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## Introduction

*As the risk society develops, so does the antagonism between those afflicted by risks and those who profit from them. The social and economic importance of knowledge grows similarly, and with it the power over the media to structure knowledge (science and research) and disseminate it (mass media). The risk society in this sense is also the science, media and information society. Thus new antagonisms grow up between those who produce risk definitions and those who consume them*[1].

Modern Biology Didactics must face new civilizational challenges. They are, among others, information surplus, necessity of life-long learning, solving problems and making decisions concerning natural environment, health, and implementing the rules of sustainable development. The educational strategies applied so far have proved insufficient, hence the numerous attempts to modify the existing classifications, methods labels and assumptions of their practical realization. The previous volumes of the Annales were devoted to the transformation of Biology Didactics as a pedagogical subdiscipline and an educational subject in the academic tradition of university-based Biological Studies (vol. I), and to seeking paradigms for education in biodiversity protection (vol. II). We are currently facing an important task. Within the scope of scientific literacy, i.e. the knowledge indispensable to every member of the information society, we need to reflect upon the knowledge and skills constituting the 'health literacy'. This is due, among others, to the fact that researchers have observed growing social interest – displayed mainly by young people – in the issues of IVF and other applications of scientific achievements in medicine, life threats in the context of various sexual behaviours, contraception, intoxicants and stimulants abuse, food additives and GMO related health safety. There are other issues that must be touched upon, e.g. the health and life threats to infoholics (information addicts) and compulsive internet users (internet addicts). Such disorders often underlie emotional disorders in children and young people (such as aggression and other behaviours that pose a threat to others).

Biology Didactics as a field seeks methods of delivering teaching contents related to health and attempts to identify the scope of the new knowledge which should be included in the curricula at different levels of education. These aims call for close cooperation with specialists in current human biology issues, extended research in human biology teaching, and discussion among the health education practitioners.

[1] U. Beck, 1992, *Risk Society – Towards a New Modernity*, Sage, London, p. 46.

Modern youth's lifestyle in extended reality often stems from the hyper-reality and from the fact that the media constitute the extension of senses of the modern man. The media, not the school, create most of the opinions and attitudes of young people when it comes to the subject of health, sickness and risk, and disease preventive measures. Therefore the problem the modern school faces is that it does not keep pace with the social needs and does not display an interdisciplinary approach towards e.g. environmental and health issues. When speaking of environmental issues, it is worth contemplating how human interference with the natural environment affects human health.

Graduates from different educational levels lack competence when it comes to social mediation conducted by specialists facing a clash of interests in natural environment exploitation, or in negotiations concerning the interests of patients and their families in conflicts resulting from inadequate communication related to health issues and health problem solving.

We must ask, then, what competences are indispensable for the 21st century people to be able to correctly assess risk and to participate in a dialogue with specialists when it comes to taking the most important decisions concerning their health and life? Thus we pose a question about competences (motives, values, involvement), not only about qualifications confirmed by appropriate certificates and diplomas.

We ask this question today, when school is commonly attacked and criticized. From the perspective of the society, curricula are supposed to reinforce the permanent values and accepted models, or to create a significant breach in the existing habits, to change the existing values of cultural patterns, and to trigger a vital turn towards the pupil's individuality. Thus school faces criticism from the conservative point of view, for the lack of unified curriculum requirements, notions canon and reading lists, and from the liberal point of view, for not providing conditions for the pupil's individual development. Meanwhile, we try to come up to the message included in Federico Mayor's *The World Ahead: Our Future in the Making*, which calls upon us to create educational contexts taking into account new knowledge (chiefly biology), in order to conduct research and control the cognitive process. We make the teacher face the necessity of: filtering the multitude of information; increasing or reducing the influence of external stimuli; providing situations for the pupils to mobilize and activate the new knowledge and to test its efficiency and limitations; providing situations in which the new data is more easily accessed and acquired, when the pupils use the new structure of notions and learn to activate their knowledge.

The articles selected for this volume consider many different aspects of the civilizational risks. Authors of particular chapters are renowned specialists in various fields, sometimes quite diverse (pedagogy, biology: mainly physiology, chemistry, human nutrition, or pharmacology), and they are all involved in the topic of risks posed by the environment. In general, the reflections presented by the Authors create an atmosphere of lively debate, which may become a starting point in developing

educational communication strategies, where civilizational risks constitute the main axis of discussion. The publication contains 12 articles in English. The Authors are academics from Poland and Argentina, France, Germany, Switzerland and India. As the review of this volume states, "the choice of the Authors is by no means accidental, as they are indeed experienced specialists in their fields".

In the beginning of the volume, we commemorate Professor Jerzy Wołek, whose professional path for several years overlapped with the path of development of Polish Biology Didactics.

*Katarzyna Potyrała*

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Studia ad Didacticam Biologiae Pertinentia III (2013)

# Profesor Jerzy Wołek (1942–2013) – reminiscencje

**Fot. 1.** Profesor Jerzy Wołek (Archiwum Uniwersytetu Pedagogicznego w Krakowie)

1 stycznia 2013 r. zmarł Prof. dr hab. Jerzy Wołek, nauczyciel akademicki w Instytucie Biologii Uniwersytetu Pedagogicznego im. Komisji Edukacji Narodowej w Krakowie, wieloletni pracownik Instytutu Botaniki PAN w Krakowie, specjalista z zakresu botaniki, ekologii, fitosocjologii. Nabożeństwo żałobne odprawione zostało 8 stycznia 2013 r. w kaplicy na cmentarzu Rakowickim, po czym odprowadzono Zmarłego na miejsce wiecznego spoczynku.

Jerzy Adam Wołek urodził się 18 października 1942 roku w Krakowie. W latach 1956–1960 uczęszczał do I LO im. B. Nowodworskiego w Krakowie. W 1960 roku rozpoczął studia magisterskie na Wydziale Biologii i Nauk o Ziemi Uniwersytetu Jagiellońskiego. W roku 1965 obronił pracę magisterską, uzyskując tytuł magistra biologii. Po ukończeniu studiów biologicznych od kwietnia 1966 roku do sierpnia 1967 roku był zatrudniony w Miejskim Parku i Ogrodzie Zoologicznym w Krakowie na stanowisku asystenta naukowo-badawczego. W okresie od września 1967 roku do sierpnia 2002 roku pracował w Zakładzie Ekologii Instytutu Botaniki im. W. Szafera Polskiej Akademii Nauk w Krakowie, zajmując kolejno stanowiska: asystenta naukowo-technicznego (1967), starszego asystenta (1972), adiunkta (1979), docenta (1998). W roku 1978 uchwałą Rady Naukowej IB PAN w Krakowie nadano mu stopień doktora nauk przyrodniczych, a w roku 1997 uzyskał stopień naukowy doktora habilitowanego nauk biologicznych w zakresie biologii – botaniki,

ekologii i fitosocjologii. W październiku 2002 roku został zatrudniony w Instytucie Biologii Akademii Pedagogicznej (obecnie Uniwersytet Pedagogiczny) im. Komisji Edukacji Narodowej w Krakowie, w Zakładzie Dydaktyki Biologii, na stanowisku profesora nadzwyczajnego. 17 czerwca 2009 uzyskał On tytuł profesora nauk biologicznych.

W latach 1972–1974 Profesor Wołek odbył staż naukowy w Instytucie Geobotaniki w Zürichu (Szwajcaria), a w roku 1981 uczestniczył w „International Workshop on aquatic macrophytes", zorganizowanym przez Biological Station Neusiedlersee w Illmitz (Austria). W badaniach naukowych koncentrował się na: interakcjach międzygatunkowych – konkurencji, allelopatii, wzorcach i procesach ekologicznych, ekologii biocenoz – czynnikach determinujących strukturę i organizację fitocenoz, zasadach zrzeszania się roślin, modelach zerowych w ekologii, metaekologii, metodach statystycznych w badaniach ekologicznych – technikach statystyki jedno- i wielowymiarowej oraz doświadczalnictwie. Opracował własną wersję modelu zerowego, służącego do testowania hipotezy zerowej, zakładającej, że zaobserwowany rozkład kombinacji gatunkowych jest losowy. Tym samym zapoczątkował On pierwsze tego rodzaju badania w Polsce i jedne z pierwszych na świecie.

Odrębną dziedziną zainteresowań Profesora Wołka była dydaktyka biologii. Wraz z współpracownikami z Zakładu Dydaktyki Biologii UP opracował między innymi trzy modele nauczania i uczenia się. W działalności dydaktycznej skupiał się przede wszystkim na ciągłym doskonaleniu narzędzi wspomagających proces nauczania i uczenia się biologii, matematyki oraz statystyki.

Jeszcze w okresie pracy w IB PAN Profesor Jerzy Wołek prowadził zajęcia dydaktyczne ze studentami biologii, w ramach ich praktyk wakacyjnych. Brał udział w seminariach organizowanych dla studentów Wydziału Biologii i Nauk o Ziemi Uniwersytetu Jagiellońskiego oraz Wydziału Leśnego ówczesnej Akademii Rolniczej (obecnie Uniwersytetu Rolniczego). Dla słuchaczy Studium Doktoranckiego przy IB PAN prowadził następujące wykłady: podstawy ogólnej metodologii nauk, zarys metodyki pracy naukowej oraz wstęp do statystycznej analizy danych.

Pracując w Instytucie Biologii UP, Profesor Wołek w ramach zajęć dydaktycznych ze studentami studiów stacjonarnych i niestacjonarnych prowadził wykłady i ćwiczenia z przedmiotu matematyka-statystyka oraz wykłady z ekologii na studiach stacjonarnych i ze statystycznej analizy danych na studiach doktoranckich. Prowadził również seminaria magisterskie z dydaktyki biologii oraz ekologii. Był opiekunem naukowym i recenzentem prac doktorskich, magisterskich i licencjackich. Dopingował pracowników m.in. Zakładu Dydaktyki Biologii do zdobywania stopni naukowych, dzięki czemu pozostawił po sobie na stanowisku kierownika zakładu swoją następczynię dr hab. Katarzynę Potyrałę, która za czasów Jego kierownictwa zrobiła habilitację z pedagogiki na Université de Bourgogne w Dijon (Francja).

Profesor Wołek wyróżniał się również wybitnymi umiejętnościami organizacyjnymi. Pełnił wiele odpowiedzialnych funkcji i godności akademickich.

W trakcie zatrudnienia w Instytucie Botaniki im. W. Szafera PAN w latach 2001–2002 był kierownikiem Pracowni Ekologii Roślin w Zakładzie Ekologii, od roku 1998 uczestniczył w pracach Rady Naukowej IB. Ponadto w latach 1996–1999 przewodniczył Radzie Redakcyjnej „Fragmenta Floristica et Geobotanica", a od 2000 roku był członkiem Rady Redakcyjnej tego czasopisma i „Polish Botanical Journal" oraz członkiem Komisji Wydawniczej IB im. W. Szafera PAN. Po przejściu do ówczesnej Akademii Pedagogicznej w latach 2002–2009 kierował Zakładem Dydaktyki Biologii Instytutu Biologii, a w latach 2006–2009 był dyrektorem Instytutu Biologii. Jako dyrektor doprowadził do zorganizowania i uruchomienia w 2007 roku Studiów Doktoranckich przy Wydziale Geograficzno-Biologicznym UP. Od 2002 roku był członkiem Rady Instytutu Biologii oraz członkiem Rady Wydziału Geograficzno-Biologicznego UP im. KEN (Fot. 2). W latach 2005–2008 był również członkiem Senatu UP. Do końca życia uczestniczył w pracach różnych komisji senackich oraz rektorskich, powołanych na Uniwersytecie Pedagogicznym, m.in. Rektorskiej Komisji ds. Rozwoju i Tworzenia Nowych Wydziałów, Rektorskiej Komisji ds. Rozbudowy UP.

W uznaniu zasług Zmarły został odznaczony Srebrnym Krzyżem Zasługi (2005), Medalem Komisji Edukacji Narodowej (2012) oraz wyróżniony licznymi nagrodami uczelnianymi, m.in. indywidualną nagrodą II stopnia przyznaną przez Rektora UP za podręcznik *Wprowadzenie do statystyki dla biologów*, opublikowany w 2006 roku, a także nagrodą jubileuszową za 40 lat pracy zawodowej (2006).

Profesor Jerzy Wołek pozostanie w naszej pamięci jako człowiek niezwykle sumienny i pracowity, służący zawsze radą i pomocą, znakomity nauczyciel akademicki, bez reszty oddany sprawom Uczelni i studentom. Jego nagła i przedwczesna śmierć jest dla wszystkich zaskoczeniem oraz ogromną stratą. Odszedł ze środowiska ekologów doskonały specjalista z tej dziedziny, dla kolegów i znajomych dobry przyjaciel, dla rodziny dobry ojciec i mąż, a dla wszystkich – dobry, życzliwy człowiek.

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**Fot. 2.** Profesor Jerzy Wołek po kolokwium habilitacyjnym dr. hab. Andrzeja Rzepki na Wydziale Geograficzno-Biologicznym Uniwersytetu Pedagogicznego w Krakowie (2009 rok)

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## Professor Jerzy Wołek (1942–2013) – reminiscence

### Abstract

This article contains a reminiscence of Professor Jerzy Wołek, deceased on 1 January 2013, an academic teacher at the Institute of Biology, Pedagogical University of Cracow, a long-term employee of the Institute of Botany of the Academy of Sciences, a specialist in botany, ecology, plant sociology and didactics of biology. This publication also includes a bibliography of selected research papers of Professor Jerzy Wołek.

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# Is contemporary food safe?

## Nutrition

Human nutrition is a phenomenon as old as the history of *Homo sapiens*. Getting food, its production, and consumption have always been one of the most important human activities and human tasks, and any failure, in this regard, has had important biological and social implications. Nutrition appears to be the requirement of the existence of every living organism and food tends to be one of the most powerful environmental factors that influence organisms (Ponzoni et al. 2009). Organic substances in the form of carbohydrates, fats, and proteins extracted from food are used by the organism to protect and satisfy its energy needs associated with performing the psychomotor activity (Yamada 2008). Specific food products provide, in the appropriate proportions and nutritional values, various nutrients, e.g. higher nutritional value of the protein derived from milk, meat or fish, in comparison to the protein derived from groats, flour, or leguminous plants (Bregendahl et al. 2002). The presence of all nutrients in the diet is crucial since every nutrient performs different specific function. Therefore, a deficiency, or absence of any of them can cause problems with the absorption disorders of another element, e.g. the use of iron in the daily food ration is worse if there is the deficiency of vitamin C in the organism (Atanassova, Tzatchev 2008; Saito 2009).

Human nutrition is one of the basic conditions not only of human life as such, but also human development, health, and physical fitness, as well as the source of human satisfaction so as to meet all human needs in all aspects of life. Thus, the food, or should it be said, a perfectly composed diet plays an essential role in maintaining the body in health and vitality, moreover, it is important to prevent the organism from contracting diseases. To keep the body in good health, the education dealing with the principles of appropriate nutrition is needed to be introduced. Due to such knowledge, the proper information can be acquired in the subject of the type, quantity, functions and the location of particular nutrients, which should be provided to the body with daily food rations (Freedman et al. 2001).

However, 'is it enough to know what products and in what quantities should be eaten so as to be healthy?' Is it also important to know the source of the food we eat? What methods and technologies were used to produce food? What were the conditions of transportation, namely, what temperature was used during the transport and how long it took? And finally, what were the conditions of food storage?

Answering these and many other questions concerning the quality of food products will allow us to find the answer to the question formed in the title of the article, namely, 'Is contemporary food safe for humans?'

Nevertheless, first of all, we shall deal with some history...

The impact of the optimal diet and the proper nutrition on human health and the length of human life was already known in ancient times. It can be proven by providing the words of the philosopher and doctor [physician] of that time, namely Hippocrates, 'Let food be thy medicine and medicine be thy food'. According to the views of Hippocrates, the rational nutrition was also associated with combining foods that had moisturizing effects and drying effects in meals (Glatzel 1967). In the ancient Greece and Rome, the rational nutrition was based on the theory of the four elements, which meant composing meals consisting of foods with different flavours. The particular diet was mainly created due to the 'natural' environment, in which the human lived. In the so-called naturalistic period lasting from about 400 BC to about 1750, there was no scientific knowledge concerning nutrition. Aulus Cornelius Celsus, a Roman scholar who lived 25 BC – 50 AD, believed that food was composed of just one nutrient known as the so-called 'matter'. Human nutrition, generally speaking, regardless of age, sex, and the state of health, was based on the eating habits, traditions, beliefs, superstitions, and religion. It is not surprising, though, that during this period a number of diseases was common, i.e. scurvy, rickets and nyctalopia (also known as 'night blindness'). The eleventh century was the beginning of the introduction of the nutritional recommendations, which required combining products in the diet from groups of different [proven] impact on human health. Such state had lasted until the mid – eighteenth century when Antoine Lavoisier, a French physicist and chemist, who was considered to be the father of the science of human nutrition, showed that food, after the consumption, was combusted in human and animal bodies in the presence of oxygen together with giving off the energy (Madeira 2012).

The German physiologist, Max Rubner, continuing Lavoisier's research calculated how much energy was given off during the combustion of one gram of fat, carbohydrates, and proteins. Rubner was also the person to discover that organisms with slower metabolism were considered to be long-lived ones. His discovery was identical to the results of Max Kleiber, a Swiss biologist, according to which the metabolic rate and lifespan of animals depended on their body weights, as well as that large animals did not only have a slower metabolism, but also lived longer. The nineteenth century and the early twentieth century was the time period during which the issues of identifying and acknowledging basic nutrients, and the consequences

of their deficiencies in the diet were mainly dealt with. However, at that time, their components, such as: fatty acids, amino acids, and dietary fibre (also known as: roughage, or ruffage) were not paid attention to.

Over the centuries, in the field of science, substantial evidence was given to confirm the close relation between the consumed food, the state of health and the length of human life. Despite numerous discoveries in that period of time, also associated with the development of the science of nutrition, the changes and progress in this area were insignificant.

At the end of the nineteenth century, noticeable improvements were observed in many disciplines of science, namely, Biology, Chemistry, Physics, and Medicine. Then, four nutrients, i.e. proteins, carbohydrates, fats, and dietary minerals were to be distinguished. The work on the composition and nutritional value of products was initiated, moreover, the nutritional standards, which already took into consideration the age, gender, and physical activity, were developed. The researchers of that period not only described the structure and functions of proteins, but also their amino acid composition, the importance of fats and fatty acids, the discovery of new nutrients, the fact of determining the nutritional value of products, developing nutritional standards, and many other issues. Finally, vitamins were discovered. This scientific event happened due to the Polish biochemist – Kazimierz Funk; furthermore, he also introduced the term 'vitamin'. This researcher not only discovered many vitamins, including thiamine (vitamin B1), but also treated patients with the vitamin deficiency, and was able to predict that the lack of vitamins could cause diseases (Piro et al. 2010).

The scientific and technological progress, which made it possible for the food intake to be independent of time and place of its consumption, was an important factor that had a significant impact on the human diet. Therefore, the cultivation was enriched by new species of plants, moreover, the work on new species of animals and fish was carried out. The fact of making scientific developments common, including those related to nutrition, and the development of biotechnology, as well as genetic engineering, led to significant changes in the lifestyle and diet; unfortunately, they were not always beneficial to the individual. At the same time, consumers became more interested in not only maintaining good health, but also preventing themselves from the aging processes.

The modern food consumer is aware of the fact that even the most valuable products consumed inexcusably, or in the wrong composition of other products can be harmful to the organism. It means that it can be both inappropriate and even dangerous to have the deficiency of proteins, as well as an excessive amount of them. The protein deficiency can be observed among e.g. the elderly people, people on special diets, including vegetarians, as well as some sportspeople, such as bodybuilders (Rutherfurd-Markwick 2012). The risk of the excessive amount of protein presence is associated with an excessive burden on kidneys and the liver, the risk of arteriosclerotic vascular disease, also called ASVD (atherosclerosis),

osteoporosis, and joint disorder (arthritis). The result of inappropriate nutrition, apart from the diseases mentioned above, can also appear in the form of diabetes – type 2, known as adult-onset diabetes (diabetes mellitus type 2), gallstones (cholelithiasis), cancer, and obesity (Desai et al. 2013; Kennedy et al. 2001), which is understood as the pathological accumulation of fat tissues in excessive amounts, namely, physiologically and adaptability more than needed by the organism can cause diseases, such as: high blood pressure – HTN (arterial hypertension), diabetes mellitus type 2, pulmonary embolism – PE (lung embolism), and degeneration of the spine (spinal spondylosis). Globally speaking, among the health risks caused by deficiencies, the deficiency of vitamin A, iodine and iron appear to be particularly concerning (Sommer and Vyas 2012). However, such kinds of 'risks' associated with the excessive or deficient amounts of certain nutrients, are more likely to be observed due to the individual, in a way voluntary, behaviours…

Asking about the issues, such as: 'Is the contemporary food healthy?' and 'Is the contemporary food safe?' people want to know if after the consumption of food offered by the chain of stores, they will be at risk other than 'the one' possibly related to the excessive or deficient amounts of nutrients (Hornig and Walter 2004). According to the World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO), the so-called. 'safe food' does not cause negative health effects in the organism. However, 'Can the harmful effect of food on the human organism be allowed at all?' It cannot, unless it is not intended (FAO/WHO 2002; WHO 2003).

The term 'food' means the substances, or the processed products, partially processed products, or unprocessed products (whole foods) intended to be consumed by humans, or the ones which can be expected to be consumed by people. The food classification is primarily based on the process of its preparation/production. While choosing the type of food one should not only be interested in its nutritional value but also in the information providing the knowledge how it was produced, transported, and stored. It seems that the most beneficial to human health is the food that is unprocessed or processed to an insignificant extent. Taking into account the methods of food preparation/production, the following kinds can be specified, namely, conventional food, ecological food (bio food, and organic food), genetically modified food (GM food), and other types of foods that combine the features and characteristics of conventional food, ecological food, and genetically modified food. Such types of foods involve e.g. convenience food, functional food, or new food. Functional food, according to its composition, is divided into the following kinds: enriched (e.g. in antioxidants, vitamins, dietary fibre), low energy, high dietary fibre, probiotic (enriched in live cultures of bacteria), low sodium, low cholesterolemic, energizing. The so-called 'attribute food' tends to be an interesting category of food, which specifies the food products with the exceptional fool qualities preferred by particular groups of consumers. This type of food combines the features of ecological food, vegetarian food and kosher food.

## Conventional food

The food products produced by the use of the conventional methods are widely available on the market. The raw ingredients for its production are provided by conventional farming (agriculture), which allows the use of mineral fertilizers, crop protection chemicals, agricultural chemicals that stimulate weight gaining of the produced plants, and animal breeding. The methods of the production employed in conventional farming enable reaching the production goals, however, the unnatural application of environmental sources by the use of crop protection chemicals, artificial fertilizers and animal feeding stuffs causes the extinction of wild birds and animals, as well as environmental degradation. The conventional technologies are not only a sign of elimination of certain characteristics of the raw ingredients, but also of the artificial enrichment in other specific properties by the use of genetic modification. More and more frequently the effects of the conventional production appear to be negative, and they result in Bovine Spongiform Encephalopathy (BSE) found in animal and poultry kinds of meat since such meat tends to contain hormones or dioxins, moreover, mercury can be found in fish. The risk of appearing of a particular disease due to the consumption of products that are not safe depends on the individual human genetic predisposition. The chemicals added to conventional foods are permitted for consumption within certain declared standards and norms. The healthy human body can easily cope with small amounts of such substances, however, their systematic introduction to the body by their consumption is believed to be an important factor in the range of initiating health risks (von Götz 2010).

The society today has to face the necessity of the ecological and civilization compromise, which could combine the technological advances in the food production with the need to make everyday life easier, together with the food safety, and the concern for natural environment. On the one hand, modern technologies used in food processing make it more long-lasting, tastier, and easier to prepare for the consumption. On the other hand, to meet the requirements of the consumer, food producers intentionally enrich it by the use of various substances, such as: food colouring (colour additives), preservatives, emulsifiers (emulgents), smelling essences (aroma substances), flavour enhancers, artificial sweeteners (sugar substitutes), raising agents (bulking agents), firming agents (stabilizers), which are of no nutritive character. More recently, in Poland the authorized list of such substances has increased to almost 290 of them.

The production of such food would not be possible without the use of the conventional agriculture plant protection chemicals (which are taken to protect cultivated plants against diseases and pests) the synthetic fertilizers, and the veterinary medicine. Conventional food can also be the source of contamination occurring accidentally. The so-called impurity, being the result of the contamination, can be understood as any substance that is not intentionally added to the food during its production process, or as a consequence of the environmental pollution. Therefore, the food can contain heavy metals, pests, toxins, microorganisms, chemicals from

food packaging, the remains of crop protection chemicals, synthetic fertilizers, and technical contamination. Furthermore, due to unskilful use of the technological processes associated with food processing, chemicals used for cleaning, or insufficient way of their removing, they can become the source of accidental contamination. All above mentioned substances can cause potential risks to human health. Their impact on human health can be manifested in various ways, depending on their type, their quantity, properties, and the way [method] of how the contaminants can penetrate the body (Hulme 2013).

A completely separate category of food contaminants is constituted as biological contaminants. The bacterial food poisoning phenomena seem to be the greatest threat to human health and life, and are the subject of the special attention drawn by sanitary and veterinary services. According to the existing Polish law, to be precise (the Act No 63 item 634 from May 11 2001), the presence of contaminants in food products, such as: microorganisms, pests, toxins, mould or other chemicals, makes it unsuitable for consumption.

One of the most dangerous kinds of bacteria that is responsible for food poisoning tends to be recognized as *Salmonella*, which causes the poisoning called *Salmonellosis* developed by the animal *Salmonella* type of bacteria. Another reason of food poisoning can be referred to the bacteria which can develop in the food, and/or in the human body, not to mention the environment. It is worth paying attention to, especially, E. coli (*Escherichia coli*), which can develop in the human body, and Streptococcus (*Streptococcus faecalis*) found in the excrement (faeces). The pathogenicity of bacteria is determined by their invasiveness, namely, the ability to penetrate the tissue, and to spread, as well as their toxicity, i.e. the ability to produce toxins.

Together with the increase in the public awareness, the interest in the wholesome food, free from contaminants including those accidental ones seems to be expressed. It occurs that such requirements can be met by ecological food, also specified as bio food, organic food and/or natural food. Ecological food is considered to be the food that has the nutritional value similar to conventional food, nevertheless, it is more friendly to the human body and the environment in which people live.

## Ecological food

Ecological food refers to plant and animal products made (produced) by using natural means of production, without synthetic additives, and chemical contaminants, moreover, free from chemical fertilizers, preservatives, antibiotics, hormones, not genetically modified, and not subject to radiation. Standards and norms related to the production, processing, transportation, packaging and storage of ecological food are very strict at all stages of the process. The whole process of the plant growth and animal breeding is carried out in a natural way. Such products are produced in accordance with the principle of the sustainable use of the renewable resources, taking care of the quality of the environment, as well as maintaining the

genetic diversity of plants and animals. Ecological food is produced by the use of only carefully selected ingredients /components, thus, the organic fruit, vegetables and meat should not contain even the insignificant amounts of artificial fertilizers, pesticides, and veterinary specifics.

Producing, processing, and storing ecological food according to the particularly determined requirements, by the use of special biological, mechanical, physical, enzymatic, fermenting, and microbiological technologies and methods, allow producers of ecological food to take action so as to get the certificate of the ecological food producers. The system of inspections and certification is the key component of organic agriculture (ecological farming) functioning. The inspection and control procedure refers to all who initiate the production and processing by using ecological methods and the food safety, which obviously, is guaranteed by the certificate confirming the product to be the ecological one. The violation of the environmental standards and norms by the producer causes the withdrawal of the certificate even for several years.

The advantage of ecological food is that it does not contain preservatives. More values of ecological food can be found in the high content of antioxidants (including vitamin C and polyphenols), which can lower the blood pressure, reduce the risk of heart diseases and strokes, improve the natural defence mechanisms of cells indicating the strong anti-cancer activity. Ecological food contains the increased amounts of magnesium, phosphorus, calcium, iron, beta-carotene (especially, in tomatoes, peppers, carrots, pumpkins). In comparison to conventional food, such food contains only minimal amounts of pesticides. Moreover, vegetables and fruit production with organic farming methods compared to vegetables production with conventional methods has a low amount of nitrate due to the fact that they contain a lower amount of water, which apart from the health benefits (values) make their pace of decomposing understood as rotting (decay) slower.

## Genetically Modified food (GM food)

Genetic modification of organisms by the way of spontaneous mutation has been taking place since the beginning of life on Earth. Nevertheless, it is the human being who has been always intervening in the genetic material of organisms by, e.g. the use of the genetic operations, namely, crossover (also known as: recombination), which means the programming of a chromosome or chromosomes from different individuals, furthermore, of looking for new, not always favourable characteristics of plants and animals. The first significant changes in this area of activities began after the domestication of plants by humans who by using genetic operation, i.e. crossover and selection processes, took responsibility for exchanging the genes between closely related species. The new variation appearing as the result was used in the traditional plant growing.

As the turning point for such activities people can consider the year 1953, when an American geneticist – James Dewey Watson, an English biochemist – Francis

Harry Compton Crick, and a British biologist - Rosalind Elsie Franklin developed a spatial model of the construction of deoxyribonucleic acid (DNA) and described its properties. However, to reveal the practical use of their findings, the world had to wait a little longer.

Acknowledging and understanding the basics of genes functioning enabled their various modifications, changes in their activity, moving them to species of different kinds, or introduction of additional copies of their own genes. The genetic manipulation allows connecting a plant's genes with another plant's genes, as well as with animal genes, moreover, it allows connecting animal genes with human genes. Nowadays, the methods used in biotechnology enable creating the plant organisms with the characteristics desired by the producer, or researcher; among other things, they involve better characteristics of their use, resistance to diseases (viral, bacterial, and fungal infections), resistance to pests, a better quality of determined characteristics in relation to previous variations, as well as getting new gene sets of plants that would not crossover with others in their natural environment. The genetic modification of plants is also designed to increase the tolerance to abiotic stress, extend the life of fruit and vegetables, moreover, to improve their flavour, to change the composition of fatty acids and amino acids, and to increase the amount of crops. Globally, and in Europe, there are some plants that tend to be most frequently modified and they involve: corn, tomatoes, soybeans, potatoes, cotton, melons, tobacco, Canola – Rapeseed (*Brassica napus)* and sugar beet.

The aim of the genetic modification of animals is to accelerate the pace of growing by including the additional gene of the growth hormone (pigs, fish, poultry), to increase milk production (cattle), and egg laying (hens), to improve the quality of meat, or to help strong immunity system to develop so as to prevent it from certain diseases by the introduction of resistance genes (gene providing sufficient defences in the piglet's organism).

However, the main purpose of the world food producers of the genetically modified food is to satisfy the growing needs for food in the constantly increasing human population, to reduce the damage caused during the transportation and the storage of food, as well as the production of products with high nutritional values. Therefore, the question arises as to whether such food producers do all these things for the consumers (Sparrow 2009).

## Functional food

The concept of functional food is derived from the philosophical tradition of the East, where there is no clear distinction between medicine (drugs) and food. The research dealing with functional food started in the 1980s in Japan, and just after several years the appropriate legislation was introduced. For that reason, its production on an industrial scale started. Therefore, Japan is the only country in which functional food has its own legal status and the significant place on the food market. The Japanese were the first people in the world to define this type of food.

According to the definition suggested by them, it is the food for the specified health use (FOSHU, Food for Special Health Uses).

In 1996 in Europe, the research programme called Functional Food Science started (FUFOSE) and it was funded by the European Commission. According to the FUFOSE report from 1999, "food can be considered functional if it has been proven beneficial, i.e. it has more than the nutritional effect that can influence one or more functions of the organism" and such influence has to rely on improving the state of health and well-being, not to mention, on reducing the risk of diseases.

