

GIUSEPPE MOSCATI: A MAN, A PHYSICIAN AND A SCIENTIST

GIUSEPPE MOSCATI: ČOVJEK, LIJEČNIK I ZNANSTVENIK

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SUMMARY

The life of Giuseppe Moscatti (1880-1927) as a man, as a physician and as a scientist may be framed within the cultural climate of Positivism, which spread over the last years of the 19th century and the beginning of the 20th Century. His activity contributed to patients' care improvement; in addition to meticulous drug regimens, he also prescribed a methodology of spiritual care, involving meditation and self-control as part of an holistic approach to health-care. Our review deals with his published researches, highlighting the innovative findings on the juvenile diabetes treatment and extensive clinical changes consequent upon nephritis. This extraordinary man put considerable emphasis on primary care and holistic health in Italy, pioneering a new patient-centred, and holistic approach to medicine.

Key words: Giuseppe Moscatti; Clinical Pathology; Nephritis; Frederician University History, Juvenile diabetes.

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Joseph Moscati (the original photo is conserved in the Moscati's archive in the church of the "New Jesus" in Naples). Copyright belongs to Moscati's archive in the church of the "New Jesus" in Naples.

Giuseppe Maria Carlo Alfonso Moscati was born in 1880 in Benevento (Southern Italy). He was the seventh of nine children, born to aristocratic Italian parents. Father career, as a lawyer and high ranking Judge in Naples tribunal, led the family to settle in Naples, however the family spent their summer holidays in the province of Avellino, his father's native region. At the end of primary education, the young Moscati entered high school and attended the Vittorio Emanuele Institute in Naples from 1889. Among his teachers was Giuseppe Mercalli, the famous volcanologist. Giuseppe Moscati progressed in his educational career with excellent marks.

At the age of seventeen, having completed high school with honours, despite his mother's objections, he decided to enter a career in medicine. Giuseppe's unexpected decision to study medicine, rather than law, can be traced back to an accident occurred during his adolescence. In 1893 his older brother Alberto, an artiller, fell from horse, and an incurable head trauma ensued. Giuseppe took care of his injured brother at home for years. As Giuseppe grew, he experienced the limited effectiveness of human remedies and the consoling power of religion. When Giuseppe Moscati enrolled in the medical school in 1897, the University of Naples — with its openly agnostic, amoral, and anti-clerical atmosphere and its secret societies — was a perilous place for a young Catholic; the prevailing atmosphere was not conducive to the ethical and religious principles of his family. A sectarian, Masonic and politic wind was blowing through the city and two cultural centres supported it: the Faculty of Philosophy and the Faculty of Medicine.

Moscatti avoided distractions, studied diligently, continued to practice his faith, and gained his doctoral degree with honours. Before graduation, Moscati developed an interest in biochemistry and medical research and, still a student, he asked to be trained at the Institute of Physiology directed

by Professor Joseph Albini [1]. His aim was to serve as assistant to professor Pascal Malerba, a pioneer of the Italian Biochemistry. Moscati decided to follow Malerba when the latter was appointed Professor of Biochemistry. His Doctorate thesis was centred on the genesis of the urea and was carried out in Malerba's laboratory of physiological chemistry. His work was also declared worthy of publication by the examining Commission. He graduated in Medicine and Surgery, *summa cum laude*, when he was 23 years old, in 1903. Two months later he obtained the position for assistant physician and lecturer at the "Ospedale degli Incurabili" in Naples. In the same year he also became research assistant in the Institute of Physiological Chemistry of the University of Naples. Later, Moscati won a public completion and obtained the role of manager of the Biochemistry Laboratory at the III Medical Clinic of Naples, directed by Cajetan Rummo, and also of the laboratory of the Cotugno Hospital [1].

