

Diabetes Type II in Vulnerable Populations: Reflections on (Upon) the Role of the State and the Relevance of the Issue in Teacher Training College

Diabetes Tipo II em Populações Vulneráveis: Reflexões Sobre o Papel do Estado e a Formação de Professores

Diabetes Tipo II en Poblaciones Vulnerables: Reflexiones en Torno al rol del Estado y la Formación Docente

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Abstract

In this work I expose the importance of approaching diabetes type II from complex perspectives, which go beyond the biological perspectives of the subjects dedicated to health education in Biology Teacher Training Institutes. I outline the relationship between poverty and diabetes type II without delving into the metabolic mechanisms involved. I characterize the HMM (Hegemonic Medical Model), the empirical/functional paradigm, functionalist public health and the State approaches to type II diabetes in vulnerable populations.

Keywords: Poverty, type II diabetes, Hegemonic Medical Model, Teacher Training

Resumo

Neste trabalho expõe a importância da abordagem do diabetes tipo II a partir de perspectivas complexas, que superam as miradas biologicistas das atribuições dedicadas à aprendizagem da saúde nos Institutos de Formação Docente de Biologia. Esboçou a relação entre a pobreza e o diabetes tipo II sem se aprofundar nos mecanismos metabólicos envolvidos. Caracteriza o MMH (Modelo Médico Hegemônico), o paradigma empírico/funcional, a saúde pública funcionalista e os modos de abordagem por parte do Estado do diabetes tipo II em populações vulneráveis.

Palavras-chave: Pobreza, diabetes tipo II, MMH, Formação de Professores

Resumen

En este trabajo expongo la importancia del abordaje de la diabetes tipo II desde perspectivas complejas, que superen las miradas biologicistas de las asignaturas dedicadas a la enseñanza de la salud en los Institutos de Formación Docente de Biología. Esbozo la relación entre la pobreza y la diabetes tipo II sin profundizar en los mecanismos metabólicos involucrados. Caracterizo el MMH (Modelo Médico Hegemónico), el paradigma empírico/funcional, la salud pública funcionalista y los modos de abordaje por parte del Estado de la diabetes tipo II en poblaciones vulnerables.

Palabras clave: Pobreza, diabetes tipo II, MMH, Formación Docente

Introduction

Based on solely biologicistic teachings, what relationship could students find between being poor and suffering from a disease that could well be considered only genetic? Why should any correlation be identified between diabetes and the high percentage of people affected by obesity in the most vulnerable sectors? Is the State responsible for the food consumed by the population, or rather, should everyone be responsible for the type of food they eat on a daily basis?

These and other questions find few answers among the inputs offered by reductionist health education, which emphasizes and values, focusses almost strictly upon anatomical details, and touches on just deal with few some metabolic processes such as glucose regulation.

The 2030 Agenda for Sustainable Development proposed by the United Nations, to which most Latin American countries adhere, states among its 17 goals: “End hunger, achieve food security and improved nutrition” (Goal 2) and “Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” (Goal 4). Both goals are linked to the present work, both are State responsibility, and both should be part of the educational agendas of teacher training and middle schools, so that students acquire conceptual elements that enable them to understand and intervene actively, critically and responsibly in their life contexts.

Although in this paper I will focus on the approach taken in Argentina to regards the relationship between poverty and diabetes, numerous studies (Mendoza Romo et al., 2018; Altamirano et al., 2015; Medina et al., 2010; Whiting, et al. 2010) show that the problem is common/recurrent in other countries of the region.

Poverty, Obesity and Type II Diabetes

Overweight and obesity have achieved general recognition as health problems later than other eating disorders (especially bulimia and anorexia nervosa). On the other hand, infectious diseases have hegemonically dominated the theories/attention of epidemiologists, physicians and the population as a whole. However, the increase in obesity is considered a true epidemic in Latin America and in most of the world (Monckeberg et al., 2015; Córdova Villalobos, 2016; Cuevas et al., 2022).

According to data from the Argentine government (2020), more than 50% of the population suffers from excess weight, while placing/rating the prevalence of diabetes at a growing 12.7%. According to the 4th and last National Survey of Risk Factors, conducted by the National Directorate for Health Promotion and Control of Chronic Noncommunicable Diseases (2019), in 15 years diabetes (has) increased by 50%. Globally, from 1980 to 2014, the prevalence in the adult population has increased from 4.7 to 8.5 percent according to WHO data (2016). Martin (2015) exposes that obesity is concentrated in the poorest sectors because they face budgetary restrictions to acquire healthy food products. The relationship between poverty, and the diseases associated with it, is established in such a way that the latter impacts on the former, in what Horowitz described, as early as the 1960s, as the “economic cycle of disease.”