Functional food is defined as the food designed for the specific needs of the organism. Functional food in the traditional form is usually produced by conventional methods, however, raw ingredients for its production are received from special breeding and cultivation, or from the specially selected livestock, including genetically modified ones. Its beneficial effects on health should be proven and documented by the clinical studies conducted on humans whose diets contained the tested food product. Only scientifically proven health benefits of such product can enable its acknowledgement as functional food.

To produce functional food, the bioactive components, such as: dietary fibre, oligosaccharides, amino acids, peptides, proteins, polyunsaturated fatty acids, vitamins, minerals, choline, and lecithin, live culture of bacteria should be used. Functional food can also be produced by the technological modification relying on the elimination of undesirable components, such as: fat, cholesterol, salt or sugar, as well as their substitutes (Young 2003). Consequently, the offer of functional food includes food products which are: enriched, low energy, high dietary fibre, probiotic, low sodium low cholesterolemic, and energizing (Weiss et al. 2006). Due to the possibility of meeting the specific needs of the organism by functional food products, the following products are distinguished: for people coping with stress, wanting to reduce the risk of cardiovascular disease, cancers, osteoporosis; that could inhibit the aging process; dietary ones for people with the metabolism and digestive disorders; for sportspeople; for the elderly people; as well as the ones that influence psychomotor efficiency.

Summarizing, it is not easy and it is not always possible to find the reliable answer to the question asked in the introduction, i.e. "Is contemporary food safe?" The food safety is built as a result of a number of thoughtfully concerted actions taken at every stage of its production, processing, storage, and distribution in order to eliminate the hazardous situations, or reduce the risk to the minimum. The consumers' views and the views of the food experts differ in evaluating food safety. The consumers believe that the greatest threat to human health can be found in food with the presence of the added substances, known as preservatives. According to the FAO, the greatest risk is associated with the presence of microorganisms, such as: *Salmonella* and some rare strains of *Escherichia coli*. In accordance with the appropriate procedures introduced for the safety evaluation, all food additives are subject to rigorous estimation. The food producers are required to provide the consumers

with the precise information on the properties of the product. If any doubts about food safety occur, further testing should be organized, and only when the product receives positive test results, can it be re-approved for the consumption. In the case of food, however, it is not always possible to get the risk level at the lowest rate. One of the numerous ways of getting the safety level tends to be strict reference of the consumer to the recommendations of the producer, taking into account the storage, and the preparation of the products bought. In case of any concerns about the quality of a particular product, questions should be asked about the source of its origin, its nutritional value, the methods of its production, the conditions of its transport and the storage, as well as about the research results [certificates, tests] carried out in order to prove its safety.

Therefore, the appropriate answer to the question – 'Is contemporary food safe?' depends exclusively on the consumer…

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## Is contemporary food safe?

### Abstract

Food and water are necessary to keep the human body functioning. People must have a balanced diet that includes a complex range of nutrients to provide energy, maintain health and resist disease. For a long time researchers have discussed the differences between conventional, ecological (organic) and genetically modified (bioengineered) food.
The difference between these food systems is in the production. Ecological products must be produced according to European regulations for ecological food, without synthetic fertilizers, irradiation, and chemical additions to food. Genetically modified foods are foods that have had a gene from a different species of plant or other organism introduced to produce the desired characteristics or traits. Bioengineering can also be used to increase the nutrient content of foods, or to add vitamins that are not found in food. The conventional food production means first of all maximizing the efficiency, increasing overall production and lowering the price for the consumer. Many researchers believe that there is no evidence that ecological food is safer, more nutritious than conventional and modified food. The discussion about safety of contemporary foods continues.

**Key words:** nutrition, food, GMO, safety

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# Vitamins – Do we really need them?

## Where does the name 'vitamin' come from?

A Polish scientist, Kazimierz Funk named the special nutritional parts of food a "vitamine". The name is from "vita" meaning life and "amine" from compounds found in the thiamine he isolated from rice husks when he was working at the Lister Institute of Preventive Medicine. In 1912 he suggested that the organic micronutrient food factors that prevent beriberi and perhaps other similar dietary-deficiency diseases might be chemical amines. Vitamine was later shortened to vitamin (Website 1).

## Vitamins- definition and classification

A vitamin is one of a group of organic substances, present in minute amounts in natural foodstuff, that are essential to normal metabolism; insufficient amounts in the diet may cause deficiency diseases such as beriberi, rickets, scurvy and other. Vitamins have no energy value (Gertig, Przysławski 2006).

Foods provide almost all vitamins. But people who don't get enough vitamins and minerals from food alone, are on low-calorie diets, have a poor appetite, or avoid certain foods (such as strict vegetarians and vegans) might consider taking multivitamin supplements.

The human body can produce a few vitamins. For example: human organism makes vitamin D when the skin is directly exposed to the sun. That is why it is often called the "sunshine" vitamin (Website 2). It is biologically inert and has to undergo two hydroxylation reactions to become active in the body. The active form of vitamin D in the body is called Calcitriol (1.25-Dihydroxycholecalciferol) (Website 3).

Human body obtains vitamin K from certain foods and from bacteria that normally live in the intestines. Intestinal bacteria also produce vitamin B7 (H) in quantities beyond our daily requirements.

Vitamins are classified as either water-soluble or fat-soluble. In humans there are 13 vitamins: 4 fat-soluble ones (A, D, E, and K) and 9 water-soluble ones (8 B

vitamins and vitamin C). Water-soluble vitamins dissolve easily in water and, in general, are readily excreted from the body, to the degree that urinary output is a strong predictor of vitamin consumption.

There is a fine line between getting enough of these nutrients (which is healthy) and getting too much (which can be harmful). Only eating different foods provides an assortment of vitamins (Website 4).

The recommended amounts of nutrients people should get vary by age and gender and are known as Recommended Dietary Allowances (RDAs) and Adequate Intakes (AIs).

**Tab. 1.** Classification of vitamins with recommended levels of intake and detailed food sources of each vitamin according to Ziemiański (2001) and Griffith (1994)

| Solubility | Vitamin generic descriptor name | Vitamer chemical name(s) | Recommended level of intake; age under 25 | | Food sources |
|---|---|---|---|---|---|
| | | | male | female | |
| Fat-soluble | A | Retinol, retinal, and four carotenoids including beta carotene | 1000 µg | 800 µg | Fresh apricots, carrot, liver, cucurbit, spinach, potato |
| | D | Cholecalciferol | 5 µg | 5 µg | Fish, eggs, liver, sun light, |
| | E | Tocopherols, tocotrienols | 10 mg | 9 mg | fruits and vegetables, nuts and seeds |
| | K | phylloquinone, menaquinones | 80 µg | 65 µg | Spinach, oat, green tea, camembert chesses |
| Water-soluble | $B_1$ | Thiamine | 1.8 mg | 1.7 mg | Salmon, seeds of sunflower, seeds of wheat |
| | $B_{12}$ | Cyanocobalamin, hydroxycobalamin, methylcobalamin | 3µg | 3µg | Meat and other animal products |
| | $B_2$ | Riboflavin | 2.6 mg | 1.8 mg | Chickens, Dairy products, almonds, liver |
| | $B_3$ | Niacin, niacinamide | 23 mg | 21 mg | Meat, fish, nuts, vegetables |
| | $B_5$ | Pantothenic acid | 5 mg | 5 mg | Meat, eggs, liver, peas, corn |
| | $B_6$ | Pyridoxine, pyridoxamine, pyridoxal | 2.4 mg | 2.0 mg | Avocado, bananas, tree nuts, vegetables |
| | H | Biotin | 30 µg | 30 µg | Cheese, wheat, meat, liver, milk, butter, peanuts, certain vegetables |
| | $B_9$ | Folic acid, folinic acid | 300 µg | 290 µg | Fruits, liver, cereal, veal, bean |
| | C | Ascorbic acid | 60 mg | 60 mg | Fruits, vegetables, liver |

## The role of fat-soluble vitamins in our organism

Vitamins are essential nutrients because they perform hundreds of roles in the body. Each vitamin takes part in different, multiple reactions, and, therefore, most have multiple functions.

Vitamin A helps form and maintain healthy skin, teeth, skeletal and soft tissue, and mucous membranes. It is also known as retinol because it produces the pigments – in the retina of the eye. Vitamin A promotes good vision, especially in low light. It may also be needed for reproduction and breast-feeding (Ziemiański 2001).

Beta-carotene is an antioxidant. Antioxidants are substances that may protect cells against the effects of free radicals. Free radicals are believed to contribute to certain chronic diseases and play a role in the aging processes (Website 5).

Food sources of carotenoids such as beta-carotene may reduce the risk for cancer. However, beta-carotene supplements do not seem to reduce cancer risk (Website 6).

Vitamin D helps the body to absorb calcium and reabsorb calcium in the kidneys – this increases the flow of calcium in the bloodstream. Calcium and phosphate are two minerals that are essential to normal bone formation (Moszczyński, Pyć 1999). Higher Vitamin D dietary intake is associated with lower risk of Alzheimer's disease (Annweiler et al. 2012).

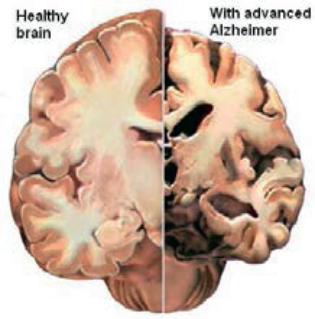


**Fig. 1.** Alzheimer's is a type of dementia that causes problems with memory, thinking and behaviour (Website 7, 8)

Vitamin E is an antioxidant such as beta-carotene. In the Women's Health Study among women aged 65 and older, vitamin E supplementation reduced the risk of major cardiac events by 26 percent. A later analysis found that women who took the vitamin E supplements also had a lower risk of developing serious blood clots in the legs and lungs in comparison with women who did not take the vitamin E supplements (Glynn et al. 2007).

Some observational studies and clinical trials suggested that vitamin E supplements might lower the risk of advanced prostate cancer in smokers (Chan et al. 1999).

However, most observational studies have not found vitamin E in food or supplements to offer much protection against cancer in general, or against specific cancers (Hunter et al. 1993). Some studies suggest that getting higher intakes of vitamin

E from diet – not from high-dose supplements – is associated with a reduced risk of Parkinson's disease (Etminan et al. 2005; Morens et al. 1996).

Vitamin K is necessary for normal blood clotting and may be needed for other activities (Moszczyński, Pyć 1999). Additionally, vitamin K helps protect bones from fracture, prevents calcification of arteries or provides possible protection against liver and prostate cancer (Website 9).

## Health risks from deficiency and excess of fat-soluble vitamins

Fat-soluble vitamins are stored in the fat tissues of our bodies, as well as the liver. Fat-soluble vitamins are easier to store than water-soluble ones, and can stay in the body as reserves for days, some of them for months.

When large amounts of the water-soluble vitamins are consumed, a large fraction of the vitamin is absorbed into the bloodstream and not stored in body tissues but excreted into the urine. The fat-soluble vitamins are more likely to be absorbed into the bloodstream and deposited in the fat and other tissues. It is the main reason why an excessive amount of fat-soluble vitamins is more dangerous than redundant amounts of water-soluble vitamins.

In the case of both water-soluble and fat-soluble vitamins, any vitamin not absorbed by the intestines is excreted in the faeces. High doses of many vitamins produce diarrhoea, because the non-absorbed nutrient draws water out of the body and into the gut, resulting in the loss of this water from the body (Website 10).

Diseases can be divided into two groups involved with deficiency and excess of vitamins. The group of diseases caused by the deficiency of one or more vitamins is named avitaminosis.

Vitamin A deficiency can cause blindness and lead to infection within the mucous membranes and the skin, the cornification expressing these elements. The skin then becomes dry and easy to peel. Also capacity of lacrimal gland secretion is reduced, and as a result there is dryness of the cornea and conjunctiva- xerophthalmia (dry eye) (Moszczyński, Pyć 1999).

Vitamin E deficiency is uncommon. It may cause mild haemolytic anaemia in newborns – destruction of red blood cells (Rożnowska 1997).

The main complication associated with vitamin K deficiency is bleeding (Moszczyński, Pyć 1999).

Vitamin D deficiency may cause rickets, osteomalacia (a bone-thinning disorder that occurs exclusively in adults and is characterized by proximal muscle weakness and bone fragility) (Griffith 1994).

Hypervitaminosis refers to a condition of high storage levels of vitamins, which can lead to toxic symptoms. The medical names of the different conditions are derived from the vitamin involved: an excess of vitamin A, for example, is called hypervitaminosis A (Gertig, Przysławski 2006). The mains symptoms of hypervitaminosis A are: intracranial pressure, bone pain, dizziness, headache, decreased

appetite, oily skin and hair (seborrhea), coma, vision changes, nausea, skin irritation (Moszczyński, Pyć 1999; Institute of Medicine 2001).

An excess of vitamin D causes abnormally high levels of calcium in the blood. This can severely damage the bones, soft tissues, and kidneys over time. The symptoms are e.g.: decreased appetite, vomiting, muscle weakness, irritability, fatigue, constipation (Website 11), calcification of soft organs (Moszczyński, Pyć 1999).

Hypervitaminosis E is a very rare phenomenon. The probable mechanism of increased incidence of bleeding tendency is because of the fact that vitamin E at a high dose antagonizes vitamin K and prolongs prothrombin time (Moharana, Moharana 1999). Symptoms of Vitamin E overload include: fatigue, headache, diarrhoea, nausea, bloating. Data suggest a possible increase in mortality and in the incidence of heart failure with long-term use of vitamin E (400 IU or more), especially in patients with chronic diseases (Website 12).

Common symptoms of hypervitaminosis of vitamin K include skin rash, diarrhoea, nausea, vomiting. But over time, these symptoms progress into liver damage and, if an infant is given large doses, that infant is at risk of brain damage (Website 13).

Prolonged consumption of megadoses of vitamin K (menadione is synthetic vitamin K) results in anaemia, which is a reduced level of red blood cells in the bloodstream. When large doses of menadione are given to infants, they result in the deposit of pigments in the brain, nerve damage, the destruction of red blood cells (haemolysis), and death. A daily injection of 10 mg of menadione into an infant for three days can kill the child (Website 14).

## What is the role of water-soluble vitamins in our body?

The most popular vitamin from this group is vitamin C. Vitamin C is required for the synthesis of collagen, an important structural component of blood vessels, tendons, ligaments, and bone. Vitamin C also plays an important role in the synthesis of the neurotransmitter, norepinephrine. Neurotransmitters are critical to brain function and are known to affect mood. In addition, vitamin C is required for the synthesis of carnitine, a small molecule that is essential for the transport of fat into cellular organelles called mitochondria, where the fat is converted to energy (Website 15). Research also suggests that vitamin C is involved in the metabolism of cholesterol to bile acids, which may have implications for blood cholesterol levels and the incidence of gallstones (Simon, Hudes 2000).

Vitamin C is also a highly effective antioxidant. Even in small amounts vitamin C can protect indispensable molecules in the body, such as proteins, lipids (fats), carbohydrates, and nucleic acids (DNA and RNA), from damage by free radicals and reactive oxygen species that can be generated during normal metabolism as well as through exposure to toxins and pollutants (e.g., cigarette smoke). However, according to recent scientific evidence, vitamin C is associated with a reduced risk

of chronic diseases such as cancer, cardiovascular disease, and cataract, probably through antioxidant mechanisms (Carr, Frei 1999).

Vitamin C may also be able to regenerate other antioxidants such as vitamin E (Carr, Frei 1999). One recent study of cigarette smokers found that vitamin C regenerated vitamin E from its oxidized form (Bruno et al. 2006). Vitamin C affects several components of the human immune system; for example, vitamin C has been shown to stimulate both the production (Prinz 1977) and function (Levy et al. 1996) of leukocytes (white blood cells), especially neutrophils, lymphocytes, and phagocytes. Deficiency of C vitamin causes scurvy, as vitamin C is required for the synthesis of collagen in humans.

**B complex vitamins**

All B vitamins help the body convert food (carbohydrates) into fuel (glucose), which is used to produce energy. These B vitamins, often referred to as B complex vitamins, also help the body metabolize fats and protein. B complex vitamins are needed for healthy skin, hair, eyes, and liver. They also help the nervous system function properly (Website 16).

## Diseases associated with deficiency of some vitamins of B vitamin complex

Beriberi is a disease in which the body does not have enough thiamine (vitamin $B_1$) – deficiency $B_1$ (Website 17).

Wernicke-Korsakoff syndrome is directly caused by a thiamine deficiency and is linked to long-term (chronic) alcohol consumption – however, some patients who do not abuse alcohol may also develop this syndrome. Thiamine deficiency is a common consequence of alcoholism. Most commonly, Wernicke-Korsakoff syndrome is seen in alcoholics because heavy drinkers typically are poor eaters. Alcohol also interferes with the proper absorption of nutrients from the digestive system. Thiamine is essential for energy production for proper neuron function. If thiamine levels are very low, the neurons may either become damaged or die (Website 18). The disease is characterized by mental confusion, amnesia (a permanent gap in memory) and impaired short-term memory. Other symptoms include ataxia, slow walking, rapid, tremor-like eye movements or paralysis of eye muscles. In the advanced stages, coma can occur (Website 19).

Deficiency of vitamin $B_{12}$ is the main reason of pernicious anaemia disease. Pernicious anaemia is a chronic illness caused by impaired absorption of vitamin $B_{12}$ because of a lack of intrinsic factor (IF) in gastric secretions. Intrinsic factor is a special protein which helps intestines to absorb vitamin $B_{12}$. When the stomach does not make enough intrinsic factor, the intestine cannot properly absorb vitamin $B_{12}$. When the intestine cannot absorb vitamin $B_{12,}$ the amount of red blood cells decreases (Website 20). Pernicious anaemia is a disease where large, immature, nucleated cells, megaloblasts, which are precursors of red blood cells, circulate in the blood, and do not function as blood cells. It was termed “pernicious" because before it was learned that vitamin $B_{12}$ could treat the anaemia, most people that developed the disease died from it (Website 21).

In pernicious anaemia blood shows increased number of megaloblasts, which are large and oval. The number of megaloblasts is increased in part due to the lower number of functioning red blood cells (RBCs) available in the blood. These are the defective mature RBCs that can no longer function properly due vitamin $B_{12}$ deficiency (Website 22, 23).

Ariboflavinosis is a condition characterized by a deficiency of $B_2$ (riboflavin). It is characterized by angular cheilosis, nasolabial lesions, optic changes, and seborrheic dermatitis (Website 24).

Anther disease involving $B_3$ vitamin (niacin) deficiency is pellagra. The early symptoms of pellagra include loss of appetite, generalized weakness, irritability, abdominal pain and vomiting. Later symptoms are bright red glossitis, chronic or recurrent diarrhoea (watery, but occasionally bloody), which leads to a state of malnutrition and cachexia. The typical skin rash is characterized by pigmentation and scaling, particularly involving the sun exposed areas (Pipili et al. 2008).

## Conclusions

In conclusion, we should remember that vitamins are essential nutrients because they perform hundreds of roles in our body. Each vitamin takes part in different, multiple reactions and, therefore, most have multiple functions. If we want to be healthy, we have to have a varied diet, and eat lots of fruit and vegetables which are the main sources of vitamins. We should remember about a fine line between getting enough of these nutrients (which is healthy) and getting too much (which can be harmful). So, we should always follow common sense and moderation because *our health and life is invaluable*.

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## Vitamins – Do we really need them?

### Abstract

Vitamins are substances that the human body needs to grow and develop normally. We get vitamins from food, because the human organism either does not produce enough of them, or none at all. Your body can also make vitamins D and K and vitamin from B complex vitamins. The main sources of vitamins are: fruit, vegetables, meat. Vitamins are classified as either water-soluble or fat-soluble. Vitamins perform many roles in our body: they help shore up bones, heal wounds, and bolster the immune system. They also convert food into energy, and repair cellular damage. Insufficient amounts of vitamins in the diet may cause deficiency diseases such as night-blindness, beriberi, anaemia, scurvy, rickets, bleeding diathesis. However, a group of researchers are now saying that vitamins may be doing some people more harm than good when they are taken in higher doses than recommended. According to Dr. Edgar Miller (2005) from Johns Hopkins University, 'High-dosage vitamin E supplementation may increase all-cause mortality'.

**Key words:** vitamins, health, diet

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# Incorporating sub-universes to address the issue of chagas in different educational contexts

## Introduction

Chagas has been traditionally addressed just from a biomedical point of view; however, its multiple factors, the diverse actors involved and the distinctive features of current scenarios make it necessary to regard it as a really complex problem (Sanmartino 2006, 2009). The perspective we present aims at going beyond the reductionist and stereotyped viewpoints that consider it "a disease of the poor", restricted to rural areas and to the biomedical concern. Therefore, to adopt an integral approach, we define four large dimensions, whose dynamic combination of elements conveys the complexity of the problem (Sanmartino et al. 2012a). Basically, these four dimensions are defined as follows:

The biomedical dimension includes features ranging from the biology of the causal agent and vectors, to medical issues regarding the disease manifestation, its diagnosis, its treatment and its transmission.

The epidemiologic dimension concerns the aspects that characterize the situation from a population point of view, using parameters – such as prevalence and incidence, distribution and infestation rates. The phenomenon of the growing immigration that influences the configurations of the problem is also considered in this dimension.

The sociocultural dimension is related to home conditions, cultural patterns, environmental management, the distinctive features of both rural and urban contexts, and social representations, conceptions and assessments (among others, discrimination or prejudice,).

The political-economic dimension regards, apart from the economic and macroeconomic conditions that affect the problem, the features related to public management and health, educational, legislative and economic decisions, at local, regional and global levels.

This viewpoint requires a careful analysis both of the actions taken until now and of the current situation, in order to develop contextualized, effective and long-term solutions concerning health, politics, research, education and communication.

To this end, the inclusion of representatives of other sub-universes different from the scientific and medical care ones is essential and is certainly a challenge. We agree with the anthropologist Byron Good (1994) who, from a critical view on the scientific work, defines the "scientific world" *as one of several worlds or "sub-universes" in which we live*, *worlds which include those of religious experience*, *of dreams and fantasies*, *or music and art*, *and of the "common-sense" reality*.

In this sense, art, science and popular knowledge are dynamically combined in a series of proposals that consider the Chagas problem beyond dichotomies and traditional approaches. Aranda Zamudio (2011) states that s*cience explains; art conveys*, and considers that *both science and art are part of a community where results are judged*, *integrated*, *assessed and contextualized* (Zamudio 2011). For this reason, since art affects and touches people in a way that science could never do, artistic expressions that somehow talk about Chagas are powerful, since they provide a sensitive and deep interpretation of issues of the sort (Sanmartino 2011a).

With our proposals, we attempt to encourage those who address this problem –from any area and discipline – to do so in a different way, respecting all voices and views (Sanmartino et al. 2012b, Sanmartino 2011a).

## Education, communication and Chagas

During the last decades, the knowledge about the problem of Chagas has increased significantly, both in the scientific field and among health authorities in general (*Organización Mundial...*, 2007). Nevertheless, irrespective of this progress, a continuous adaptation to new rural and urban realities and to globalization is required (Briceño-León, Galvan 2007). This *continuous adaptation* needs the inclusion of new points of view and, according to Morel (1999), *we have no choice but to be imaginative*, *flexible and devoid of prejudices in the selection of the new priorities that will shape our next research agenda*. We consider these words to be valid even beyond research agendas. Therefore, in the light of this, we also believe we have no other choice but to contemplate and add all the useful elements that enable the analysis of this issue from the greatest possible number of sub-universes (Sanmartino 2006, 2009, 2011a, 2011b).

We consider that an integral approach directed not only to preventing the disease, but also to promoting health in affected populations is substantial. As Briceño León and Galván (2007) assert, the solution to Chagas disease given at the beginning of the 21st century cannot be developed exclusively through an entomologic or medical perspective, but in a broader social and health context, and taking into consideration the different government levels and society in general. Besides, since a serious and responsible debate on the issues presented here is needed, communication and education are essential tools. However, not only are they essential for the people directly affected by the disease, but also for those who discriminate, who look the other way, who take decisions, who investigate, diagnose and prescribe medicines,

and who communicate and educate. Therefore, communication and education are needed not only to inform, but also to raise awareness, challenge and engage.

By considering the role that education plays in issues like Chagas, we make reference mainly to scientific, environmental and health education. Generally, these areas refer to the curricula of the compulsory education that starts in kindergarten, where given knowledge and different types of approach have been criticized. Criticism refers to content and resource fragmentation, decontextualization and lack of update, the predominance of traditional teaching approaches (based on the transmission/reception model), and the incoherence between the science taught and the students' educational demands (Díaz 2004; Pozo, Crespo 1998). These aspects frequently lead to a lack of interest in and motivation for studying (Giordan et al. 2001). There are other places that simultaneously address issues related to natural sciences, environment and health, such as science clubs, museums, zoos and social organizations. Many of the proposals presented at these places and those developed at schools are an attempt to improve the previously mentioned aspects, through innovations in education.

In this sense, we state that by understanding the various elements that are involved in the production of non-conventional[1] didactic environments[2] when referring to Chagas, it is possible to reinforce the role of communication and education in the struggle against the disease, through *the modification of the huge distance separating labs*, *congresses and publications from the affected populations* (Pintos Dias, Borges Dias 1993).

On the other hand, as Aranda Zamudio (2011) explains, *spectators external to science and art also incorporate their own criteria coming from the personal experience*, *from multiculturalism*. Thus, this challenge of combining different "sub-universes" to address an issue like Chagas motivates the participants' creativity, encouraging them to develop a critical stance, to judge, to argue, to explain phenomena, to create objects, or to solve problems (Zamudio 2011).

From these observations, we promote the use and development of non-conventional strategies and resources referring to Chagas as good "excuses" to address it and to encourage its treatment in different educational contexts. This is valid not only for those who live with the problem, but also for those who, being out of risk, are indifferent to this really important regional reality.

[1] We understand that a ***non-conventional*** educational experience or approach referred to Chagas is the one that introduces innovative elements (new communication technologies, artistic expressions, games, etc.) or that involves actors/scenarios other than traditionally biomedical or institutional ones (social organizations, patients groups, artists from various disciplines, etc.).

[2] The concept of ***didactic environment*** has been developed by Giordan et al. (2001) and can be defined as a group of *didactic resources and strategies*. By *didactic resource*, we understand the group of educational elements available for the teacher or entertainer to make the learning process easier for the student, and by *didactic strategy*, the organization of a classroom, an entertaining event, a club or a theatrical museum that can involve different situations, activities and types of intervention.

## Resources and strategies

Next, a number of concrete examples arising from non-conventional proposals and approaches referring to Chagas are mentioned. We think they are interesting tools that can be used to deal with the issue in different educational contexts (Sanmartino 2011b).

### Paintings

– the series of paintings called *CHAGAS* of the Argentinian plastic artist Néstor Favre-Mossier, which includes 14 oils made between 2007 and 2008 as a result of an interesting personal journey. These paintings talk about different aspects of the issue (vectors, parasites, vectorial transmission, reservoirs, disease, original context) and, at the same time, make us reflect on the particular way of addressing the issue by the artist.

"DONDE COMO" (WHERE I EAT)
Óil on canvas, 80 x 100 cm. 2007.

"MALA SANGRE" (BOILING BLOOD)
Óil on canvas, 80 x 100 cm. 2007.

Both paintings belong to the World Health Organisation

### Songs

– *Vinchuca (Kissing Bug)* is a reggae song composed and performed by Renée Asteria[3]. The song makes reference to different types of kissing bugs, their blood-sucking habit and some risk factors.

***Vinchuca***[4]
Han Visto Vinchuca?
La Negra, La Rubita ...
Han visto Vinchuca?
Que chupan la sangre...

[3] Independent music producer who mixes Latin styles and Caribbean rhythms and deals with issues about public health. Renée Asteria is Magister in Public Health (University of California, Berkeley, USA) and currently, apart from producing music, she works as a teacher in high schools and as a research assistant in the University of California.

[4] http://www.myspace.com/music/912988/songs/48419455

Asesino escondido...
De qué está hecho tu techo?
Afata Poleo Afata Poleo...
Refugio para el asesino...
Gallinas Cerdos Cabras Caballos
Dónde dónde dónde duermen tus caballos
Sangre para el Asesino
(Renée Asteria 2007)

– *La Vinchuca (The Kissing Bug)* is a *milonga*[5] composed by José Luis Serrano and performed by Doña Jovita[6]. The lyrics refer to aspects related to the vectorial transmission of Chagas, the vectors' habits and some consequences of the disease.

***La Vinchuca***
Para el año del terremoto
tuve en el rancho un cimbrón
se descolgó un chaparrón
de cien vinchucas golosas
y me picaron las mozas
desde la nunca al garrón.
Chuparon toda la noche
dejándome el cuero seco
cagaron al lado del hueco
y yo me empecé a rascar
me rasguñé hasta el ojal
que hasta me salieron flecos.
Para qué me habré rascado
de esa manera imposible
el parásito temible
estaba en la caca del bicho
y sentí un frío de nicho
en mi destino terrible.
De vez en cuando me viene
un sacudón en el pecho
no son gases ni es afrecho
es que tengo mal de Chagas
es la muerte que me amaga
y que cayó de los techos.
(José Luís Serrano 1994)

[5] Translator's note: *milonga* is a folk music style of Argentina.

[6] The character "Doña Jovita" has been played by José Luis Serrano, an actor from Córdoba, Argentina, for more than 20 years. Regarding this lovable character, Serrano explains that "Jovita is completely imperfect and has all the disadvantages: she is old, she is a woman, she is from the countryside and she is poor. Thus, she has things to say" (http://www.donajovita.com.ar/).

**Graphic humour**

– *Desde la paja del rancho* (*From the Straw of the Ranch*) is a comic about Inodoro Pereyra[7] created by Roberto Fontanarrosa[8]. With lots of drawings and few words, Fontanarrosa's characters (Inodoro Pereyra, Mendieta and Eulogia) address some generalities concerning Chagas, aspects related to the vectorial transmission, certain risk factors and some prevention measures (the following is an extract of the comic[9]).

Desde la paja del rancho…


– *Nacionalista (Nationalist)* by Cristóbal Reinoso (Crist). This piece can serve as a brief and forceful trigger for thinking and discussing the characters' sayings and, from there, for characterizing the problem in its complexity.


CLARÍN Newspaper (25/07/2005)

[7] "Inodoro Pereyra is a solitary gaucho from the Argentine Pampa, a man with bad temper and lots of creole mischief. It is known that once this gaucho who is "macho" and bears it, wears a headband, rides horses and is good at improvising presented himself saying: "I'm Pereyra because of my mother and Inodoro because of my tata, who was a plumber." (Source: www.todohistorietas.com.ar)

[8] Roberto El Negro Fontanarrosa (Rosario, 1944–2007) was a well-known Argentinian graphic humorist and writer.

[9] To see the complete comic go to the book N°. 7 of *Inodoro Pereyra* (Ediciones de la Flor) or to Sanmartino (2011b).

### Combining resources and strategies

During these years of work we have generated and used these (and many other) resources as a complement of educational and communicative strategies in many opportunities through activities addressed to students of different levels, teachers, specialists of various disciplines and public in general (Ceccarelli et al. 2013; Medone et al. 2013; Sanmartino et al. 2012a, 2012b; Sanmartino 2011a). These ideas have been expressed in proposals developed in scientific dissemination, educational institutions and scientific events. Some examples include the "Art, Science and Chagas" conferences (Santa Fe 2009, Paraná 2009, La Plata 2010), "The Chagas Week in La Plata Museum" (2011) and "The Chagas Month in La Plata" (2012), as well as a huge number of workshops and seminars with students and teachers of different levels, among others.

## Closure

The resources previously mentioned are tools of great potential and, due to their particular features, can be used in diverse situations (this fact is demonstrated through the enumerated activities, which are just a sample of the many possible options). The range of possibilities is wide, but the idea of this text is to briefly show some of the resources that can be found and the strategies that can be adopted if we want to be *flexible*, *imaginative and devoid of prejudice* when undertaking educational and communicative activities about Chagas.

