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Profile of the social scientist dedicated to health and his interface with Dentistry

Perfil do cientista social dedicado à saúde e sua interface com a Odontologia

Perfil del científico social dedicado a la salud y su interfaz con la Odontología

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Abstract
Objective: To discuss social scientists dedicated to health and their contributions to medicine and dentistry. Methodology: online searches using data published in VHL/BIREME, PUBMED Central, Science Direct, Web of Science, Research, Society and Development Journal and Google Academy. Results: We used 46 articles to compose this work. Conclusion: We obtained a literature review that addresses what a social scientist is applied to health and what its impact is on dentistry. A timeline was drawn, bringing some of the first social scientists, then we approached some more current ones bringing their contributions to health in general, finishing the article by creating an interface showing how these general contributions impacted dentistry.
Keywords: Laser therapy; Radiology; Sterilization; Bioethics; Ozone therapy.

Resumo
Objetivo: Abordar sobre os cientistas sociais dedicados à saúde e suas contribuições na medicina e odontologia. Metodologia: buscas on-line através de dados publicados na BVS/BIREME, PUBMED Central, Science Direct, Web of Science, Research, Society and Development Journal e Google Academy. Resultados: Utilizamos de 46 artigos para compor este trabalho. Conclusão: Obtivemos uma revisão de literatura que aborda o que é um cientista social aplicado à saúde e qual seu impacto na odontologia. Foi traçado uma linha do tempo, trazendo alguns dos primeiros cientistas sociais, depois abordamos alguns mais atuais trazendo suas contribuições na saúde de forma geral, finalizando o artigo realizando uma interface mostrando como essas contribuições gerais impactaram a odontologia.
Palavras-chave: Terapia a laser; Radiologia; Esterilização; Bioética; Ozonioterapia.

Resumen
Objetivo: Discutir sobre científicos sociales dedicados a la salud y sus aportes a la medicina y la odontología. Metodología: búsquedas en línea utilizando datos publicados en BVS/BIREME, PUBMED Central, Science Direct, Web of Science, Research, Society and Development Journal y Google Academy. Resultados: Se utilizaron 46 artículos

para componer este trabajo. Conclusión: Obtuvimos una revisión de la literatura que aborda qué aplica un científico social a la salud y cuál es su impacto en la odontología. Se trazó una línea de tiempo, reuniendo a algunos de los primeros científicos sociales, luego nos acercamos a algunos más actuales aportando sus contribuciones a la salud en general, terminando el artículo creando una interfaz que muestra cómo estas contribuciones generales impactaron a la odontología.
Palabras clave: Terapia con láser; Radiología; Esterilización; Bioética; Ozonoterapia.

1. Introduction

A Social Scientist has an extremely broad definition, he is a traditional intellectual, who according to researchers, has the function of understanding society in a disciplined way, with a scientific nature, meaning that this scientist has a framework of references with rigorous limits, aiming to clearly understand society and how she finds herself without judging in a personal way (Berger, 1963).

The social scientist dedicated to health, on the other hand, is the combination of the role of the social scientist with the definition of health that according to the World Health Organization (WHO): "health is not only defined as the absence of a disease, but in fact it harbors various concepts, being a situation of perfect physical, social and mental well-being" (Segre, 1997). In this way, it is seen that the social scientist dedicated to health has some different characteristics from the social scientist, even with more people studying social areas, there are still professionals who have training in health areas, but also who studied Sociology. This shows that the different areas are mixing, which is good, but there is also some resistance from professional groups to accepting the entry of sociologists in the training of health professionals. This creates professionals with diverse skills, as both areas require learning many theories and methods, as well as practical experience. In some areas and places, there are not many of these professionals, but there is a great need for them, especially for teaching and researching Public Health. Therefore, it can be said that the profile of a social scientist dedicated to health consists of the combination of scholars from the social area and the health area, mixing information and studies, in a way that benefits society (Rigotto, 1998).

Health scientists who dedicate their studies to people have influences that are not current, but rather from ancient philosophers, who bring ideas and thoughts that help with questions that are still being asked today. The objective of this article is to address the origin of the first social scientists dedicated to health, their contributions to society, and bring modern scientists, making an interface with dentistry, addressing not only their discoveries and scientific advances, but approaching them by making an interface with dentistry.

