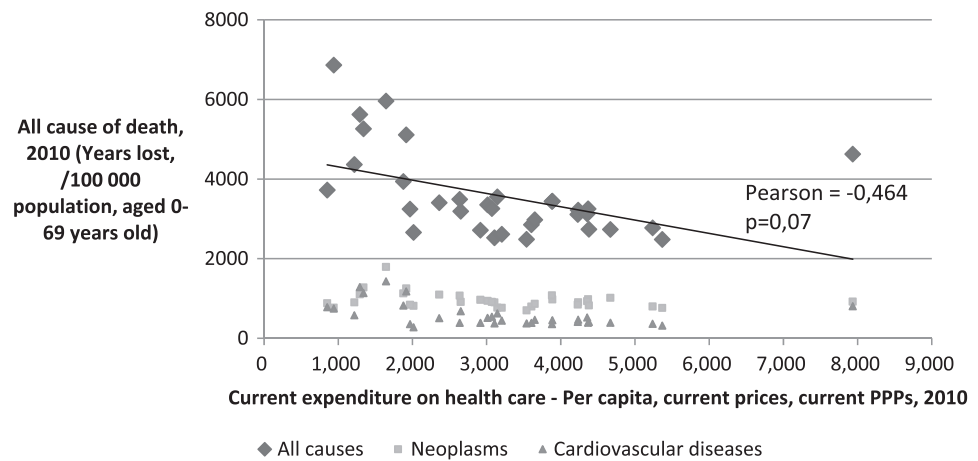
3. Health literacy as an engine for investment

Health literacy is crucial when we think in primary prevention level, aiming to change lifestyles that interfere significantly with the health results. Kalache's curves (WHO, 1997) show that after the peak of the functionality in early adulthood, the descent can be more or less pronounced depending on one's everyday choices through life (Kalache & Kickbusch, 1997). Depending on the multiple life options, the healthiest will be the one who choose wiser between good and bad eating habits, be active or sedentary, smoking or not, having cautious sexual and social behaviors or making a good stress management.

The current situation is far from the desired. As we may see in Figure 2, reducing preventable death corresponds to higher financial investment, or, in other words, better health costs money. We choose to measure preventable death by potential years of life lost under 69 years old because this variable may represent the healthy life and not just the endpoint mortality, as life expectancy or infant mortality rates. Furthermore, in Portugal, we have a life expectancy at birth of 81.2 years and a child mortality of 2.9 (OECD, 2015), like the best of OECD countries, but with a burden of illness very high among population, objectified by high values of potential years of life lost under 69 years old, thus justifying the attention to this variable. This negative relation between preventable death and

Figure 2. Relationship between total investment in health (current prices, per capita, US dollar) and potential years of life lost for all causes, circulatory diseases and neoplasms, 0–69 years, in 2010, in OECD countries (OECD Health Data, 2017).

Notes: Countries of OECD included in this evaluation: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States.



expenditure leads us to conclude that OECD countries improve the health status of the population through cash injection on health. An interesting point is that we verify this relation with all cause potential years of life lost, but not individually with CVD or cancer. Data can't properly explain it, but we may think that the investment in these areas pushed the related mortality to higher ages, thus conditioning less impact in youngsters.

In Figure 2, we use the real costs in current prices per capita in US dollars to present the investment, not the percentage of gross domestic product or of public expenditure. Although very common, these are indirect indexes, subject of several biases due to different efficiency of tax systems and state budgets organization around the world, which may mislead its interpretation. Rather than showing the investment, they are more useful to draw the attention to the effort that societies make to maintain the health of the population, showing the social and political choices of resources' allocation to health sector. When we compare with the proportion of gross domestic product spent on health, the relationship is not so evident (Pearson correlation coefficient = -0.282 , $p = 0.112$).

In a context of limited resources, if we want to do better with less financial effort, the solution may go through the investment in primary prevention and lifestyles changing, where any intervention will have impact in a variety of outcomes, multiplying its efficiency. If we increase the daily intake of fibers in food, for instance, we will improve the lipid profile, independently of being a healthy or a sick person. At the same time we decrease insulin -resistance, control excess weight, decrease cardiovascular risk, reduce the cancer risk, and improve the gastrointestinal functioning, among others, Slavin (2008) acting positively in the main determinants for the risk of disease and death of Western countries.