The examples presented can be appropriate both to raise interest among students and to function as triggers for addressing aspects related to the issue, gathering information and creating other tools. We hope this paper arouses curiosity and encourages the employment of these and other "non-scientific" expressions with creativity, with the purpose of developing particular and contextualized didactic environments.

We believe that this type of activities, where diverse actors and knowledge interact, contribute to what Alderoqui and Pedersoli (2011) define as a *kaleidoscopic view* – within the "instrumental views" that should be favoured in science museums. According to the authors, *the internal mirrors of kaleidoscopes make it possible to see the colourful and multiform beads multiplying*, *creating different images each time we twirl it. Similarly*, *by constructing kaleidoscopic views*, *we encourage the observation of the same thing*, *but from different points of view*, *in a way that the superposition of different partial images enables us to build a more complex and richer image of the issue*. The metaphor sums up correctly the ultimate end of the educational actions referring to Chagas that we try to encourage (Sanmartino et al. 2012b).

This purpose poses important challenges, including the necessity to remember that the real characters of this story are those who suffer any consequence of Chagas. Remembering this implies considering them as active subjects of the decisions and solutions, and not as passive receptors of actions that are sometimes

thought of at hundreds of (geographical or cultural) kilometres away. In this sense, what is presented in this text also implies the questioning of the development of educational and communicative resources and strategies with receivers that are regarded as passive "beneficiaries". We aim at encouraging spaces for research, debates and learning, where every actor involved actively participates in the different moments and where the medical or "scientific" voice is not the only one authorized to talk about the problem (Sanmartino et al. 2012b; Sanmartino 2011b).

In a more general level of analysis that goes beyond the specific problem of Chagas, and considering the "sub-universes" involved in this text, we agree with Aranda Zamudio (2011) when he states that *while science and technology provide us with the possibility of understanding and transforming the world*, *showing us their limits*, *art enables us to break and recreate them*, *challenging reality and ourselves.*

Finally, we observe that traditionally *education* has been regarded as one of the foundations for "the struggle" against Chagas (as well as the fight against vectors, the improvement of homes and the detection/assistance of the affected people). However, concerns about the role played by education are usually restricted to the discursive level or limited to the areas surrounding rural schools. From our approach, we think it is necessary to reduce the distance between biomedical and scientific knowledge, and the knowledge promoted from educational areas. Therefore, a combined work between researchers, teachers and young people is needed at all educational levels (both at school and at technical and professional formation) and at all possible contexts (rural/urban, formal/non-formal, with kissing bugs/without kissing bugs, etc.) in order to achieve the solid purpose of increasing the number of voices that, from diverse views, talk about Chagas.

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# Incorporating sub-universes to address the issue of Chagas in different educational contexts

## Abstract

Although Chagas has been traditionally addressed just from a biomedical point of view, due to its multiple factors and the diverse actors involved, it is necessary to consider it as a really complex problem characterized by four large dimensions: biomedical, epidemiological, sociocultural, and political-economic. A comprehensive analysis of the problem is thus needed, in order to obtain effective and long-term solutions, appropriate to the different contexts where Chagas exists. In this text we share our ideas and experiences that we have applied to activities, didactic materials and resources that aim at creating a comprehensive view of this environmental and health issue, by providing elements and actors that are usually disregarded. Art, science and popular knowledge get dynamically combined in a group of proposals developed to provide all of us with the opportunity to observe and feel beyond dichotomies and traditional approaches.

**Key words:** Chagas disease, communication, education

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# Traditional herbal medicines used for fertility control in North East India: potential for discovery of contraceptive drugs

## Introduction

One of the most critical problems of developing countries like India is tremendous rise in human population. The individual population of some states of India is equal to the total population of many countries. For example, population of Uttar Pradesh almost equals the population of Brazil. As per the 2001 Population Census of India, it has 190 million people and the growth rate is 16.16%. The second most populous state, Maharashtra, has a growth rate of 9.42%. According to the 2011 population census, the population of India has increased by more than 181 million during the years 2001–11. Some of the reasons for rapidly growing population are poverty, illiteracy, high fertility rate, rapid decline in death rates or mortality rates, etc. Despite significant advances in contraceptive options for women over the last 50 years, world population continues to grow rapidly (Page et al. 2008). Various birth control methods are promoted by the government but due to lack of their availability in the rural market, illiteracy, lack of medical personnel availability to rural people as well as the lack of acceptability of synthetic drugs due to various socio-cultural and religious perceptions prevailing among many communities, these methods have largely remained unsuccessful.

## Birth Control Methods used in India

Family planning has been promoted through several methods of contraception. But all these methods have largely remained unsuccessful.

The Contraceptive Prevalence Rate is 48.3% in India. It is obvious that despite good intentions, the methods for population control have failed. Even in ancient times, people limited the size of their families. Since the major responsibilities of pregnancy, birth, and child rearing fell on women, they found the methods for controlling fertility and aborting unwanted children using traditional herbal medicines. They have passed this knowledge as an oral tradition that survives in India. It is

obvious that now there cannot be an ideal contraceptive, suitable for everybody. As a result there is a growing interest in searching for contraceptives of natural product origin, which have cultural acceptability, better compatibility with human body, lesser side effects and better effectiveness. Traditional herbal medicines practiced in India comprise of plants which produce a great diversity of substances that are of therapeutic significance. A number of traditional systems of medicine exist which have been in use for more than 3000 years (Lodha, Bagga 2000). In different regions of India ethnic people have been using plant based medicine till today. Due to adverse effects produced by synthetic contraceptives, attention has now been focused on indigenous plants for possible contraception. Since ancient times, mankind has been using plants and plant parts as a means to reduce fertility.

**Tab. 1.** Contraceptive Prevalence Rate in India (Source: DHS, 1999/2000)

| Contraceptive Prevalence Rate in India | 48.3% |
|---|---|
| Pills | 2.1% |
| Injectables | 0% |
| Implants | 0% |
| IUD | 1.6% |
| Female Sterilization | 34.2% |
| Male Sterilization | 1.9% |
| Condom | 3.1% |
| Traditional or Natural Method | 5.4% |

## Important plants found in North Eastern India having contraceptive property

North East India, being characterized by high biodiversity, is affected by different climatic conditions, varying from tropical, subtropical, temperate and alpine zones, which is adorned with abundance of medicinal plants. Several states of North East India belong to different hill zones, like Eastern Himalayas beginning from Sikkim to Lohit district of Arunachal Pradesh, Naga Hills covering the areas of Nagaland and Manipur states, Lusai Hills with Mizoram and Tripura states, while Garo, Jayantia and Khasi Hills occupy the state of Meghalaya. The biodiversity distribution extends to the neighbouring countries, like China, Myanmar and Bangladesh. Plants produce a great diversity of substances that are of therapeutic significance in many areas of medicines. India has a valuable heritage of herbal remedies. Particularly in the North East India ethnic and tribal people use plant based medicines even today. These days natural herbal contraception has become one of the foci of modern contraceptive research (Gediya et al. 2011). Due to adverse effects produced by synthetic contraceptives, attention has now been focused on indigenous plants for possible contraceptive effect. Since ancient times, mankind has been using plants to cure diseases and relieve physical suffering. Because of better cultural acceptability, higher compatibility with the human body, lesser side effects and better effectiveness of many traditional medicines, it is now an accepted fact.

More than 35,000 plant species are being used in various human cultures around the world for medicinal purposes. Nearly 80% of the world population rely on traditional medicines for primary health care, most of which involves the use of plant extracts (Sandhya et al. 2006). Some of the important medicinal plants found in North East India which are attributed with contraceptive properties include:

1. 

**Prickly Chaff Flower**: Commonly known as Prickly Chaff Flower, *Achyranthes aspera* is locally called '*Apang*' (in Bengali) and '*Apamarga*' (in Hindi). It belongs to the family Amaranthaceae. It is an annual herb that also been attributed with abortifacient, contraceptive, cardiac stimulant, astringent, diuretic and purgative properties (Satyavati et al. 1976). This plant is used by the ethnic people of Tinsukia district of Assam to treat many ailments, including the root decoction for swelling and wounds of nipples (Borgohain 2011).

2. 

**Neem**: *Azadirachta indica* is commonly and locally known as Neem. The seed/leaf extract of *Azadirachta indica* can act as powerful spermicide and was found to significantly inhibit spermatogenesis, decrease sperm motility, sperm count and cessation of fertility. It can accompany a significant reduction in semen volume and higher incidence of morphological abnormalities of spermatozoa. These conditions were found to be reversible if the neem product is withdrawn from use 4-6 weeks later (Sadre et al. 1983). Neem leaf extracts are also used as a traditional plant product for longterm and reversible blocking of fertility after a single intrauterine application (Deshpande et al. 1981). Leaves have also shown reversible male antifertility activity and 3mg of leaf extract can immobilise and kill 100% of spermatozoa within 20 seconds.

3. 

**Rosary Pea**: Commonly known as Rosary Pea, *Abrus precatorius* is locally called '*Kunch*' (in Bengali) and '*Gunja*' (in Hindi). Methanolic extract of seeds (70%) is capable of exhibiting contraceptive and toxic effects, particularly on body and organ weights, cauda epididymal spermatozoa, biochemical indices, toxicological profile and fertility rate. When administered on adult male mice, it brought about significant decrease in caudal sperm motility, count and viability. However, contraceptive effect at higher doses can be reversible after 90 days, which suggests induction of reversible antifertility effect by seed extract (Bhat et al. 2012).

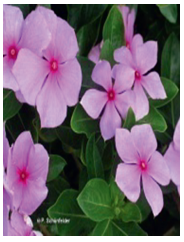
4. 

**Acacia**: Commonly known as Acacia, *Albizia lebbeck* and it is called '*Shiris*' (in Bengali) and '*Siris*' (in Hindi). Oral administration of saponins isolated from *Albizia lebbeck* barks to male rats brought about a significant decrease in the weights of testes, epididymis, seminal vesicle and ventral prostate. Apart from reduction in sperm motility, and *Albizia lebbeck*

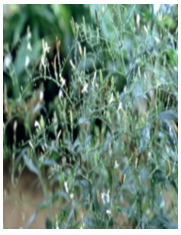
was found to lower the fertility of male rats by 100%, the protein, glycogen and cholesterol contents of the testes, fructose in the seminal vesicle and protein in epididymis were found to decrease significantly, too (Gupta et al. 2006).

5. 

**Stephania**: Also known as Velvet-Leaf Pareira, *Stephania hernandifolia* is locally called '*Malabuta*' (in Bengali) and '*Aknadi*' (in Hindi). In North East India, roots are used for treatment of fever, diarrhoea, dyspepsia and urinary diseases. Paul and colleagues (2010) studied duration-dependent antifertility activity of the hydro-ethanolic composite extract of *Stephania hernandifolia* and *Achyranthes aspera* on male rats when administered orally for 7, 14 and 28 days. Treatment for 14 and 28 days showed a significant decrease in the epididymal sperm count, androgenic key enzyme activities and plasma testosterone level, along with an increase in the level of testicular cholesterol.

6. 

**Madagascar Periwinkle**: Commonly known as Periwinkle, *Catharanthus roseus* is locally called '*Nayantara*' (in Bengali) and '*Sadabahar*' (in Hindi). It belongs to the family Apocynaceae and is a rich source of alkaloids, which are distributed in all parts of the plant. Two alkaloids extracted from *Catharanthus roseus*, that is vinblastin and vincristine, can affect spermatogenic cell lines other than spermatogonia (Murugavel, Akbarsha 1991).

7. 

**Indian Echinacea**: Commonly called Indian Echinacea, *Andrographis paniculata* is locally known as '*Kalmegh*' or 'Chirota' (in Bengali) and '*Kirayat*' (in Hindi). Dry powdered leaves of this plant exert antispermatogenic and antiandrogenic activity in rat model (Akbarsha et al. 1990).

8. 

**Belliric Myrobalan**: The plant *Teminalia bellirica* is commonly known as Belliric Myrobalan, which is locally called '*Bohera*' (in Bengali) and '*Behra*' (in Hindi). Treatment with bark extracts of the plant can result in a decrease in the weight of accessory reproductive ducts in adult male rats. The total cholesterol content increased while protein content and epididymal sperm count significantly decreased and the changes could be due to non-availability of androgens in *T. bellirica* bark-extract treated rats (Patil et al. 2010).

9. 

**Pergularia**: The plant *Pergularia daemia* is locally known as '*Chagalbati*' (in Bengali) and '*Utaran*' (in Hindi). Sadik and co-workers (2001) reported that ethanolic extract of the plant and its steroidal fractions are responsible for antifertility activity. Both the ethanolic extract and the steroidal fractions showed significant antifertility activity in the preimplantation stage in female mice apart from late abortifacient activity. This perennial twining herb has a folkloric reputation as an antifertility agent and is used by the rural people to induce abortion in the region including Bangladesh. It is also a drug of good repute in Ayurvedic literature in uterine complaints and it facilitates parturition (Kirtika, Basu 1994), and has been documented for antifertility properties (Nama, Joseph 2010).

10. 

**China Rose:** Commonly known as China Rose, *Hibiscus rosa sinensis* is locally called '*Joba*' (in Bengali) and '*Jasum*' (in Hindi). Anti-implantation, uterotropic, antispermatogenic and antiandrogenic activity has been observed when using extracts of flowers (Reddy et al. 1997). It is also used when there is excessive bleeding during menstruation: one cup of juice obtained from a macerated mixture of flowers of *Hibiscus rosa sinensis*, flowers of *Punica granatum*, and bark of *Mangifera indica* is taken thrice daily (Jahan et al. 2011).

## Conclusion

It can be noted that the commercial birth control methods have not proved to be popular among the rural and ethnic communities of North East India, which can be attributed to various factors. On the other hand, this contributed to the growing interest of researchers in developing new herbal contraceptive drugs which are of natural product origin. A study on such plants has been carried out which are attributed with contraceptive properties and are components of traditional herbal medicines used in North East India. The plants focused on in this review are traditionally known for antifertility properties, which offers the potential for possible manipulation and evaluation using suitable mammalian models for discovery of contraceptive drugs.

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WHO Report, Bangladesh and Family Planning: An Overview. 1999/2000. The Department of Family and Community Health, WHO, Regional office for South-East Asia, New Delhi.

## Traditional herbal medicines used for fertility control in North East India: potential for discovery of contraceptive drugs

### Abstract

One of the most critical problems of developing countries like India is its enormous increase in human population. Contraceptive Prevalence Rate of India is 48.3 and as the vast majority of population belong to rural areas, the family planning programmes have largely remained unsuccessful because of many factors including lack of availability of contraceptive drugs in rural markets, lack of availability of medical personnel to rural people, as well as the lack of acceptability of synthetic drugs due to various socio-cultural and religious perceptions prevailing among ethnic communities. These contributed to a growing interest among researchers in developing contraceptives of natural origin and at present natural herbal contraception have become one of the major focuses in modern contraceptive research. Since time immemorial herbal drugs have been practiced by various rural communities and ethnic tribes in North East India, and hence the acceptability of herbal contraceptives is expected to be much higher among rural folk. Ethnic communities are using plant based medicinal products even today. This study aims at highlighting the contraceptive property of some plants used for fertility control as components of traditional herbal medicines in North East India, which need evaluation for the potential discovery of contraceptive drugs.

**Key words:** herbal medicine, fertility, contracteptive

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# Obesity and Health Education

The problem of obesity in adults was recognized a long time ago and it is obesity in children that has become alarming within the last years. A considerable number of parents do not recognize obesity as a disease, what is more, they do not consider it to be a problem and are even convinced that a chubby child equals a healthy child. On the contrary, overweight and obesity at a particular degree does constitute a health risk and it ought to be considered one of the chronic non-infectious diseases that have long been known as civilization diseases (Sikorska-Wiśniewska 2007). Currently, struggle with overweight and obesity in children and young adults has become one of the greatest challenges of the 21st century (Gawlik et al. 2009).

Obesity is a pathological increase in the amount of body fat, which, subsequently, leads to dysfunctions of a number of organs, and results in higher risk of developing diseases and disorders. In adults, obesity is diagnosed when the percentage of fatty tissue is greater than 30% of the normal body mass in females, and when it is 25% greater than the normal body mass in males; in children, the percentage of body fat is strictly dependent on age and sex.

For the purpose of determination of the degree of obesity and proper presentation of the anthropometric data distribution, centile charts and Body Mass Index (BMI) are typically applied. The body fat callipers that measure the subcutaneous fat amount are now less frequently used by paediatricians. Centile charts indicating proper body mass in relation to age, height in relation to age, and mass in relation to height facilitate graphic presentation of a selected parameter located on the chart, and verification against the normal size values (Sikorska-Wiśniewska 2007).

Body Mass Index (BMI), also known as Quetelet index, is defined as the individual's body mass provided in kilograms, that is then divided by the square of their height given in meters (Chapter 75, 2008). Any values ranging from 20 to 25 are considered to be normal, i.e. healthy weight. One observes overweight when BMI values range from 25 to 30, whereas obesity is diagnosed when the BMI values exceed 30. In children, the values received from BMI are compared with the

data presented on a centile chart. Despite the fact that both the values provided by BMI measurement and centile chart parameters allow for proper evaluation of a child's nutrition condition, which is considered to be an ideal method of obesity diagnostics, the BMI measure is not frequently used by paediatricians who seem to apply body mass proportion charts in their medical practice on a daily basis. For the purpose of anthropometric evaluation in younger children, Cole index is preferred (LMS, Least Mean Square) (Cole 1990).

In 1997, the World Health Organization (WHO) officially recognized obesity as a global epidemic diagnosed in children and adults that poses one of the greatest threats to health of common humanity. The number of obese individuals is growing rapidly. It is believed that the world suffers from a pandemic of obesity which is no longer considered to be a problem of highly developed countries, but is now also observable in low income countries (Galal, Hulett 2005). The data published by Haslam and James (2005) indicate that about 10% of the global underaged population, i.e. individuals aged 18 and younger, is overweight or obese. Research programmes done in North America on a group of more than eight thousand children and young adults, completed in 2002, show that about 30% of the research participants had excessive body mass (Hedley et al. 2004). Furthermore, the global data including small children is even more alarming; it is estimated that more than 22 million of children aged 5 and younger are obese (Kosti, Panagiotakos 2006). European researchers estimate that, in Europe alone, about 20% of children manifest an excessive body weight, out of whom 5% is diagnosed with obesity (International Obesity Task Force). In Poland, obesity in children and young adults is estimated at 2.5% to 12% depending on a region. Among three thousand children aged 7 to 9 in the Silesian region, more than 15% were overweight, whereas 4% were obese (Małecka-Tendera et al. 2005).

The most comprehensible and extensive data on the global incidence of obesity come from research MONICA conducted by the WHO (MONItoring of Trends and Determinants in CArdiovascular Diseases Study) (WHO MONICA Project 1989). The MONICA research findings along with data from a number of countries indicate an increase in obesity incidence in the majority of European countries by 10 to 40% in the last 10 years, particularly by 10 to 20% in males, and by 10 to 25% in females (World Heath Organisation 2000). The most alarming increase was noted in Great Britain, where more than two third of adult males and more than 50% of females are obese or overweight (Ruston 2004). In England alone, between 1995 and 2002, obesity incidence in boys increased twofold, i.e. from 2.9% to 5.7% of the population, and in girls, an increase from 4.9% to 7.8% was recorded. One boy out of five, and one girl out of four suffer from either overweight or obesity. Among young males aged 16 to 24, obesity incidence rose from 5.7% to 9.3%, whereas among young females, the numbers increased from 7.7% to 11.6% (Sproston, Primetesta 2002). The problem of obesity is monitored worldwide by the International Obesity Task Force organization on a daily basis.

An international study on economic obesity-related costs show that they constitute between 2 to 7% of all medicare costs, and the differences occurring in these costs evaluation are strictly dependent on the method of an applied analysis (World Heath Organisation 2000).

Trade unions including government organizations, health care, schools, mass media and consumers should promote proper and healthy nutrition as well as increased physical activity. All of these groups ought to feel obliged to propagate healthy eating which is characterized not only by low fat content, but is also rich in complex carbohydrates, and significant numbers of fresh fruits and vegetables.

The greatest emphasis is to be put on promoting physical activity in free time, which is particularly of crucial importance in the light of advancing urbanization, aging society and sedentary lifestyle.

The main objectives of modern education pertain to the basic school programmes on general education, teaching programmes and education quality. It is where one observes the main change in the approach towards school and social knowledge. To promote responsibility for one's own health and the health of others, and understanding the relations between humans and their environment (Potyrała 2011) is one of the chief elements of this knowledge. One of the greatest projects schools now embark on is health education whose main aim is to encourage children and young adults to take care of their own health and the health of others, and to allow for conditions in which health can be maintained (MEN 2009). Health is considered to be the basic notion in education, and 65% of adult Poles consider it to be one of the ingredients of a happy life (Woynarowska 2007).

School constitutes one of the main communities which play an essential role in the process of shaping healthy attitudes among children and young adults. The health education is a process based on scientific principles ensuring the possibility of learning about health and taking conscious decisions impacting health. Families, the schooling system and the society are greatly responsible for this process. Health education should be a part of a child's daily life, health being the basic condition allowing for affective process of education which should ensure that all students' basic health needs be satisfied depending on individual predisposition. It is commonly believed that this kind of education taking place at schools is the most effective one (Potyrała, Walosik 2007). According to Woynarowska (2007), health education includes, inter alia, body care, balanced diet, and physical activity. Schools, in fact, should influence not only children, but also their families because obesity diagnosed in children and young adults may reflect the health conditions of the adults (Gawlik et al. 2009).

An opinion that diseases and disorders resulting from an unhealthy lifestyle can be related to adults and internal medicine only is no longer valid. One needs to believe that effective preventive actions will not only result in a decrease in the number of overweight children, but that they will improve the general health condition of the already obese ones, and will reduce further incidence and death rates among the adult population (Fichna, Skowrońska 2008).

The introduction of the documentation encapsulating the main objectives of schooling programme, effective since 1st September 2009, draws attention to the fact that one of the important tasks of the school is health education, with its purpose being promotion of an attitude in children to care about their own health and the health of others, and teaching how to ensure conditions in which health is maintained (MEN 2009). This note places health education among the most crucial objectives that schools face. In addition, the new schooling programme draws particular attention to students' education, especially, to encouraging proper attitudes towards their health. Traditional school programmes seemed to concentrate more on sharing information relating to various aspects of health, mainly the physical one. Currently, one believes that these guidelines should involve numerous purposes depending on the needs of the group in question, as it has been proved on a number of occasions that this knowledge is not always validated by individuals' actions and behaviours. For instance, although doctors and nurses are fully aware of the negative consequences of smoking, a considerable number of them do smoke (Woynarowska 2011). The new schooling programme introduced a change in the health education that concentrates on helping students get to know themselves, how to monitor the process of physical development as well as how to identify and solve health problems, also known as *know yourself*. Students are to learn about and improve their self-esteem and potential, the sense of responsibility for their own health and that of others. Teachers' task includes encouraging young people to act for the benefit of health and create a healthy environment at home, school and in the local community.

At school, a child with excessive body mass often not only becomes a subject of malicious comments and has no friends, but is also believed to tell lies more frequently, be generally lazy, and not as intelligent as their normal size peers. This all results in their being very reluctantly accepted as partners in common plays or social gatherings (Wardle et al. 1995; Sobal et al. 1995).

Obese children are discriminated by their peers, have lower levels of self-esteem and self-confidence, at times, they manifest depressed moods, and the greater the BMI values, the greater the degree of accompanying depression, (Goodman, Whitaker 2002). Such social discrimination and rejection seem to go together with eating disorders including anorexia nervosa and bulimia (Szajewska 2002).

Therefore, it is crucial that good rules for healthy eating and lifestyle be promoted from the early years, and that bad eating habits be noticed as early as possible. Furthermore, one needs to limit or exclude fast food, crisps, bars and, instead, incorporate fresh fruits and vegetables into the daily diet in order to ensure that a child eats regularly, is provided with the proper amount of nutrients adjusted to age, and is encouraged to physical activity and does not spend time sitting in front of a TV or a computer. It is also important to note that, in overweight individuals, the weight loss must not be abrupt but gradual, and under no condition should a pharmacological treatment be initiated without a prior medical consultation.

Nowadays, one notices an ever greater necessity to educate children, young adults as well as parents towards a healthy attitude. Teachers and mass media should, consequently, stress the importance of proper, balanced diet and promote active life style. Such an approach should be delivered not only to obese people, but also to those with normal weight because the normal body mass in childhood or adolescence periods does not exclude weight increase in the future.

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## Obesity and Health Education

### Abstract

A general perception of obesity in children has been changing over a period of time. Particularly in our culture, it is essential that proper health education be implemented and that school and government organizations as well as the mass media are the key propagators of the good attitude towards health. In this respect, school should act prophylactically in relation to students' health and promote a healthy life style. Currently, one observes an increasing number of overweight and obese individuals suffering from weight-related disorders, which has now become a global problem. One of the purposes the health education serves is to alert young individuals to potential health problems that result from both unbalanced diet and unhealthy life style.

**Key words:** overweight, obesity, health education, school programmes

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# Lifestyle of junior high school pupils in the Lesser Poland region of the 21st century from the point of view of eating habits

*Physical health and psychological well-being*
*of a human are closely related to one another.*

Avicenna

## Introduction

In modern times human health is one of the most valuable goods. It stems from the fact that the average life expectancy among humans tends to increase, which is why it is important that a long lifetime is not only a period of pain and suffering, but also of joy and health. In order to have long but also healthy life, people have to learn how to take care of it. According to the proverb "*You can't teach an old dog new tricks*", the awareness of a healthy lifestyle should be instilled in pupils from their earliest years. This is why information on healthy lifestyle appears in school curricula, television programmes, and teenage magazines. In the Curriculum for Biology in the 3rd stage of education, under the category of the aims of general education (The knowledge of conditions for human health), the following requirements were defined: "A pupil analyses the correlation between his own behaviour and being healthy (proper diet, physical activity, preventive screening)....." In the topics of education (Digestive system and eating), the following aims were presented: "A pupil:

- presents the role of fibre in proper functioning of the digestive system and justifies the need of regular eating of fruit and vegetables;
- presents the role and consequences of deficiency of some vitamins (A, C, $B_6$, $B_{12}$, folic acid, D), minerals (Mg, Fe, Ca) and essential amino acids in human organism;
- explains why it is important to have a well-balanced diet adjusted to organism needs (age, health, lifestyle and physical activity, time of the year, etc.) and enumerates the benefits of healthy eating habits;
- calculates the body mass index and presents and analyses the consequences of a bad diet for health (obesity or underweight and their results)."

## Research

One could think that with such an omnipresent promotion of a healthy lifestyle, pupils should know its rules and apply them on an everyday basis. In order to verify the above hypothesis, a research among 111 pupils aged 11–16, living in the Lesser Poland Voivodship concerning their lifestyle was carried out. The research included all the aspects of teenagers' lifestyle: eating habits, leisure time activities, hobbies and interest, and the system of values. This article presents in detail teenagers' lifestyle from the point of view of eating habits; the remaining aspects will be discussed in subsequent articles.

In particular, answers to the following problem questions were tried to be found out:

1. Do pupils go to school in the place where they live?
2. Is the population structure of teenagers in town and village the same?
3. What are teenagers' eating preferences and what do they depend on? Are there any vegetarians among junior high school pupils?
4. What is the body mass index (BMI) of the pupils taking part in the research? What factors influence their BMI?
5. Do pupils know the rules of a healthy lifestyle and apply them in their life?

In order to answer the above research questions, it was decided to verify the following research hypotheses:

1. Pupils go to school in the place where they live.
2. The urban sample differs from the rural sample in terms of the structure of: sex, BMI, age, school class.
3. The BMI among junior high school pupils has a normal value. The BMI depends on the place of living.
4. The eating preferences of teenagers are in accordance with the healthy lifestyle rules.
5. The eating preferences of teenagers depend on their sex and place of living.
6. There are no vegetarians among junior high school pupils.
7. The BMI depends on sex.
8. The BMI depends on the eating preferences of teenagers.
9. Junior high school pupils know the rules of a healthy lifestyle and apply them in their life.

## Materials and methods

In order to assess the lifestyle of teenagers, a survey was conducted among 111 pupils of junior high schools in the Lesser Poland Voivodship, living both in urban as well as rural areas.

Table 1 presents a detailed description of samples.

**Tab. 1.** The sample description – place of living and sex

| sex | place of living | | | |
|---|---|---|---|---|
| | town | | village | |
| | N | % | N | % |
| **woman** | **18** | 62.1 | 33 | 40.2 |
| **man** | **11** | 37.9 | 49 | 59.8 |

Survey questions concerning the lifestyle of junior high school pupils were conducted with the help of the Internet questionnaire within the options provided by Google Documents. The Google questionnaire is a tool that makes it possible to gather information electronically in a rapid and comfortable manner. The questionnaire consisted of general questions (age, sex, class, school location, place of living, height, weight) and 21 questions of the proper questionnaire. The advantage of the "Google questionnaire" consists in the automatic transfer of answers given by respondents to a spreadsheet as well as the creation of charts and diagrams within the so-called "summary of answers" option. The research was conducted over eight weeks, from 1st November 2012 till 22nd December 2012.

The empirical distributions of variables (features) for teenagers living in rural areas and teenagers living in towns were checked by means of the $\chi^2$ test. The $\chi^2$ test for independence was used to verify correlations between features in question. The strength of correlation between dependent features was measured with the help of the $\varphi$ correlation coefficient (for a fourfold table) and the $V$ Cramer's coefficient (for a cross tabulation: 2 x 3). Moreover, a test analysis of features' independence in the samples under investigation required to combine categories of features initially adopted in the survey into larger sub-classes as expected numbers were significantly lower than the required 5 (according to some authors 10; see Wołek 2006). For each feature larger sub-classes were given in parenthesis (Tab. 2).

**Tab. 2.** Categories of variables and sub-classes used to analyse the test $\chi^2$

| Category of variables | Grouped sub-classes |
|---|---|
| fast food | every second week or more often;<br>every few months; |
| beverages | *often* covers: (every day, twice a week, once a week)<br>*occasionally*: (every second week - every few months) |
| fruit, vegetables, eggs and dairy products, meat, wholemeal bread, sweets | every day (daily)<br>not every day (several times a week or never) |
| eating during breaks at school | sandwich;<br>other: sweets, doughnuts, pretzels, fruit, yoghurt |
| BMI | norm<br>different from the norm (underweight, overweight) |

With the help of the $\chi^2$ test the hypothesis that the variables are independent was verified for each variable. Zero hypotheses were falsified at the level of relevance

$\alpha = 0.05$. All calculations were made with the help of the software STATISTICA version 7.1.

## Research results

Hypothesis 1: Pupils go to school in accordance with their place of living (town – town; village – village). In order to verify the above hypothesis, the $\chi^2$ test for features' independence was carried out (Tab. 3).

**Tab. 3.** The results of testing the hypothesis that features are independent

| Dependent variable Independent variable | Pearson's $\chi^2$ | df | p | ML $\chi^2$ | df | p | Statistical result | $\varphi$ correlation coefficient; |
|---|---|---|---|---|---|---|---|---|
| school location vs place of living | 38.779 | 1 | 0.00000 | 35.645 | 1 | 0.00000 | features are dependent | 0.591 |

Pupils living in villages go to schools situated in villages, while pupils living in towns go to schools in towns. Due to the above, urban and rural samples with relation to the place of living or school location can be assumed in analyses. Variables are dependent.

Hypothesis 2: The urban sample differs from the rural sample in terms of the structure of: sex, BMI[1], age, school class. With the help of the $\chi^2$ test, hypotheses that the empirical distributions being compared are statistically consistent were verified (Tab. 4).