2. Methodology

This narrative literature review article used Rother's (2007) study as a basis, which explains how narrative literature should be written, what approach to use, what information is needed and how it should be organized. Along with other articles that were researched online, based on data published in VHL/BIREME in conjunction with PUBMED Central. Searches were carried out on platforms such as: Portal CAPES, Web of Science, Science Direct, Research, Society and Development Journal and Google Scholar. Gray literature was also used to compose this work due to its great wealth of information and history. During the construction of the article, descriptors from the DeCs platform were used: Laser Therapy; Radiology; Sterilization; Bioethics; Ozone therapy.

3. Results

3.1 Origin of the profile of the social scientist dedicated to health

3.1.1 Hippocrates (460 BC - 370 BC)

The “father of medicine” Hippocrates was born on the island of Kos, Greece, around 460 BC. He was from a family of doctors called the Asclepiades, who were said to be descendants of Asclepius, the god of medicine. Hippocrates practiced and taught medicine in various parts of Greece, as well as in Egypt and Libya. His method made a great advance in health and society (Ribeiro Jr, 2003).

Before Hippocrates, medicine was seen as a religious activity rather than a scientific one. These practices were part of the cures, which included magical and religious rites, taking the sick to temples to receive treatment. Hippocrates helped elevate medicine to the status of a science. But for this to be possible, medicine needed to move away from philosophy and avoid being absorbed by it.

"All those who spoke or wrote about medicine are deeply mistaken, basing their ideas on postulates such as hot and cold, wet and dry, or any other, excessively simplifying the cause of human illness and death, attributing the same cause for all cases based on one or two principles", says an excerpt from one of Hippocrates' books in the Hippocratic Corpus. In other words, he considered harmful the idea that water, air, earth and fire were the four elements that explain health and disease. Hippocrates believed that a god could not contaminate the human body, rather the human body would actually be treated when struck by an external agent (Vasconcelos & Freitas, 2012).

Clinical observation, rationality and a holistic vision were the three main pillars that Hippocrates used to redefine health in social terms. He emphasized the importance of carefully observing patients, noting their symptoms and tracking the progress of the disease. This practice marked a shift from superstitious medicine to more rational medicine. Thus, Hippocrates defended the idea that all diseases have natural causes and rejected supernatural explanations for illnesses. This encouraged the rational search for causes and treatments. Furthermore, rather than focusing only on specific symptoms, he emphasized the importance of the individual as a whole, including their physical, mental and social aspects. Contemporary integrative medicine methods have emerged from this holistic perspective (Vasconcelos & Freitas, 2012).

3.1.2 Plato (428 BC - 347 BC)

Plato, a renowned philosopher from Ancient Greece, profoundly influenced health and society through his philosophical, ethical, and political ideas, which shaped Western thought for many centuries. Although his contributions are not directly related to medicine or health in the contemporary sense, his theories have relevant implications for the social and moral health of society (Kraut, 2002).

Plato proposed that the human soul consisted of three distinct parts: the rational, the irascible and the appetitive. He argued that the health of the soul manifests itself when these parts are in balance, with reason exercising dominion over the others. This view has profound implications for mental and moral health, suggesting that virtue and reasoning are fundamental to well-being. Plato argued that justice, both on an individual and social level, is crucial to a healthy and harmonious life. He also established a connection between physical health and the health of the soul, being one of the first philosophers to recognize this interrelationship. Furthermore, in his work "The Republic", Plato explored the importance of social justice and the common good, arguing that society should be organized in a way that allows all individuals to achieve virtue and well-being (Pinheiro, 2005).

3.1.3 Aristotle (384 BC - 322 BC)

The philosopher Aristotle was born in the city of Stagira, in the Macedonian region of Greece, around 384 AD, physician to King Amyntas III of Macedonia, and this is how he introduced him to the study of biology and medicine. After his father's death, when he was just eight years old, Aristotle was sent to Athens to study at Plato's Academy. He spent nearly twenty years there, developing techniques and methods that are still valuable in modern medicine (Fernando Pessoa, 2006).