Moreover, if we think that the peak of functionality, a major determinant of the quantity and quality of life, is reached in early adulthood (Kalache & Kickbusch, 1997), we may conclude that the health behavior change should occur early in life in order to maximize its impact.

This depends on peoples' literacy as the capacity to understand the information and incorporate it in their own daily health decision.

4. Health literacy as an engine for disinvestment

Health literacy is also essential when we discuss the issue of disinvestment on established technologies in the habit but obsolete in performance. The example is the breast cancer screening using mammogram in asymptomatic women. The rational for breast cancer screening is the detection of tumors in early stage of the disease where the cure is more likely with less invasive treatments. The

other option is to wait for the clinical phase in which the lump is apparent in the objective breast examination, but in a more advanced stage, forcing more aggressive intervention and conducting to less effective results. For many years, the proposed scheme included the completion of 26 mammograms over time, starting at the age of 35 years old. Latest investigation brought new data both about the benefit of screening for the different ages (Nelson, Fu, et al., 2016) as about the caused damage. It included false positives, overdiagnosis and iatrogenesis of procedure (Nelson, Pappas, et al., 2016) in particular for the risk associated with the exposure of breast tissue to radiation (Miglioretti et al., 2016), weighting the potential net benefit. The conclusion resulted in the universal recommendation for females, from 50 to 70 years old, to make a mammogram every 2 years, leaving however some place for custom decision dependent on the individual risk and women's expectations.

It's not enough to publish the best evidence in high impact scientific journals and translate it in guidelines to transform procedures in standards that every doctors, like if by magic, accept and incorporate into clinical practice. The best research evidence must be weighed by clinical expertise and patients values, according the definition of evidence-based medicine by Sackett (2000). High-level medical decision-makers that base screening guidelines on research evidence have to include the clinicians' perspectives towards a personalized medicine. It will be hard for doctors who don't understand the rationale for a standard to explain it to the patient, and we know that the explanation of the rationale for a new procedure may be more useful than its imposition. The modern medical practice quitted being paternalistic to assuming an inclusive stance, giving primacy to the patient's autonomy, only possible if patients own the necessary and sufficient information for a free and informed decision. Although the goodness of this principle, there is some difficulty to translate it for the current language. The clinical guidelines published in Portugal in recent years are a good example of this difficulty, as they largely exclude the values of patients, in their expectations, fears and beliefs, of decision flowcharts (Santos et al., 2015), in a time marked by a practice oriented to health indicators rather than to the person (Henriques & Alexandra, 2014).

Integrating patients in decision, using clear and accessible language, free of prejudices, enforcing the creativity of communication strategies, and giving enough time for the patient to understand it, can promote health care quality improvements and more equitable resource allocation (Santos et al., 2015).

5. Health literacy as a determinant of health

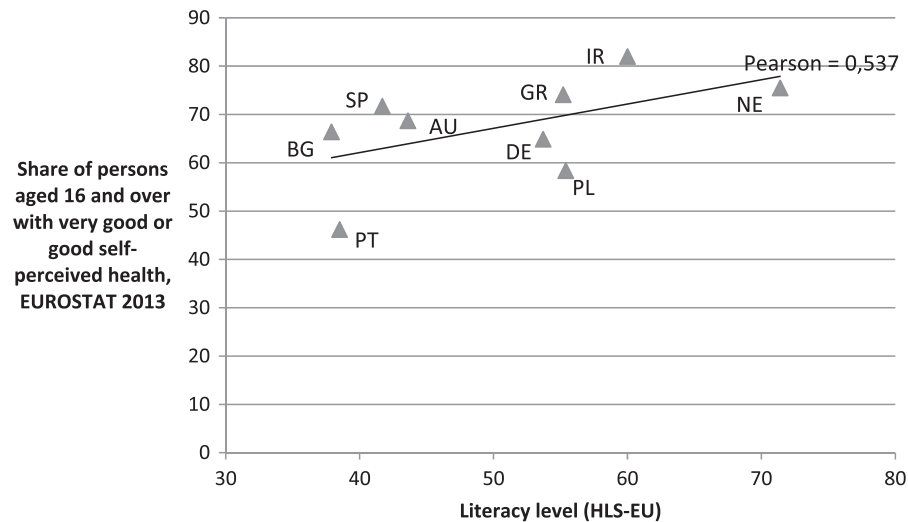
Health literacy develops in three sequential levels. The first level, classified by Nutbeam (2000) as functional, deals with the effective communication of information. The second level, or interactive, corresponds to the acquisition of individual skills. The third level, or criticism, promotes the qualification of the person (*empowerment*) and of the community. It isn't enough to have access to information, you need to know how to use it and actually use it.