However, the cyclical idea that men and women get sick because they are poor, become poorer because they are sick, and become sicker because they are poorer, is impossible to refute. The prevailing inequality in Latin America strongly influences upon the lethality of diabetes. In turn, these structural social conditions generate a vicious circle: higher levels of poverty and inequality, as well as precarious living conditions of the population exacerbate health problems and, when they occur, generate more poverty and greater inequality (Mendoza Zapata et al., 2021).

The main causes of the obesity epidemics seem to be quite evident: the consumption of ultra-processed foods rich in fats, sugars, refined cereals and flours and the reduction or abandonment, especially in low-income social sectors, of physical activity (Diderichsen et al., 2002).

Food insecurity, understood as the difficulty in obtaining nutritious, adequate and safe food, is one of the manifestations of malnutrition which, in turn, brings together along cases of inadequate food due to deficiencies, which can lead to states of malnutrition, or to the excessive consumption of unhealthy foods that lead to overweight and obesity. Food insecurity is associated with the likelihood of diabetes if the household difficulties in accessing to healthy and varied foods and is therefore forced to focus on carbohydrates. Delving into the relationship between food insecurity and overweight becomes imperative when designing public policies; in particular, it is important to understand which ones should be implemented to combat/avoid food insecurity, in its two versions, using defined affecting factors that have a direct effect on the likelihood of obesity (Aguayo-Telles et al., 2018).

Poverty in its multidimensional nature, is linked to food insecurity, due to the impossibility of sustaining regularity in the consumption of nutritious food and, therefore, is associated with the likelihood of type II diabetes.

The Epidemiology of Risk and Type II Diabetes

Health problems can be approached from different perspectives which, in turn, offer different explanations and answers. Thus, while at one extreme is the hegemonic biomedical model that understands disease from causes and risks that can be avoided by individuals, at the other end is the perspective of the social determination of health that provides a more complex problematization of health-disease-care problems.

During the second half of the 20th century, and in relation to chronic diseases, the paradigm of risk epidemiology gained relevance. Focused on the individual, the model sought to establish the links that the different aspects of human life have with the development of diseases, and focuses on the control of risk factors through the modification of lifestyles.

The intention of delving deeper into the social factors that generate inequalities in health ended up reproducing the limitations of the dominant paradigm of public health, i.e., it fragmented the reality of the subjects into factors with the pretension that, if kept isolated, they would retain their explanatory power (Almeida, 2000).

Once social determinants are converted into risk factors, they lose their historical and social dimension. And also, they become nothing more than inadequate, incorrect lifestyle choices that have a negative impact on health.

For classical epidemiology, the conception of risk assumes that, in each society, there are communities, families and individuals who are more likely than others to suffer from diseases. The reasons for this vulnerability are considered to be basically individual, for example, based on their genetic load. The conception of risk, in the case of type II diabetes, generates that the disease itself becomes a new risk factor, as it can generate future health complications, such as diabetic foot and vision problems.

Hegemonic in Argentina and in most of Latin America, the model began to be strongly questioned in the 1980s, especially because of its difficulty in explaining and intervening in complex health problems such as addictions and some cardiovascular and degenerative diseases. Criticism focused on the approach of therapeutic change in people's lifestyles, considering that these are styles, in the sense of free choices, when, in fact, many of the behaviors and decisions adopted by the subjects are made under the conditions of the possibilities imposed by their jobs, cultural and social contexts.

For the case of type II diabetes, this idea seems to suggest that all subjects are free and able to choose what types of food to consume, and that even sustaining a healthy diet, is for some sectors, just an individual choice. The decision about what to eat is crossed by economic dimensions that push these sectors to resort to community canteens where carbohydrate-based foods abound. Then, there are other social dimensions, such as the impact of insidiously effective advertising, and the difficulties in interpreting it properly, derived from deficient levels of education. Several studies have pointed out that the consequences of diabetes are more severe in disadvantaged socioeconomic levels, and that metabolic disorders and obesity are associated with poverty (Medina and López Arellano, 2010; Drewnowski et al., 2004).

When lifestyle terminology is adopted, it is assumed that behavioral habits are to blame for the risks they embody: in the case of the present work, obesity and diabetes. The problem with this way of conceiving diseases is the blaming and stigmatization of the subjects/people and the omission of the social conditions that shape such decisions (Serena, 2020).