In 1906, the young doctor heroically rescued many patients of the Hospital of Torre del Greco while the roof was collapsing during the eruption of Mount Vesuvius. Two years later he offered his assistance to cholera patients in Naples and saved many. Dr. Moscati was officially recognized for his merits both in his service during the epidemic of cholera of 1911 and his service in the military health departments during the Austrian-Italian War [1]. From the very beginning, Moscati's career developed between two parallel paths that, as a magnetic dipole, encapsulated his two aspirations: the University and the Hospital. Although he ended up in opting for the latter, he never definitely abandoned the former. During his life at the Hospital, Moscati never left the University, which for its part always had a great regard for this passionate researcher. In 1911 a special Commission convened by the Department of Education, conferred him the title of Lecturer in Physiological Chemistry. In the same period, he helped in rescuing the decaying Institute of Pathological Anatomy, in which illustrious researchers use to work under the guidance of Professor Luciano Armani, after whom the Institute was named. Dr Moscati not only re-established the services of dissection and analytical investigations, but also opened a section of Biological Chemistry. He deemed that every morphological inquiry should be combined with biochemical research. His ultimate purpose was to offer every physician the means of diagnostic verification *intra et ultra vitam* (in life and beyond life) [1].

Giuseppe Moscati, having helped Prof. Filippo Bottazzi, who was at the time both Director of the Physiology Institute and Rector of the University of Naples, was appointed to lead the scientific research of the Institute of

Physiological Chemistry. Moscati was already well known in the Italian and European medical communities for his work as a collaborator and editor of specialized medical journals. He authored many articles published in scientific journals, including the *Medical Reform*, a journal for which Prof. Rummo proposed him as the correspondent for the English and German language. From 1903 (his graduation year) to 1916, he published 27 articles [2-5]. Moscati was a true pioneer for his time, merging the methods of traditional clinical diagnosis, (mainly based on physical signs), with the novel acquisitions of physiological chemistry.

A review of his papers allows the understanding of his original contributions to the scientific community, in particular those concerning the treatment of juvenile diabetes. Moscati was the first to introduce insulin therapy in Italy; and can therefore be considered a pioneer of modern diabetology and endocrinology. In 1923, he established an association with the first foreign business companies that had started experimental production of insulin. He was able to obtain the precious drug at a very high price, from one of his ex-students who worked in the USA.

Quoting from a letter wherein he affirms that *<for years he was treating diabetic boys using insulin>*[6-8]. In this letter (April 19th, 1926), Moscati established treatment guidelines regarding the diabetic disease, underlying the necessity of controlling the exact doses of insulin. He wrote that its excess *<can be harmful and its insufficiency useless>*. He wrote of the importance of regulating dietary regimens and insulin injection according to both blood and urine glucose levels. At that time he carried out a methodology which was firmly established only some decades later. In the above mentioned letter, Moscati also sketched the profile of a physician who is aware of the complications regarding diabetic patients: *<he must have patience in choosing the doses and above all know how to sacrifice himself close to the patient>*.

By 1926 Moscati trained a group of physicians, specifically prepared for diabetes the therapy, notably anticipating the concept of specialization in Diabetology. Moscati was also able to underline the particular keenness that each patient acquires in discerning the symptoms of hypoglycaemia. He affirmed the necessity of patients' self-diagnosis and therapy, which is one of the crucial concepts in the modern clinical practice of modern diabetes care.

Moscati's scientific interest focused also on the endocrine system, as it is shown by his interesting experimental research on hypophysis, pancreas and adrenal glands. Other scientific publications are centred on the following

topics: the ammoniuria in relationship to the nature of food and muscular work; the dosage of boron in various organs; the peritoneal and pleural tuberculosis with also an accurate study of its involvement with the lymphatic drainage (9-15).

Moscato is also famous in Italy for his studies on the determination by light microscopy of the amount of blood in experimental nephritis. These studies allowed him first to explain the clinical and patho-physiological difference between nephritic and nephrotic syndrome and the existence of the extended clinical syndrome of nephritis [16,17]. Specifically, he discovered that in nephropathies with high albuminuria level (e.g. in the nephrotic syndrome) there is a chronic tendency to water and salt retention with weight gain, compared to nephropathies in which the absence of proteinuria and salt and water retention are transient.

