

# Ignaz Phillip Semmelweis' studies of death in childbirth

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In 1846, Ignaz Phillip Semmelweis (1818–1865), who was born in Hungary, was appointed to what was then by far the largest maternity hospital in the world: the Vienna Maternity Hospital, which was divided into two clinics. Doctors and medical students were taught in the first clinic, midwives in the second and patients were allocated to the clinics on alternate days. There was no clinical selection of cases for either clinic. From 1840 through 1846, the maternal mortality rate in the first clinic was 98.4 per 1000 births, while the rate in the second clinic – the midwives clinic – was only 36.2 per 1000 births.

Almost all the maternal deaths were due to puerperal fever. The alarmingly high mortality in the first clinic had defied explanation until Semmelweis was appointed and postulated that the excess deaths in the first clinic were due to the routine procedures carried out in the courses attended by doctors and medical students. Each day started with postmortem examinations of women who had died of puerperal fever. Then, without washing their hands, the pupils went straight to the maternity wards where they were required, as part of their training, to perform vaginal examinations on all the women. By contrast, the pupil midwives in the second clinic did not undertake either postmortem examinations, nor routine vaginal examinations.<sup>1,2</sup>

These observations were made many years before the role of bacteria in diseases was discovered. Semmelweis suggested that the training procedures of the first clinic resulted in transfer on the hands of the students from the corpses of what he first called 'morbid matter', and later 'decomposing animal organic matter'. In 1847, acting on his theory, he introduced a system whereby the students were required to wash their hands in chloride of lime before entering the maternity ward. The result was dramatic. In 1848, the maternal mortality rate in the first clinic fell to 12.7 per 1000 births, comparable to the rate of 13.3 per 1000 births in the second (midwives) clinic.

The process of admission to the two clinics on alternate days had produced, by accident rather

than design, a controlled trial, and the large numbers of deliveries (from 1840 through 1846 there were 42,795 births and 2977 maternal deaths in the two clinics) meant that chance could confidently be excluded as a possible explanation for the differences observed.<sup>3</sup>

Ironically, when the lying-in hospital in Vienna – which was part of the Vienna Allgemeines Krankenhaus (Vienna General Hospital) – was opened in 1784, no postmortems had been carried out because the director, Lucas Boer, foresaw the danger of infection. In 1823, Boer was succeeded as director by Johannes Klein, who had introduced routine postmortems for teaching purposes. By 1833, the lying-in hospital had become so overcrowded that an extension was built and the two clinics were created. Until 1838, both clinics were used for teaching medical students and midwives. In 1839, by decree, the first clinic became used solely for teaching medical students and the second clinic was used for training midwives.<sup>1,2</sup>

It was in May 1847 that Semmelweis insisted that medical students should wash their hands in disinfectants before entering the first clinic.

Table 1 shows the maternal mortality rate in the lying-in department of the Vienna General Hospital from 1784–1859, based on information in Table XXIV on pp. 460–2 of I.P. Semmelweis, *Etiology, Concept and Prophylaxis of Childbed Fever* (1860, translated into English by FP Murphy, *Medical Classics* 5/5, (1941)).<sup>4</sup>

Semmelweis' observations were clinically astute and potentially of great practical importance. But Semmelweis was a complex, difficult and dogmatic man, intolerant to the point of paranoia of the slightest criticism, and capable of distorting the views of others when it suited him to do so. Although urged by his friends to publish, he waited for 13 years before he published his treatise, *The Etiology, Concept, and Prophylaxis of Childbed Fever*, which although dated 1861,<sup>4</sup> was actually published in 1860.