On the other hand, large sectors of the population do not have safe and appropriate spaces for sustained physical activity. Also long working hours limit their willingness to engage in physical activity. Many have not received quality education that alerts them to the conditions that predispose them to diabetes. Finally, many vulnerable sectors receive food parcels from national and/ or provincial governments containing low-cost foods that produce satiety (flour, rice, corn flour, noodles, potatoes, sugar) that are extremely rich in carbohydrates. In any case, these sectors do not incorporate fruits and vegetables either by their own means or through social and state aid. Socioeconomic differences condition food and nutritional inequalities which, in turn, contribute to inequity in terms of health. Healthier diets, with better nutritional quality, tend to be more expensive and,

therefore, tend to be less consumed by lower socioeconomic levels of populations. Social vulnerability is linked to higher rates of obesity, and type II diabetes is associated with lower consumption of fruits, vegetables, fish and fiber, sedentary lifestyles, and higher consumption of tobacco, alcohol and highly sweetened beverages (Kovalsky et al., 2020).

The Hegemonic Medical Model

The HMM was (and is) the support of the empirical-functional paradigm and functionalist Public Health. Centered on biologicism, it focuses on disease whose causes are sought in nature (viruses, bacteria and other living entities). With a clear individualistic perspective, the subject will be precisely the unit of analysis considered, and the emphasis will be (placed) laid on the sick body, hence the idea of a public enfermology (Granda, 2004). Meanwhile, the diagnosis of the disease and its treatment pathways, as well as promotion and prevention actions, are also conceived at the individual level. The biomedical model introduces the notion that health is the absence of physical signs of disease, so that curing it is the exclusive task of medical professionals supported by technologies, while patients are almost exclusively passive recipients. This model is particularly attractive, for example, for bacterial infections (Rocca et al., 2020). What underlies the logic of the HMM, is a type of linear causal thinking that flattens and reduces reality, (fragments) fragmenting it into pieces. It then focuses on fragments/compartments, but does not attempt to establish relationships within a general framework.

The hegemony and legitimization of the HMM stems from several factors. On the one hand, legally, through its recognition by the different States. On the other hand, academic hegemony is established by the curricula of medical careers. In this sense, the Flexner report (1910) played a fundamental role in proposing that medical studies should be of a biological nature and with individual subjects as the unit of study, which is still maintained today in most academic units dedicated to the training of health personnel. On the other hand, the model ignores the external conditions in which diseases occur.

Medical institutions have constantly tried to deny -or at least secondarise- the role of subjects and social conditions in the health/disease process and especially in biomedical care, trying to impose the existence of an autonomous, professional and scientific medical view (Menéndez, 2005, p. 11).

Another more subtle legitimization is generated at the socio-cultural level, through society itself, which demands, for its attention, the practices offered by the model, especially with regard to pharmacology and sophisticated diagnostic studies. Finally, there is a legitimization coming from the economic field that generates capital accumulation through the pharmaceutical, technological industries supplies, diagnostic devices and health insurance companies. The commodification of medical consumption shows, in all its nakedness, the economic objectives of the different sectors involved in the development of biomedicine, which is evident in the growing application of business criteria to the forms of health care and prevention. The commercialization of disease will go hand in hand with a growing dehumanization in the relationship between the subjects and the actors of medicine.

Functionalist public health pursues a vertical control of health, at the top of which will be the State, which, in turn, will set Public Health policies, thus becoming the guarantor of citizens. It will deal with diseases suffered at the individual level. Also, I will seek for their causes in the natural world, and will operate with a military logic that is recognized in the methodological jargon: control, monitor, eradicate, eliminate, combat (Basile, 2020). Under the pretense of sustaining stability in the health of subjects, each of the problems that arise will be considered functional maladjustments that must be corrected. This logic is in tune with the foundations of pre- and post-Pasteurian hygienism and the idea of a sort of sanitary police.

Hygienist urban medicine, with its methods of surveillance, hospitalization and population cleansing, was nothing more than a refinement, in the second half of the 18th century, of the political-medical scheme of quarantine that had been initiated at the end of the Middle Ages, in the 16th and 17th centuries (Basile, 2020, p. 10).

The HMM and Diabetes

Since the year 2000, medical guidelines for the diagnosis and treatment of type II diabetes have been modified, based on pharmacological management, with the aim of establishing stricter control goals, supported by almost all international diabetes organizations. Thus, the AAG (Altered Fasting Glucose) went from a value of 140 mg/dl in 1980, to 100 to 126 g/dl in 2003, when the concept of prediabetes or impaired fasting glycemia was introduced (Serena, 2013).