Another core of his research, which represents a significant anticipation of discoveries of enzymatic pathways that will be evinced years later, relates to the transformation of starch into glycogen in the same organs in which it is accumulated after intravenous administration, and the glycogen distribution and velocity of its disappearing following death [18,19].

Both the Moscati Scientist and the Physician were well known in Italy, making him an outstanding figure, well known for his clinical and diagnostic acumen. His clinical skill was able to reveal, even in challenging cases, precise and complex diagnosis, performed through the use of clinical examination and percussion only, such as the case of a sub-phrenic abscess, which he diagnosed in one of his most famous patients, the famous singer Enrico Caruso [2]. Moreover, he diagnosed cirrhosis of the liver just in the act of talking to a patient because, while shaking hands, he felt the dilated subcutaneous veins (*caput medusae*) on the man's abdomen (that were swollen because of the advanced liver cirrhosis).

There is a trove of evidence, concerning the great kindness and charity that he reserved to his patients. He used to examine them without charge when they were poor; in some cases even handing them money for purchasing prescribed drugs in a period when public health-care was utopic. In addition to meticulous drug regimens, he also prescribed a spiritual care approach, guiding his patients to meditation and self-discipline as tools for a holistic approach to well being, along with mental and physical health [4].

An intriguing question regarding Moscati's academic career, is why He never succeeded to be elected full Professor of Medicine in spite of his

well-recognized culture and expertise in teaching clinical disciplines. Several factors, both political and academic, contributed to prevent Moscati from obtaining a Professorship in Medicine at the University of Naples. In this regard, it is relevant first to remember that Italian unification was achieved almost exclusively by the enlightened bourgeoisie, a social class definitely anticlerical. The Catholic Church, spoiled of the ancient privileges and political influence, reacted, under the guide of the Pope Leone XVIII, by directing its attention and care to the problems of the lower and poor classes that were excluded from any benefit and right by the new ruling Class. Hence a very formidable and devastating struggle between the upper Classes that controlled the State and the Catholic Institutions and individuals. Moscati, as a convinced catholic, was deeply involved in this new movement. A second and very relevant factor was the new situation regarding the organization of the medical teaching during the first decades of the XX century. In the past and during the XIX century, the Medical teaching was carried out in the Hospitals and was accomplished by the physicians through the care of patients whose diseases, prognoses and therapies were very variable as a function of the type of the Hospital: Charity, Hospice, etc. At the beginning of the 20's, the medical teaching was completely modified by the great reformation of the University system made by the fascist Minister Giovanni Gentile. According to this Act, the function of teaching the clinical disciplines was attributed exclusively to the Professors of the Medical Faculty that were nominated by the Minister on the basis of a national competition. It is interesting to note that the Members of the Medical Faculty of Naples were disposed to promote Moscati to the university Chair of Physiological Chemistry, but not of Medicine, an activity much more influential on the students, town and society. Clearly, Moscati was aware of the different impact of the two academic activities on his role and refused the Chair of Physiological Chemistry suggesting as a candidate to this basic Chair his friend and emerging scientist Gaetano Quagliariello. Many years later, Prof. Quagliariello evoked this episode in an article published in the journal *Medicus* in 1948:

“The chair of Physiological Chemistry had to be newly assigned, since it was vacant after the death of prof. Malerba occurred at the end of 1917; although the Faculty of Medicine was pointing to Moscati, who provided a highly satisfactory teaching during Malerba’s long period of illness, and after his death. But, Moscati himself let everyone know that he would not accept the public office, and suggested and recommended my name, with the result that the assignment was given to me [...]”[2].

In that era, Moscati was probably completely unaware of the fact that in a few years, in 1923, the Gentile Decree would have transformed the structure of public hospitals and clinics; and that his greatest passion for teaching would have been reserved to University Professors only, and not to every hospital Physician.

