

Loudon I. Ignaz Phillip Semmelweis' studies of death in childbirth

Commentary on: Semmelweis I (1861). Die Aetiologie, der Begriff und die Prophylaxis des Kindbettfiebers [The etiology, concept, and prophylaxis of childbed fever]. Budapest and Vienna.

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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 1,000 births, while the rate in the second clinic, the midwives clinic, was only 36.2 per 1,000 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 the carrying out of post-mortems on 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 undertake vaginal examinations on all the women. The pupil midwives in the second clinic did not, of course, carry out post-mortem examinations, and did not undertake routine vaginal examinations.

This was many years before the role of bacteria in diseases was discovered, and Semmelweis suggested that the training procedures of the first clinic resulted in the transfer from the corpses of what he first called 'morbid matter', and later 'decomposing animal organic matter', on the hands of the students. In 1847, he therefore 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 in the first clinic compared with 13.3 in the second clinic. The process of admission to the two clinics on alternate days 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 2,977 maternal deaths in the two clinics) mean that chance could confidently be excluded as a possible explanation for the differences observed.

When the lying-in hospital in Vienna - which was part of the Vienna Allgemeines Krankenhaus (Vienna General Hospital) - was opened in 1784, no post-mortems were carried out because the director, Lucas Boer, foresaw the danger of infection. In 1823, Boer was succeeded as director by Johannes Klein who introduced routine post-mortems for the purpose of teaching. By 1833 the lying-in hospital had become so overcrowded that an extension was built and two clinics were created. Until 1838 both clinics were used for teaching medical students and midwives. In 1839, by decree, the first clinic was used solely for teaching medical students and the second clinic was used for training midwives. Semmelweis insisted that medical students washed their hands in disinfectants before entering the first clinic in May 1847.

The Table below 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 F. P. Murphy, Medical Classics 5/5, (1941).

| Period | Characteristics of the period | Number of deliveries | No. of maternal deaths | No. of maternal deaths per 1000 deliveries |
|-----------|---|----------------------|------------------------|--|
| 1784-1822 | The years in which post-mortem examinations were not routinely carried out | 71,395 | 897 | 12.5 |
| 1823-1832 | The years in which post-mortem examinations were carried out routinely | 28,429 | 1,509 | 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 | 1,505 | 66.6 |
| | Second clinic: | 13,097 | 731 | 55.8 |
| 1839-1847 | Separate arrangement of the two clinics: | | | |
| | First clinic, medical students: | 20,204 | 1,989 | 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 | 1,712 | 35.7 |
| | Second clinic, student midwives: | 40,770 | 1,248 | 30.6 |

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 thirteen years before he published his treatise, 'The Etiology, Concept, and Prophylaxis of Childbed Fever', which is dated 1861 but was actually published in 1860. The treatise of over 500 pages contains passages of great clarity interspersed with lengthy, muddled, 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.

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 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 (1822-95) 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 nineteenth-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.

Semmelweis' observations and deductions in 1847 were original and astute. But most of the claims made about him in the twentieth century - that he was the first to discover that puerperal fever was contagious, 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 nineteenth-century medicine - are sheer nonsense. The truth about Semmelweis is both more interesting and more tragic than the numerous hagiographic biographies.

Bibliography:

The first (slightly abridged) translation into English of Semmelweis' treatise, was published in 1941 by F.P. Murphy in 'Medical Classics' 5 (1941), 339-478, 481-589, 591-715, 719-773.

A more recent (and also abridged) English translation with an excellent introduction and commentary on the text, is: K. Codell Carter, 'Ignaz Semmelweis, The Etiology, Concept and Prophylaxis of Childbed Fever,' (University of Wisconsin Press, Wisconsin, 1983).

My books, 'The Tragedy of Childbed Fever' (Oxford University Press, 1997) and 'Death in Childbirth: An International Study of Maternal Care and Maternal Mortality 1800-1950' (Clarendon Press, 1992) set Semmelweis in the wider context of the histories of childbed fever and death in childbirth.

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