Among the most important philosophers of Ancient Greece, Aristotle, through his extensive studies in different areas of knowledge, made significant contributions to health and society. His progress is particularly observable in the areas of biology, philosophy, ethics and politics. Aristotle believed that philosophy played a crucial role in medical practice. He declared that the fundamental role of the natural philosopher was to analyze the principles of illness and health. He defended the complement of philosophers and doctors with a scientific interest in medicine, with the idea that they should share the same objectives, since illnesses and health are aspects of life. The former were supposed to study medicine, while the latter based their medical theories on the natural principles of science (Aristotle, 1957).

Like Hippocrates, Aristotle highlighted in his thought the importance of thoroughly investigating the principles and causes, without letting magical-religious influences interfere in this process. Thus, one of the advances that Aristotelian thought has brought to the present day is the rigorous and rational approach to investigating socially defined health issues (Aristotle, 1957).

Aristotle was one of the first to investigate anatomical studies. Although he did not dissect humans, he performed dissections on animals to examine their anatomy and biology. His observations made significant contributions to the biological knowledge of the time and laid the foundation for future anatomical studies. The lack of having dissected human bodies restricted his understanding of human anatomy in comparison to animal anatomy. However, this practice has brought important advances to medicine over the centuries, contributing to a more precise and detailed understanding of human anatomy and physiological mechanisms, aiding in the development of surgery, as well as the diagnosis and treatment of diseases (Biazotto, 2022).

3.2 The profile of the social scientist dedicated to health in modern times

3.2.1 Marie Curie (1867-1934)

Madame Curie was a physicist, chemist and one of the most important and intelligent scientists humanity has had, both for her great contributions to science and for her life story and scientific career. She had several contributions to the scientific world, such as the discovery of the elements Radium and Polonium, began the study of radioactivity, and was the first woman who, through her research, won a Nobel Prize. She obtained two laureates, even though she was a woman, who at the time was seen by many as a person who should not practice science, caused by a whole gender prejudice that was part of the scientific and social environment at the time.

Her discoveries, contributions and difficulties faced by her within the context of discrimination that occurred at the time, left a great life story that serves as an example, due to her enormous obstinacy, focus and dedication to the advancement of science and scientific research (Guimarães, 2011). Curie, in addition to being a great researcher, was an important educator and teacher at the time, who developed and organized classes for a group of children, aiming to stimulate their development, critical thinking and cognitive growth (Chavannes, 2007), being a great education professional and who left an impactful message to his 13-year-old student Isabelle Chavannes: “However, I continue to believe that the ideas that guided us then were the only ones that could lead to true social progress, we cannot hope to build a better world without improving individuals” (Giroud, 1989), a phrase that encourages the advancement of social researchers dedicated to health even today.

3.2.2 Louis Pasteur (1822-1895)

The French scientist and researcher Louis Pasteur began the history of sterilization from his experiments and studies carried out during his life, which made contributions within health science, providing several irrefutable evidence of how living microorganisms are the generators of diseases. contagious diseases that affect animals and humans, giving rise to the first insights and pillars regarding sterilization (Agudo, 2016).

Through the studies and experiments carried out by Louis Pasteur and Robert Koch, during the late 19th century, they gained insight into the biological nature of infectious agents. From this, practices began to eliminate them from surgical material surfaces, such as: disinfection and sterilization, which will prevent the spread of infections, bacteria and other microorganisms during other surgeries, and carrying out correct cleaning, triggering the elimination of different types of microorganisms that may be attached to the instruments used in a given surgery, which came into contact with blood and biological secretions, eliminating even the most resistant pathogens that are found in the form of spores (Serratine & Rocha, 1998).

3.2.3 Galileu Galilei (1564-1642)

From the end of the Middle Ages onwards, there was a huge increase in the number of research and experiments involving human beings, and it can be said that in the 16th century, the beginning of scientific experimentation occurred, with the physicist and social researcher dedicated to health Galileo- Galilei, who stated that: "truth should not simply be accepted, but rather sought through observation and experimentation" (Sakaguti, 2007).