The treatise of over 500 pages contains passages of great clarity interspersed with lengthy, muddled,

**Table 1.** Maternal mortality rate in lying-in department of the Vienna General Hospital.

Period	Characteristics of the period	Deliveries (n)	Maternal deaths (n)	Maternal deaths per 1000 deliveries (n)
1784–1822	The years in which postmortem examinations were not routinely carried out	71,395	897	12.5
1823–1832	The years in which postmortem examinations were carried out routinely	28,429	1509	53.0
1833–1838	Separation of the maternity hospital into two clinics with roughly equal numbers of students and midwives in both clinics			
	First clinic	23,509	1505	66.6
	Second clinic	13,097	731	55.8
1839–1847	Separate arrangement of the two clinics			
	First clinic, medical students	20,204	1989	90.2
	Second clinic, student midwives	17,791	691	33.8
1848–1859	Period following the introduction of chlorine washing in the first clinic			
	First clinic, medical students	47,938	1712	35.7
	Second clinic, student midwives	40,770	1248	30.6

repetitive and bellicose passages in which he attacks his critics. No wonder that it has often been referred to as ‘the often-quoted but seldom-read treatise of Semmelweis’. When he wrote the treatise, Semmelweis was probably in the early stages of a mental illness that led to his admission to a lunatic asylum in the summer of 1865, where he died a fortnight later. The nature of his illness and cause of death is still debated.<sup>1,2</sup>

During his lifetime and for many years after his death, Semmelweis had few supporters, and his work, which had very little effect on obstetric practice, was almost totally forgotten. Antisepsis was not introduced routinely into obstetric practice until the 1880s, when the role of bacteria had been discovered and the use of antisepsis in surgery had become firmly established by Joseph (1st Baron) Lister (1827–1912). Thus, antisepsis in obstetrics came not from the work of Semmelweis, but from the transfer of Lister’s methods in surgery<sup>5</sup> to the lying-in (maternity) hospitals. Mortality in the lying-in hospitals fell dramatically as a consequence in the space of a few years.

Lister was profoundly influenced by the discoveries of Louis Pasteur (1822–1895) but not by

Semmelweis. Indeed, Lister had not even heard of Semmelweis until long after his antiseptic method was firmly established. It was not until 1887 that the publication of a paper by a Hungarian doctor led to an extraordinary revival of Semmelweis’ reputation, unparalleled in the history of 19th-century medicine. His defects were forgotten and Semmelweis was presented as an unjustly neglected hero and a martyr driven insane by the implacable opposition of his contemporaries. By the 1920s, the story of Semmelweis had all the elements of a Hollywood epic.<sup>1,2</sup>

Semmelweis’ observations and deductions in 1847 were original and astute. But most of the claims made about him in the 20th century – that he was the first to discover that puerperal fever was contagious (see, for example, Gordon<sup>6</sup>), that he abolished puerperal fever (or that if he did not, it was because of the stupidity of his contemporaries), and that his treatise is one of the greatest works in 19th-century medicine – are sheer nonsense. The truth about Semmelweis is both more interesting and more tragic than the numerous hagiographic biographies.<sup>1,2</sup>

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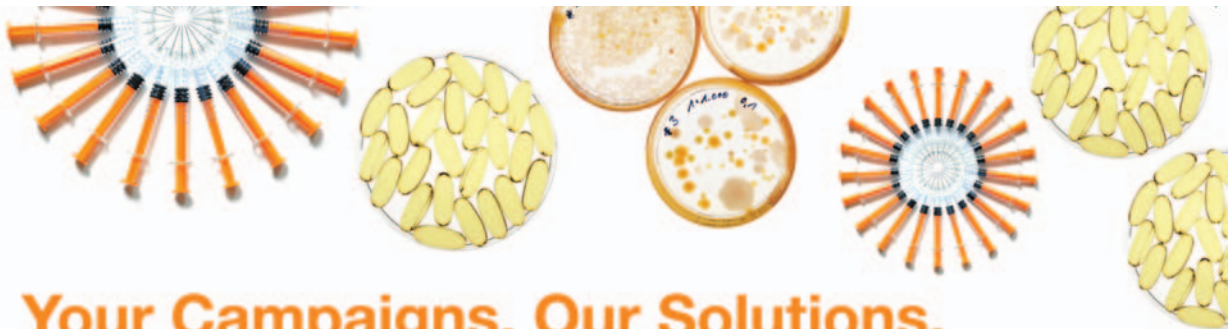
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