Maybe this choice was due to the religious desire to mortify the ambition that must have certainly enlivened his youth. Prof. Moscati worked in his beloved hospital for years and went on teaching, always surrounded by a crowd of pupils, whose number continued to grow and who continuously followed him with interest and affection. He also taught clinical semiology, but without any official assignment. Some colleagues noticed that students were always crowded around the free chair of Moscati, while deserting the official lectures at the University of Naples; for this reason, they plotted to prevent him from teaching. Moscati wrote to Prof. Castellino for the first time: *"I do not know if my colleagues will longer tolerate, the fact that I teach"*. In May 1922, Castellino asked him to present himself for assessment in front of the University committee. Reading such a letter, we realize that even a delightful man like him (he was recognized as a holy Saint, therefore as a reference model and a figure of rare humanity and morality) had experienced second thoughts, discouragements, and regrets. It is also necessary to consider that the vexation of his spirit reflected with negative consequences on his physical well-being. The great Clinician, the great Professor, the great Saint resembled simple mortals and suffered the way they all do. This was revealed particularly in his letter to Prof. Pietro Castellino of May 22, 1922 [20]:

<You were for me, since I was 17 years old (I was just a student, now my hair is white), the guide, the beloved father [...].

I am close to extreme exhaustion and deadly fatigue, because from the years of the war to nowadays, life is a restless job and a continuous series of emotions for me! [...].

I spend sleepless nights, since I missed the opportunity of the ratification of my teaching activity. Perhaps I will achieve it at the next round of assessment [...]>

On October 14, 1922 the Minister of Education signed the decree that finally conferred to Moscati the title of "Clinical Professor". Three days later Moscati wrote[20,21]:

"Love truth, show yourself as you are, without feigning and without fears and without scruples. And if the truth costs you persecution, accept it, and if

it causes you torment, bear it. And if for the truth you had to sacrifice yourself and your life, be always strong in your sacrifice.”

He never concealed his Catholic faith; and he professed his Christian beliefs with conviction and passion in an historical period, socio-politically dominated by the anti-clerical and secularist parties. Moscati reacted with uncommon vigour against abuses or overbearing powers. His great love for the hospital wherein he intended to train young students, led him to write to Benedetto Croce. His message was a protest against the decree of the Italian Minister of Public Education that took the university clinics out of the hospitals, erasing the free teaching usually supplied by the heads of the hospital departments [6,7].

The separation of clinical and teaching activity occurred in an era, when hospitals were purely pious institutions of healthcare, mostly led by religious institutions that didn't include University students. So, the training of new physicians was isolated in a purely academic context. Following the reform, hospitals had to take care of public health, while University acquired the “most important” and exclusive task of popularizing science and teaching pupils. In sharp contrast to this philosophy, Moscati was always available for his patients and felt the duty to visit the poor free of charge.

Professor Moscati died in 1927, at 47 years of age, in the most productive period of his professional life [23]. Undoubtedly the religious aspects of his life are attractive and amazing, but what surprises so many people today is the way he developed *<the sublime mission of a medical doctor>* (in his words) and his behaviour in the culture and scientific context of Southern Italy, particularly in Naples.

Moscati was beatified by Pope Pius VI on November 16, 1975, and canonized by Pope Giovanni Paolo II on October 25, 1987.

In conclusion, there is another important and intriguing question: Why years after years are memory and veneration of this man more alive than ever? As a common man, he intensely lived his faith, never neglecting the duties of his profession and those of an inhabitant of a city that, even at that time, was subjected to the same troubles that still plague it nowadays.

His short life, his genius as a scientist, his contribution as a physician and as a man and his detachment from money remind the reader in the 21st century of the words of Plato, reported by the press in the Professor Moscati

obituary, April 1927: "All the gold which is under or upon the earth is not enough to give in exchange for virtue." [24].