Galileo initiated the concept of the scientific method, which contributed to the development of how the methods we still practice today work. The researcher stated, since that time, the clear need to carry out peer inspection as a way of exercising control over new results. He believed that knowledge could take a forward direction from a sieve formed by a group of scientists, who would analyze and judge new discoveries and theories. Basically, after the presentation of an idea or thought, peer review would occur first, analyzing and discussing that particular fact, accepting or discarding it. Coming to the conclusion that the discussions and debates held will give rise to true science (Neves et al., 2004).

3.2.4 Rosalind Franklin (1920-1958)

Of British origin, Rosalind Franklin was a great chemist and biophysicist. It contributed to several scientific factors, and played a crucial role in the discovery of the structure of DNA. As a scientist, Rosalind carried out several experiments, one of her scientific testing methods was the use of x-ray diffraction, a technique that can be recorded and analyzed. At the beginning of May 1952, through this method and because it is a technique that allows the recording of images, she took one of her most famous photos known as photograph 51, in which she was fundamental in revealing the structure of DNA. In her research, Franklin discovered that DNA comes in two forms, form A, as she called it, was the dry form, and form B was the hydrated aspect. Her contribution is now widely recognized and valued in the scientific community. Therefore, it can be said that Rosalind Franklin was a great scientist dedicated to society (Maddox, 2002; Klug, 1974).

3.2.5 Isaac Newton (1643-1727)

Isaac Newton was an English physicist, mathematician, astronomer, alchemist and theologian. He is widely considered one of the most influential people in the history of science. Newton did significant experiments with light and optics. He discovered that prisms can separate and recombine the spectrum of colors that make up white light. As a result, it brings many scientific benefits to society (Westfall, 1995).

Newton began the study of science with the intention of uncovering the true nature of the world, without being influenced by religious beliefs or standards from medieval times. Among his contributions, it is worth highlighting laser therapy. Newton embraced the corpuscular theory of light, which consists of the idea that light is made up of tiny particles called "corpuscles." Later, this theory was essential for the development of the laser (Enciclopedia Delta Universal, 1986; Araujo, 1989).

3.2.6 Nikola Tesla (1856-1943)

Nikola Tesla was a Serbian-American inventor, electrical engineer, mechanical engineer and futurist, born on July 10, 1856 in the village of Smiljan, in the Austrian Empire. Nikola is highly recognized for his revolutionary contributions to the development of society, which continue to this day (Saturno, 2018).

The first ozone generator was built in the United States by Nikola in 1896. This innovation accelerated the use of the molecule in gas form in several sectors, such as health and dentistry for complementary treatment of diseases. The ozone molecule produced has many indications for application and, due to its bactericidal capacity, it was used for the first time during the First World War as a complementary treatment for infectious gangrene. In addition to its effectiveness against anaerobic bacteria, such as Clostridium, which was eliminated after the use of ozone (Bocci & Di Paolo, 2009).

3.3 Social scientist and his interface with dentistry

3.3.1 Dental radiology

Researcher Marie Curie was the mother of radiology, a science used to this day and which is extremely important in dental care, which was boosted by knowledge about the spectrum of X-rays, which are extremely important when it comes to to understand the major stages during the production of an image exam, which will be used to diagnose the patient, with the aim of improving care, and aiming to optimize the quality of the radiographic image, which will show the entire anatomical structure of the oral structure of the patient, so that the specific treatment desired by the dental surgeon can be carried out, and which is only possible thanks to the studies and discoveries developed by Madame Curie (Potiens, 1999).

From studies carried out on radiology, a result of sets of qualified X-ray beams were obtained, which have been standardized and characterized in various areas of application within ionizing radiation, such as: radiotherapy, radioprotection and radiology, which are used within dental clinics, aiming to qualify and enhance the quality of care, in addition to greater protection of the patient's health (Deustsches Institut Für Normunge, 1983).

3.3.2 Sterilization of dental instruments

From the experiments and studies carried out by Louis Pasteur, sterilization methods were developed, which within dentistry are widely used in cleaning dental instruments, which are used by dental surgeons during care and procedures, being something of extreme importance and necessity, as well as regularized biosecurity within dental offices, being a factor that is also of great importance. One of the oldest sterilization equipment is the Pasteur oven, created and developed by him, and which is very popular in the dental world, commonly used in the past by dental surgeons when it comes to sterilizing the instruments used in consultations (Graziano & Graziano 2000), with objective of prioritizing and preserving the health and well-being of patients, aiming to prevent possible cross-contamination during and after clinical care.