Modifications in the thresholds for making diagnoses have managed to significantly increase the number of patients classified as prehypertensive, prediabetic, or requiring treatment with statins or other drugs (Ugalde et al., 2009).

Applying these mechanisms, lowering the values or broadening the spectrum of symptoms that define risks and ailments implies that, from one day to the next, to be healthy people are considered to be sick or at risk of being medicated. This happened in the United States of America when the values for hypertension, cholesterolemia, overweight/obesity and diabetes were redefined at the end of the 1990s. This procedure implied that, in that country alone, 140,630,000 people (75 percent of the adult population) could be diagnosed and treated for some of these conditions and risks (Iriart et al., 2017, p. 68).

During almost the entirety of all the 20th century, the HMM suffered criticism in relation to commodification, and the constant increase in health care costs, at all levels, which aggravated the situation of vulnerable sectors. The following quote shows the drama to which they are exposed:

(...) the dominant biomedical orientations at present tend to exclude or subordinate in fact the social, cultural, psychological, economic and power aspects, with respect to a patient who can potentially choose what to do about their ailments, given the informational and economic resources they have, but within a world where the majority cannot choose, even if they have information, given their limited living conditions. Therefore, this type of proposal refers to

two apparently contradictory orientations since, on the one hand, the dominant neoliberal system supports the existence of an informed, autonomous subject, with the capacity to intervene and at the same time, it points out or connotes that it is on this basis that this subject has to take economic responsibility for his or her illnesses, which we can observe in the latest trends of the so-called European Welfare States and, above all, in the health policies of the USA, increasingly oriented towards mercantilism. But it is in the dependent countries where this situation is most negatively evidenced given that, for example, in a country like Mexico, where more than 50% of health spending is “out-of-pocket spending”, i.e., it is paid by the people, and not necessarily to consume robotic medicine, a trend that has been driven by more than three decades of neoliberal policies (Menéndez, 2020, p. 22).

In the pharmacological treatment of type II diabetes, failures are identified in adherence, in the follow-up and adherence to treatments. And, with respect to the hypotheses that could explain these observations, problems of economic accessibility are persistently located. The significant increase in drug prices in recent months, added to the critical economic situation of many families who lost their income, or part of it, was referred to as another factor that influenced this growth in the demand for care and, consequently, for drugs and pharmacy supplies (Ombudsman’s Office of the Autonomous City of Buenos Aires, 2021).

Policies to Address Type II Diabetes in Argentina

In 2019, the Secretariat of Health, through the National Program for the Prevention and Control of People with Diabetes Mellitus, developed a pilot health strategy in three provinces to prevent, detect and treat diabetes.

Its responsible stated that more than a third of the people living with the disease are unaware of it, and among those who are diagnosed, half are not in treatment. Hence the importance of implementing a National Diabetes Plan that articulates resources and actors, both in national and provincial health ministries, as well as scientific and civil society organizations to improve indicators. The National Diabetes Plan includes a broad strategy to reduce diabetes mortality and has several additional components:

- a. the formation of a Foot Network to prevent and treat diabetic foot ulcers.
- b. the development of a Clinical Practice Guide as a tool for health teams working with people with diabetes soon to be published.
- c. the training strategy for health teams at the first level of care.
- d. the periodic updating of the vademecum of medicines in the first level of care centers.
- e. the coverage of medication according to what is established in the National Diabetes Law.
- f. the incorporation of a diabetology education module to the Compulsory Medical Program is being processed.

Post pandemic, on November 14, 2022, the Minister of Health of the Nation signed the update of the Norms for the Provision of Medicines and Supplies that incorporates, among the technologies evaluated, a new group of oral antidiabetics for those people with type II diabetes who require intensified treatment to achieve the goal of glycemic control.

If the decisions described above are analyzed, regarding the forms of intervention of the Argentine State in the face of this problem, a clear alignment with intervention at the individual and pharmacological level is quickly identified. In fact, the only measure that could have an impact at the level of training, that is, the knowledge for action, involving empowerment of patients to learn about other complementary ways of dealing with their disease, in addition to medication (a module aimed at diabetes education), is still in the process of being incorporated.

On the other hand, the mistake is aggravated if one considers that this is an intervention that costs significantly less than the exclusive use of medication. It could be thought that the selected strategy is one of the possible ones, but in a deeply unequal country, clinging to the HMM inevitably leads to obvious and foreseeable difficulties. The following case exposes a concrete example of the deficiency in the articulation of actions.