**Tab. 4.** Results of testing the hypothesis that distributions are statistically consistent in both samples

| Feature | Sample | Pearson's $\chi^2$<br>ML $\chi^2$<br>Yates' $\chi^2$ * | df | p | Statistical result |
|---|---|---|---|---|---|
| age [14 and below; 15 and above] | place of living: town vs village | 9.979<br>9.311 | 1 | 0.002<br>0.002 | distributions are not statistically consistent |
| sex [W/M] | | 4.109<br>4.118 | 1 | 0.043<br>0.042 | distributions are not statistically consistent |
| BMI [norm, different from the norm] | | 4.897<br>4.666 | 1 | 0.027<br>0.031 | distributions are not statistically consistent |
| school class [1,2,3] | | 11.282<br>10.374 | 2 | 0.004<br>0.006 | distributions are not statistically consistent at the limit of statistical significance |

Explanations: Pearson's $\chi^2$, ML (Maximum Likelihood) $\chi^2$, * Yates' $\chi^2$ (calculated for cross tabulations; **2 x 2**, when numbers in sub-classes are small, less than 10 (according to some authors – less than 5 – was also applied in the above analysis) – values of statistics $\chi^2$; df – degrees of freedom; p – test probability.

[1] In the analysis of the data received the value of BMI (i.e. *Body Mass Index*) was calculated according to the formula: BMI = body weight [kg] / height2 [m2] and the following interpretation of BMI was adopted: <18 und Lifestyle of junior high school pupils... erweight; 18–25 norm; 25.01 – 30 overweight; >30.01 obesity.

As it turned out that the samples being analysed differ from one another in terms of the structures of variables, in further analyses the correlation of variables (in two samples: urban, rural) was analysed separately.

The distribution of BMI in samples being analysed was different from the norm. The most numerous is the class of normal BMI (similar results were obtained in research by: Ponczek & Olszowy 2012). However, in both samples, urban and rural, a shift of BMI towards underweight is to be noticed.

Hypothesis 3: The eating preferences of teenagers are in accordance with the healthy lifestyle rules. There are no vegetarians among junior high school pupils.

## Results and conclusions

Tables 5–9 present the results of a detailed analysis of teenagers' eating preferences in the context of the weekly and annual frequency of eating selected products: the urban and rural sample, and the type of products eaten during breaks at school.

**Tab. 5.** The weekly frequency of eating selected products, the urban sample

| product | never | | less often than once a week | | once a week | | twice-four times a week | | every day | | sex |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | W/M |
| fruit | 1 | 5.6 | 1 | 5.6 | 3 | 16.7 | 5 | 27.8 | 8 | 44.4 | W |
| | 1 | 9.1 | 1 | 9.1 | 1 | 9.1 | 3 | 27.3 | 5 | 45.5 | M |
| vegetables | 1 | 5.6 | 1 | 5.6 | 4 | 22.2 | 8 | 44.4 | 4 | 22.2 | W |
| | 2 | 18.2 | 0 | 0.0 | 2 | 18.2 | 3 | 27.3 | 4 | 36.4 | M |
| sweets | 2 | 11.1 | 3 | 16.7 | 2 | 11.1 | 8 | 44.4 | 3 | 16.7 | W |
| | 0 | 0.0 | 0 | 0.0 | 1 | 9.1 | 2 | 18.2 | 8 | 72.7 | M |
| eggs and dairy products | 0 | 0.0 | 1 | 5.6 | 3 | 16.7 | 6 | 33.3 | 8 | 44.4 | W |
| | 1 | 9.1 | 0 | 0.0 | 1 | 9.1 | 1 | 9.1 | 8 | 72.7 | M |
| meat | 1 | 5.6 | 1 | 5.6 | 0 | 0.0 | 8 | 44.4 | 8 | 44.4 | W |
| | 0 | 0.0 | 0 | 0.0 | 1 | 9.1 | 2 | 18.2 | 8 | 72.7 | M |
| bread | 1 | 5.6 | 7 | 38.9 | 2 | 11.1 | 4 | 22.2 | 4 | 22,2 | W |
| | 2 | 18.2 | 2 | 18.2 | 0 | 0.0 | 0 | 0.0 | 7 | 63.6 | M |

On the basis of the results presented above it can be said that in the urban sample fruit is eaten on an everyday basis by 44% of women (W) and 46% of men (M), while in the rural sample by 64% of W and 39% of M. On average it constitutes a half of the population, which seems to be a very low result, taking into consideration the low price of fruit in Poland. 45% of W and 36% of M in towns eat fruit 1–4 times a week, while in the rural sample it is 36% of W and 50% of M. In town, fruit is eaten less than once a week by about 6% of W and 9% of M, and in villages by 6% of M, while all women in villages eat fruit at least once a week. 6% of W and 9% of M in town and

4% of M in villages declare not to eat fruit at all. The results obtained are alarming as fruit should be the most basic source of vitamins for pupils, who are still growing.

Even lower results were obtained with reference to vegetable consumption. Only 22% of W and about 66% of M in town eat vegetables every day, while in villages – over 50% of women and 25% of men. These are not satisfying quantities, especially bearing in mind that in Poland there are many vegetables that are cheap and easy to prepare. The situation is a bit better when it comes to the "average" vegetable consumption: 67% of W and 46% of M in town and 43% of W and 65% of M in villages eat vegetables 1–4 times a week. 6% of W in town and 3% of W and 8% of M in villages eat vegetables less frequently than once a week. None of the men from the urban sample declared such an infrequent consumption of vegetables. 6% of W and 18% of M in town and 2% of M in villages declare not to eat vegetables at all. All women from the rural sample eat vegetables, at least occasionally.

**Tab. 6.** The weekly frequency of eating selected products, the rural sample

| product | never | | less often than once a week | | once a week | | twice-four times a week | | every day | | sex |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | W/M |
| fruit | 0 | 0.0 | 0 | 0.0 | 2 | 6.1 | 10 | 30.3 | 21 | 63.6 | W |
| | 2 | 4.1 | 3 | 6.1 | 6 | 12.2 | 19 | 38.8 | 19 | 38.8 | M |
| vegetables | 0 | 0.0 | 1 | 3.0 | 2 | 6.1 | 12 | 36.4 | 18 | 54.5 | W |
| | 1 | 2.0 | 4 | 8.2 | 9 | 18.4 | 23 | 46.9 | 12 | 24.5 | M |
| sweets | 1 | 3.0 | 2 | 6.1 | 6 | 18.2 | 17 | 51.5 | 7 | 21.2 | W |
| | 0 | 0.0 | 5 | 10.2 | 9 | 18.4 | 18 | 36.7 | 17 | 34.7 | M |
| eggs and dairy products | 0 | 0.0 | 0 | 0.0 | 4 | 12.1 | 12 | 36.4 | 17 | 51.5 | W |
| | 0 | 0.0 | 5 | 10.2 | 5 | 10.2 | 13 | 26.5 | 26 | 53.1 | M |
| meat | 0 | 0.0 | 0 | 0.0 | 4 | 12.1 | 17 | 51.5 | 12 | 36.4 | W |
| | 1 | 2.0 | 1 | 2.0 | 6 | 12.2 | 13 | 26.5 | 28 | 57.1 | M |
| bread | 0 | 0.0 | 2 | 6.1 | 5 | 15.2 | 12 | 36.4 | 14 | 42.4 | W |
| | 3 | 6.1 | 9 | 18.4 | 8 | 16.3 | 5 | 10.2 | 24 | 49.0 | M |

In comparison to fruit and vegetables, which pupils do not eat very often, the majority of pupils (especially boys) enjoy eating sweets. 17% of W and as many as 75% of M from the urban sample, as well as 1/5 of W and 2/3 of M from the rural sample eat sweets every day. In the urban sample, 50% of W and 27% of M, and in the rural sample, 70% of W and 50% of M eat sweets at least once a week. It can be said that a considerable population of pupils eats sweets very often. 17% of W from the urban sample eat sweets less frequently than once a week, while men eat sweets at least once a week. The results for the rural sample are: 6% of W and 10% of M respectively. Only 11% of W in towns and 3% of W in villages do not eat sweets at all.

Proteins are the elementary building material for humans, which is why the intake of proteins and meat in the period of a child's rapid growth, e.g. the period of junior high school, should constitute an important element of their diet.

In the research conducted the consumption of eggs and dairy products is as follows: 44% of W and 75% of M in towns, and half of W and M in villages eat them every day. It can be said, then, that about a half of the population of junior high school pupils provides their organisms with a necessary daily intake of proteins and calcium. 50% of W and 18% of M from the urban sample as well as 50% of W and 37% of M from the rural sample eat proteins at least once a week. 6% of W from towns and 10% of M from villages eat dairy products less frequently than once a week. All women and men from the rural sample eat dairy products, while 1/10 of M from towns does not eat dairy products at all. What is worrying is the fact that about 10% of the population declare not to eat proteins at all or to eat them very infrequently (in this age group the percentage of children allergic to proteins should be lower than 3–4%).

The results concerning meat consumption are quite similar to the ones of dairy products consumption. Meat is eaten every day by 44% of W and 75% of M in towns, and by 33% of W and 57% of M in villages. It can be said, then, that men are more "carnivorous." 44% of W and 27% of M in towns and 2/3 of W and 39% of M in villages eat meat at least once a week. All men in towns and all women in villages eat meat at least once a week. 6% of W in towns and 2% of M in villages eat meat less frequently than once a week or declare not to eat meat at all. It can be concluded that the percentage of vegetarians among pupils taking part in the research is very low.

When it comes to the consumption of wholemeal bread, it can be said that 22% of W and 66% of M in towns and almost 50% of W and M in villages eat wholemeal bread every day. 33% of W in towns and 50% of W and 25% of M in villages eat wholemeal bread at least once a week. 6% of W and 18% of M in town and 6% of M in villages declare not to eat wholemeal bread at all. All women in villages eat wholemeal bread. The remaining respondents eat it less frequently than once a week. It can be said that the majority of pupils choose healthy bread for their meals.

The subsequent tables show the consumption of "junk food", that is fast food and sweet carbonated beverages among pupils.

**Tab. 7.** The annual frequency of eating selected products, the urban sample

| product | every day | | several times a week | | once a week | | every second week | | every six months | | once a year | | sex |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | N | % | W/M |
| fast food | 0 | 0.0 | 1 | 5.6 | 0 | 0.0 | 3 | 16.7 | 12 | 66.7 | 2 | 11.1 | W |
| | 2 | 18.2 | 0 | 0.0 | 0 | 0.0 | 6 | 54.5 | 2 | 18.2 | 1 | 9.1 | M |
| sweet carbonated beverages | 2 | 11.1 | 0 | 0.0 | 3 | 16.7 | 8 | 44.4 | 3 | 16.7 | 2 | 11.1 | W |
| | 9 | 81.8 | 0 | 0.0 | 2 | 18.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | M |

**Tab. 8.** The annual frequency of eating selected products, the rural sample

| product | every day | | several times a week | | once a week | | every second week | | every six months | | once a year | | sex |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | N | % | W/M |
| fast food | 0 | 0.0 | 1 | 3.0 | 3 | 9.1 | 14 | 42.4 | 12 | 36.4 | 3 | 9.1 | W |
| | 0 | 0.0 | 1 | 2.0 | 3 | 6.1 | 14 | 28.6 | 25 | 51.0 | 6 | 12.2 | M |
| sweet carbonated beverages | 8 | 24.2 | 6 | 18.2 | 4 | 12.1 | 13 | 39.4 | 2 | 6.1 | 0 | 0.0 | W |
| | 15 | 30.6 | 8 | 16.3 | 12 | 24.5 | 10 | 20.4 | 3 | 6.1 | 1 | 2.0 | M |

It turns out that during a year, 18% of M from towns eat fast food every day; the remaining respondents, regardless of their place of living and sex, do not eat fast food every day. 20% of W and 50% of M from towns as well as 50% of W and 37% of M from villages eat fast food every second week or more often. 80% of W and 27% of M from towns and 45% of W and 63% of M from villages eat fast food every 6 months or less frequently. It can be concluded that boys living in towns are most often "enchanted" by the magic of fast food and eat it more frequently than the remaining part of the population. 1/10 of W and 4/5 of M from towns and 1/4 of W and 1/3 of M from villages drink sweet carbonated beverages every day. 61% of W and 20% of M from towns, as well as 70% of W and 61% of M from villages drink sweet carbonated beverages every second week or more often. 28% of W from town and 6% of W and 8% of M from villages drink such beverages every 6 months or less frequently. All men from towns taking part in the survey declare to drink sweet carbonated beverages at least once a week. In this case we may also point to the unhealthy tendency that occurs mostly among boys from towns.

The next table shows what types of meals pupils eat during breaks at school.

**Tab. 9.** Meals eaten by pupils during breaks at school

| place | town | | village | | sex |
|---|---|---|---|---|---|
| product | N | % | N | % | W/M |
| nothing | 2 | 11.1 | 1 | 3.0 | W |
| | 1 | 9.1 | 1 | 2.0 | M |
| sandwich, roll, pretzel | 6 | 33.3 | 20 | 60.6 | W |
| | 6 | 54.5 | 28 | 57.2 | M |
| doughnut, sweets | 2 | 11.1 | 5 | 15.2 | W |
| | 1 | 9.1 | 9 | 18.4 | M |
| sandwich, doughnut, sweets | 2 | 11.1 | 3 | 9.1 | W |
| | 1 | 9.1 | 6 | 12.2 | M |
| sandwiches, fruit | 0 | 0.0 | 3 | 9.1 | W |
| | 0 | 0.0 | 1 | 2.0 | M |
| other | 6 | 33.3 | 1 | 3.0 | W |
| | 2 | 18.2 | 4 | 8.2 | M |

Analysing these results, it can be said that when pupils are at school they most often eat bread: 33% of W and 50% of M from towns and 60% of W and 57% of M from villages have a sandwich, roll, or pretzel during a break. 10% of W and M from towns as well as 15% of W and 18% of M from villages eat sweets at school. 10% of respondents eat sandwiches and fruit regardless of their sex and place of living. Pupils from towns do not eat fruit at school, and only 10% of W and 2% of M from villages eat it at school. About 10% of W and M from towns do not eat breakfast at school, while these results for villages are 3% of W and 2% of M. The remaining respondents eat other meals, e.g. crisps. Taking into consideration the time spent at school by junior high school pupils, their second breakfasts seem to be insufficient; they contain too many sweets and too little fruit; none of the pupils mentioned vegetables as their second breakfast.

What was also checked (with the use of the $\chi^2$ test), was whether the eating preferences in the samples under investigation depend on sex and place of living (Tab. 10).

**Tab. 10.** The results of testing the hypothesis that features are independent

| Variable sex [W/M] vs Variables: | Pearson's $\chi^2$ ML $\chi^2$ Yates'$\chi^2$ * | df | p | Statistical conclusion | ϕ correlation coefficient; *V Cramer's | Sample |
|---|---|---|---|---|---|---|
| How often do you eat fast food? [every second week or more often; every few months] | 7.180<br>7.376 | 1 | 0.007<br>0.007 | features are dependent | 0.498 | city |
| How often do you drink sweet carbonated beverages? [often, occasionally] | 14.399<br>18.621 | 1 | 0.0002<br>0.0000 | features are dependent | 0.705 | city |
| How often do you eat sweets? [every day; not every day] | 9.114<br>9.385<br>*6.888 | 1 | 0.003<br>0.002<br>*0.009 | features are dependent | 0.561 | city |
| How often do you eat fruit? [every day; not every day] | 4.878<br>4.928 | 1 | 0.027<br>0.026 | features are dependent | 0.244 | village |
| How often do you eat vegetables? [every day; not every day] | 7.678<br>7.673 | 1 | 0.006<br>0.006 | features are dependent | 0.306 | village |

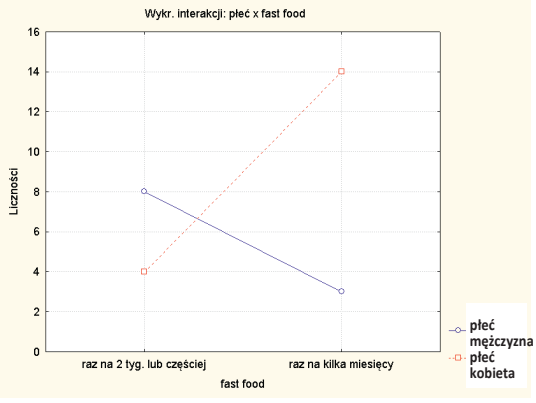
Explanations: Pearson's $\chi^2$, ML (Maximum Likelihood) $\chi^2$ – value of test statistics; *Yates' $\chi^2$ (calculated for cross tabulations 2 x 2, when numbers in sub-classes are small, less than 10 (according to some authors – less than 5 – was also applied in the above analysis) df – degrees of freedom; p – test probability. Pearson's correlation coefficient $\varphi$ is used for a four-fold table, *V* Cramer's coefficient is used for cross tabulations, in this case *2* x *3*.

COMMENT: By applying the *V* coefficient we acquire full comparability between cross tabulations sized *w* x *k* and the measure $\varphi$ for four-fold tables (Wołek 2006).

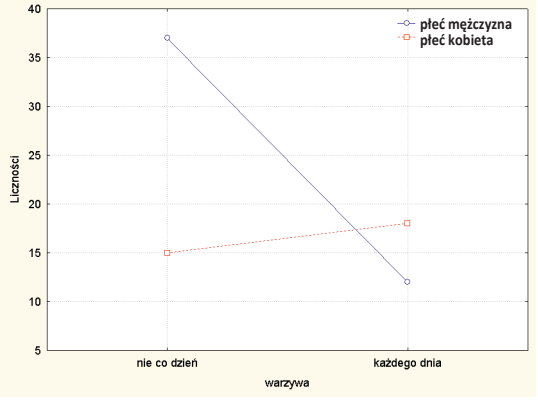
The analysis of the data received made it possible to state that generally speaking, eating preferences do not depend on the place of residence.

However, some features are interdependent and show quite strong or weak strength of relation. Among teenagers living in towns, a strong correlation between eating fast food and sex was noticed. Boys eat fast food every second week or more often, while girls only once every few months. There is also a very strong correlation between drinking sweet carbonated beverages and sex. Boys drink those beverages often, while girls occasionally. Quite a strong correlation between eating sweets and sex was also noticed. Boys eat sweets every day. It can be said that junior high school boys living in towns have definitely more negative eating habits than their female schoolmates.

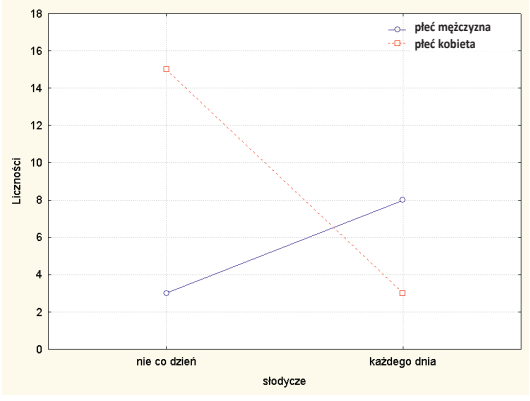
Among teenagers living in villages only a weak correlation between eating fruit and vegetables and sex was observed – girls eat fruit and vegetables every day, while boys eat them definitely less frequently. Generally speaking, it can be stated that in some selected aspects junior high school girls prefer more healthy eating habits than their male schoolmates. However, it is not a constant tendency concerning all aspects of eating – one may speak here of selected, individual preferences.



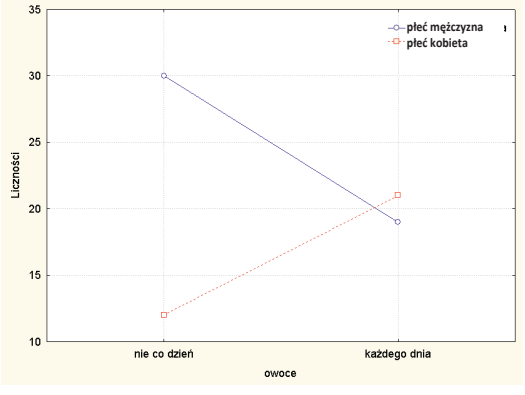

Graph of interaction: eating fast food vs sex (urban sample)



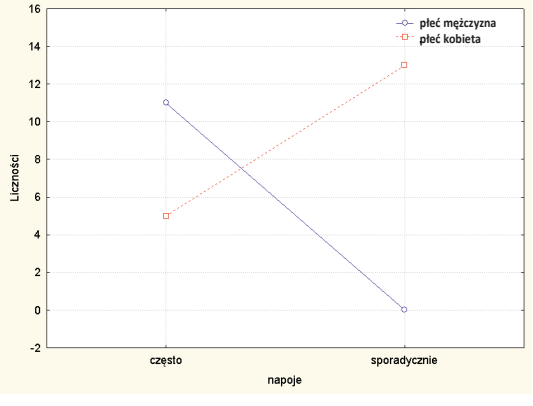

Graph of interaction: eating vegetables vs sex (rural sample)




Graph of interaction: eating sweets vs sex (urban sample)




Graph of interaction: eating fruit vs sex (rural sample)




Graph of interaction: drinking sweet carbonated beverages vs sex (urban sample)

Hypothesis 4: The BMI depends on the eating preferences of teenagers and sex.

The results of the conducted research on BMI did not prove any correlation with eating habits of teenagers in both samples (urban, rural). It is possible that this correlation is more complex and other variables, such as lifestyle, also influence BMI. This is why it seems that this correlation requires detailed, additional analyses. The research also did not prove any correlation between BMI and sex of the pupils under investigation.

## Conclusions

Comparing the research results to information to be found in the "Curriculum", it can be stated that in everyday life pupils do not take care of the rules of healthy diet. Generally speaking, their meals have insufficient amount of fruit and vegetables and pupils eat too much fast food and drink sweet carbonated beverages.

Pupils from towns taking part in the research most enjoy eating (every day): women– fruit, dairy products, and meat, 45% each; men – sweets, dairy products, and meat, 73% each. In rural areas pupils most enjoy eating (every day): women – fruit 64%, vegetables 55%, and dairy products 52%; man – dairy products 53% and meat 57%. It can be stated that the diet of junior high school pupils both in towns and villages primarily consists of dairy products and meat, with the exception that girls additionally complement this diet with fruit. The results obtained are in line with other research of this type (see Ponczek, Olszowy 2012):

**Tab. 11.** Percentage of pupils eating given foodstuffs every day

| Respondents | eggs and dairy products | meat | fruit | sweets | bread | vegetables |
|---|---|---|---|---|---|---|
| pupils from towns in the Lesser Poland Voivodship: | 55.2% | 55.2% | 44.8% | 37.9 % | 37.9 % | 27.6% |
| pupils from villages in the Lesser Poland Voivodship: | 52.4% | 48.7% | 48.9% | 29.2% | 46.4% | 36.6% |
| pupils from the Kuyavian-Pomeranian Voivodship | 47.1% | 35.6% | 20.2% | 34.6% | 32.7% | 28.8% |

It can be concluded that despite the present-day fashion for a healthy lifestyle and information on this subject that is to be found in the Curriculum, nutritional mistakes made by junior high school pupils are noticed, for example teenagers too often drink sweet carbonated beverages or eat products with high energy value and relatively low nutrition value. It may be a matter of concern in the aspect of health and physical fitness of pupils taking part in the research. Despite the fact that during the research the BMI among junior high school pupils turned out to be standard, in the long run such a diet creates favourable conditions for obesity. This is why eating fruit and especially vegetables as a valuable source of vitamins should be popularised.

## Summary

During the research it was found out that:

- Pupils go to school in the place where they live.
- The urban sample differs from the rural sample in terms of the structure of: sex, BMI, age, school class.
- Eating preferences of teenagers are not in line with the healthy lifestyle and only in few cases was it established that there is a correlation between teenagers' eating habits and sex and place of residence. There are a few vegetarians among junior high school pupils.
- The value of BMI does not depend on sex or eating preferences of teenagers.

## Literature

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Ponczek D., Olszowy I. (2012) *Ocena stylu życia młodzieży i świadomości jego wpływu na zdrowie*, Hygeia Public Health, 47(2), 174–182.

## Lifestyle of junior high school pupils in the Lesser Poland region of the 21st century from the point of view of eating habits

### Abstract

Lifestyle determines health to a large extent. It is necessary to pay special attention to health education of young people to help them in the formation of proper attitudes towards health. Healthy lifestyle developed among young people will affect their health as adults and their children's health in the future.

**Key words:** lifestyle, health education, attitudes

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# Motivating secondary school students to raising the level of health literacy

*People cannot achieve their fullest health potential unless they are able to take control of those things which determine their health.*

THE OTTAWA CHARTER
FOR HEALTH PROMOTION
1986

Contemporary people are faced with the necessity of adjusting to social changes generated by the progress of civilization. At the same time, they wish to experience high quality of living. *Health*, as a foundation for successful completion of both these tasks, constitutes the plane for normal development of each human being, and health education should be considered an urgent challenge for present-day educators. Influencing students' perception of health as a value worth protecting and striving for is one of the most important aims of the process of education. Health education as an element of the national health policy has been reflected in the operational aims of the following actions:

- The National Health Programme for the years 1996–2005;
- The National Health Programme for the years 2007–2015;
- The National Activities Plan for Children for the years 2004–2012;
- The Strategy of Development of Health in Poland for the years 2007–2013;
- Expertise concerning Education for Sustainable Development (ESD) in Poland. Final Report 2012;
- Cooperation agreement between the Ministry of National Education and the Ministry of Health regarding the promotion of health education in schools and development of a network of health promoting schools of 23 November 2009.

The above documents constitute the main legal framework for the realization of health education at schools. However, its implantation and effectiveness require devising appropriate support for schools, in particular creation of a training system at the university level, as well as further professional training options and provision of methodological advice.

There is no unanimity as to the form of assistance provided to schools in that respect, especially that even the nomenclature and terminology is very often applied

interchangeably at schools, so that the meanings and actions undertaken are understood incorrectly. It pertains in particular to the notions of health promotion and health education.

According to the traditional approach, health education concerned improving and protecting health by means of stimulating the learning process and changes in behaviour. Its aim was merely to raise the level of knowledge and provide advice on health hazards. The contemporary idea of health education puts the main emphasis on practical actions. Accordingly, theoretical knowledge should only help in acquiring necessary information required for undertaking specific actions aimed at health protection.

Health education is an inseparable and complementary element of health promotion. The overriding objectives of health education are defined variously, depending on the chosen definitions and ideas behind them. It is generally assumed that the basic aim of health education is the acquisition of knowledge about health pertaining to the functioning of human body, its conditioning factors and potential risks. It concerns also the formation of the ability to identify one's health needs, the needs of the family and environment, the ability to make choices and decisions for the benefit of one's and others' health, as well as the ability to prevent and deal with difficult situations. Finally, health education aims at developing behaviour necessary for protection and improvement of health, and sets as its objective raising health awareness among young people (Woynarowska 2000, Krawański 2001, Dudkiewicz 2004).

Similar views are aired by Słońska (2001) who claims that health education does not involve only transmission of necessary knowledge about health, but it concerns primarily the formation of conditions conducive to the creation of health behaviours and introduction of positive changes aimed at raising the competences of individuals and whole social groups with respect to their independent health-related actions at various levels of social life. Young people's superficial, sometimes not well consolidated and fragmentary knowledge about factors conditioning health might have serious consequences for human health (Stoczkowska 2007, Woynarowska et al. 1999, Lewicki 2006).

Contemporary health systems aim, among others, at improving access to information about health. It has a positive influence on the participation of people in the health system (Kickbusch 2001).

A very important factor in developing health awareness among young people are the programmes promoting the ability to read texts concerning health with comprehension. One of the aims of these programmes is to present the opportunity of making informed and suitable decisions regarding one's health as well as the health of other people.

The notion of *health literacy* has its origin in the Ottawa Charter for Health Promotion of 1986. The contemporary definition introduced by the World Health Organization defines it as knowledge about health, or the ability to read health, and

extends the definition found in the Charter by incorporating in it the element of "developing personal skills," which means developing skills such as: comprehending social elements of health, negotiating with the environment, understanding and assessing risk connected with individual and social behaviour, and the ability to participate in the health system (Kickbusch 1997). The new definition of health literacy is also closely connected with promotion of health.

Promotion of health is a process enabling individuals to control their own health and body. Health promotion is a new outlook on education, which should be conducive to the development of a healthy lifestyle, as well as on the environmental and individual conditions beneficial to health. One of the important methods for achieving the overriding aim of health promotion, *i.e.* strengthening human health, is the improvement of health literacy.

In Polish literature on the subject, the notion *health literacy* is translated in most cases literally or as "functional health knowledge". The most recent definitions explain health literacy as "health competencies" (Niedźwiedzka, Hunskar 2010; Bulska 2010; Iwanowicz 2009; Kickbusch 2002; Nutbeam 2000).

The ability to read health constitutes an important element of human living, making it possible to react to changing environmental conditions. Without health literacy it would not be possible to understand data about the functioning of human body or to interpret a wide range of information about the state of one's health and about its conditioning factors, which is necessary for the maintenance of normal health. Lack of ability to read one's health impairs the realization of the idea of health promotion (Kirsch 2008). According to Karski (2003), scientific research which used the above definition indicated that lack of competency to read health constitutes a huge obstacle in educating patients suffering from chronic diseases and impairs proper application of medications. Today "reading health" pertains also to the ability to read information contained in brochures, notice boards, charts, or the Internet, in a way which enables application of the obtained knowledge to oneself and to the observed symptoms, and allows for utilizing the instructions pertaining to lifestyle changes. The ability to "read health" is also perceived as the key concept in health promotion (Karski 2003, Iwanowicz 2009).

Ishikawa and Yano (2008), as well as Ratzan (2001), rightly note that the definition of the World Health Organization expands the earlier definition of the term, among others, by including the development of social competencies, e.g. with respect to communication, negotiation, which are necessary for making decisions benefiting one's health.

A very interesting interpretation of this term within the context of health was put forward by Nutbeam in 2000. He proposed a three-tier hierarchy of *literacy*:

- *basic literacy* which refers to basic competencies such as reading or writing necessary for effective functioning in everyday situations;
- *communicative literacy* which pertains to more advanced cognitive mechanisms, which in connection with social competencies might be used for active

participation in everyday life, selecting information incoming from various sources, as well as adjusting information to changing conditions;
- *critical literacy* which stands for the ability to analyse information critically and on that basis to gradually increase the control over various events taking place in everyday life.

In the context of the three-tier hierarchy of the notion, it is worth considering which competencies should be developed at the relevant levels of the so defined health literacy?

According to Zarcadoolas et al. (2005), a person with fully developed competencies at all three levels can apply necessary information pertaining to health in accordance with the changing situation and take active part in public and private dialogue about health, medicine, scientific knowledge and cultural convictions. An important element in this respect is comprehensive health education. The concept of comprehensive health education of young people assumes taking into consideration the holistic approach to health (all its aspects) and factors conditioning health connected with the environment; creation and implementation of innovative programmes of formal and informal health education; striving for popularization of knowledge about health which the student acquires from various sources (family, teachers, peers, mass media, advertisements, etc.); encouraging young people to lead healthy lifestyles, as well as creating conditions and opportunities for healthy lifestyle in educational establishments (Bednarski 2002, Woynarowska 2007).

## Position and status of health education in the core curriculum for general education

The first appearance of health education in the core curricula for general education dates back to 1997.

An educational path "health education" was introduced at all levels of the educational system within the framework of the educational system reform of 1999. The acknowledgement of the necessity of introduction of a broadly defined health education of children and teenagers was an undisputed asset of the so-called old core curriculum for general education (1999–2002) as well as a result of the works on the reform of the educational system in year 2008 (Ministry of National Education 2009). Finally, this effect was brought about by the development of health promoting schools.

In 2007, during works on the new core curriculum, the educational paths were removed from the national programme of study. It was decided that health education would be carried out within the framework of other subjects, in particular Biology and Physical Education. The authors of the core curriculum for general education of 2009 (Ministry of National Education 2009) put great emphasis on prevention of health risks and health promotion. The importance of health education was increased, making it an important objective for schools and teachers. The above is defined in the Regulation by the Minister of National Education of 23 December

2008 on Core Curricula for Pre-school and General Education in particular types of schools (Ministry of National Education 2009), which reads: "An important objective for schools at the third and fourth educational stage is health education, whose aim is to develop among students the ability to protect their health and health of other people, and the ability to create environment conducive to good health". Further: "The set of teaching programmes at school, the personal development programme followed by the school, and the prevention programme compose a coherent whole and have to account for all requirements as described in the core curriculum. Their preparation and implementation is a task for the school as well as for the teachers".