The sterilization process that dental instruments need to go through becomes indispensable and essential, both before and after clinical care, taking advantage of an indispensable technique that seeks to trigger prevention and care for the patient and the oral health team. Nowadays, three techniques are used to sterilize instruments: moist heat, dry heat and the use of ethylene oxide. Within these various sterilization techniques, within dentistry, the most common use is through water vapor (moist heat)

to eliminate microorganisms from blood or other substances, which are retained on the surface of dental instruments (Hupp et al., 2021).

3.3.3 Bioethics and scientific research

Due to the increase in experiments carried out on humans during the 16th century, Galileo Galilei began the scientific method, developing part of the methodology that is still used today within the scientific world, which began by questioning people, who began to notice the large number of research articles and studies related to experiments involving human beings, which led to the emergence of questions about ethical aspects, demanding that human experimentation be placed in the hands of social control. Aiming to protect the rights of human beings, in 1970, the term bioethics emerged in the United States, through a scientific article written by doctor Van Potter, which placed bioethics within a vast field of application (Potter, 2001; Neves et al., 2004).

3.3.4 Forensic Dentistry

After the discovery of the structure of DNA evidenced by scientist Rosalind Franklin, there was a revolution in the investigation of identifying people through the dental arch. It is known that the fingerprint and DNA are unique to each human being, therefore, in the same way they form the dental arch as well. Therefore, forensic dentistry (also called legal dentistry) allows the identification of human bodies through the analysis of polymorphic DNA profiles. However, the degradation of the body after death, whether for voluntary, accidental or natural reasons, as well as environmental conditions, can affect the conservation of the remains, resulting in an objection to obtaining suitable biological material for genetic DNA analysis. However, legal dentistry is effectively present in this difficulty (Manjunath et al., 2011; Maddox, 2002; Dolinsky et al., 2007).

This is possible because tooth enamel is the hardest substance in the human body, and is therefore an organ that remains intact when the individual is in the post-mortem state, compared to other tissues that decompose much more easily. This resistance of the enamel allows the preservation of small amounts of DNA, which, although small, are present in sufficient concentrations for diagnostic analysis. Thus, tooth enamel is a useful source of samples for genetic identification, even when most of the biological material is destroyed (Cury et al., 2005; Vieira et al., 2010).

3.3.5 Ozone therapy

In 1896, it was designed and created by scientist Nikola Tesla, the first ozone generator. This invention accelerated the use of the gas molecule in various health sectors, making it widely used in dentistry, bringing many benefits. To maintain the body's homeostasis, the mouth is the fundamental entry point for many nutrients and substances that pass through the body. Because of this, a lot of care and attention is required. Due to its biological characteristics, ozone has become a viable option for prevention, treatment and therapy of clinical cases. In addition to having the ability to stimulate blood circulation and the immune response, ozone has antibacterial, analgesic, anti-inflammatory and regenerative properties (Elvis & Ekta, 2011).

In the field of dentistry, ozone was initially used to treat cavities, proving to be a very effective tool even in cases of severe impairment. Recently, it was discovered that ozone can also treat the progress of cavities and reverse early lesions. The use of the ozone molecule can be applied directly to abscesses and fissures to control and eliminate bacterial plaque (Domb, 2014).

3.3.6 Laser therapy applied to dentistry

Isaac Newton proposed the corpuscular theory of light in the 17th century, which explains that all light sources emit tiny particles that form light, with the idea that these particles travel at high speed in a straight line, in theory these particles are called “corpuscles”. This idea was created to explain several optical phenomena that were not understood at the time, however it is a theory that brings innovations even today, such as laser therapy. The term "laser" comes from English and means "amplification of light by emission of stimulated radiation". This term refers to the production of light, a specific type of electromagnetic radiation that has distinct characteristics that distinguish it from light emitted by ordinary sources. In short, a laser device emits a beam of concentrated light, capable of penetrating the skin and underlying tissues (Gomes et al., 2013)