The Ombudsman's Office of the CABA (Autonomous City of Buenos Aires, the Capital of Argentina) is an autonomous and independent body in charged of defending, protecting and promoting the rights, guarantees and interests of all people who live, work, study or transit through the Autonomous City of Buenos Aires. In 2021 the agency conducted a survey in the Health and Community Action Centers (hereinafter CeSACs) located in the most vulnerable areas, and detected a shortage of the test strips that allow the patient to (perform) test the daily measurement of the blood glucose level, in order to estimate the insulin dosage. It is vital that the patient can measure his/her daily blood glucose level in order to estimate the dose of insulin to be injected. The agency also identified difficulties arising from the incompatibility between the test strips provided by the CeSACs and the glucometers (glucose meters) for inserting the same that patients have. That is to say, if both elements — strips and glucometer — do not belong to the same company, it is not possible to perform the measurement. This situation is due to the fact that the company awarded in the bidding process for the provision of the test strips is not the same company that provided the meters in the past. They also detected shortages of medicines such as metformin and other oral hypoglycemic agents. In view of the lack of insulin pens earlier this year, the alternative offered by the CeSAC pharmacy was to provide vials of insulin ampoules. However, patients agreed that insulin administration by syringe is somewhat complex, given the number of applications that must be performed daily. On the other hand, not all patients are able to use this method: such is the case of the blind, or of recently diagnosed patients who have not yet mastered this application technique. In response to the claim made by the CeSACs to the Ministry of Health, the response was that the lack of supplies is due to the time involved in the bidding process, which makes it impossible to estimate when the awards will be made.

The situation described above clearly shows the consequences of clinging to a single mode of intervention in this disease. To ignore the contexts in which people develop their life experiences is to look at reality with only one eye. The HMM model seems to work only in high-income sectors where access to medicines and supplies is never denied and where, in addition, they can freely choose what to consume and how often, and sustain quality physical activity in safe environments and coordinated by specialists.

The Responsibility of Educational Institutions

The changes required in food assistance for vulnerable sectors and the approach to type II diabetes are urgent but, at the same time, there is little that we educators can do to accelerate modifications and times. However, it is possible to operate in indirect ways to influence these changes. One of them, unavoidable, is to intervene in initial teacher training with the conviction that future teachers, aware of the importance of reversing this reality, incorporate in their classes with their future students. This action implies that teacher trainers take responsibility for addressing the problem of obesity and the risk of type II diabetes in vulnerable sectors with the commitment not to anchor them in the biologicist model. It is essential to disassociate oneself from the constraints that this model generates and to make explicit and go deeper into the network of relationships that are interwoven in the vital experience of the subjects. It is necessary to take root in the conception of the social determination of health (Breilh, 2013), which reveals the impact that socioeconomic and political dimensions exert on health-disease processes.

The objective is that educational institutions address this problem by addressing multi-causality (Revel Chion, 2015) with knowledge that enables subjects to act responsibly, that have a positive impact on their health through healthy practices, that can transcend the school, thus, reaching families and the educational community.

It is necessary to analyze whether the school incorporates these issues and, if so, how it approaches them: whether it is in a comprehensive manner or as disciplinary and/or fragmented contents; whether the environmental reality where it is located is taken into account when addressing the issues, and what pedagogical strategies are developed when food and/or environmental vulnerability directly affects children (González Cuide et al., 2022, p. 179).

The widely extended traditional methodologies, of transmissive-informative cut, seem to have given few results. The need is visualized to develop learning instances that impact on cognition, but also on the students' abilities to make adequate decisions in relation to food and health (González Jaramillo et al., 2022).

In relation to type II diabetes, an approach that does not exclude, but does not focus exclusively on the hormones involved in blood glucose regulation is required: the biological contents are as indispensable and they are insufficient. It is necessary to analyze, expose, propose and deploy the analysis of all the dimensions that are intertwined to account for the high number of patients with this disease in vulnerable contexts. It is

also necessary to include content knowledge that enables students, who develop their lives in vulnerable contexts, to exercise their rights in relation to food, and to claim quality food when the economic realities of their families do not allow it.

These “impositions” demand teachers trained in conceptions that do not reduce the approach to health to the contributions of biology; a revision, strengthening, and reformulating the curricula of teacher training is the urgent task to be addressed. Despite the role assigned to the school to achieve health literacy, some research reports that it poses a challenge that involves overcoming the barriers of lack of teacher training for health education, educational materials, administrative support and the curriculum that does not necessarily provide space to address these contents (Vamos et al., 2020).