That's the Miller's pyramid adapted from the original clinical skills assessment (Miller, 1990) to our model of creating skilled patients to better health decisions. We aren't waiting to have experts on life sciences discussing the last paper about a particular topic, but we can expect to have patients that understand the rationale for their health decision through the coaching of the doctor they trust. Channeling this higher knowledge to better attitudes, leads to the appropriation of the necessary skills towards more suitable options, which are the basis of better health results.

The decision of reducing salt intake to lower cardiovascular global risk is a good example. Portuguese population is still very accustomed to excess use of dietary salt (Polonia, Martins, Pinto, & Nazare, 2014). To reduce it, we need to show that excessive salt plays an important role in hypertension and that's the main cause for CVD. Decreasing salt intake leads to lower blood pressure and to less CVD risk. Being aware of this information isn't enough to change habits, but it will create the necessary negative perception on this topic, as the positive feeling in the solution (Now, I know!). The next step is to work on attitudes towards to attaining this goal, for instance, replacing salt by

Figure 3. Self-perception of health depending on the literacy levels in the population included in the study HLS-I.

Source: Sorensen et al. and EUROSTAT (<http://ec.europa.eu/eurostat>). AU-Austria, BG-Bulgaria, DE-Germany, GR-Greece, IR-Ireland, NE-Netherlands, PL-Poland, PT-Portugal, SP-Spain.



aromatic herbs (Now, I know how!), and to embed them in individuals' daily lives so that they are skilled to go on (Now, I do!). As every cycle of continuous learning, the more skilled individuals are, the more they will want to be, perpetuating the cycle, even to the next generation.

On the other way, better literacy levels is associated to better perception of health. In Figure 3, we propose an exercise where we cross the results of the nine countries included on European study of health literacy, sponsored by Sorensen et al. at the University of Maastricht, the Netherlands (Sørensen et al., 2015), with the data from the European Commission on the self-perception of the health status of population with 16 or more years. There is a linear relationship between both with higher levels of literacy associated to better sense of health, with a Person correlation coefficient of 0.537.

These results don't allow to confirm the causality relationship, but they place literacy as one of the key determinants to be considered in the analysis of the health of populations. That's another argument to reaffirm health literacy as a priority in public health intervention (Nutbeam, 2000).

6. Conclusion

Medicine is the art of establishing a diagnosis to set the treatment that improve the prognosis of the natural history of the disease, until the ideal level of healing, that is, of the disappearance of the disease. The concept of prevention takes us to a previous stadium of life timeline, in a phase of absence of disease, but where there is already a constellation of factors, whose presence over time increases the risk of happening a clinical event.

The object of preventive medicine is to anticipate the diagnosis, by using a probabilistic reasoning of weighting several different interactive variables. This game of odds is not always easy to understand by the population more accustomed to the deterministic network of cause and effect.

The improvement of the health literacy leads people to know the variables at stake, to understand how they interact, and to be able to integrate them in their daily lives, for the sake of a better health for themselves and for the community. The role of health providers is crucial to initiate and maintain the continuous process of defining aims, designing strategies for achieving them, implementing the solutions and evaluating the process, according to the patient will and in the limit of it. The final evaluation is the beginning of a new cycle, and so on.

An informed population is more conscious to be able, freely, to take the most appropriate decision in each case, demanding the best evidence, filtered by the experience of the doctor that they trust

and integrating it into their own system of values. In other words, people demand for the best evidence-based personalized care, capable of being applied to the specific case. Health literacy is then a public health priority towards an effective preventive approach in medical care.

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