

## Comment / reflection

**BERNARDINO RAMAZZINI (1633-1714) Y SU LECCIÓN INTEGRAL EN PREVENCIÓN DE RIESGOS LABORALES, PROTECCIÓN Y PROMOCIÓN DE LA SALUD DE LOS TRABAJADORES****BERNARDINO RAMAZZINI (1633-1714) AND HIS COMPREHENSIVE LESSON IN OCCUPATIONAL RISKS PREVENTION, WORKERS HEALTH PROTECTION AND PROMOTION**

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**RESUMEN**

**Introducción:** Bernardino Ramazzini, académico de la Facultad de Medicina de Módena, vivió en la segunda mitad del siglo XVII. Aunque su trabajo es recordado principalmente por ser la primera contribución sistemática al conocimiento de las enfermedades profesionales, merece una consideración más detallada y completa. **Objetivo:** Este ensayo tiene como objetivo ilustrar su compromiso visionario al visitar lugares de trabajo, identificar amenazas para la salud, sugerir medidas para prevenir riesgos y proteger la salud de los trabajadores. **Desarrollo:** Se pueden reconocer muchos aspectos de su pensamiento: (i) comprender la asociación entre medio ambiente y salud, (ii) sospechar el origen ambiental de cada enfermedad, (iii) proponer intervenciones encaminadas a la protección contra riesgos, (iv) brindar recomendaciones adecuadas para un estilo de vida saludable y (v) sugerir una estrategia relevante para combatir una devastadora epidemia de peste bovina que se estaba produciendo en ese momento. **Conclusión:** Ramazzini tenía una visión amplia que abarcaba múltiples aspectos: desde observaciones de trastornos de salud hasta estudios sobre el impacto del aire y el clima, desde la inspección en el lugar de trabajo hasta recomendaciones para una protección eficaz de la salud, desde propuestas de dispositivos de protección personal hasta consejos sobre el comportamiento del estilo de vida. Su estatura científica se evidencia en la modernidad de su pensamiento a la luz de la tendencia actual de la salud ocupacional y pública que requiere una alianza fuerte y una mejor integración con otros campos médicos y no médicos.

**Palabras clave:** salud de los trabajadores, enfermedades relacionadas con el trabajo, enfermedades profesionales, riesgos laborales, promoción de la salud, historia de la medicina, salud ocupacional

**ABSTRACT**

**Introduction:** Bernardino Ramazzini, an academic at the School of Medicine of Modena, lived in the second half of the 17<sup>th</sup> century. Although his work is remembered mainly for being the first systematic contribution to knowledge of occupational diseases, it deserves more detailed and complete consideration. This essay aims to illustrate his visionary commitment to visiting workplaces, identifying health threats, suggesting measures to prevent risks, and protecting workers' health. **Development:** Many aspects of his thinking can be recognized: understanding the association between environment and health; suspect the environmental origin of each disease; propose interventions aimed at risk protection; provide appropriate recommendations for a healthy lifestyle; and suggest a relevant strategy to combat a devastating bovine plague epidemic that was taking place at the time. **Conclusion:** Ramazzini had a broad vision covering multiple aspects from: observations of health disorders to studies on air and climate impact; from workplace inspection to recommendations for effective health protection; from proposals for personal protective devices to advices on lifestyle behavior. His scientific stature is evident in the modernity of his thinking in light of the current trend of occupational and public health that requires a strong alliance and a better integration with other medical and non-medical fields.

**Keywords:** Workers' health, work-related diseases, occupational diseases, occupational risks, health promotion, history of medicine, occupational health

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**Introduction**

Workers' health protection and occupational risks prevention is regulated by a variety of national laws mainly founded on international conventions and recommendations defining standards in the social and labour field.<sup>(1)</sup> Many features of this approach find their conceptual roots in the past. This short essay aims at presenting the main aspects of Bernardino Ramazzini's contribution (figure 1).

Academic at the School of Medicine of Modena and Padua, Ramazzini (1633-1714) lived in a time of deep economic and cultural recession characterizing the Italian peninsula. He visited the workshops, identified occupational risks, diagnosed health disorders and suggested measures for preventing risks and protecting health. Although forgotten for many years, this topic has attracted the interest of scholars in different fields for the implication in the health sector and in the social environment. For his keen observations, influential recom-

mendations and convincing proposals in this field, Ramazzini's main work is considered a milestone and it has been compared to Vesalius' book in anatomy, Harvey's in physiology, and Morgagni's in pathology.<sup>(2)</sup> More than a century ago, it has been claimed that his writing represented the inauguration of a new branch of medicine<sup>(3)</sup> and since a long time, he has been acknowledged as the founder of occupational medicine.<sup>(4)</sup> Currently, he is commonly considered the father of the discipline.<sup>(5)</sup> A few years ago, several papers reminded to the future generations of occupational health professionals the importance of the discipline roots<sup>(6-8)</sup> and his comprehensive lesson for doctors, general practitioners, occupational health physicians and all occupational health professionals has been reviewed and explained.<sup>(9)</sup>