Of all the aspects that have an impact on teachers’ difficulties in making the necessary innovations to address these — and other — sensitive issues, the most decisive ones are school biographies. Indeed, the decisions made by the teaching staff in relation to the aspects to be addressed, the approaches they adopt and the activities they propose to their students, depend on the ways in which they themselves have dealt with the contents throughout their own schooling, in this case (mainly) those related to health and the aspects that condition it. It is easy to suppose which formats will tend to shape the proposals that future teachers propose to their students, depending on the weight of personal biographies and tradition (Alliaud, 2004).

Initial training also influences the didactic-pedagogical decisions made by teachers. In our country, the boundaries between disciplines remain fixed, with very few proposals for integration between subjects belonging to the field of natural sciences, so that the teaching staff does not have experiences that enable them to conceive areal (interdisciplinary) links. In the same sense, references to social sciences are practically nonexistent in initial teacher training (Revel Chion & Aduriz-Bravo, 2021). For this reason, it is essential to intervene to overcome the limitations of the hegemonic views of the training centers that fragment reality, which is always complex, and that appeal to exposure as a privileged way of circulating knowledge. The biases regarding health that have had an impact on the school biographies of the teaching staff, will probably not be completely diluted, but they will undoubtedly provide enabling elements to reflect upon, “watch over” those biases, and propose to encourage their future students to participate in robust, challenging activities that generate reinforce the concept of citizenship and (involve further) commitment. It is an auspicious outlook.

Conclusions

I have exposed the existing link between a diet based almost exclusively on carbohydrates, which the most disadvantaged sectors are forced to consume, and obesity. Together with deficient physical activity due to lack of time, safe spaces or adequate information, are all aspects that lead to a worryingly increasing percentage of type II diabetes.

A brief characterization of the HMM and functionalist public health gave me the opportunity to present one of its assumptions: medicalization, which exacerbates the vulnerability of low-income populations. I pointed out how Argentine health policies for the approach to type II diabetes are aligned with this model, starting with the National Diabetes Plan. And, in the face of this approach, I exposed how the CeSACs, community health centers, in the poorest neighborhoods of the Autonomous City of Buenos Aires suffer discontinuities in the provision of anti-diabetic drugs. No other intervention, apart from medicalization, is offered in relation to this ailment: it is not explicitly taught (education campaigns are under analysis), fruits and vegetables are not included in the food bags distributed in vulnerable neighborhoods, and actions aimed at creating safe corridors or spaces for adequate physical activity are not promoted or accompanied.

In Argentina, no government, ministry or municipality clear measures have been able, throughout history, to develop a successful agenda to control obesity. Nor has there been any action on the elements that, associated with it, lead to diabetes, which is precisely the urgent challenge that should become a State policy.

In this context, I turn my attention to initial teacher training as a possible and auspicious space to encourage future teachers to address this disease with an explicit link to the contexts in which they work. This knowledge could have an impact on the adoption of healthy behaviors by students, transcend the classroom and make it possible for young students to become multipliers of knowledge and behaviors to be followed with their families and in their neighborhoods.

Didactic-pedagogical support in biology teacher training centers/colleges could enable future teachers to overcome the disciplinary fragmentation that blurs reality and include, in the approach to diabetes, the elements that the HMM fails to consider:

1. How social determinations account for inequalities in the quality of food consumed, in access to quality education, and in sustained physical activity.
2. To shed light on the interplay between the biological and the social, which makes it possible to cushion the blame for the behaviors adopted by the subjects and the decisions they make with more or less direct impacts on their health.
3. Not to omit the metabolic processes that explain the relationship between unbalanced consumption of carbohydrates, overweight and the onset of diabetes, but to make it clear that this knowledge is absolutely essential but definitely insufficient to give a full account of this health problem.

The aim is for the teaching staff to understand that the high rates of obesity and type II diabetes in vulnerable sectors represent an epitomic case of the multicausal nature of health that should be incorporated in all classrooms at all educational levels. Indeed, biological factors are interwoven in this problem, but especially lifestyles that are expressed in a very particular way in the cities, which dramatically affect family organization, the time available for food preparation, the pressures of long working hours, the lack of social protection and the scarce access to recreation and sports.

It is an ambitious but urgent bet, no less urgent than the implementation of Public Policies with new approaches to address this issue, but perhaps with greater chances of concretion in the medium term fairly soon.

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