The core curriculum for the third and fourth educational stage includes the requirements as to the various aspects of health education taught within the framework of various subjects, in particular Physical Education, Biology, Natural Science, Family Life Education, Civic Education, Safety Education, Ethics, modern languages and Introduction to Entrepreneurship.

Biology is among the group of subjects which embrace the greatest number of educational issues pertaining directly or indirectly to health education. They focus mainly on physical health and prevention of illnesses. Within the framework of the subject Biology (extended programme) at the fourth educational stage, some of the educational objectives (general requirements) are as follows:

II. Broadening the knowledge about the structure and functioning of the human body. Students are able to explain the functioning of the human body at various levels of complexity; they recognize connections between the structure and the functions at all these levels.

VI. Attitude towards nature and environment. Students understand the meaning of conservation of nature and environment; they know and understand the rules of sustained development; they present a respectful attitude towards themselves, all living creatures and the environment; they know how to define an attitude of a person who makes responsible use of natural resources.

The educational content for Biology accounts for many specific requirements pertaining directly or indirectly to health education (Table 1). They concern first of all:

- physical health and prevention of various illnesses in connection with the anatomy and physiological functions of the human body (it constitutes a continuation and extension of the educational content taught in lower secondary schools);
- environmental health, which, in accordance with the definition of the World Health Organization, pertains to the aspects of human life dependent on physical, chemical, biological, social, and mental factors, as well as on economic factors of a person's living environment – home environment, school, workplace, recreational facilities and local community.

**Tab. 1.** Specific requirements relating to health education at the fourth educational stage for Biology

| **Fourth educational stage. General upper secondary school. Extended programme.** | |
|---|---|
| **Subject: Biology** | |
| **Programme section** | **Specific requirements relating to health education:** |
| **IV. Variety of organisms** | |
| **Viruses** | Student:<br>4) enumerates the most important human viral diseases (hepatitis type A, B and C, AIDS, HPV, influenza, measles, mumps, German measles, chicken pox, polio, rabies), names routes of infection and describes basic principles of viral diseases prevention. |
| **Bacteria** | Student:<br>5) enumerates the most important human bacterial diseases (tuberculosis, dysentery, typhoid fever, cholera, anthrax, Lyme disease, tetanus), names routes of infection and describes basic principles of bacterial diseases prevention. |
| **Protists and primarily aquatic plants** | Student:<br>4) enumerates the most important protists responsible for human diseases (malaria, trichomoniasis, giardiasis, toxoplasmosis, amoebosis), names routes of transmission and presents basic prevention principles. |
| **Terrestrial plants** | Student:<br>6) gives examples of significance of plants for humans (e.g. edible plants, poisonous plants, plants used in manufacturing and medicine). |
| **Fungi** | Student:<br>8) presents basic principles of prevention of diseases caused by fungi. |
| **Invertebrates** | Student:<br>5) with the help of diagrams describes life cycles of unarmed tapeworm, nematodes – "roundworm", Trichinella spiralis; enumerates intermediate and definitive hosts, and routes of transmission. |
| **V. Structure and functions of human body** | |
| **Musculoskeletal system** | Student:<br>5) enumerates main groups of human muscles and describes factors conducive to normal development of muscles;<br>8) analyses the relation between regular physical exercise, density of bones and state of the musculoskeletal system. |
| **Digestive tract and digestive processes** | Student:<br>4) analyses energetic needs of the human body and compares (orders) chosen types of physical activity with respect to the energy consumption;<br>5) analyses relations between diet, lifestyle and health (obesity and its consequences for health; diabetes, eating disorders). |
| **Respiratory system** | Student:<br>5) analyses the influence of external factors on the state and functions of the respiratory system (allergies, active and passive smoking, air pollution). |

| | |
|---|---|
| **Circulatory system** | Student:<br>6) analyses relation between diet, lifestyle and state and functions of the circulatory system (atherosclerosis, heart attack, varicose veins). |
| **Immune system** | Student:<br>5) describes situations in which the immune system is defunct (immunosuppression after organ transplants, AIDS, etc.) and enumerates risks involved;<br>6) explains the notion and gives examples of autoimmune diseases. |
| **Nervous system** | Student:<br>8) explains the biological significance of sleep. |
| **Sensory system** | Student:<br>4) explains the basic principles of sight and audio organs hygiene. |
| **Structure and functions of skin** | Student:<br>2) describes basic principles of skin disease prevention. |
| **Human reproduction and development** | Student:<br>4) presents characteristics and course of human physical, mental and social development;<br>5) presents basic principles of prevention of sexually transmitted diseases. |
| VII. State of health and diseases | Student:<br>1) explains the meaning of the notions "health" and "illness" (health as a state of balance of the internal environment of the human body, physical health, mental health, social health; illness as a disruption of this state;<br>2) presents the negative influence of some psychoactive substances on human health (cigarettes, alcohol), drugs, doping, overuse of caffeine and some medicines (especially those affecting the mental system);<br>3) enumerates the most important human diseases caused by viruses, bacteria, protists, parasites, and methods of their prevention; presents routes of infection by HIV, HBV, HCV and HPV viruses, prevention principles, and is able to predict individual and social consequences of the infection;<br>4) presents factors conducive to the development of cancer (e.g. inappropriate diet, lifestyle, psychoactive substances, UV radiation) and gives examples of those diseases;<br>5) presents basic principles of cancer prevention;<br>6) explains the necessity of regular medical examinations (e.g. dental examination, basic blood and urine tests, blood pressure and heart rate measurement);<br>7) analyses information attached to medicines and explains why patients should not take in commonly accessible medications without justified reasons and why antibiotics and other medications should be taken in strict accordance with the doctor's instructions (dosage, times and length of treatment);<br>8) describes basic principles of personal hygiene;<br>9) analyses relation between appropriate amount of sleep and bodily functions, in particular influence of sleep upon the learning and remembering processes, as well as on the immune system. |

Health education issues implemented into Natural Science – fourth educational stage.

The aim of Natural Science is to broaden the knowledge about natural sciences and simultaneously incorporate knowledge about health issues (Table 2).

**Tab. 2.** Specific requirements relating to health education at the fourth educational stage for Natural Science

| **Fourth educational stage. General upper secondary school.** | |
|---|---|
| **Subject: Science** | |
| **Programme section: Science and World** | Specific requirements relating to health education |
| Chapter: Moral dilemmas in science | Student:<br>7) describes biological and social background of various forms of intolerance and suggests methods of their prevention;<br>8) presents his attitude towards GMO, reproductive cloning, in vitro fertilization, prenatal tests, human genome research, access to the information about individual genetic features, and other ethical problems related to the development of genetics, biotechnology and medicine. |
| Chapter: Science in media | Student:<br>1) performs critical analysis of information provided by the media with respect to its conformity with the current state of scientific knowledge;<br>4) analyses the influence of advertised products on health, in particular food products, pharmaceuticals, cosmetics (e.g. actual number of calories in products with the "light" label, products' "ecology", vitamin content versus daily demand. |
| **Section: Science and technology** | |
| Chapter: Sport | Student:<br>3) describes types of doping used in sport and argues for the negative influence of those chemical substances on human health;<br>4) analyses the influence of various factors on physical fitness and sport achievements (e.g. diet, training, high altitude mountain conditions);<br>6) analyses the influence of professional sport on health. |
| Chapter: Contemporary diagnostics and medicine | Student:<br>1) explains the principles of contemporary medical imagining and gives examples of its application;<br>2) gives examples of body fluids analysis and its significance in prevention of diseases (e.g. detection of protein and glucose in urine);<br>5) describes methods of gene mutation detection and assesses its significance in diagnostics;<br>6) researches and analyses information and statistical data about the causes and occurrence of modern-age diseases in the world. |
| Chapter: Protection of nature and environment | Student:<br>1) explains the mechanism of greenhouse effect and describes controversies pertaining to the human influence on climate changes;<br>2) describes the consequences of the use of fertilizers and chemical pesticides and it significance for farming;<br>3) presents the chemical characteristics of freons and their influence upon the environment;<br>5) explains the role of bacteria in neutralising environment pollution (e.g. biological water treatment); assesses the genetic signification of bacteria modified in the process. |

| **Section: Science around us** | |
|---|---|
| Chapter: Learning | Student:<br>2) describes various forms of learning and assesses their biological significance;<br>3) describes the role of neural connections in the process of learning;<br>4) describes basic characteristics of learning by senses;<br>5) presents methods of remembering information;<br>6) presents possibilities of application of contemporary technological achievements in the process of learning. |
| Chapter: Cycles, rhythm and time | Student:<br>4) describes the daily rhythm of human activity and analyses daily hormone secretion;<br>5) analyses the influence of daily rhythm disruptions on human health. |
| Chapter: Laughing and crying | Student:<br>3) describes chemical aspects of stress;<br>6) describes the significance of laugh and crying with reference to maintaining human relations among primitive humans and contemporary humans;<br>7) researches and presents information relating to cultural differences in expressing emotions in traditional and modern societies. |
| Chapter: Health | Student:<br>1) enumerates the mechanisms of heat loss;<br>2) explains the role of clothing in the exchange of heat between human body and the environment;<br>3) analyses leaflets attached to medicines and describes the information given;<br>4) explains in what way human body maintains homeostasis;<br>5) describes the state of physical, mental and social health ;<br>6) analyses the influence of external and internal factors on health;<br>7) analyses health as an individual and social value;<br>8) researches information pertaining to risks relating to living in different environmental conditions and points to means of their prevention. |
| Chapter: Beauty and good looks | Student:<br>3) gives examples of pancultural beauty canons and analyses their relation with sexual selection;<br>4) presents the significance of plant and animal products for the maintenance of bodily health and beauty. |
| Chapter: Water – a miracle of nature | Student:<br>7) justifies the necessity of sustainable use of water resources and presents actions that can be undertaken by them for this purpose. |

Nonetheless, the "health education" module incorporated in the core curriculum for Physical Education is by far the most important and valuable innovation. It constitutes a completely new approach elevating Physical Education to the status of a key subject in health education in lower and upper secondary schools. It turns into practice the ideas that have been put forward for years by the representatives of physical culture studies. This solution creates one of the models advised by the WHO: a leading subject (Physical Education) and incorporation of educational content pertaining to health into various subjects.

The "health education" module should be realized within the framework of optional Physical Education classes. At the third and fourth educational stage Physical Education as a subject has important educational, development and health functions. It supports physical, mental and social development, as well as helps maintain students' health and instils the habit of partaking in physical activities and caring for one's health throughout the entire life. It gives rise to a healthy lifestyle and the awareness of the necessity to protect health.

The objectives of health education, until recently, focused mainly on the issues of physical health – hygiene, skincare, prevention of injures and somatic illnesses. The innovative element within Health Education (Ministry of National Education 2009) is the focus on psychosocial health and development of life skills – an element of Health Education that has been rather neglected thus far.

The change is triggered by rapid social, economic and industrial changes in the contemporary globalized world. They force young people to face new requirements and challenges, and are conducive to the ever frequent occurrences of psychological disorders and problems (Ostaszewski 2007, Kozak 2007).

"Life skills" are defined as "abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life" WHO (1993), *Life skills education in schools*, Geneva. Among life skills one can enumerate: communication and interpersonal skills, e.g. verbal and nonverbal communication, negotiation skills, assertiveness, team work, decision-making skills, critical thinking – especially with reference to peer pressure and analysis of media advertisements pertaining, for example, to smoking. Other life skills include the skill of directing one's life and behaviour, e.g. building one's self-esteem, self-awareness of one's rights, behaviour, values, and being able to control emotions. These life skills influence the teenagers' ability to protect themselves against various health threats and help them build competencies required for positive behaviour and strengthening relations with others. Life skills should be developed and improved at all stages of life (Woynarowska 2002).

The analysis of the theoretical assumptions of the core curriculum for general education (2009) with respect to health education allows for the conclusion that the curriculum is characterized by a holistic approach, i.e. it accounts for all aspects of health: *physical*, which pertains to normal functioning of the human body, organs and systems; *mental*, encompassing emotional health, which means the skill of recognizing experiences, expressing emotions in an appropriate way, coping with stress, conflicts, panic, depression, and the ability to think logically; *social health*, which refers to the ability of making and maintaining positive relations with others; and finally *spiritual health*, which includes beliefs, religious practices, moral values and life principles.

One of the conditions for the effectiveness of the educational process and educational practices with regard to health is motivation, which inspires for action, gives direction and points out aims to be achieved. The role of motivation and its

significance in the process of learning was stressed, among others, in the report "Learning – The Treasure Within" by Jacques Delors (Internet I). The report presents the pillars of the twenty-first century education. In one of the chapters, "Learning to be," the authors accentuate the role of education, thanks to which people attain full potential with respect to their intellectual development, competencies, emotional development and motivation. One of the most important objectives of education is the creation of lasting and strong motivation for learning as a basis for further self-education and personal development. According to Reykowski (1970), motivation is a mental process which conditions achievements of particular aims. In the literature on the subject the sources of motivation are divided into internal forms of motivation, which are generated by the individual (acknowledgement, development, independent thinking and acting, self-satisfaction) and external forms of motivation, imposed by the society (Broophy 2004). One cannot always expect that students will present sufficient motivation for learning; often the support of the environment, in particular the teacher, is required. It is the teacher who, by realizing the educational programme in a skilful way, by using teaching methods suitable to the topic of the lesson and intellectual level of students, triggers the learning process, at the same time mobilizing students to creative activity. The ideal situation, according to L.S. Wygotsky, is when the programme and teaching methods not only relate to the level of development already attained by the students but are somewhat ahead of that development. It provides young people with additional stimuli for work, motivates for effort, but does not discourage them. Such learning context creates the so called area (zone) of proximal development (Wygotsky 1971). It is well known that the students' attitude towards school is to a great extent influenced by the type of motivation. Motivation also decides about the fact whether the students' work is independent and they learn being motivated by reasons within themselves, or if they require encouragement from the seniors. The outcome of the teaching process is also to a significant extent dependent on whether students like to learn and are interested in gaining knowledge, whether they feel responsible for their learning and, finally, see the connection between the knowledge gained and their plans for future (Niebrzydowski 1989).

## Object of the research and its methods

The skill of reading one's health is gaining importance in today's world. Its development is fuelled by the necessity of finding essential information quickly. In order to fully participate in social life one requires not only the skills for gaining knowledge, i.e. positive motivation for the creation of knowledge and for learning, but also the skills enabling appropriate application of the knowledge in everyday situations. The object of the research is the ability to read health and it is conducted in order to find out if students apply the skill of reading one's health in the process of acquiring information about health.

**Theoretical objectives**

Analysis of documentation (core curriculum for general education) with reference to the occurrence of content connected with health risks brought about by using and abusing intoxicants.

**Cognitive objectives**

Describing upper secondary school students' level of motivation to learn about issues relating to alcoholism, nicotinism, and drug addiction; accounting for directions of change in students' motivation to learn about issues concerning risks caused by using selected stimulants; and describing differences in the level of motivation to learn about stimulants among students taking part in the research.

Practical objectives

Conducting a series of classes with the students of the second grade of the general upper secondary school, pertaining to the prevention of stimulant use: cigarettes, alcohol and drugs. Conducting survey research before the classes and after their conclusion.

The research makes use of a survey construed in accordance with the assumptions of Likert's scale (Brzeziński 2006). A set of 26 sentences was constructed in order to define students' attitudes towards those issues. The statements were divided into three components of attitude: cognitive (11 statements), emotional (9 statements) and behavioural (6 statements). Students' attitudes pertain to their knowledge about alcoholism, nicotinism and drug addiction, perceived as element of Biology, i.e. the science of particular natural and social application, having influence upon interests and attitudes.

Likert's scale is a type of rating scale. Students expressed their attitude to each questionnaire item by choosing one of the five categories of answer to which numerical values were assigned: strongly agree – 5, agree – 4, neither agree nor disagree – 3, disagree – 2, strongly disagree – 1. The choice of "strongly agree" and 'agree' answers indicates positive attitude towards health risks issues. Choosing "disagree" and "strongly disagree" indicates negative attitude towards these problems. The answer "neither agree nor disagree" indicates indifferent attitude towards alcoholism, nicotinism and drug addiction.

The researcher assumed that motivation is to be understood as a sum of acceptance indicators for particular statements. For this purpose the following interpretation key is applied:

- 26–46 points – negative motivation
- 47–68 points – moderately negative motivation
- 69–88 points – neutral motivation
- 89–109 points – moderately positive motivation
- 110–130 points – positive motivation

## The level of students' initial and final motivation to acquire knowledge about health risks

The research into initial motivation involved sixty students of the general upper-secondary school (14 students from class IIc, 26 students from class IId, and 20 students from class IIe). Class IIe is a control group in the conducted experiment, whereas classes IIc and IId are the experimental groups.

The research into the final motivation involved 40 students of the general upper-secondary school, that is 14 students of class IIc and 26 students of class IId. Altogether 100 survey questionnaires were analysed.

## Initial motivation

**Tab. 3.** Initial motivation among students of the respective classes of general upper secondary school

| Variable | Descriptive statistics (initial motivation) | | | | |
|---|---|---|---|---|---|
| | N important | Average; | Minimum | Maximum | Standard deviation |
| Year IIc | 14 | 89.07143 | 77.00000 | 97.0000 | 5.703768 |
| Year IId | 26 | 91.53846 | 78.00000 | 111.0000 | 6.598368 |
| Year IIe | 20 | 86.45000 | 74.00000 | 99.0000 | 7.330362 |

The lowest score in the initial research was recorded in class IIe – 74 points, whereas for class IIc and class IId it was slightly higher – 77 and 78 points respectively. The outcomes indicated neutral motivation. The highest score was observed in class IId: 111 points. The result indicated positive motivation. In class IIc the maximal number of points in the initial research was 97 points; in class IIe – 99 points. The results indicated a moderately positive motivation.

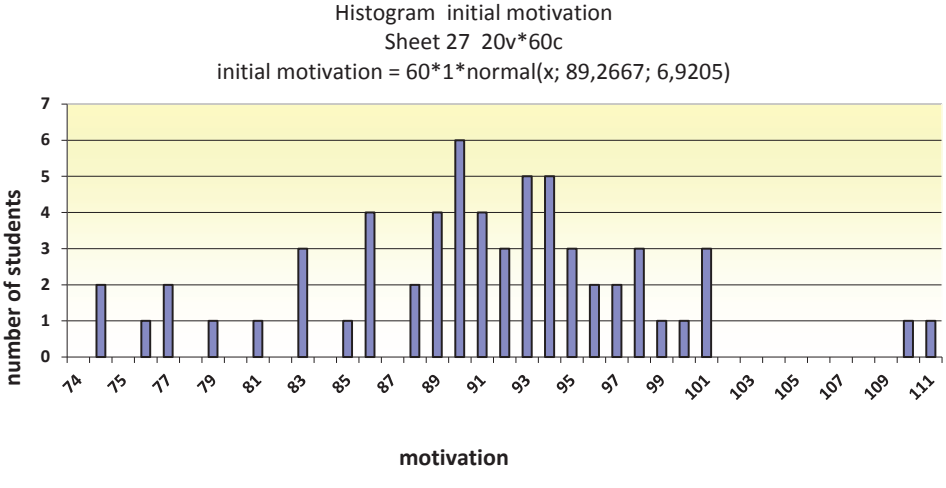



**Fig. 1.** Level of initial motivation for learning about selected health issues

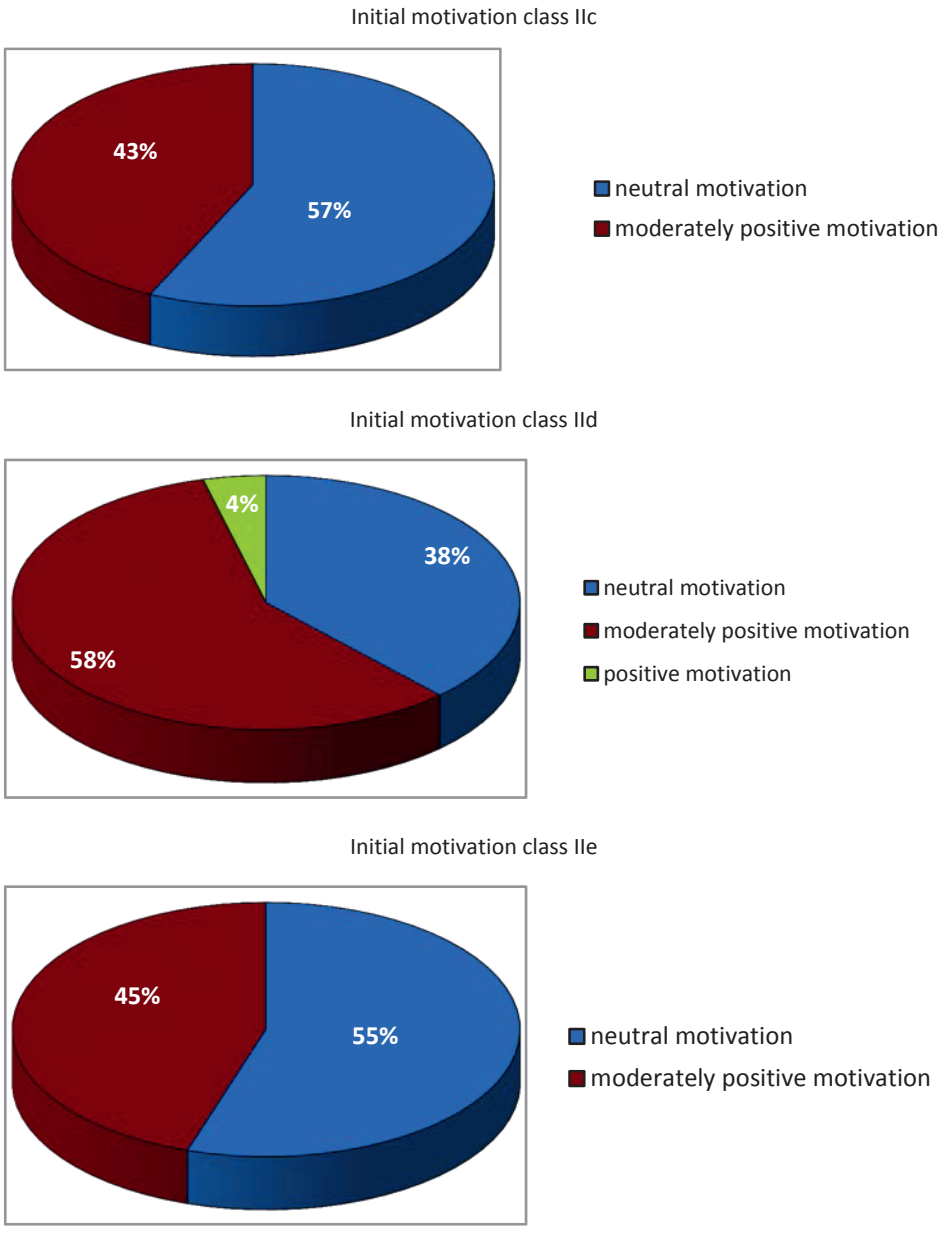



**Fig. 2.** Percentage presentation of initial motivation in particular classes

The analysis of initial motivation pointed to the fact that the highest number of students with moderately positive (58%) and positive motivation (4%) was recorded in class IId. The largest number of students with neutral motivation was in class IIe (55%). Classes IIc and IIe do not present positive motivation. None of the researched groups presented either negative or moderately negative motivation.

## Final motivation

**Tab. 4.** Final motivation among students of the respective classes of general upper secondary school

| Variable | Descriptive statistics (initial motivation) | | | | |
|---|---|---|---|---|---|
| | N important | Average | Minimum | Maximum | Standard deviation |
| class IIc | 14 | 90.21429 | 82.00000 | 111.0000 | 7.392081 |
| class IId | 26 | 90.34615 | 69.00000 | 111.0000 | 9.649631 |

The maximal point score noted in the research into final motivation was 111 points in class IIc and class IId.

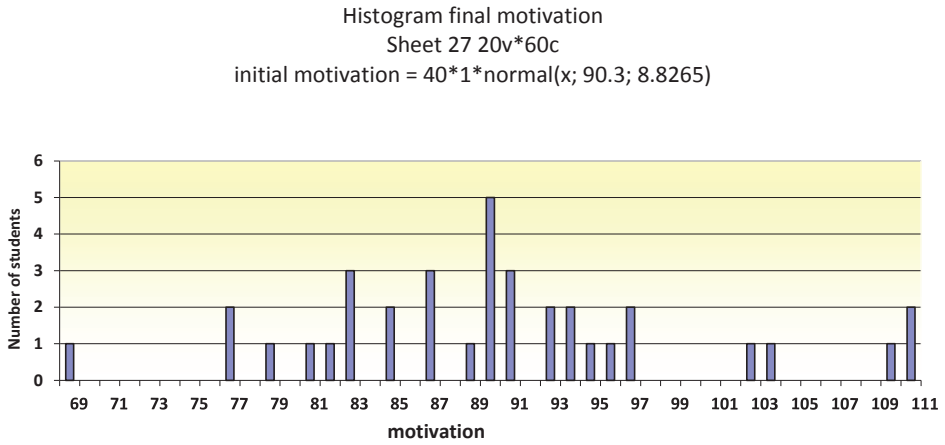
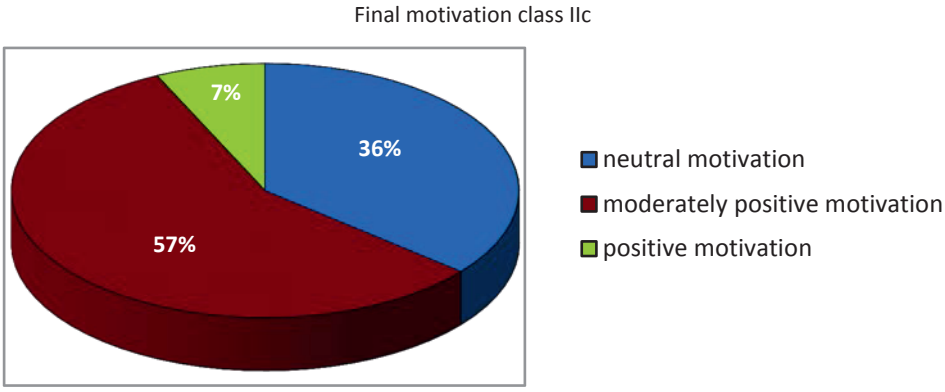



**Fig. 3.** Level of final motivation for learning about selected health issues



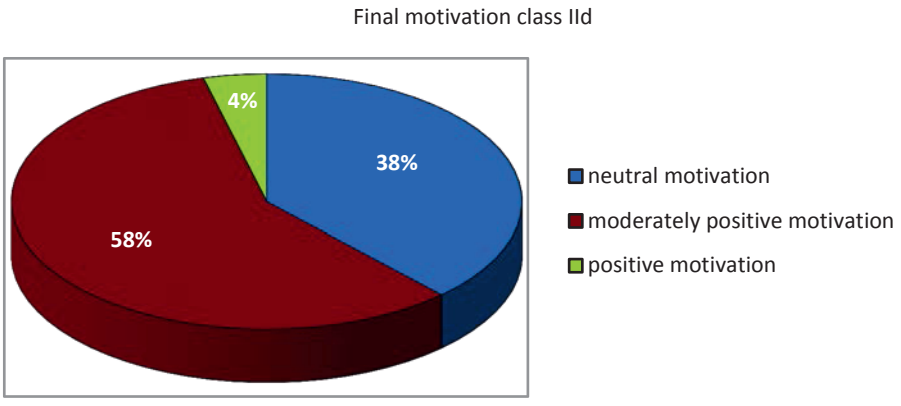
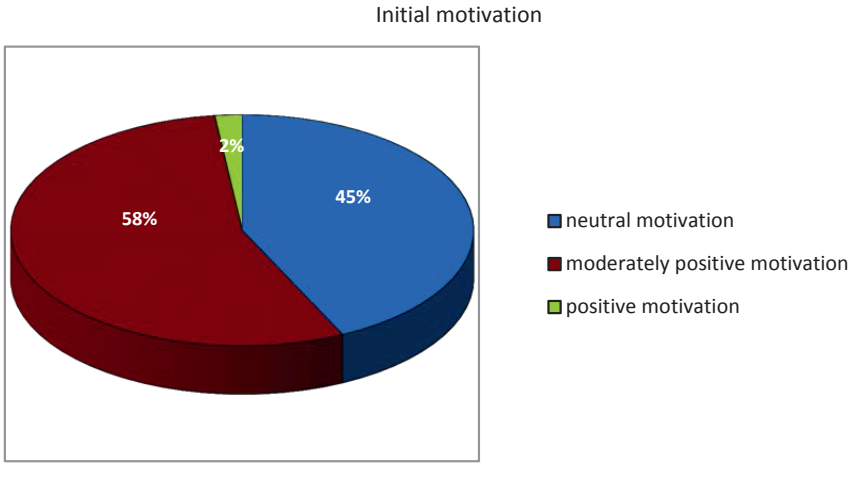



**Fig. 4.** Percentage presentation of final motivation for learning about health issues in the experimental groups

The research indicated that 57% students of class IIc presented moderately positive motivation, whereas 7% of them were characterised by positive motivation. Only 36% of students from class IIc present neutral motivation. Students from class IId were characterised by moderately positive motivation 1 pp /percentage point/ higher than students from class IIc and positive motivation 3pp lower than the former group. Exactly 38% of students from class IId presented neutral motivation.

## Comparison of motivation levels



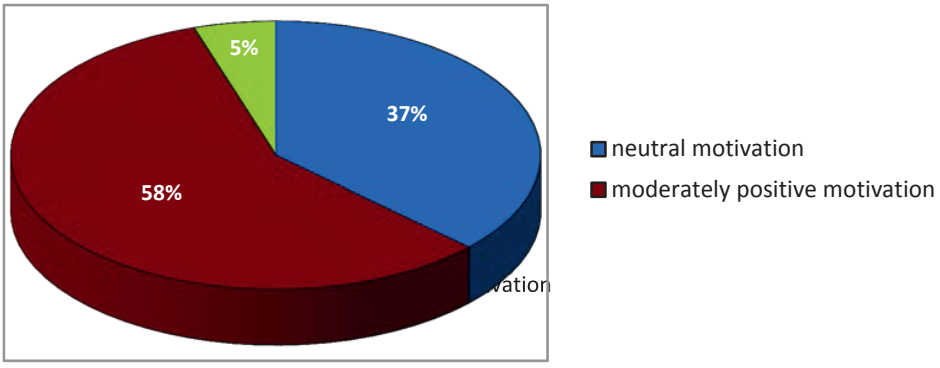



**Fig. 5.** Comparison of levels of initial and final motivation among secondary students taking part in the research

The comparison of initial and final motivation among students participating in the research allows for stating that after the series of classes on the use and prevention of stimulants and cigarettes the positive motivation rose by 3pp, whereas moderately positive motivation rose from 53% to 58%. The initial research, as well as the final research, did not record either negative motivation or moderately negative motivation. By comparing the average results of students' motivation one can note that students of class IIc, which has a Biology-Chemistry profile, are characterised by a lower motivation to learn about health risks and psychoactive substances than students from class IId (Humanities profile).

## Acceptance indicator for particular statements

The level of acceptance indicators for final motivation differs from that for initial motivation except for one statement (no. 14), which pertains to the fact that *learning about human behaviour under the influence of stimulants will show the risks relating to hygiene and personal culture.* The indicator was the same in both cases and came to 3.750. The highest acceptance indicator was recorded for the statement number 7 reading that *everyone should know the structure of their body and how psychoactive substances influence their health* (4.650 – initial motivation; 4.750 – final motivation), and number 26 pertaining to the *influence of alcohol and its consequences for the process of thinking* (4.583 – initial motivation; 4.675 – final motivation).

