

# Circadian variation in onset of epistaxis: analysis of hospital admissions

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Circadian patterns have been shown in several acute cardiovascular events—for example, myocardial infarction and stroke—and such patterns could be related to blood pressure rhythms.<sup>1</sup> We reviewed all cases of epistaxis from 1 January 1992 to 31 December 1998 in the emergency department of St Anna Hospital, the emergency hospital for the 150 000 people in the city and suburbs of Ferrara, Italy. In Ferrara epistaxis is considered a medical emergency, for which help is generally sought in hospitals, as practitioners do not make emergency house calls.

## Subjects, methods, and results

In total there were 1741 cases of epistaxis (990 in men, 751 in women). The mean age of the patients was 53 (SD 22) years. Precise (within a 30 minute range) determination or gross (within three hours) determination of the time of the onset of epistaxis was possible in 1366 (78%) and 349 (20%) cases, respectively. We performed the main statistical analysis using a partial Fourier series with up to four harmonics, categorising each precise time of event as one of 24 intervals of 1 hour. To test goodness of fit we calculated the “percentage of rhythm”—the percentage of the overall variability of data about the arithmetic mean that was attributable to the fitted rhythmic function. We used the *F* test to determine the significance of the fit of each function.<sup>2</sup>

The 375 cases in which time of onset of epistaxis could not be determined precisely did not differ from the other 1366 with respect to confounding factors such as age, sex, race, severity of symptoms, and underlying or concomitant diseases. Two secondary analyses—one in which the 375 excluded cases were combined with the main analysis dataset (15.6 (375/24) were added to the number of events in each time interval), and one in which the 1715 cases in which time of onset (precise or gross) was determined were regrouped into eight time intervals of three

hours—showed that the exclusion of these cases from the main analysis did not significantly affect the results.

A highly significant ( $P < 0.001$ ) circadian rhythm was found, with a primary peak in the morning, a smaller secondary peak in the evening, and a nocturnal nadir (figure). The pattern occurred both in the population as a whole ( $n = 1366$ , primary peak at 8 24 am, percentage of rhythm 92.9%) and in subgroups by sex (men: 762, 8 12 am, 90.3%; women: 585, 8 44 am, 91.3%). The pattern was repeated in hypertensive patients (727, 8 36 am, 88.8%) and normotensive patients (639, 8 20 am, 89.8%). We found no influence of age on the circadian variability of epistaxis.

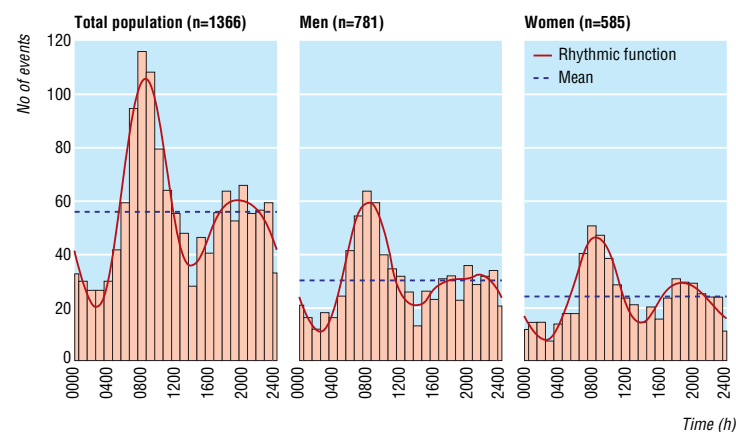
## Comment

The time of occurrence of epistaxis shows a biphasic circadian pattern. A similar biphasic pattern was recently reported on haemorrhagic cardiovascular events related to hypertension, such as subarachnoid haemorrhage,<sup>3</sup> and on rupture of aortic aneurysms.<sup>4</sup> It is interesting that a biphasic pattern such as we found closely resembles the physiological circadian rhythm of blood pressure, suggesting that blood pressure might trigger or be conducive to epistaxis. Several other physiological factors that are relevant in the determination of acute cardiovascular events show a significant temporal variation and are believed to contribute to the time dependency of cardiovascular risk.<sup>5</sup> Other local mechanisms or factors related to venous bleeding that might be implicated in epistaxis and that might show circadian variation deserve further investigation.

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Epistaxis events in men and women at different times of the day

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