Laser therapy can be used in two ways: it can be used as a low-intensity laser or a high-intensity laser. Low Intensity Laser Therapy, also called cold laser, is a non-invasive treatment method that is financially accessible. It can be used as an addition to traditional treatment methods or, in some cases, as a stand-alone approach to treating certain conditions (Henriques et al., 2010; Assis et al., 2012). High Intensity Laser Therapy is generally used for tissue removal, cutting and coagulation. Among its advantages are hemostasis, the absence of direct mechanical contact with the tissue and its proven regenerative capacity. Furthermore, it is possible that the number of bacterial cells present at the application site may decrease as a result of this therapy. Thus, a diode laser, similar to that used in soft tissues, causes little or no bleeding, rapid healing and less likelihood of postoperative infections (Andrade et al., 2014; Nadhreen et al., 2019).

Within the scope of dentistry, laser therapy can be used in a wide range of ways for the patient. Can be used to treat cavities, lasers remove decayed tissue more precisely, with fewer drills and less discomfort for the patient, thus, it can also be very useful in tooth whitening, accelerating the teeth whitening process and producing results. faster (Siqueira et al., 2015). It also has the possibility of being used in the treatment of Gingivitis and Periodontitis, used to remove bacteria and inflamed tissue in the gums, promoting healing and reducing bleeding, in addition, it can be used in oral surgeries, such as implants, causing it to reduce pain and recovery time (Andrade et al., 2012). Likewise, laser treatment can be used in the therapeutic process of tooth sensitivity, which can help seal exposed dentinal tubules, reducing the sensitivity of teeth to heat and cold (Gojkov-Vukelic et al., 2016). Therefore, laser therapy is a major advance in dental treatment. It is a popular choice for many dental procedures due to its precision, effectiveness, and patient comfort.

4. Discussion

In this way, it is seen that social scientists dedicated to health have been present in society since the beginning of civilization, such as Hippocrates, Plato and Aristotle, who were philosophers, sociologists and scientists who brought a new look at the population itself, seeking to develop improvements for individuals. , innovations and perspectives that impacted dentistry. These scientists are present at different moments and times, leaving their great contributions to our society, which to this day is perpetuated as advances in health coming from scientists dedicated to modern health, for example: Marie Curie was a scientist who discovered new elements and had his contribution to dental radiology, which is used in the diagnosis, treatment and monitoring of the oral structure, Louis Pasteur was responsible for developing one of the first pieces of equipment used by dentists to sterilize the instruments used in the procedures performed, the called "Pasteur's Oven", which gave the impetus for further studies to acquire other more advanced and improved equipment that makes up the dentist's office.

Galileo Galilei, from his contributions to bioethics and within scientific methodology, triggered contributions that protect and preserve human life, stipulating what must be followed during scientific research carried out with human beings and which norms must be followed to establish a relationship that does not cause harm to the health of study participants, since Rosalind, with her great discovery of the double helix of DNA, today, through improvements in her studies, it is possible to

identify the genetic code of a human being within forensic dentistry, which It is used, for example, in the discovery of dead people who are not known for sure who they were, victims of shipwrecks, for example, and among other fatalities in which it is necessary to identify their identity. Nikola, who with his genius used ozone as a tool in the treatment of various human health problems, such as the treatment of cavities, and Isaac Newton, who contributed to the study that bases the functioning of Lasers, commonly used in medicine, stimulating tissue renewal and treating injuries, and in dentistry with the same objective and among others how to make "cuts".

Thus, social scientists dedicated to health are important professionals who cover their discoveries within the areas of health, who contribute to treatments, research, studies and within several different functions and who generate a better quality of life for the individual in society.

5. Conclusion

Social scientists dedicated to health, are professionals who despite having existed for so long, today still continue to impact dentistry in a positive way with their diverse contributions and scientific innovations, which boost and improve both the care and procedures performed by dentists, during their clinical life. From this we can conclude that these scientists are extremely important for the advancement and maintenance of dentistry, seeing that they contribute with innovations that are used in clinical life since graduation.

However, there are few studies that address what a social scientist is, their origin and participation in society, so it is clear that more articles and research should be carried out that talk about these scientists and their presence and role in society, to influence more people, making them seek to become social scientists dedicated to health.

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