High acceptance indicators were also recorded for questionnaire items relating to *behaviour under the influence of alcohol (in the context of changes in the brain)* – number 12 (4.150 – initial motivation; 4.125 – final motivation); and the statement relating to *the prevention of addictions* (no. 22 – 4.500; 4.225).

In the case of thirteen statements the acceptance indicator in the final research was lower than the indicators recorded in the initial research. For the remaining statements the acceptance indicators in the final research were higher than the

values of indicators in the initial research. Therefore half of the statements experienced rise in the level of acceptance with respect to the initial motivation.

The lowest acceptance indicators in the research into initial motivation were recorded for sentence number 4 (*information about the influence of alcohol*, *drugs and nicotine on human body is not particularly useful* – 1.813) and number 21 (*I do not put much value on good marks in Biology* – 1.838).

Low indicators were recorded also for sentences:

- I am interested in issues concerning alcoholism, nicotinism and drug addiction because they relate closely to my life – (2.569);
- One should not start learning Biology at school from learning about all types of stimulants – (2.841);
- The average person is not interested in problems relating to alcoholism, nicotinism and drug addiction – (2.558);
- Learning Biology is boring and tiring – (2.659).

The highest acceptance indicator (both in initial research and final research) was recorded for the sentences:

- Everyone should know the structure of their body and how psychoactive substances influence their health – 4.577; 4.242;
- In my opinion, in order to prevent illnesses one requires knowledge about them, knowledge about routes of infection, and common sense – 4.500; 4.239;
- An addiction is a disease very difficult to treat because it relates to mental, physical and social spheres – 4.533; 4.527;
- The higher the concentration of alcohol in blood, the more serious the consequences for the process of thinking and acting – 4.648; 4.497.

## Conclusion

Contemporary young generation is exposed to a great extent to contacts with psychoactive substances, which might result in health and social problems. An increasing number of teenagers are suffering from lack of social adaptation, which shows in the consumption of alcohol and use of stimulants. It is proved, among others, by the results of the material research which point to weak motivation of students to learn about health risks caused by stimulants. Prevention of misadaptation in social life among young people has become a very important issue, almost a necessity. Young people, whose psyche has not been moulded yet, should receive help in understanding themselves, their behaviour and the surrounding world. Therefore it is vital to focalize activities aimed at prevention of addictions among teenagers. The above is supported by pedagogical factors pertaining to education and development of young people, as well as by factors concerning health and life quality. Proper motivation to learn leads to the creation of appropriate internal conditions. As a result, students start perceiving learning as important, and conditions for the development of important life skills are formed accordingly (Woynarowska 2002).

The research into upper secondary school students' motivation to broaden their knowledge about addictions applied the three-tier structure of "health literacy" according to Nutbeam (2000) and encompassed the first level – "basic/functional literacy". Particular emphasis was put on the role of the teacher – health educator –which mainly involved appropriate presentation, organization and transmission of information about risk factors, informing students about sources of reliable information on the material issue and health system, as well as giving them precise advice as to positive behaviours. The realisation and effectiveness of the educational process are to a great extent dependent on the teacher's personality, the style of their teaching, the organization of the teaching process, as well as on the quality of the teacher – student communication (Jędrzejczyk 2007).

The research was aimed particularly at the creation of basic life skills among students, as well as presenting them the ability of influencing their social and economic environment and material factors determining health. The final motivation to learn about issues concerning health risks rose slightly in comparison to initial motivation. The research did not record either negative or moderately negative motivation, which indicated a little growth of interest in learning about issues concerning alcoholism, nicotinism, and drug addiction. The research also indicated that students possess only some ability to analyze information critically, which is an indispensable element in making decisions about health. Therefore comprehensive education of young people with regard to health literacy is required, in particular at the level of critical literacy. For the effectiveness of educational actions it is necessary to develop students' life skills, particularly in the context of risk situations; create safe environment conducive to the improvement of skills; as well as use such teaching and learning methods that enable students to practice their skills in various situations (also with an increased level of difficulty and risk), enable observation of the behaviour of others and allow for transmission of information concerning health. In the educational process it is also important to account for the development and individual features of the particular students, as well as for individual characteristics of the teacher, which to a great extent influence the communication and, as a result, the quality of the teacher-student relation and the level of motivation among students. It is therefore so important for teachers to constantly develop their teaching and professional skills so as to be able to motivate students to learning.

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## Motivating secondary school students to raising the level of health literacy

### Abstract

Recent decades have brought many changes in the concepts and implementation of health education. Contemporary health education of children and teenagers accounts for all aspects of health (physical, psychic and social health) as well as for their conditioning factors. One of the main challenges of the twenty-first century public health is the promotion of 'health literacy'.

The article presents changes that have been taking place in health education in Polish schools in recent years. It will also focus on the position and status of health education after the latest curriculum reform (Ministry of National Education 2009). The new core curriculum significantly increases the status of health education making it an important objective for the schools and the teachers.

The aim of the research conducted in year 2011/2012 was to investigate the level of motivation of secondary school students to learn aspects connected with health, as well as to measure their level of awareness and health literacy after a series of classes devoted to preventing the use of stimulants and psychoactive substances. The outcomes of documents analysis were researched by means qualitative approach, and the results of the applied pedagogical experiment were analyzed statistically. Students' motivation was measured by a survey, in accordance with the assumptions of Likert scale (Brzezinski, 2006).

The initial motivation and final motivation after the experiment were measured among 153 students from five grade 2 classes of the upper secondary school. After the experiment, a test research was applied to investigate the level of comprehension of issues connected with maintaining good health. The comparison of initial and final motivation of students participating in the research indicated that after the series of preventive classes their levels of positive motivation, as well as moderately positive motivation, have risen.

The research indicated that the main aim of health education classes should be the continuous motivation of young people to undertake pro-health activities and avoid health risks. It is important to draw teenagers' attention to the interlinks between their behaviour (in particular actions which put health at risk) and the regularities resulting from their development, and to make them aware about the necessity to lead a healthy lifestyle adjusted to their age.

**Key words:** "helth literacy", curricula, students' motivation

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# Health Education – syllabuses, methods and results in the secondary school

One of the Polish poets, Jan Kochanowski, who wrote over 400 years ago about 'health' as the most precious, the dearest and the most irreplaceable value, was right. As long as people are healthy, they are not really interested in their own body. The situation changes dramatically when the disease appears.

The answer to the question: "what does it mean to be healthy and/or what does it mean to be ill?" is not simple. It is, inter alia, due to the fact that a person is not only a biological entity but also has a great mentality. As a result, it happens that people with a strong psyche, despite their illness, consider themselves to be healthy, while a person with a weak psyche and healthy body may feel physically ill.

Referring to the past of the human history and analysing it, special attention must be paid to the various attempts to cope with the infectious diseases. They appeared to be the most dramatic for the humanity of the past periods since they could be observed as the epidemic or even the pandemic.

The diseases that occurred suddenly made people equal since the representatives of all social classes were vulnerable to them. The only chance to survive was to escape from the areas where the sickness was present, however, it also involved the risk of new outbreaks. Gradually, people started to realise that importance of applying to the principles of hygiene as the cause of being healthy and of well-being in general.

Medicine in the recent years has seemed to be one of the fastest growing areas of the research. The conducted numerous studies have provided people with the knowledge which is necessary in order to control many diseases and to cure them.

Yet there are still new ones, which create new challenges, and the attempts to fight them are not yet effective.

The fight against many diseases will not bring the expected results if human beings do not acquire the appropriate health-related knowledge. It allows people

to undertake a number of preventive actions to avoid falling ill and to reduce the impact of diseases.

From the very early age, people should learn the principles of the personal hygiene and how to take care of their own safety, which in the future will prevent them from many dangerous diseases and will help maintain a good health.

In schools, a very important role is played by the classes conducted in the range of the first aid, which supply students not only with the knowledge in this field, but also with some practical skills. They allow, if necessary, to undertake a quick action – often the action that could save someone's life.

Health Education should be an integral part of the school education in all school types. For that reason, 'the basic work' is very important; such work focuses on repeating certain behavioural patterns so as to take care of the physical and mental health. It should be started at the very young age. Together with the development of children and young people, the health-related contents should be improved, making them suitable for the age and needs of young people.

Therefore, the degree of the realisation of Health Education at the 4th stage of education is the subject matter of this article, which discusses the familiarity with the health-related issues in secondary schools, and specifically in the Polish lyceum – the upper secondary school.

Apart from the information provided, concerning 'health' issues, an important aspect of the education is the role of upbringing. The realisation of the basic syllabus contents is, though, very essential. However, "is it always realized by Biology teachers to such an extent as they would like it to be taught themselves?" It will be possible to answer this question after conducting the relevant research in schools and providing the analysis of the results.

The health-related knowledge can be acquired by different types of educational activities of the interdisciplinary character, which can be compared to the way in which students move through different areas of education with the guidance of teachers - guides. Students, by following this path, integrate the knowledge associated with the specific concepts, facts, issues and, in the end, they build a holistic picture of the surrounding reality.

The direction of the realisation of the health-related issues should be based on the syllabus bases in the range of the general education, including:

- educational goals
- educational activities
- contents that should be included in the syllabuses of various subjects
- students' achievements and learning outcomes, which should result from the realisation of the discussed areas of education.

On the foundation of the syllabus bases, teachers develop the teaching plans, they determine how to realise them, as well as create classes by the use of the new contents, and they summarize educational activities.

Acquiring the health-related knowledge by students should appear as the result of the cooperation of several teachers in the interdisciplinary integration. However, it requires a close cooperation of teachers during the planning and the realisation stages.

Many contents are realised by the use of the activating methods, which enable students to plan and organize their own work independently as well as to undertake creative activities (Żeber-Dzikowska 2000). In this way, students not only have the conditions to develop their knowledge but also possess the ability to develop necessary skills and attitudes.

Such kind of education meets the requirements of the interdisciplinary integration, which is usually realized in one of three forms.

Such forms are known as models and fall into three different types, namely, linear, divergent, and flow models (Smolińska, Wójtowicz 2012).

Therefore, schools should consider three educational models of cooperation that are based on the subject proportions:

- Linear model – one subject (monodisciplinary). It relies on creating the holistic picture of the world and knowledge integration (from various disciplines); it can be realised by one or many teachers in the range of classes dealing with one school subject (e.g. Ecological Education, Health Education, Regional Education);
- Divergent model (multidisciplinary) – can be realised during the classes of many different school subjects with their complete autonomies and without time synchronization. This model requires the cooperation of teachers in the interdisciplinary team. The determination of reason-cause relations as well as the synthesis of the complete knowledge and skills must be realized during different school subjects.
- Flow model (interdisciplinary) – is realised by all teachers in the ordered way. Due to the synchronisation of the model in time, it becomes a part of the upbringing syllabus of the school (Buchcic, Żeber-Dzikowska 2003; Smolińska, Wójtowicz 2012).

The unsatisfactory health condition of the Polish society, including children and the youth, as well as the phenomenon of social pathology oblige teachers to start the so-called 'basic work', namely, Health Education in the school environment.

It is, therefore, necessary to define the concept of 'health' and the concept of 'disease' as the opposite phenomena first. According to WHO[1], 'health' is a state of physical, mental and social well-being, it is the efficiency and accuracy of homeostatic mechanisms of the body, adapting it to almost any situation.

'Disease', however, is a state of disorder in the range of the homeostatic mechanisms. To be precise, 'disease' impairs the harmonious cooperation of cells, tissues, organs and systems. It weakens the life forces, and consequently the physical and mental efficiencies of the body.

[1] WHO – the abbreviation: World Health Organisation

The average person quite often wonders when the preventive medicine in its actions will achieve the desired results. It will be possible only when people can keep consciously trying to change their behaviour in the range of 'health', in favour of the prevention of principles of hygiene.

A huge role in this sphere can be played by Health Education, which teaches how to take care of personal health and the health of others. It gives people the opportunity to acknowledge better and understand the way of functioning of one's own body and its environment. It enables people to distinguish the factors influencing the health and well-being positively and negatively. With its presence, any human-being can acquire skills of living according to the principles of a healthy lifestyle.

There is no need to persuade anyone that Health Education is the most cost-effective investment in the public health. The school environment tends to be a huge sphere for acting in the field of Health Education, which not only focuses on providing the knowledge about 'health', but also on undertaking a variety of ad hoc actions. Therefore, the main goal of the school in this regard is to inculcate students with the principles of hygiene and to shape their attitudes of responsibility for their own health and health of others at the appropriate stages of the educational way.

The topics associated with the health-related issues should be introduced from the nursery, and gradually expanded at the early-schooling learning stage – forms 1–3 – followed by forms 4 – 6 of the primary school, and at the 3rd and the 4th stage of education. The health-related contents should be complementary to the prophylactics and its syllabus, which can be considered as the integral knowledge taught in schools at various stages of education. They should be understood as a set of contents and skills that play an important role in the range of the health-related, preventive, and educational realisation, which can take place in the teaching process of different subjects.

Health Education should have its own syllabus bases, which would be included in the curriculum together with its realisation in terms of 'health', prevention and education aspects.

## The suggestions of the syllabus bases for Health Education

Educational aims

1. Improving the knowledge about the realisation of the health-related contents in the range of behaviours to protect, maintain and improve the health of the individual and the public;

2. Developing life skills appropriate to the physical, mental, social and spiritual improvement;

3. Developing an active and responsible approach towards personal health and health of others;

4. Developing the need for action in favour of creating the healthy environment.

School tasks

1. Increasing students' interest in the health-related issues and providing them with reliable information about the various aspects (physical, mental, social and spiritual) of health and the factors in favour of 'health', and the most common health risks and possibilities of their elimination;

2. Creating school environment that enables students to practice healthy life-style, to improve student's self-esteem, self-confidence and capabilities, as well as to provide students with support in difficult situations;

3. Developing the cooperation with parents and the local community in the range of Health Education as well as solving students' health problems.

Educational / teaching contents

1. The lifestyle and its relations with health and diseases; the concepts and aims of health promotion. 'Health' as a value for the human and the society;

2. Personal beauty care; caring for maintaining the appropriate body weight, body shape, good performance and physical fitness; protecting the environment from the pollution;

3. Work and leisure time, active ways of spending free time; physical activity, fun and a sense of humour as factors referring to 'health';

4. Identifying and taking risks; safe behaviour patterns in everyday life; concern for the safety of others;

5. Principles of rational nutrition in different periods of life; nutrition and well-being as factors referring to the ability to work and prevent the body from diseases; effects of inappropriate weight loss, consequences of elimination diets; selection of health promoting food products and their storage; the rights of food consumers;

6. The use of medical, psychological and other forms of support; the importance of prophylactics and medical testing; the behaviour during the disease; attitudes towards the chronically ill, the disabled and the elderly;

7. Conditions of the supply and demand for psychoactive substances; types of such substances and their effects on the body, psyche and social and spiritual development of people; legal regulations dealing with the use of psychoactive substances; forms of assistance and support for the experimenting people and addicts;

8. Personal and social skills necessary for the protection of life as well as the improvement and maintenance of 'health'.

Achievements

1. The knowledge of the main factors in favour of health and creating risk for human health, and the basic principles of prophylactics in the range of the most common disorders and diseases; the realisation of health-related values;

2. The ability to use the medical and psychological care, to cope with difficult situations and to support others;

3. The ability to communicate and maintain good relationships with other people, and to function and cooperate within a group, dealing with the pressures of the environment;

4. Conscious aspiration to protect, maintain and improve the personal health, and the health of others, among whom the student lives.

The sources of knowledge in the range of the health-related contents should belong to the interdisciplinary contents. To its complete realization, Health Education is required to be included in the curriculum and involves the presence of the school coordinator. Such a function should be associated with the teacher of specific competences, who can be observed as a person, who is very interested in the problem of 'health' and is motivated to face such a task. Under the supervision of the coordinator and with his/her practice, a school syllabus of the Health Education should be created. Such syllabus is to be realised during Biology and P.S.E.[2].

The introduction of the health-related contents requires:

- cooperation with the staff of the National Health Centre;
- new, willing cooperation with the office staff, canteen workers, and the supportive staff;
- creating the environment that supports Health Education;
- cooperation with parents
- cooperation with the local community
- investment in the teachers' personal, social and health development;

Health Education, realizing the suggested goals, is the way to complete and consolidate the knowledge among young people that deals with the mentioned issues, namely, developing and improving skills to take care of and respect personal health and the health of others.

One of the conditions to undertake any kind of the examination is to create the appropriate problems and to form working hypotheses, which enable and direct the research towards the aims as well as examination ranges.

The present article makes an attempt to answer the formulated main problem and the resulting specific problems.

The main problem: In what way is Health Education realised at the 4th educational stage?

The specific problems:

1. Are the teachers involved in the realisation of the health-related contents in upper secondary schools?

2. What kind of educational syllabus is realised?

3. Does the realisation of the health-related contents influence the state of knowledge and students' attitudes?

4. Is there a correlation with other subjects in the range of the realised health-related contents?

5. What educational model is used during the realization of the health-related issues in upper secondary schools?

[2] Abbreviation: Personal and Social Education, the lesson also known as: weekly class meetings, or tutor's lesson – performance and discipline analysis.

The investigated issues refer to the following hypotheses:

Main Hypothesis: Health Education is included in the curriculum and realised at the 4th stage of education.

Specific hypotheses:

1. Teachers are committed to the realisation of the health-related contents;

2. The realization is mainly based on the individual professional syllabuses due to the lack of syllabuses created by the Ministry of National Education;

3. The realization of the health-related contents increases the knowledge and develops the appropriate attitudes;

4. In the range of the realisation of the health-related contents, there is a correlation with some other subjects;

5. In upper secondary schools, there is the divergent / multidisciplinary educational model realised related to the health-related issues;

The study used a questionnaire for teachers. The survey examination was prepared to investigate the extent and the way of the realisation of the health-related contents in upper secondary schools.

The appropriate structure of questions created the possibilities for the respondents to provide the complete answers, which created a valuable material for the analysis, and the analysis allowed obtaining the results and drawing conclusions.

The survey examination was conducted among the teachers of Biology and the related specialties, namely, Chemistry, Physics and Civil Defence Course, Physical Education, Religious Science, from upper secondary schools located in the Świętokrzyskie Province.

The study involved 179 teachers of different subjects, i.e., Biology, Chemistry, Physics, and Physical Education. Among the respondents, there were 142 women and 37 men. The most of the respondents, 95 people, had the work experience in a range from 16 to 25 years (53.07%), 58 teachers worked from 6 to 15 years and the fewest number of teachers, i.e. 26, had the experience of more than 25 years (14.53%).

The demonstrated data specify that the respondents are teachers with extensive experience in the classroom. All of them have a higher degree qualification (Master of Arts or Master of Science) in the field of teaching, which means gaining the appropriate content-related preparation for teaching,

The certified teachers created the majority (i.e. 72 teachers – 40.22%) and 66 (36.87) of the teachers were the appointed ones, however, 41 of the respondents (22.91%) were at the lower level of the career promotion. Thus, such a small number of the respondents at the level of career advancement lower than the appointed teachers confirms the high competences and great experience of the respondents in teaching career and didactic work.

The first question concerned the extent to which the health-related contents were realised, according to the evaluation of teachers. Most of them believed that

it proved to be on a good level (47.49%) and sufficient level (26.26%) (table 1, figure 1).

**Tab. 1**. The level of realisation of the health-related contents at school

| The level of the realisation of the contents in the point-based scale | N | % N |
|---|---|---|
| 0–1 insufficient/unsatisfactory level | 11 | 6.15 |
| 2 – adequate level | 18 | 10.06 |
| 3 – sufficient/satisfactory level | 47 | 26.26 |
| 4 – good level | 85 | 47.49 |
| 5 – very good level | 18 | 10.06 |

N – Number of teachers

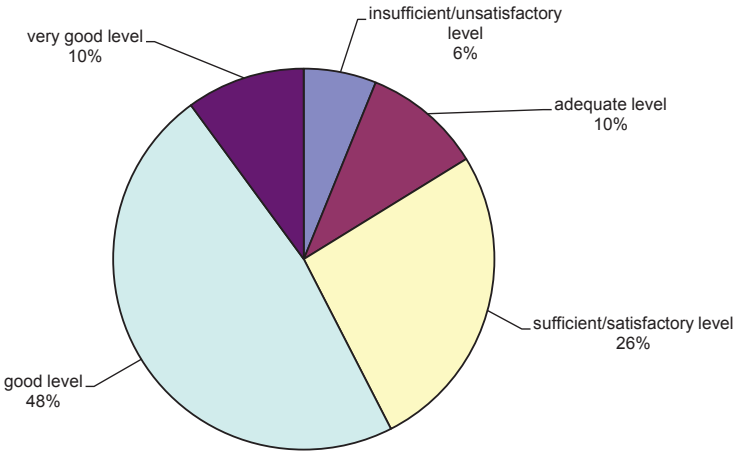


**Fig. 1.** The level of the realisation of the health-related contents at school according to the respondents

The next question was to determine what percentage of the respondents realised the health-related issues. As it can be seen from the data, 100% of them realised such issues.

When asked about the patterns according to which the health-related contents were realised, 66.48% of the teachers indicated the syllabus bases, 20.67% of them introduced some elements, based on the syllabuses developed by a group of authors and approved by the Ministry of National Education, which was not a typical syllabus of Health Education, but only in the syllabus of Biology with the elements of Health Education. Only 11.17%, thus, a small number of the respondents realised the above-mentioned contents using the personal professional syllabuses prepared and approved by the pedagogical council body of the their own school or another school, 3 of the teachers (1.68%) indicated other than stated sources, however, without specifying them.

The existing condition seems to be a result of the lack of independent and accessible syllabuses of Health Education created, developed and approved by the Ministry of National Education (table 2, figure 2).

**Tab. 2.** Patterns according to which the health-related contents are realised

| Patterns according to which the health-related contents are realised; | N | % N |
|---|---|---|
| Syllabus bases | 119 | 66.48 |
| Syllabus created by a group of professionals approved by the Ministry of National Education | 37 | 20.67 |
| Individual syllabus created and approved by pedagogical council body of another school | 20 | 11.17 |
| Other (provide the name) | 3 | 1.68 |

N – Number of teachers

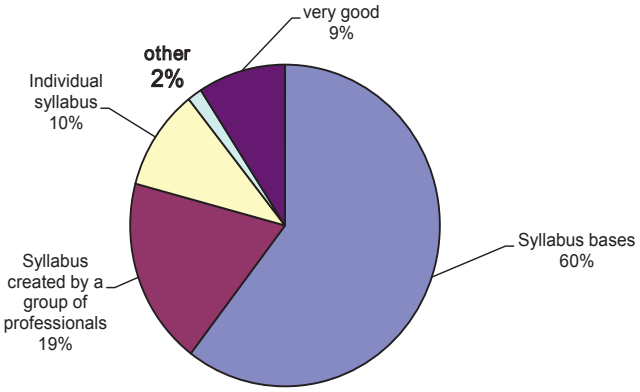


**Fig. 2.** Patterns according to which the health-related contents are realised

79 of the respondents (44.13%) explained that the reason why they realised the health-related contents relying only on the syllabus bases was the fact that it contained the most important issues affecting the awareness and attitudes of young people in the sphere of the health issues. In addition, such motivation was reinforced by yet another important argument, which was the lack of extra hours (classes) exclusively dedicated to Health Education alone.

57 of the teachers (31.84%) provided as the main reason the lack of extra hours (classes) dedicated to the realization of Health Education only. The remaining 24.02% of the respondents (43 teachers) justified their decisions by the lack of the syllabus developed and approved by the Ministry of National Education (table 3).

The respondents providing the answer in the survey about the syllabuses employed for the realisation of Health Education did not mark that the syllabus approved by the Ministry of National Education was the only one that took into account all the necessary contents, moreover, that it in some way completed the

syllabus in Biology. However, such a syllabus still cannot be called the syllabus of Health Education.

**Tab. 3.** Motivations according to which teachers realise health-related contents based only on the syllabus bases

| Motivations according to which teachers realise health-related contents based only on the syllabus bases | N | N % |
|---|---|---|
| Lack of syllabuses created and approved by the Ministry of National Education | 43 | 24.02 |
| The essential issues influencing the human health-centred awareness and attitudes are included and it is possible to realise the contents without extra teaching hours (classes) dedicated only to Health Education | 79 | 44.13 |
| Lack of extra didactic hours dedicated only to health-related contents and their realization during Biology lessons | 57 | 31.84 |

N – Number of teachers

27 of the respondents (15.08%) used the health-related issues included in the syllabus of Biology prepared by the educational publisher 'WSiP', 26 of them (14.53%) employed the one created by 'Nowa Era', 20 of the teachers (11.17%) referred to the one published by 'PWN', 21 (11.73%) – by 'Operon', while 16 of the respondents (8.94%) used the syllabus of Biology – 'MAC'. Nevertheless, 69 of the respondents (38.55%) declared realising Health Education on the basis of their own syllabuses.

The data demonstrated above by the use of percentages indicate the lack of individual syllabuses in the range of Health Education approved by the Ministry of National Education. Therefore, only some respondents are supported by a few individual professional syllabuses.

The purpose of the next question was to find out the factors that make teachers realise the health-related issues.

68.16% of the respondents (122 persons) mentioned two factors that made them realise such issues. Among the most frequently mentioned there were the following:

1. Paying attention to the state of personal health as the principal value and inculcating the habit of taking care of it among young people;

2. Making an attempt to shape students' attitudes so that they become responsible for their own health;

21.13% of teachers (38 persons) mentioned three factors; among them, apart from the two factors stated above, the third was given, i.e., a commitment of the school authorities to realise such issues.

10.61% of the respondents (19 persons) mentioned only one factor, i.e. paying attention to the state of personal health as the principal value and inculcating the habit of taking care of it among young people. All the above mentioned factors are important and help teachers shape the consciousness of the young persons in the range of health prevention, which will be useful in their future life (table 4).

**Tab. 4**. Factors that make teachers realise health-related contents

| Factors that make teachers realise health-related contents | N | % N |
|---|---|---|
| 3 factors mentioned | 38 | 21.23 |
| 2 factors mentioned | 122 | 68.16 |
| 1 factor mentioned | 19 | 10.61 |

N – Number of teachers

When asked about the educational model associated with the issues of the health – related contents realised by teachers, 103 of the respondents (57.54%) indicated the divergent model – multidisciplinary model, 57 (31.84%) chose the flow model – interdisciplinary model, and only 19 (10.61%) referred to the linear model – monodisciplinary model.

The multidisciplinary model, selected by the majority of the respondents, ensures us that the contents will not be repeated during the realisation of various subjects, but that they will be complementary. Then, the discovery, the experience and the knowledge complementation of missing links of the overall perception of reality were mentioned (table 5, figure 3).

**Tab. 5.** Educational model associated with the health-related contents selected and realised by teachers

| Educational model associated with health-related contents selected and realised by teachers | N | % N |
|---|---|---|
| Linear model –monodisciplinary one | 19 | 10.61 |
| Divergent model – multidisciplinary one | 57 | 31.84 |
| Flow model – interdisciplinary one | 103 | 57.54 |

N – Number of teachers

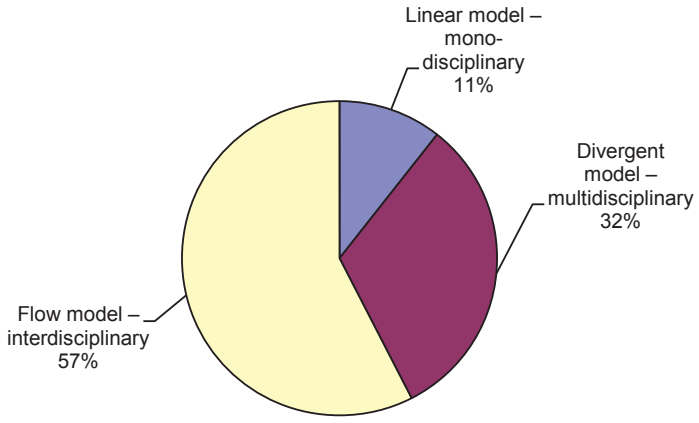


**Fig. 3**. The educational model chosen and realised by the respondents

Then, the respondents were asked to state whether the realisation of the health-related issues could take place during extra hours (classes). All teachers unanimously responded that they did not get extra lessons (classes) for the realisation of issues relating to Health Education. For that reason, it is the major problem preventing the possibility of its complete realisation.

When asked about advantages and disadvantages of the realised contents, 57.90% of the respondents stated that following advantages: shaping the attitudes of health prevention and personal responsibility for the state of one's own health. 21.05% of the respondents mentioned the recognition of the risk factors associated with falling sick and the appropriate prophylactics. 21.05% of the respondents, i.e. the same percentage as above, referred to the advantage of gaining extra knowledge in the range of health protection.

102 of the respondents (56.98%) did not mention any disadvantages in the range of the health-related contents. Neither did they acknowledge any disadvantages that could be classified as disadvantages influencing the lack of their realisation.

59 (32.96%) of the respondents discovered disadvantages in having difficulties in realising the above-mentioned issues due to the time limits, namely, the lack of extra hours (classes). 18 of the respondents (10.06%) referred to the lack of a syllabus created by the Ministry of National Education associated with the health-related contents and to difficulties with the documentation of such educational activities, which additionally makes teacher's work inconvenient and difficult.

As it can be seen from the data shown above and the respondents' statements, despite the numerous and undisputed advantages, there are considerable difficulties in the realisation of the complete issues, and therefore, satisfactory realisation of Health Education in upper secondary schools (table 6).

**Tab. 6**. Advantages and disadvantages of the contents related to Health Education

| **Advantages and disadvantages of Health Education** | | **N** | **% N** |
|---|---|---|---|
| Advantages * | Shaping attitudes and personal health prevention | 102 | 56.98 |
| | Recognizing risk factors associated with falling sick and the appropriate prophylactics | 36 | 20.11 |
| | Gaining extra knowledge in the range of health protection | 41 | 22.91 |
| Disadvantages ■ | Difficulties in the realisation due to the time limits (lack of extra teaching hours -classes) | 59 | 32.96 |
| | Lack of a syllabus created by the Ministry of National Education associated with the health-related contents and difficulties with their documentation. | 18 | 10.06 |
| | Lack of disadvantages | 102 | 56.98 |

N – Number of teachers

* – Respondents providing answers concerning advantages, i.e. 100%

■ – Respondents providing answers concerning disadvantages, i.e. also 100%

When asked about the difficulties faced during the realisation of Health Education, 103 people, i.e. more than half of all respondents (57.54%) stated that the main problem was due to the lack of getting extra teaching hours (classes).

Only 18 of the respondents (10.06%) claimed finding difficulties in the lack of teaching facilities (didactic sources) contributing to the proper realisation of the above-mentioned contents. The data presented in the table below (table 7) constitute clear evidence of significant difficulties in the complete realisation of Health Education. It is surprising that as many as 58 people representing 32.4% of the respondents did not answer the question, which can mean that either they did not perceive them, or the survey question was dealt with without appropriate consideration.

**Tab. 7**. Difficulties faced by teachers in realising Health Education

| Difficulties faced by teachers in realising Health Education | N | % N |
|---|---|---|
| Lack of extra teaching hours for realising health-related contents – time limits | 103 | 57.54 |
| Lack of didactic base relevant to appropriate health-related issues | 18 | 10.06 |
| No answer | 58 | 32.40 |

N – Number of teachers

The vast majority of teachers realising the health - related contents benefits from the cooperation with the institutions not involved in everyday school activities (table 8). Such institutions can sufficiently develop and improve the health – related issues. Ignoring the possibility of such cooperation most certainly diminished and reduced the effectiveness of Health Education. However, only 24 (13.41%) of the respondents did not enter such cooperation.

**Tab. 8.** The cooperation of teachers realising Health Education – school – with the institutions not involved in everyday school activities

| The cooperation of teachers realising Health Education-school – with the institutions not involved in everyday school activities; | N | % N |
|---|---|---|
| YES | 155 | 86.59 |
| NO | 24 | 13.41 |

N – Number of teachers

124 of the respondents (69.27%) cooperated with such institutions as the Polish Red Cross, the National Sanitary Inspection, as well as doctors and school nurses. 33 of the respondents (18.44%) cooperated with blood donation centres, the Association of 'Amazonki', the National Sanitary Inspection and school nurses. 22 of the respondents (12.29%) worked together with doctors, psychologists, as well as psychological and pedagogical counselling centres for addicts.