**Figure 1**  
**Bernardino Ramazzini (1633-1714)**  
Taken from:

[https://it.wikipedia.org/wiki/Bernardino\\_Ramazzini#/media/File:Bernardino\\_Ramazzini.jpg](https://it.wikipedia.org/wiki/Bernardino_Ramazzini#/media/File:Bernardino_Ramazzini.jpg)



## Development

### Work as a pathogenic factor

Over 100 years ago, Luigi Devoto, the well-known founder of the Clinica del Lavoro in Milan<sup>(10-11)</sup>, named «*medicina del lavoro*» (work's medicine) the then growing discipline aiming at studying workers' diseases. By using this expression, he implied that the work was a pathogenic factor and as such, it required to be studied by physicians.<sup>(12)</sup> Consequently, Devoto assumed that the new discipline could legitimately take the name of work's medicine, as work itself was the object of investigation, diagnosis and treatment. Discussing further development of the discipline and remarking that prevention was a never-ending process, Devoto wrote that: «Ramazzini could

be compared to a vigorous stream that, at a certain point, disappeared and in the dark bowels of the underground continued its march. Some people heard the deep murmur but could not define it. They had to walk a long way for those human waters to come to the surface».<sup>(13)</sup> These poetic expressions appear still valid, since the conceptual approach of Ramazzini looks up-to-date and remains consistent with continuous theoretical advances and the most widely used practices in the field of risk prevention and health promotion.<sup>(14)</sup>

### Identifying workplace hazards and diagnosing work-related diseases

Ramazzini is often reminded for his approach in detecting work-related disorders.<sup>(15-16)</sup> Although the well-known question *quam artem exerceas?* (What is your job?) is a crucial aspect of the anamnesis that doctors must know, there are a variety of other even more relevant aspects worthy to be considered. Some elements of his *De Morbis Artificum Diatriba*<sup>(17)</sup> and *De Principum Valetudine Tuenda Commentatio*<sup>(18)</sup> are consistent with the today's guiding principles on hazard identification, risk prevention, individual protection measures, and health promotion.

He identified many environmental hazards that could harm workers' health, due to the dangerous character of materials and unnatural postures of the body. He observed that they caused specific disorders in individuals and in groups of workers who carried out the same job. He diagnosed silicosis in miners, lead and mercury intoxication in several occupations, noise deafness among carpenters and many other disorders among workers employed in more than sixty occupations. In some case, he was able to provide evidence of the specific agent responsible for the disease. Several observations about respiratory diseases and their etiopathological hypotheses were confirmed only after many decades when investigation techniques became available as for the hypersensitivity pneumonitis in sifters.<sup>(19)</sup> He described several musculoskeletal disorders and evidenced a causal link with factors such a posture, movements repetition and muscular overload. By examining the diseases caused by prolonged sitting and the stress on the mind, he identified precise stressful circumstances which acutely involved scribes and notaries and foresaw the role of high job demands, repetitive job activity and stress.<sup>(20)</sup> Those workers looked tortured by the intense and continuous application of the mind by the effort not to make mistakes and cause losses to their employers.

Throughout his treatise, Ramazzini explored not only the health conditions of men but also of women. In the field of cancer, he observed that a celibate life caused an excess of breast cancers in nuns. In this way, he anticipated by centuries the observation between null parity and hormonal status.<sup>(21)</sup> By describing other health problems of women, who were often employed in dangerous jobs requiring strenuous work and long hours, he looked beyond women's reproductive system to report the effects of environmental and social conditions on their health and provided a very up-to-date message.<sup>(22)</sup>

## Preventing occupational risks

His interest was not limited to the description of clinical aspects of diseases. In fact, he was profoundly concerned with prevention. As for risk prevention based on engineering and controls, the identification of hazards allowed him to propose some measures to protect workers' health addressing different ways to combat environmental hazards. He suggested removing the thick air emitted from minerals and fumes of lighted lamps and to force in fresh air employing ventilating machines. Currently, these engineering measures are widely adopted. He advised the best way to contain dust pollution: working always in spacious places and never in confined environments. He recommended workers reducing the working time. Men employed in the standing trades were invited to interrupt a too prolonged posture by sitting or walking or exercising the body. Furthermore, he advised workers who made small objects and sat all day long keeping their eyes fixed to drop their work from time to time and turn elsewhere their eyes. As for individual protection devices, he suggested using personal tools, such as stuffing the ears with cotton to protect the inner part of the ear to avoid the threat from loud noise, and use of mouth and nose covering with masks against dusts.