REFERENCES

1. D'Onofrio F. Joseph Moscati. As seen by a Medical Doctor. Messina: ESUR - Ignatianum, 1991.
2. Moscati G. Giuseppe Moscati. Napoli: Giannini, 1927.
3. Rossiello R. L'anatomia Patologica di San Giuseppe Moscati. Messina: ESUR, 1992.
4. Pinuzzo da B. Giuseppe Moscati. Milano: Artigianelli, 1932.
5. Marini E. Il Prof. Giuseppe Moscati della Regia Università di Napoli. 2nd ed. Napoli: Giannini, 1930.
6. Marranzini A. Giuseppe Moscati, il laico santo di oggi, scritti inediti, editrice a. v.e.: Roma; 1978.
7. Marranzini A. Giuseppe Moscati, un esponente della Scuola Medica Napoletana. Roma: Orizzonte Medico Pr, 1980.
8. Letter of April 19, 1926 In: A. Marranzini, Giuseppe Moscati, Modello del laico cristiano di oggi. ADP Pr; 2003: 369-70.
9. Moscati G. Alcuni effetti della privazione dell'ipofisi cerebrale nei cani secondo un nuovo metodo orbitario. Atti R. Accad. Medica chirurgica, Napoli 1914.
10. Moscati G. Influenza del riposo e del movimento sulla eliminazione di ammoniac con l'urina. Giornale Internazionale di Scienza Medica, 1911.
11. Moscati G. Sul cosiddetto antagonismo tra surrene e pancreas. Folia medica, 1922.
12. Moscati G. Il boro nell'organismo animale. Archivio Scienze Biologiche, n. 3, 1922.
13. Moscati G. Misure di quantità dei liquidi di versamento nelle sierose. Atti R. Accad. Medica chirur., Napoli, 1916
14. Moscati G. Peritoniti tubercolari sperimentali. Atti R. Accad. Medica chirur., Napoli 1916
15. Moscati G. Vie linfatiche dall'intestino ai polmoni. Riforma medica, 1923.
16. Moscati G. Determinazione della quantità di sangue col metodo ottico. La quantità di sangue nelle nefriti. Riforma Medica, 1922, pp. 435-8.
17. Gaetano Q. Giuseppe Moscati. in Medicus (Un. It. Med. Biologica S. Luca)1948;4:86-100.
18. Moscati G. Il glicogeno nei muscoli dell'uomo. Atti R. Accad. Medica chirur., Napoli, 1907

19. Moscati G. Quantitè de glicogène dans les muscles de l'homme. Cours de sa dispariture après la mort. Riproduzione dell'Archives Italiennes de Biologie, Tome XLIX, fasc.I.
20. Letter of May 22, 1922 In: A. Marranzini, Giuseppe Moscati, Modello del laico cristiano di oggi. ADP Pr; 2003:165-6.
21. Marranzini A. Giuseppe Moscati, Modello del laico cristiano di oggi. ADP Pr; 2003:72.
22. Ponti G, Tomasi A. Giuseppe Moscati (1880-1927): a holistic approach to medicine. J Med Biogr. 2013 Sep 16;22(2):80-82.
23. Musella M. The death of Joseph Moscati In: Il Mattino, April 13-14; 1927.
24. Burnet I. Ed. Plato Republic. Oxford: Bibliotheca Oxoniensis, 1902.

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SAŽETAK

Život Giuseppea Moscatija (1880.–1927.) kao čovjeka, liječnika i znanstvenika može biti smješten unutar kulturne klime pozitivizma, koji se proširio posljednjih godina 19. i početkom 20. stoljeća. Njegova aktivnost doprinijela je unaprijeđenju njege pacijenata; uz pedantan režim lijekova, on je također propisao metodologiju duhovne skrbi, uključujući meditaciju i samokontrolu kao dio holističkog pristupa zdravstvenoj skrbi. Naš pregled bavi se njegovim objavljenim istraživanjima, naglašavajući inovativna otkrića o liječenju juvenilnog dijabetesa i opsežnih kliničkih promjena koje slijede nakon nefritisa. Ovaj izuzetan čovjek stavljao je znatan naglasak na primarnu skrb i holističko zdravlje u Italiji, utirući put novom pacijentu orijentiranom i holističkom pristupu medicini.

Ključne riječi: Giuseppe Moscati; klinička patologija; nefritis; povijest Fredericijanskog sveučilišta, juvenilni dijabetes.