The presented data constitute clear evidence of the fact that while dealing with Health Education, teachers willingly cooperate with the institutions and professionals that work for the benefit of health promotion. The result of such cooperation

is regarded as highly effective in the range of gaining knowledge and developing health-centred attitudes by students (table 8, 9).

**Tab. 9**. The names of the institutions that the teachers cooperate with while realising the health issues

| Names of the cooperating institutions or people* | N | % N |
|---|---|---|
| Sanepid[1], Association of Amazonek[2], school nurse, blood donation centres | 29 | 18.71 |
| PRC[3], Sanepid, nurse, doctor | 108 | 69.68 |
| Doctor, psychologist, psychological and pedagogical counselling centre for addicts | 18 | 11.61 |

N – Number of teachers

* – Corresponding only to the respondents who provided us with the positive answer to the previous question. In this case, 155 respondents are considered to constitute 100%.

1 National Sanitary Inspection

2 The Society of 'Amazonki' (Amazonki – refers to women fighting with breast cancer)

3 Polish Red Cross ( Polish: Polski Czerwony Krzyż, abbr. PCK)

One of the survey questions was related to the most commonly used activating methods. 84.92% of the respondents, i.e. the vast majority (152 persons), provided us with two activating methods, among which the most frequently mentioned were 'debate' and project. That means that they are most willingly applied during the realisation of Health Education. It is worth acknowledging that teachers confuse the notion 'project' with other activating methods. It should be remembered that 'project' realisation consists of a number of teaching methods since 'project' is multi-methodological in its character.

Three methods are used by 18 respondents (10.06%), and four by only 9 of them (5.03%). The respondents who constituted the minority also mentioned the method of 'portfolio', 'interview' and the method of drama.

**Tab. 10.** The activating methods most commonly used by respondents during the realisation of the health-related issues

| The activating methods most commonly used by respondents during the realisation of the health-related issues | N | % N |
|---|---|---|
| Four methods | 9 | 5.03 |
| Three methods | 18 | 10.06 |
| Two methods | 152 | 84.92 |

N – Number of teachers

Among the respondents, to be precise, 66 of them (36.84%) chose the debate as a method considered to be the most effective, in their opinion. Such choice was justified by the fact that this method allows preparing students for the effective participation in public life and allows them to develop the abilities to express their own beliefs.

46 respondents (26.31%) considered a project to be the most effective form of work because it develops students' creativity and improves the abilities of reasoning.

The smallest number of respondents, i.e. only 18 (10.53%) used the method dealing with portfolio, which forces the student to search for information, select it for the purpose of its use during the classes, and then for the purpose of effective presentation.

It is puzzling, though, why as many as 47 people, which constitutes 26.26%, did not answer this question.

**Tab. 11.** The respondents' choice of the most effective methods, in their opinion

| The respondents' choice of the most effective methods, in their opinion | N | % N |
|---|---|---|
| Debate | 66 | 36.87 |
| Project | 48 | 26.82 |
| Portfolio | 18 | 10.06 |
| No answer | 47 | 26.26 |

N – Number of teachers

The last question of the survey concerned the difficulties faced by the teachers during the realisation of health-related contents in high schools. The vast majority of the respondents, i.e. 152 persons (84.21%) stated as the main problem the time limitations, namely, no extra time for the realisation of such contents. 18 respondents (10.53%) referred to the lack of syllabuses approved by the Ministry of National Education that would involve issues related to health prevention, and lack of appropriate education facilities.

Only 9 people (5.03%) specified as a problem the variances in the subject syllabuses and curricula. Therefore, due to the difficulties mentioned by the respondents, Health Education cannot be completely and effectively realised in upper secondary schools (table 12, figure 4).

**Tab. 12.** Difficulties that the respondents had to face during the realisation of classes related to Health Education in high schools

| Difficulties that the respondents had to face during the realisation of classes related to Health Education in upper secondary schools | N | % N |
|---|---|---|
| Time limits – lack of additional hours dedicated to their realisation | 152 | 84.92 |
| Lack of teaching hours, lack of professional syllabuses recognised/approved by MNE* as well as insufficient and inappropriate didactic base | 18 | 10.06 |
| Variances in curricula (subject syllabuses) | 9 | 5.03 |

N – Number of teachers

* Ministry of National Education (Polish: *Ministerstwo Edukacji Narodowej i Sportu*, MENiS)

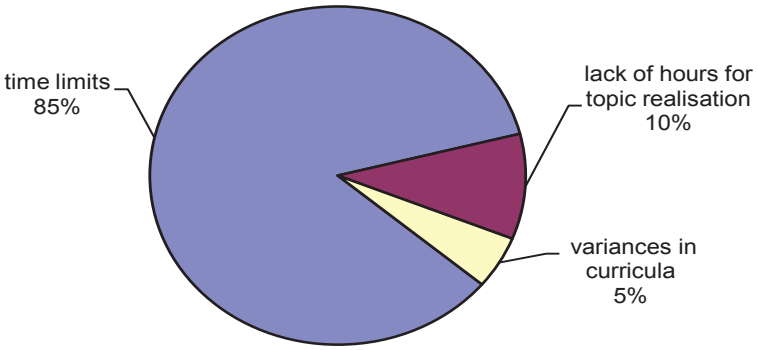


**Fig. 4.** Difficulties that the respondents had to face during the realisation of issues related to Health Education in upper secondary schools

Summarizing, it should be recognized that the assumed hypotheses were confirmed by the survey examination. They show the following aspects:

– Health Education is not fully realised, however, its elements are included in the curriculum and realised at the 4th stage of education:
  - individual teachers realise the elements of the health-related contents by making the appropriate subject contents relevant to the teaching subject, especially in the case of Biology teachers, due to the fact that this discipline refers very closely to human beings and their health.
  - the realisation of the health-related issues develops the knowledge and shapes appropriate attitudes, that is activities essential in the prophylactics of human health, aiming at improving the personal health as well as the health of the family.
  - during the realisation of the above-mentioned contents the correlation with certain subjects can be observed. Apart from Biology, Health Education, which was confirmed by the survey examination, is conducted by teachers of the following school subjects: Civil Defence Course, Physical Education, Family Life Education, and Personal and Social education (weekly class meetings, also known as tutor's lesson – performance and discipline analysis). Thus every teacher realises Health Education contents according to their school subject issues. It is a good example of the school subject correlation, namely, the interdisciplinary one, that takes place during the realisation of health-related issues within a particular school subject. Such correlation is very valuable because it helps to increase the efficiency of the acquired knowledge and shaped attitudes and beliefs.
  - in upper secondary schools, the divergent model of education can be observed considering the realisation of Health Education (multidisciplinary one). Such a model, as mentioned earlier, is realised during the classes dealing with some different subjects while maintaining their individual autonomies, however,

without acknowledging the synchronization, namely, during the classes which correspond to the subject contents. The cooperation of teachers is required in such case.

Analysing the problem after the survey examination, the following conclusions should be referred to:

1. Health Education, due to its unique role, should be realised in every school completely (in a full range). However, it is difficult because of the lack of personal syllabuses and lack of obtaining extra teaching hours (classes), which could be dedicated to the realisation of such contents.

2. The effectiveness of such education could be more efficient if it appeared as a separate discipline realised by several teachers. It means that all teachers could play their own parts according to their personal qualifications.

The present state cannot be quickly changed; however, most certainly the attempts can be made to prevent the presently appearing phenomena related to the Health Education realisation.

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## Health Education – syllabuses, methods and results in the upper secondary school

### Abstract

The fight against many diseases will not bring the expected results if human beings do not acquire the appropriate health-related knowledge. It allows people to undertake a number of preventive actions to avoid falling ill and to minimize the impact of diseases.

From the very early age, people learn the principles of personal hygiene and how to take care of their own safety, which in the future will prevent them from many dangerous diseases and will help them maintain good health.

In schools, a very important role is played by the classes conducted in the range of the first aid since they supply students not only with the knowledge in this field, but also with some practical skills. They allow, if necessary, to undertake a quick action, often the action that saves someone's life.

Health Education should be an integral part of the school education in all school types. For that reason, 'the basic work' is very important; such work focuses on repeating certain behavioural patterns so as to take care of the physical and mental health. It should be started at the very young age. Together with the development of children and young people, the health-related contents should be improved, and should be made suitable for the age and needs of young people.

Still, the realisation of Health Education is essential. However, "is it always realized by Biology teachers to such extent as they would like it to be taught themselves?" To answer this question, research was conducted in seven upper secondary schools situated in Kielce. It appeared that the realisation of Health Education is made difficult due to the lack of the independent and accessible syllabuses of Health Education and due to an insufficient number of hours for its realisation. Varied extent to which students are interested in the subject matter requires the employment of the most interesting methods to discuss the contents. To improve the effectiveness, the health-related issues should be considered as a separate school subject realised by some teachers who would have their personal theme range to cover, according to their qualifications.

**Key words:** health education, curricula of secondary school, methods of teaching

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# Health education assumptions and models and their implementation in the Polish educational system

## Introduction

Health education is a relatively new term in Polish academic literature, however, issues connected with health protection have been present in the Polish educational system for a long time. Originally, this study was defined as "health upbringing", which constitutes the integral part of human personality, involving among others: the production habits indirectly or directly, shaping attitudes aimed at boosting the health and developing interests in the issues related to the structure and functioning of the human body (Demel 1968). This term is still in use. In the 1970s health pedagogy was developed.

According to Mazurkiewicz – its author – health pedagogy provides a theoretical base for health education offering the fundamental methodological basis. The subject of its analysis is the process of upbringing to health and teaching health, the essence of which is developing one's competence through "providing the information, shaping a system of values and behaviours connected with health" (Kapica 2001). Currently we are observing a wide interest in the issues dealing with health protection. As a result, more and more faculties such as 'health studies' are created at universities, the role of which is to educated highly qualified staff, who deal with health promotion in the broad sense. It has been several years since the increase in research studies in the scope of health sociology and psychology started to be observed. Also, for several years one can observe increasing interest in research in the field of health, sociology and psychology, as well as in the impact of the disease on the processes of teaching and education. This tendency involves the educational system. Since 1992, some schools have been 'promoting health', and their aim is to organize an environment supporting healthy lifestyle among children and teenagers and also the local community (Brzenska 2012). The new core curriculum of general education from 2008 indicates the increasing role of health education. The curriculum assumes that 'the important task of any school (apart from upbringing) is health education' (Woynarowska 2012b). Joining the 'health education' model to

the curriculum of physical education in lower and upper secondary schools / 'junior high school and high school' / opens a new stage in school's health education in Poland (Bogacz 2009).

## Health education and its goals

There are many definitions of health education. Over the past few years psychologists, sociologists, and public health specialists have brought a new interdisciplinary dimension to health education. Health education is the right of every human being, especially a child, because it allows obtaining competence in protection and improvement of one's and other people's health. That is why health education favours:

- positive adaptation to developmental changes,
- development of one's interests,
- prevention of disorders and risky behaviour (e.g. using psychotropic substances) for health and development.

Systematic health education in schools is considered as the most profitable and long-term investment in a healthy society (Nakijma 1993). According to T. Williams, health education is a process which makes people take care of their own health and the health of the society they live in (Williams 1988). Health education is understood as the process in which a person uses knowledge in an effective way – it means that they make a decision and act where the following outcomes matter for themselves or the society they live in (Andruszkiewicz, Banaszkiewicz 2008).

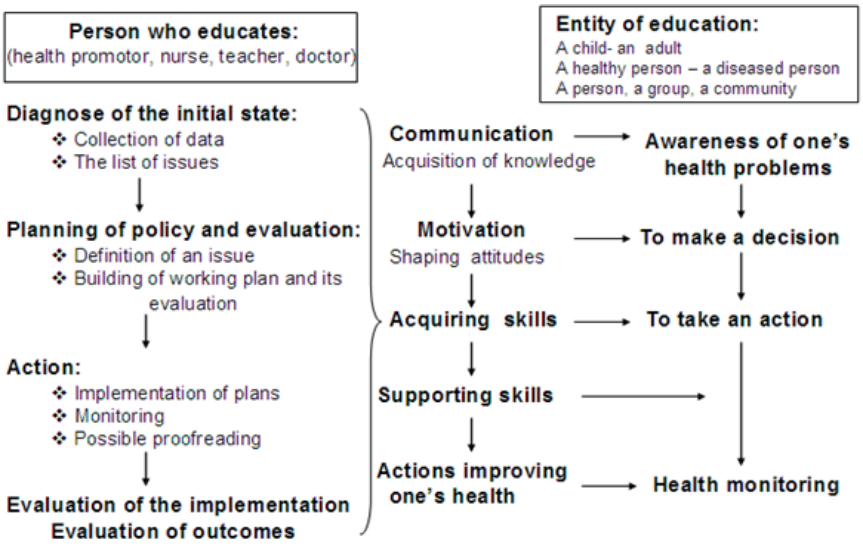


**Fig. 1.** The process of health education (source: Andruszkiewicz, Banaszkiewicz 2008)

However, it should be mentioned that health education is not only a didactic-educational process conducted at educational institutions (formal education), but also consists of social activities that have influence on people's behaviour (Krawczyński 2003). It is essential that health education should not only mean institutional forms of acting. Health education of adults is based on the activity of an individual, on self-improvement. They can also take advantage of various educational solutions (for example the University of the Third Age). It is crucial that health education is a lifetime process which embraces all stages of people's live. Next stages are connected with different perception of the world, changing priorities, preferences and increasing experience influence on everyday activity, including risk behaviour as well as aspects which do not concern health issues (Szewczyk 2000).

Health education understood in a traditional way embraced mainly education which boiled down to teaching of various aspects of health. However, aims of health education and its expected effects should be differentiated according to the needs of the given group of people (Woynarowska 2010a, 2010b, 2012a). Nowadays, according to the widespread belief, relaying of knowledge concerning health cannot be the main goal of health education. There is a risk that excessive amount of information can contribute to lack of understanding and general discouragement.

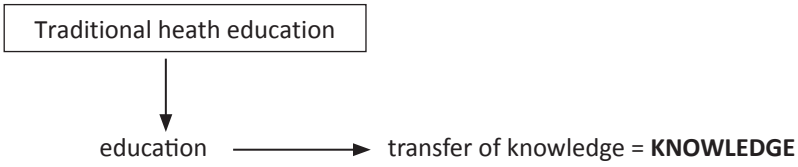


**Fig. 2.** The goals of health education in traditional approach (source: Andruszkiewicz, Banaszkiewicz 2008)

The main goal of health education should be 'building' people's competence. According to J. Skrzypczak, shaping particular qualifications in a given field means to provide people with a certain amount of knowledge, which should be understood by them. It also means to support people in using their qualifications in a proper way and developing a motivation to act accordingly (Skrzypczak 2000).

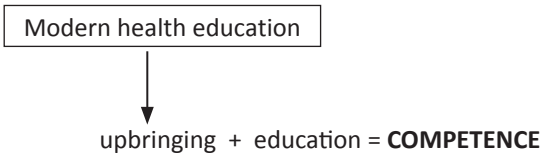


**Fig. 3.** The goals of modern health education (source: Andruszkiewicz, Banaszkiewicz 2008)

The universal function of health education is exerting relatively permanent and positive change in the human activity. The new, differentiated goals of health education were presented in the comment to the curriculum 2008, which includes helping students in:

- gaining knowledge of themselves and the course of their development,
- understanding what is health, which determines why and how to care about it,
- developing a sense of responsibility for their own and other people's health,
- enhancing self-esteem and confidence in their abilities,
- developing personal and social skills conducive to well-being and adaptation to daily life,
- preparing to participate in the activities for health and creating a healthy environment at home, school, workplace and community.

Achieving these objectives requires, however, various actions taken within the program of teaching, child care and school prevention program. This process is long and requires the involvement of students and their parents, because the effectiveness of health education depends on whether the children transfer what is taught at school into their daily lives (Białek 2011).

## Conditioning of health education

Implementation of the health education program should be adjusted on the one hand to cognitive recipients, their age group, social and cultural conditions, as T. Parsons noted in his research (Woynarowska 2012a). Effective health education should have the characteristics of universality and the program should be based on prior analysis of the problems of the group, community, or culture. Culture of the community, influencing an individual's behaviour, is also influenced by the so-called "standard of health", i.e. the way in which somebody meets their health needs (Tobiasz-Adamczyk 2000). According to the PZH research, among the most important issues in the field of health education young people list: sexual maturation, nutrition, substance abuse, mental hygiene and disease prevention (Miller, Supranowicz 2002).

One of the learning outcomes of health education is to form positive habits (behaviour) conducive to maintaining health in good shape. According to Łuszczyńska (2004), health behaviours of individuals are classified as relating to health or those that have documented health effects. In these terms, we can talk about behaviour:

- related to health,
- focused on health, which means consciously taking steps to protect and preserve the health,
- health risk, both conscious and unconscious actions that have a negative impact on health.

Implementation of pro- or unhealthy behaviour is therefore a matter of choice among many possible patterns of behaviour. At the core of these individual choices are values mainly recognized by people, and the hierarchy of values, mutual submission and place health occupies in the hierarchy (Puchalski 2004, Andruszkiewicz, Banaszkiewicz 2008). There is no doubt that the culture of the society affects the implementation of a number of behaviours that make up the typical lifestyle. A classic example is the patterns of diet, which is usually conditioned by a tradition,

customs and tastes formed in the process of socialization. The composition of meals, the amount of meat and its kind are typical of certain groups (cultures) and are passed down from generation to generation. Similar considerations are, among other things: spending free time, caring for personal hygiene or attitude towards drugs. Another important factor in human life style is also the role of the media, functioning independently of culture, which are more often a health education tool, where education is realized e.g. in the form of social campaigns (Włoszczak-Szubzda et al. 2007, Purchałka, Brzenska 2012).

Łuczyńska (2004) classifies the health behaviours:
- health-promoting behaviours (regular exercise, proper diet)
- preventive behaviour, for detecting disease.

An important issue is the theme that accompanies the delivery of the health education because it may affect the formation of permanent habits or result in just a temporary modification of behaviour. Those themes may include:
- desire to maintain good health and well-being (welfare of one's own),
- willingness to adapt to the prevailing patterns of behaviour in the group (the need for approval),
- willingness to try new "things",
- fear of disease and its consequences.

Behaviours relevant to health in accordance with the guidelines of the WHO and the European Union are now included in the list of recommended indicators for monitoring. Therefore these issues are constantly updated and controlled, influencing health policy undertaken by the Member States.

## Features of contemporary health education

In recent years, significant changes in the design and implementation of health education have been introduced in the school. The basis for these changes was the plan to include a holistic health model, which assumes that:
- every human being is a whole, but also part of the wider society and nature,
- there are complex relationships between humans and the environment and human health is affected by many factors simultaneously.
- Among the factors that have the greatest impact on human health we should distinguish: lifestyle, the group everyday behaviour, typical reactions and certain personality traits, the environment (physical and social), and human biology (age, sex, genetic factors). Currently, it is believed that the main determinants of health are socio-economic factors, because they depend on the lifestyle and environmental conditions. Inequality (income diversification, level of education, housing, etc.) are the cause of health inequalities, which can be observed already at school.

Key features of the modern approach to health education are:
- taking into account all dimensions of health (physical, mental and social), and the factors determining them,

- using different circumstances: both formal and informal educational programs,
- taking into account the interests and needs of young people in the field of health education,
- striving for consistency of information from various sources,
- creating patterns on the part of adults – parents, school staff and members of the local community,
- creating conditions to practice healthy behaviours at home and at school,
- active participation of students in the planning and implementation of health education.

Health education content, in current practice, has been focusing on physical health issues - health, care and prevention of injuries and somatic diseases. A new element of health education is to pay special attention to the psychosocial health and development of life skills. Life skills are understood as the ability to enable positive behaviour adaptation om a person who effectively deals with the tasks and challenges of everyday life. This is one of the fundamental differences between traditional education and its modern dimension, where knowledge and skills are a key effect of education. A similar approach has been implemented in some EU countries, for example in the UK, for a long time the subject of "personal and social education" has been realized; in Ireland – "Social, Personal and Health Education". A reflection of these changes is the introduction of the new general education core curriculum listing the skills that will be practised, depending on the stage of training in various subjects. These skills are also the foundation of the educational curriculum and school prevention program (Woynarowska 2012b).

In today's education (including health) the role of the teacher has changed and the focus on learning/teaching has shifted. The teacher is a guide (adviser), who oversees the development of the students. Teachers no longer play the role of "experts" – they limit evaluation, comment in their own words and have the courage to say "I do not know, but I'll check and answer your question". That means a teacher has the right to lack certain knowledge and to learn from the students. The role of the teacher is to organize the learning process. It is also important for teachers to model the desired attitudes and health behaviours, because, according to the theory proposed by Bandura, people learn by observing the behaviour of others, especially the significant persons. The student, in turn, is treated as a partner, whose knowledge and experience are the basis for further development. According to current trends in contemporary health education, the prevailing methods of teaching / learning should be activating methods, which can be defined as a way of teaching in which teachers do not provide ready-made knowledge, but only create the conditions for self-learning. An example of such a method is an educational project, which is now an important element of Polish education.

## The place and the status of health education in contemporary education

The new core curriculum of general education opens a new stage in school-based health education in Poland. The history of health education in Polish schools is quite long, but its implementation did not include the actual needs of the students. In the core curriculum of general education, health education appeared for the first time in 1997 (Ministry of Education). However, it was not granted the schedule and hours for implementation in the timetable. In 1999, the reform of the educational system introduced the educational path "health education" in primary and lower secondary schools.

Since 2002, as a result of the next reform, this educational path has been included in all types of schools. In 2007, the work on the new core curriculum was established to remove the educational paths, including "health education". It is recognized that health education will be implemented across multiple subjects at the same time, with the leading role in the field given to physical education (Bogacz 2009). In the preamble of the new core curriculum for primary schools and lower and upper secondary schools it is written that "the important task of school is also health education aimed at shaping students' habits of caring for their own and other people's health and developing the ability to create an environment conducive to health." This record, for the first time in the history of education in Poland, has given health education high rank among the school's tasks (Woynarowska 2008, 2012b). The currently functioning model of school health education, health promotion, i.e. the content included in a number of items, with the important role of physical education, is in line with the recommendations issued by the World Health Organization (Nowak 2012, Woynarowska 2012b).

**Tab. 1.** Curriculum, which includes health education content

| SUBJECT | Primary school | | Junior high school | High School |
|---|---|---|---|---|
| | grades I–III | grades IV–VI | | |
| Social education | X | | | |
| Environmental education | X | | | |
| Technics classes | X | X | X | |
| **Physical Education** | **X** | **X** | **X** | **X** |
| Ethics | X | X | X | X |
| Polish Language | | X | X | |
| Foreign Language | | X | X | X |
| Science | | X | | X |
| Social Studies | | | X | X |
| Geography | | | X | X |
| Biology | | | X | X |
| Chemistry | | | X | X |
| Physics | | | X | |
| Safety Education | | | X | X |

Source: Woynarowska 2008 (junior high = lower secondary/ high = upper secondary)

Curriculum for health education is included in the core curriculum, which has been recorded by requirements. It specifies the learning outcomes at the end of that stage of education. In the basic records, the so-called base line curriculum has been accepted, which means that the content of the curriculum will not be repeated in the next stages of education (so far the spiral curriculum has functioned). As a result of program changes, the contemporary school requires the answer to two basic questions: how to effectively implement the current model of health education, and how physical education can play the leading role in health education. We conclude that the new model requires school health education: participation in the implementation of all teachers, coordination at the level of individual schools or departments, the use of different occasions and situations (trips, class parties) as well as the commitment and creativity on the part of physical education teachers. It is also necessary to monitor the course of the implementation of health education in the new instalment in the education system (Woynarowska 2012a).

## The reform of education and its implications

The inclusion of the Health Education unit and a number of requirements in this area of curriculum for Physical Education, at all levels of education, is an undoubted success and has historical significance. It creates an opportunity for a gradual improvement in the implementation of health education. It can also trigger the increase in prestige (personal, professional and social) of Physical Education teachers. Changing the implementation of the Physical Education classes, which allows students to choose the form of classes, may contribute to long-term reduction in the number of students exempted from such classes or students which are frequently skipping classes (Woynarowska 2008, 2012b). The new core curriculum also reveals a problem with the competence of Physical Education teachers, their resistance to learning new issues as well as the obligation to adjust the appropriate Health Education textbooks. Undoubtedly, the changes in governing the Polish school should be evaluated positively because they offer many benefits, e.g. determining the duration and the number of hours spent on health education, and extension of the issues to be dealt with in the classroom, including psychosocial health topics as well as life skills training. The network of health promoting schools is developing, which will also have a positive impact on achieving the objectives of health education.

## Conclusions

Changes which follow from the modern health education have to stabilize its position among the subjects taught in school. Also development of ready-made patterns of education and introduction of the various stages of education will improve the quality of health of the Polish population. But in order to do so, one should create an environment in which knowledge and skills gained in school can be applied

in everyday life. What is therefore particularly emphasized is the need for training, training of life skills, developing the appropriate habits and their gradual consolidation. The reform of the education system, which took place in late 2008, introduced a number of new issues, but to be able to speak of a success in this case the implementers – that is the teachers – should be allowed to acquire relevant competencies. Of particular importance is the cooperation with the local school community, as well as the parents, who should continue and complete the tasks in education in the health of children, started by the teachers.

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## Health education assumptions and models and their implementation in the Polish educational system

### Abstract

According to World Health Organization (WHO), health is defined as physical, psychological and social well-being, and also education (upbringing, training and learning itself). Those are terms which are mutually overlapping because the proper knowledge and health behaviour are essential for a person to be in good shape, as is the proper attitude towards the subject of development of the human organism.

Health education is a process within which a man not only learns what health is or what pathogenic factors are, but also shapes a kind of habits which can reduce the risk of developing certain illnesses in the future. Health education can be run in a formal way (in schools, kindergartens or any other educational institution) and also as informal education, using i.e. hi-tech and media. In the educational system, the new core curriculum (2008) appears to reflect the role of health protection. The curriculum assumes an increase in the course content dealing with health and its comprehensive participation in the process of teaching.

Issues connected with health areas appear in such subjects as: Biology, Chemistry, Physical Education and foreign languages. That new holistic approach to health education is aimed at forming aware and health-oriented people. In the new core curriculum, health education becomes "an important mission of the school". In the following study, a model assumption of health education is presented at the particular stages of education.

**Key words:** health education, educational models, reform of education

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# About the utilisation of children's conceptions to create an interactive book

## Introduction

Sexual education at school becomes more and more popular, especially as prevention against the AIDS problem. This education is generally given to young teenagers and presented by external persons who arrive in the classroom with a specific material. We are not against these practices. It is necessary and it is a very good way of opening the pupil's mind to the sexual world and its indispensable methods for protection and contraception.

But sexual curiosity doesn't wake up with the puberty. Children, and especially young children, ask themselves a lot of fundamental questions about their existence. Still this subject often remains taboo. Parents and even teachers don't know how to handle it. However, the children's book market abounds in publications on this subject. Unfortunately, most of them "explain" things but often don't dare to go right to the end of the children's curiosity. For example, the sexual act is generally not shown. Knowing that father's sex is not the same as mother's doesn't say a lot about "how it works", not only from the physiological, but also emotional, and sentimental point of view.

Indeed, children's questions are not limited to the "scientific" aspect only, even if they often begin with "how". They often are real research of identity. While talking about physiological phenomena, we have to keep in view that the acquirement of knew knowledge could be stopped if the child is not able to cope with the affective feelings. To answer to these problems, we create a book for children between 5 and 9 years old. It relates human procreation and baby's life inside the mother's womb without avoiding the emotional part of it. The most usual questions about procreation asked by children are presented all along as fairy tale.

## The book's presentation

This book is conceived on the model of an interactive CD-ROM. A double entry is proposed through the utilisation of the face or the verso of the book, without one being indispensable to the other. One of the entries proposes a fairy tale like *Hänsel et Gretel* by the Grimm brothers. Two heroes, a little boy and a girl, are confronted with the birth of another baby. Jealousy pushes them to leave their family. They will have to face a lot of trials before coming back home. All along this fairy tale, the most usual questions about procreation coming from children are presented. Each question has a different coloured point. This one is sending the reader to the other side of the book, where a scientific approach of the physiological phenomena is proposed. The colour of the point shows the readers in which chapter they can find the information on this specific question. And so the child can always choose between the imaginary part and the scientific information. The latter offers the readers different levels corresponding to their own level of knowledge, their own questions and their own interest in the subject.

## Creation of the book

The importance of using learner's conceptions to create didactic tools does not have to be proved anymore. A lot of research about this practice shows the interest in this method. Yet, every time we must define exactly which are these conceptions and choose an appropriate method to go beyond them. First of all, we have to define what "creating a baby" means for young children and how they imagine the baby's life inside the mother's womb. In the same time, we put in relation what Bettelheim and the fairy tale's psychoanalysis say about the emotional part of this very important life's moment with the observations issued from the professional practice.

## Using conceptions for creating the "Question book"

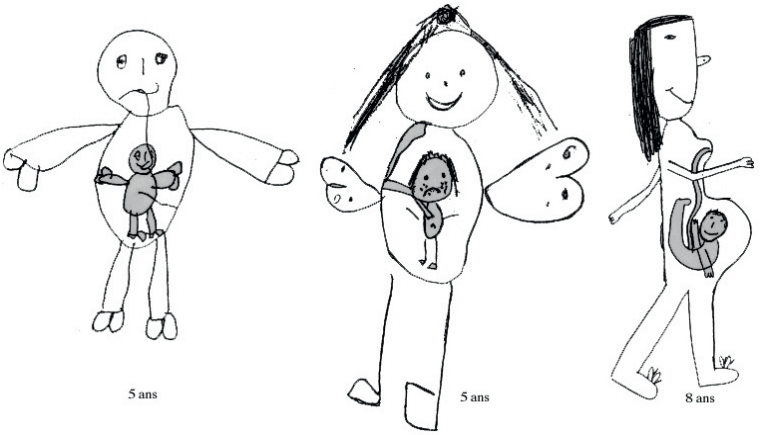
In the special fairy tale part, the readers are confronted with a lot of questions for which they never get direct answers, because they have to go and find them themselves in the scientific information part. This part is especially used to show some conceptions we can often observe among young children[1]. First of all, the story brings up a conception that almost all the 5-year-old children recognise as an error.

[1] The pictures of this part are taken as a pattern from *Cedric* by Laudec, Dupuis édition.