## Promoting workers' health

In addition to health problems directly linked to occupational risk factors, Ramazzini was attentive to those related to lifestyle. Today, we know that many of the prevalent diseases relating to workers' health are not caused exclusively by work-related risks, but also originate from a combination of work and individual factors.<sup>(23)</sup> Ramazzini

anticipated the view based on the integration of health promotion within the traditional occupational health and safety measures. In fact, in circumstances involving sedentariness, food intake and wine abuse, he proposed measures to limit the risk suggesting healthier behaviours. As to the sedentariness, he described health problems among sedentary, sitting or standing workers, and constantly urged them keeping their body active. He was well aware that physical activity was needed to maintain a healthy condition. As to obesity, it should be remembered that the second half of the seventeenth century was a time of severe famines affecting the Italian peninsula. It could be argued that manual workers have had resources just sufficient having a frugal life. Consequently, Ramazzini's attention was devoted to princes and rich people. He reminded them that those who lived longer and suffered less from diseases were the same ones who lead a sober life. Today, this sounds as well-known truth.<sup>(24)</sup> As to tobacco smoking that he defined an incurable and harmful habit, Ramazzini was quite prophetic when foretelling that the vice would always be censured and always conserved. As to wine consumption, Ramazzini claimed that nothing was more hostile, either openly or subtly, to health than wine intake. He stressed the damage caused by its abuse, not only physical but also of reputation and esteem.

## Prevention is far better than cure

Ramazzini's approach to contrast a devastating panzootic highly contagious of cattle should be mentioned in the light of the public health emergency represented by Coronavirus Disease-2019 (COVID-19). The event is reported in his xiii oration that includes the well-known precept "far better to prevent than to cure" (*longe præstantius est præservare quam curare*).<sup>(25)</sup>

Figure 2

«... *longe præstantius est præservare quam curare...* » (Far better to prevent than to cure)

**Translation:** I would like to conclude with a few preventive arguments, since it is far more crucial to preserve than to cure, just as it is better to foresee the storm and avoid it, rather than escape it alive and healthy

**Taken from:** Ramazzini B. Oratio decimatertia. In: Opera Omnia, Medica et Physiologica. London: Paulum et Isaacum Vaillant; 1739. p. 85-96

Atque hæc quidem ad Therapœjam, modo pauca quædam documenta pro hujus meæ prælectionis coronide, in prophylaxeos gratiam lubet proponere, quando longe præstantius est præservare, quam curare, sicuti fatius est tempestatem prævidere, ac illam effugere, quam ab ipsa evadere. Cum igitur boves ab agris post

The oration describes the severe rinderpest epidemic that struck different states of the Italian peninsula at the beginning of the eighteenth century. Ramazzini led a

group of experts in charge of studying the infection affecting both people and cattle.<sup>(26)</sup> As the infection was rapidly spreading especially in closed spaces, he rec-

ommended preventive measures including a lockdown of infected animals. Accordingly, the authorities restricted the marketing of livestock and the freedom of movement of the people in contact with infected animals. As for the treatment of cattle plague, Ramazzini suggested treatment with Cinchona bark (*Cortex Peruvianus*). Its active principle quinine would have been isolated after several decades and its derivatives chloroquine and hydroxychloroquine would have been used as antimalarials after more than two centuries. In the light of some conflicting reports about Covid-19 treatment<sup>(27)</sup>, Ramazzini's contribution deserves to be admired as he paid attention to the evaluation of both benefits and harmful effects of taking new drugs and testifies the scientists' constant commitment to face new challenges.

## Conclusion

Ramazzini had a broad view encompassing multiple aspects: from observations of health disorders not only in patients but also in groups of workers to studies on the impact of air and climate, from workplace inspection to recommendations for effective health protection, from proposals of personal protective devices to advice of lifestyle behaviour.<sup>(9)</sup> His scientific stature is evidenced by the modernity of his thinking in the light of the current trend of occupational and public health requiring a strong alliance and a better integration with other medical and non-medical fields.

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### Conflicts of interest

The author declares that he doesn't have conflicts of interest.

### Contribution roles

Conceptualization, data curation, formal analysis, acquisition of funds, research, methodology, resources, software, supervision, validation, visualization, writing of the original draft and writing, review and edition

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