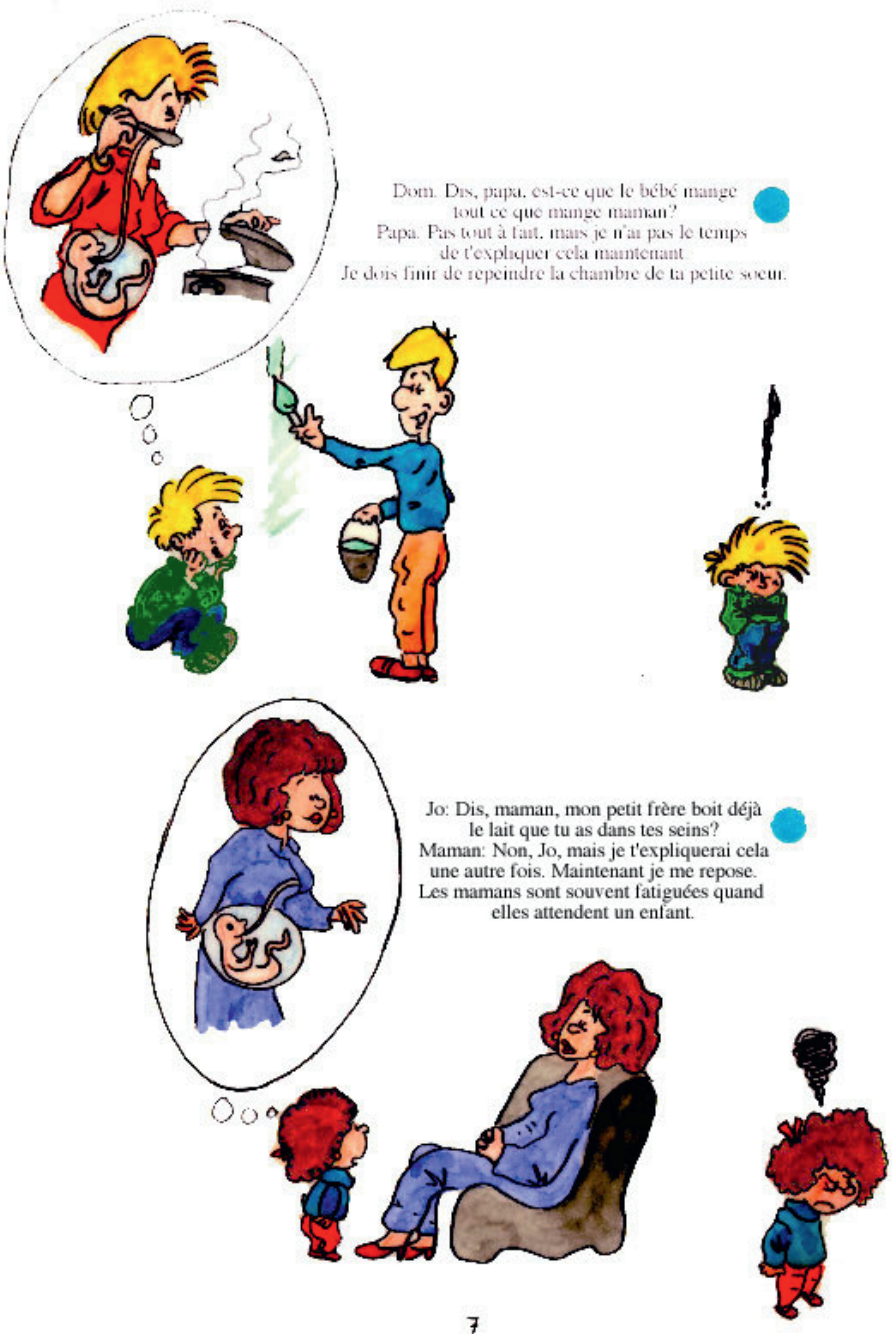

Jo: Mais non, idiot. Elle va bientôt avoir des bébés, alors elle a un gros ventre!
Dom: Pourquoi? Les bébés sont dans son ventre? Mais, comment sont-ils entrés?

***Puppies are put inside the mother's womb by a doctor***

The function of this picture is to give the children self-confidence, especially in their own knowledge. They can laugh heartily, like the heroine of the story, because they know that what they are looking at is not true. But the function of this picture is also to warn the child that this kind of picture (they are always inside a bubble) is not the reality. So, when the story proposes a similar situation, with the hero who is imagining answers, the reader knows that this is not correct, even if it corresponds to what they were imagining themselves.




***Drawings of children's conceptions about a baby's breathing and nutrition. Parallel with the drawing proposed by the Question book about these subjects.***




***Drawings of children's conceptions about a baby's breathing and nutrition. Parallel with the drawing proposed by the Question book about these subjects.***

The aim of this kind of visual presentation is to destabilise the child. For most children, this explanation is the same they could give themselves. But, without any help from the adult, the whole context raises doubt about this explicative model. Even if they dare not admit their ignorance, this confrontation with their own conceptions pushes them to find explanation in the other part of the book.

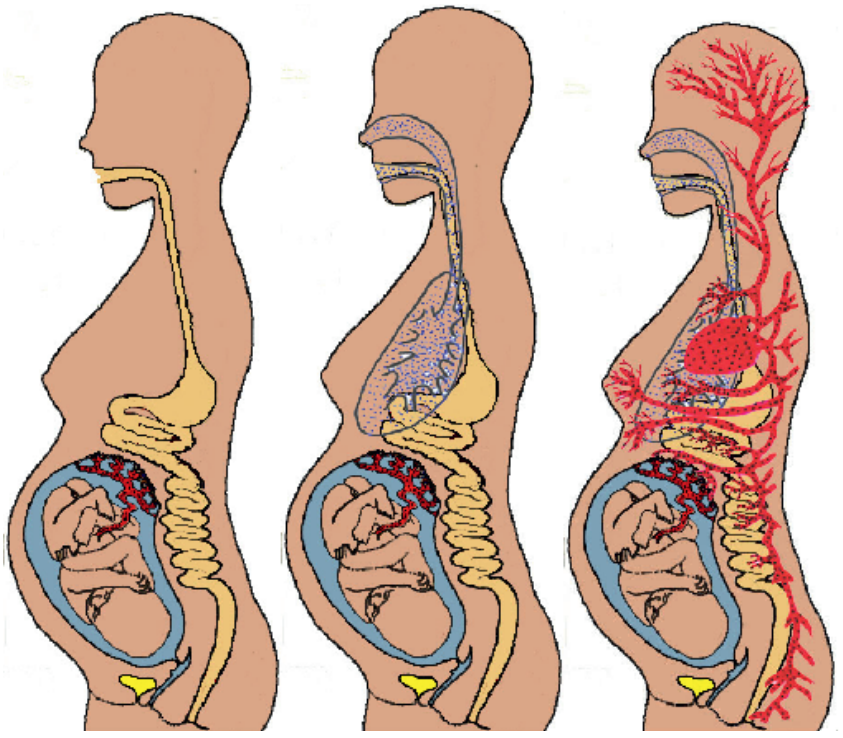
At this time, it is very important that the adults should not answer the child themselves. On the contrary, they must invite children to find the information they need on their own.

## Conceptions utilisation for creating the Info-book

The information part of the book never answers directly the questions of the fairy tale. The answer is principally included inside the pictures, since this book is especially made for children who cannot read yet. To create these pictures, it is important to define the principal obstacles to the comprehension of physiological phenomena. These were expressed in some interviews and drawings made by children. Several unchanging conceptions can be noticed. First, the sexual act is generally misunderstood, or unknown. Moreover, even if the children received information about this subject, it was usually very short and often misinterpreted. For example, children who are using the phrase "making love" put behind these words actions like kissing on the mouth or just sleeping in the same bed. For the older, 8 or 9 years old, some very rude words like "fucking" show not only misunderstanding but real fear, like this child's, who said: "the father fucks the mother and the mother suffers, endures".

This example shows us the importance of the child's being able to understand exactly what the sexual act means, making them realise that it should be something in which feelings are involved and during which both man and woman should discover pleasure.

In direct relation with the sexual act, we noticed confusion of the excretion and reproduction systems. The vagina and the uterus are usually completely unknown by the children. The baby is in the womb, this one could be stomach or intestine, without any distinction. When the children know that the baby goes out of the womb through a "hole between the legs of the mother", this one is generally mistaken for the urethra or more rarely for the anus. The book presents a model where the children could easily find the difference between these different organs.



***The different steps to present the baby inside the mother's womb***

This model is also corresponding to the conceptions about the way the baby is feeding and breathing inside the mother's womb, as you can see on the last illustration. This picture presents no direct connection between the mother and the baby. It is showing, very simply, the travelling of the food through the digestive tube, the isolation of the bladder and the specific place of the baby. Of course, everything is very schematized; the aim is not to give the child a lesson in anatomy, but a way to understand the bases of the bodily functions. Playing with the superposition of transparent sheets, the interaction between the different systems, and especially between the mother's body and the baby, appears when we are putting on the blood system.

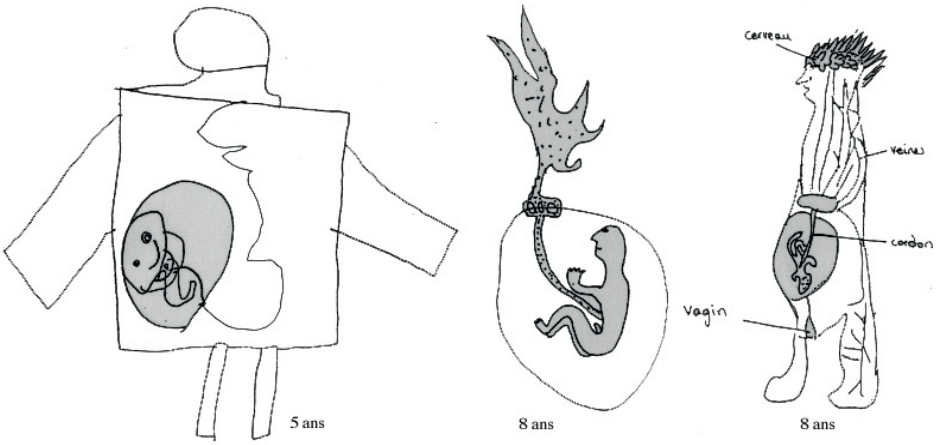
Many times during the interviews, some "scientific" words are used by children, but in a wrong way.

This fact usually hides serious misunderstanding of the processes. The language used in the book suppresses all scientific words inside the basic text going with the pictures. The urethra is just the "hole for the wee-wee", the anus, "the hole for the poo" and the vagina, "the special baby's hole". So, the children know exactly what the book is talking about, and refer to their own life experience. The utilisation of plain language allows going quicker over the embarrassment about this subject. If the child sees that the adult is using children's own vocabulary to speak about these

physical orifices, s/he is freer to talk about them. Of course, if children want to know more about a subject, each text has a second, even a third information level, where the specific scientific words are given.

## Conclusion

This presentation is just to give an idea of the incredible richness of opportunities when using children's conceptions in creating didactic tools. If we really want to help children to go beyond their representations, using such concepts is absolutely necessary, even if – as in the case of this book – we must accept that we won't be able to know all the conceptions of each child, and even if we have to make some definite choice. The originality of this book resides also in the direct confrontation between children and their own conceptions. It would be interesting to go further with this experiment, to see if this confrontation is a real help to improve and understand new scientific knowledge. Even if we couldn't clearly establish where the apprenticeship was coming from, we could see a real evolution or transformation of the conceptions for the majority of the children.




***Post-test drawing of where the placenta is placed***

The experiments we made in different classrooms showed children's great interest in this book. We also received a lot of requests from parents and teachers who wanted to buy it for themselves. It seems that children love to have a look at it, on their own or with friends, even without the adult being present.

As it is shown through the evolution or the transformation of conceptions in children to whom this book had been presented, using them does not only mean creating didactic tools; it is also useful in the evaluation of their impact and in the evaluation of the pupils themselves. Children's conceptions give us the opportunity to really visualise where some remediation work should be done.

Creation, evaluation, and remediation are three complementary ways to use learners' conceptions without conceiving "a priori" some teaching aids or didactic sequences.

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## About the utilisation of children's conceptions to create an interactive book

### Abstract

The article deals with using learners' conceptions to create an interactive book for children between 5 and 9 years old, about the human procreation and baby's life inside the mother's womb. A double entry proposes an emotional and a scientifically approach. This special combination offers to the child different ways to come into this complex knowledge. A special vulgarisation way proposes some different level of knowledge on the model of the CD-ROM.

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# The role of the media in health education

## Introduction

The Convention on the Rights of the Child adopted by the United Nations General Assembly in 1989 established health education as the fundamental right for all children. Health is a huge value for both individuals and society as a whole. Promoting appropriate behaviour is a global health idea. Around the world, efforts are aimed at protecting and improving health. In our daily life we should not only focus on taking care of our physical but also mental and social health. This is possible owing to the health education, the aim of which is the acquisition of knowledge about how to take care of our health and the environment. It is in fact crucial for the implementation of our life plans, ambitions, and physical and spiritual development.

Health education is based on scientific grounds; it offers the opportunity to learn and consciously decide on matters relating to health. The family is responsible for this process as well as the education system and society as a whole (Resolution of the Council of the European Community 2009). Modern health education should be based on the following: acquisition of knowledge and skills related to the disease and the functioning of the body, to be able to cope with difficult situations; increasing the level of knowledge and skills related to the system of health care and using it; raising the level of awareness in relation to the impact of social, political, environmental and human health factors (Potyrała, Walosik 2007, 2008).

## Methodology and research concept

Research objectives focus on: / 1 / analysis of the hazards affecting people, including schoolchildren, in connection with an inadequate knowledge of health education; / 2 / examining ways of representing the currently prevailing views on health and popularizing the knowledge about health education in the media and their associated social institutions.

The research hypothesis was formulated assuming that with the development of various types of media, issues of health education are more frequently addressed, thereby increasing people's awareness on the subject. The above-mentioned

analysis was carried out so as to, on the basis of selected examples, show how the approach to health has changed in recent years. It is important to show how the health issues are interpreted, and to show a different perspective on the perception of health aspects, not only the physical and biological, but also the cultural and social ones.

## Results

Over the past several decades, the interest in the issues of health has significantly increased. It is also defined differently, depending on one's point of view: the perception of it by theologians differs from the perception of psychologists or sociologists and doctors. Many international organizations, and in recent years also Polish ones, encourage the implementation of health education. Nowadays prevention programs for various diseases are common. Very often, governmental, non-governmental and scientific organizations encourage immunization, preventive examinations, courses in first aid, or actions to discourage drug use. Unfortunately, very often people just do not want to use that help, which is probably due to the lack of adequate knowledge about their importance, and the consciousness of people about health. Therefore, development of healthy behaviours should begin in early childhood, making this type of action by the media, practically available to everyone, most appropriate.

In Poland, in the years 1992–1995, thanks to the initiative of WHO, a program "School Promoting Health" was started. Its aim was to create an environment that would increase the well-being of students and school staff, as well as the development in the school community of the need to take action concerning one's own and other people's health and taking care of the appropriate condition of the environment. Its assumption related to: the creation of health relevant physical and social conditions at school; participation of students, teachers and parents in health promotion projects; scientific research giving evidence that the approach to health as a whole helps the school students to solve health problems; cooperation with the local communities to increase health awareness (Woynarowska 2007).

The tasks of modern education are related to the core curriculum of general education curricula and education standards. There are trends evident in the change of the approach to the school and social knowledge. One of the elements of this knowledge is the development of responsibility for the health of an individual and others, understanding the relationship between man and the environment (Potyrała 2011). Very popular forms of spreading the knowledge of health education are periodical projects. The media facilitate access to various kinds of health information. However, they often cause the feelings of confusion, fear, and anxiety. Thus, health education should include a critical skills assessment of information provided by the media in terms of their credibility. The media have a very strong impact on the contemporary society, which is why it is important to be able to use them in the right way to promote health and health education. It is also vital to keep in mind that it

is not just the media that will develop people's appropriate behaviour in terms of health awareness (Woynarowska 2007).

Many actions to protect the health of young people evolve around promoting positive feelings towards food. The aim of the social campaign "Drink milk! You'll be great!" was to create the need to drink milk in the minds of school-age children. Very often, in fact, it was linked with something distasteful and forced. Polish children were drinking not enough of milk, which was associated with an increase in the number of people suffering from bone diseases in later life. Spots appearing in the media were supposed to make parents aware of the role of milk in the lives of their children, and make the children themselves perpetuate the belief that drinking milk is associated with well-being.

A lot of famous people like Kayah, Boguslaw Linda, and Krzysztof Holowczyc took part in this project. Another action – "Mom, Dad, I prefer water" – was a campaign of education through which parents were made aware that water plays a very important role in the daily diet of children. It was to help families in their proper nutrition habits and to teach children the principles of healthy eating.

In Poland, there was also an action called "Poland Is Running". Anyone could participate, as dictated routes were of varying length or level of difficulty, and you could choose a route that runs through the woods or the city. The action was to make people aware that movement should play a very important role in life. To promote the idea of running, one must create favourable conditions for doing so in the surrounding environment. In Poland, several actions were organized to improve the state of nature, and thus the health of ourselves. One of them was an action under the slogan "Grow with us a million of trees," in which television celebrities were involved. Another project, the "Earth Day", was to educate people that they should segregate waste, save water, not waste electricity, limit driving and instead use the public transportation, not use plastic bags from stores and replace them with eco-bags. This last concept was related to a campaign called "Clean Up the World", in which different levels of school education were significantly involved.

On 14th October, each year, 'World Hand Washing Day' takes place. It has been implemented by UNICEF with the aim to convince people that hand washing with soap and water is of great importance and prevents many diseases, and often saves lives. The awareness of people on this issue, however, is small – it is very surprising, since in the era of availability of various kinds of products, soap can be bought almost everywhere. It is indicated that hand washing should last about 30 seconds and should be done: after returning home, after using the bathroom, before eating, or in the course of any disease that involves cough.

A very emotional campaign for the health and life was the action "Stop Rotaviruses." In the advertising spot we could see a mother sitting at the hospital bed of her child that had a drip attached to its arm. The mother's facial expression indicated that the child's health was not good. This affected the attitudes of parents who saw this ad, who grew anxious about the health of their own children.

This campaign was to raise awareness of parents in caring for the health of their family. A similar effect was exerted by the campaign "Stop Pneumococcus." It concerned the vaccination of children against pneumococcal infections, and its slogan was: "You have the right to know, you have the right to ask." Although also related to the health of children, it was rated much worse since it was considered to cause fear and did not mobilize people to enforce pro-health behaviours. Poland's largest action on behalf of children is organized every year under the name "The Great Orchestra of Christmas Charity." This nationwide campaign is based on auctions, collecting donations in exchange for a sticker in the shape of a heart with the logo of the campaign, and everything is broadcasted live on television. This event's aim is to raise funds for the purchase of specialized equipment that different hospital wards treating children should be equipped with.

The slogan "Stop to Cervical Cancer 'is known to the majority of people watching television. Pro-health campaign "Vaccinate good behaviours" evolved around actions preventing cervical cancer, possibilities of carrying out cytology, and vaccinations against HPV. The aim was to popularize the idea of mothers and daughters working together for health. Such actions are also in the program of actions of the National Organization for the Eradication of Cervical Cancer "Feminine Flower".

Attitudes towards the presentation of sexuality in the media differ. They relate to the risks arising from advertising (AIDS, venereal disease, lung cancer), denial of biological regularities in commercials ("no" impotence after drinking alcohol), abnormal biology through cultural interaction (body weight – being overweight and weight-loss diet), fitness / gym / bodybuilding / plastic surgery as a search for the "ideal body" against biology, slim body and shame due to obesity, growing up – weight gain and cultural expectations, eroticisation of products, the way of advertising alcohol, the 'Barbie dolls' body as the ideal to follow, or the theme of the races (the superiority of the "true" white body against the "inferior" black body) (Melosik 2006, 2010).

A very important thing is to promote, especially among young people, safe behaviour in the sphere of sexual life. People are usually very well aware of the fact that venereal diseases exist. In spite of that fact they take the risk of unsafe sexual contacts and do not even think that the disease can affect them. Alcohol and drugs cause lack of control over sexual behaviour and contribute to the occurrence of accidental sexual contact and, in extreme cases, prostitution. One of the actions to fight HIV was a campaign in the media under the slogan "Travel Stop 50 zł. HIV free" and showed a prostitute leaning against the car and talking to the driver. Another campaign was under the slogan "You will not get me." It was attended by representatives of the media, such as Alexandra Kwaśniewska, Malgorzata Socha and Jakub Wesolowski, who had to draw the public attention to the importance of testing for HIV in the body. This was important because in Poland the awareness of virus detection and blocking it in its early stages was very low. Efforts were made to make the public aware that testing for HIV detection increases the chance to extend life and improve the quality of life of infected people.

A number of campaigns to prevent the spread of AIDS and HIV were done outside Polish borders. To prevent behaviour that in one of the commercials was presented with the sentence: "Fast Sex, Great Sex. Anytime! Anywhere!, commercials appeared showing two pairs of feet, pointing in the opposite direction. On the big toe of each pair of feet, there was a piece of paper, probably personal information, and the feet were sticking out from under a white sheet – same as the one used to cover corps in the morgue. Below them were the words: "There is still no cure for AIDS. Protect yourself".

In Milan a happening was organized to draw the attention of young people that taking risk in sexual contacts, such as unprotected sexual intercourse, can result in AIDS. Organizers encouraged people to take part in the action via online portals. In front of the Milan University a condom was set up, large enough to fit in 100 adults. It turned out that 200 people went in and it received a lot of attention in the media.

In addition to the project that aimed to strengthen health, health education focuses on prevention of abuse of substances like tobacco, alcohol, and drugs. The current generation of young people is very vulnerable to the contact with these substances, which can lead to serious health risks. Such substances are most popular among people aged 15–34 years. Among adults in Poland, drug use is relatively rare and is much less common than among the young people. Experimenting with psychoactive substances is one of the characteristics of adolescence. Drinking alcohol and smoking is in majority the beginning for initiating contact with drugs. It is very rare that someone starts using marijuana without first drinking alcohol and smoking cigarettes. Also, it is rare that young people who have turned to heroin or amphetamine, had no previous contact with marijuana. These observations are the base for a conclusion that limiting experiences of children and adolescents with alcohol and cigarettes at the earliest stage can prevent the effects of their usage, as well as limit the risk of starting to use other dangerous substances (Woynarowska 2007). Since 31st May 1987, as an initiative of WHO, "No Tobacco Day" takes place. Its aim is to send a message to people that smoking leads to diseases and even death. In the U.S., it is even celebrated as the "Day of quitting." Preventive actions in this area allow smokers to receive tips on how to get help in quitting smoking, free medical tests, such as blood pressure test, cholesterol measurements, or carbon monoxide in exhaled air measurements. In connection with the fact that smoking becomes less fashionable, it starts to disturb an increasing number of people. Therefore, in many countries, including Poland, smoking was banned in public places, i.e. those in which smoke could harm the health of people in the company of a smoker. Another way of fighting smoking, with the aim of raising awareness of the health risks associated with it, are short sentences which since some time ago have been placed on cigarette packs. In general, they are pretty drastic, like "smoking kills", "Smoking can seriously harm you and those in your surrounding", "Smoking causes heart disease", or "Smoking can damage sperm and reduce fertility." One of the foreign campaigns to encourage pregnant women to quit smoking was rather drastic. It used posters which depicted a human foetus in an ashtray full of cigarette butts. In Poland the

"Day Without Alcohol" is also celebrated, established by the government on 1st June. Around Easter, the "Week of Prayer for Sobriety of the Nation" takes place and the "National Day of Sobriety". The aim of the campaign is to encourage the reduction of drinking alcohol during social events, as well as showing the positive aspects of abstinence. There are also preventive campaigns concerning other psychoactive substances. One of them is the campaign "Stop the Drugs". People engaged, who are opposing the distribution of this kind of stimulators, want to educate the public on the dangers of those legal drugs. Due to the fact that they do not contain illegal ingredients, they are legal, despite the fact that they work on the same principle as drugs. They are often sold as "collectibles" to facilitate their distribution, and the prosecution of the manufacturers under the charge of putting the human life and health into danger is difficult, since on the packages we can see inscriptions such as "not for human consumption"; "if ingested, immediately contact a doctor".

Throughout the year, but especially during the holidays, there is a great need for blood at the donation points. The European Voluntary Blood Donor Foundation organizes campaigns to encourage people to donate blood as part of the Honourable Blood-Giving Campaign. The campaign "Blood Brothers" ('Krewniacy'), which was conducted by the Polish television, and Polish artists under the banner of "bestow upon each other," was to convince the public that blood donation does not bring any harm to the human body. Through fundraising they purchased buses used for blood collection, and one can support the action by sending a text message to the number indicated in the campaign.

The high demand for blood results, among others, from the fact that there is a frighteningly large number of road accidents, where people involved need blood transfusions to save their lives. Therefore, it can be noticed that there is an increasing number of campaigns organized to prevent causes of car accidents.

In a series of public campaigns called "Switch On Thinking" an educational campaign "The last jump" appeared. It concerned the necessity of fastening the seat belts at any time while driving, even during the shortest drive. This was to reduce the number of fatalities on the roads. It sought to implant into the minds of road users that the seat belt does not cost anything and can save lives. The promotion of this campaign in the media was very appropriate since Polish drivers are convinced that they are prominent experts in the field of driving and always, in every situation will be able to control their car.

Too much haste on Polish roads inspired the campaign "Do not rush – switch on your mind". Television, radio, newspapers and the Internet joined in the campaign. One of the ads showed a traffic accident in which its victim was in a plastic zippered black bag. This quite drastic scene was to help make drivers realize that driving fast does not lead to anything good.

One of the campaigns aimed at drivers was held under the slogan "Have you been drinking? Do not drive." The campaign aimed to raise awareness of threats associated with driving a vehicle after consuming alcohol. It was an appropriate campaign, since there have been numerous reports in the media on intoxicated drivers

and the fatalities caused by their irresponsibility and lack of imagination. It can also be noticed that it is usually the young drivers who drive too fast, often inadequately to the weather conditions, and often do not pay attention to priority signs at junctions. Unfortunately, it is the young people driving cars under the influence of alcohol that cause the most of the accidents.

## Conclusions

In the case of pupils, it is very important that they should be able to recognize and effectively respond to the signs of their health problems, or problems observed in someone from their environment, using various sources of knowledge. It is important, however, that they should be able to select the obtained information, evaluate it, as well as use it in everyday life. The earlier a child begins to come into contact with the formation of positive health behaviours, the easier it will be in the future for that child to act according to the healthy lifestyle standards. With all certainty it can be concluded that health education should continue throughout a person's whole life and appear in a very natural way. It should take place in the family, school and social life.

In the structures of school knowledge, there are different aspects of health education that students should acquire, which would have a positive effect on their physical and mental development. In this respect, it is very important that students get interested in health issues and implement in their healthy lifestyle the habits of hygiene, nutrition, exercise, or a broad-based security. Such actions are not only possible thanks to the school, but also to the media. For children and young people of school age, they are often a stimulus that affects them with more strength than school. Therefore, social media communication should provide accurate information about health and disease. Television programs, radio broadcasts, commercials, or newspaper articles often present the latest research on health, advice on the proper way of life, and information about the diseases.

It is important that the media transmit information that is accurate and true, such that would indeed clearly influence health-promoting behaviours of the society, including young people. The distortion of understanding health just to advertise a product is simply unethical, and yet there are still adverts of food products and cosmetics which are the result of current prevailing fashion. Advertised as “healthy”, they often are not. Lotions for wrinkles, products such as “light”, ready meals for babies, guides on healthy nutrition, products advertised with their unbelievable effects, are all advertised in a very attractive way. Advertising often encourages to buying products such as potato chips, cigarettes, alcohol and sweets. Everyone knows that these products are harmful to the body and health, and yet they have a high level of sales. Therefore, it is not just the ad that is the only one to be blamed for improper health habits. On each packaging of food products we can find their composition and calorific value, and on cigarette packs we can see the information about the harmful ingredients, and the consequences of smoking.

In many cases, the media have a very positive impact on the development of healthy attitudes. They encourage a healthy lifestyle and taking care of the environment, which is in that form in harmony with our health. The media show how to take care of your health and how to follow the rules of hygiene in various areas of everyday life, thus, they activate students to take healthy actions in their families, in their surrounding and the society in which they live.

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## *The role of the media in health education*

### Abstract

Modern education is associated with a significant tendency to change the approach to the school programs and social knowledge. One of the elements of this knowledge is developing the responsibility for the health of an individual and other people. Health is recognized as a fundamental concept in education, and 65% of adult Poles list it as a condition of a happy life. Health education is a process based on scientific principles that create opportunities for learning and making conscious decisions about your health. Responsible for this process are the family, the education system and the society. Educational activities should be directed to: discussion and enhancement of knowledge about health and health risks, the development of appropriate attitudes towards the application of the principles of hygiene, disease prevention and treatment. Therefore, an analysis of ways to spread knowledge about the health allows to note the numerous examples of social campaigns connected with the promotion of health behaviours in biological, social, cultural and moral contexts.

**Key words:** health knowledge, media, social attitudes

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*André Giordan, Alain Golay*

# Bien vivre avec sa maladie
# New book recommendation


The disease comes at us like a bolt from the blue. And when it is very serious (cancer of the breast or prostate, stroke, kidney failure...) or chronic (diabetes, asthma, obesity, heart disease, cardiovascular disease, rheumatoid arthritis, chronic back pain, etc...) it crushes us completely. We are in depression or we despair, we think that everything is "damned"... then comes a psychological shock, a revolt, depression, and moreover – physiological disturbances.

Few people are prepared to face it. It is true that the topic of disease does not have its place in school, even health is not very important in the curricula. The body itself is taught in installments as a separate glossary devices; despair that many students. But over a lifetime, are often those who can escape... Currently, a quarter of Europeans (150 million) are suffering from a disease of long duration.

It happens often by surprise, then comes the doubt and complaining. Is it possible to prepare for this? Accepting the disease is difficult, long-term illness is a daily treatments, the need for lifestyle changes and lack of acceptance of self.

Yet the person called "sick" can learn to live "healthy" with their illness... and it can surely prevent some complications. And in certain diseases, type 2 diabetes,

obesity, back pain or heart disease, it may even lead to certain remission, if changes are introduced in behaviour or lifestyle.

## Learning about the disease

What good is it to know or understand one's disease treatment? Can we not fully trust our doctors, and their medication? "He's an expert", "it is he who knows"... It is not so simple! Everything depends not only on the caregiver. When you are suffering from a disease that medicine calls "diabetes", for example, you must understand why sugar is "high or low" in the blood. You must take care of what you eat. A person with this disease is always in a "crossfire" of "too much sugar" or "too little".

But who knows about their health, the means to preserve it or recover it? So what does it take to heal? And what about the drug treatment? What are the side effects? Can we avoid them? What kind of knowledge is necessary?

However, it was found that when a person suffers from a disease and especially its treatment, it is better to monitor it and reduce complications. For diabetes, the numbers have been reduced by 80% for amputations and 90% for the risk of blindness. Similarly, asthma attacks or relapses in cardiovascular disease were reduced by 80%. Moreover, most of the risk factors for cardiovascular diseases are preventable, being directly related to lifestyle.

## Regain your autonomy

Know more, the patient can find self-efficacy, and even regain their autonomy... By informing and forming gradually, they can acquire the knowledge and skills to best prepare a balance between the ideal control of their illness and their daily life.

When patients know better, they are also less dependent on their caregivers, and they can make better choices. Some people may even become "co-therapists" by shaping behaviors that are the best for them to solve health problems. The patients become the real "authors" of their health, the "owners" of their body and the treatment.

They can ask the right questions, consult the best experts and identify what suits them best. Permanently, they can interact with caregivers in making decisions about their health. Do not forget that such persons live permanently with their illness, while the doctor is interested in it for 20 minutes from time to time... in this way, the person suffering from a disease, even a serious one, learns to anticipate and react quickly to a crisis. Patients avoid a new behaviour worsening the situation, or prevent suffering from a relapse; such treatment may even go into a form of healing.

## Grow by illness

The behavior of a sick person is an important factor in treatment and care. What would they change? Some patients were asked questions about their way of life. Do

we not have a pathogenic behaviour? An unbalanced diet, for example? Or too much stress? Change the diet, undertake physical activity, avoid addictions to tobacco and alcohol: these basic tips should be included on the prescription before medication.

There are even people with the disease that could "grow"... The management of their condition has led them to ask questions about their values and the link between their values and their lives. Others have had to make drastic changes in their lifestyle choices, they upset their habits, they brought moments of sharing and created associations or sites to support people in greatest difficulty. They could then be fulfilled otherwise than they had been before, caught up in the daily routine. They became "otherwise"...

Do not expect everything from caregivers or medicaments. Notably, bring meaning to what you experience. To begin with, accept what you are to change "a little", gradually. Clarify your values, repérons those who really take you to "heart" and live as much as possible according to them. Making the link with others is often a way to find meaning, and, first of all, to link with yourself.

Do not expect everything from the outside, we have a lot in our own hands... Take advantage of the knowledge or accompaniments that caregivers can bring us. But look within yourself for a life that corresponds to what life you want to lead...

**For more**

**A. Giordan et A. Golay,** *Bien vivre avec sa maladie*, Lattès, 2013

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