Short reports

Effect of the moon on general practitioners' on call work load

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A general practitioner's on call workload can vary enormously. Probable determining factors include practice size, surgery hours, appointment system flexibility, season, and current epidemics. It is still difficult to explain, however, why one night may be busy and the next very quiet.

Anecdotal evidence suggests that many doctors, and from different specialities, believe that they are busier around the time of the full moon, but we could not find any general practice based research on the subject. This study looked at the phases of the moon and its apsides, and their possible influence on a general practitioner's on call workload.

Patients and methods: Information for this study was collected from messages received by the nursing staff at a private nursing home which covers all out of surgery hours calls from two neighbouring seaside practices that share an on call rota. A total of nine general practitioners look after a combined practice population of 18 600 patients. In addition, a considerable number of temporary residents are treated, especially during holiday periods.

The study took place over 24 complete lunar cycles, beginning on 1 September 1989. The times of the lunar phases and apsides (perigee: moon closest to earth, and apogee: moon furthest from earth) were obtained from the Royal Observatory at Cambridge. The sessions closest to the time of the full moon, and three sessions on either side of it, were taken as falling on the full moon, as used by Tasso and Miller.¹ Similarly, data were collected for the first quarter, new moon, and last quarter, along with two other features of the lunar cycle – the perigee and apogee.

In part two of this study, questionnaires were sent to one hundred general practitioners chosen at random from the Wessex region. They were asked what factors they perceived might influence their on call workload. There was no indication that our main interest was in the possible effect of the moon.

Results: In part one of the study, 6013 out of hours calls were received from patients over a total of 730 days. The reasons for calling were as follows: physical illness, 5655 (94%); mental illness, 285 (4.7%); social problems, 64 (1%); and miscellaneous, 9 (0.1%). The percentage change in mean on call rates was calculated (see table). Of the 100 questionnaires sent to general practitioners in part two, 79 were returned completed. Altogether 59 (83%) stated the full moon had no effect, but 12 (17%) said it increased the on call workload. None said it caused a reduction.

Discussion: The Transylvania hypothesis – the suggestion that human behaviour can be directly affected by the moon – has always fascinated people. A significant relationship has been found between phases of the moon and urinary retention² and crime.³ Rotton and Kelly performed a meta-analysis of 37 studies and concluded that there was no consistent relationship between phases of the moon and acts usually described as lunatic.⁴ However, Garzino in 1982 defended open minded scientific lunar research and identified how a subtle lunar effect may be overlooked.⁵

Various theories have been proposed as to how the moon might affect human behaviour or illness. One of the more popular is the "biological tide" theory, characterised by fluid and electrolyte shifts within the central nervous system leading to physiological effects, possibly mediated by the suprachiasmatic nucleus of the hypothalamus. The Darwinian explanation postulates a genetic sensitivity to the lunar tidal drive, as all creatures originally evolved from the sea.

Kepler's (1571–1630) first law of planetary motion states that all planets describe an elliptical orbit. The moon's gravitational pull increases at perigee and is further enhanced if this coincides with a new or full moon. Our initial examination of the data suggested an increased workload at the full moon, though not at the new moon, and while we found no

Percentage changes in total daily out of hours calls. Values are 95% confidence intervals (95% CI) and significance, unadjusted and adjusted for year, month, weekends, and bank holidays

	Unadjusted		Adjusted for year, month, weekend and bank holidays	
	p value	% change (95% CI)	p value	% change (95% CI)
New moon	0.194	96 (90, 102)	0.343	97 (91, 103)
First quarter	0.680	101 (95, 108)	0.862	101 (95, 107)
Full moon	0.032	107 (101, 113)	0.322	103 (97, 109)
Last quarter	0.383	97 (92, 103)	0.699	101 (95, 107)
Apogee	0.007	92 (87, 98)	0.032	94 (88, 99)
Perigee	0.110	95 (90, 101)	0.647	99 (93, 105)

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change in workload at the perigee, there was a reduction in out of hours calls at the apogee, when the moon's gravitational pull is at its lowest. Further analysis showed that any apparent effect could be explained by the occurrence of more bank holidays on the full moon days in our study period. Though the reduction in workload at the apogee remained significant ($p=0.032$).

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- 4 Rotton J, Kelly IW. Much ado about the full moon: A meta-analysis of lunar lunacy research. *Psychol Bull* 1985;97:286-306.
- 5 Garzino SJ. Lunar effects on mental behaviour: A defence of empirical research. *Environment and Behaviour* 1982;14(4):395-417.

Oral contraceptive use and risk of myocardial infarction: an Italian case-control study

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There is consistent evidence that oral contraceptives are associated with increased risk of acute myocardial infarction. There is, moreover, strong synergism between their use and other recognised risk factors for myocardial infarction. In terms of implications for prevention, this has led to the avoidance of oral contraceptives in women at high risk for ischaemic heart disease for other reasons.¹ These indications for selective prescription have probably been as important for reducing vascular risk as the changes in newer formulations of oral contraceptives. We evaluated the recent impact of oral contraceptives on myocardial infarction in Italy, where its incidence and the pattern of oral contraceptive use² are different compared with northern Europe and America, where most studies have been conducted.

Methods: A case-control study of myocardial infarction was conducted in northern Italy between 1983 and 1992. Its general design has already been described.²

Cases were women with diagnosis of a first episode of acute myocardial infarction admitted to the coronary care units of the participating hospitals. A total of 251 cases aged 18 to 54 years (median age 48) were included in the study.

Controls were women admitted to the same network of hospitals during the same period, for diseases other than cardiovascular or cerebrovascular and not related to known or potential risk factors for acute myocardial infarction. There were 475 women aged 17 to 54 (median age 48), comparable with cases in terms of age and area of residence. Twenty two per cent of controls were admitted for traumatic conditions, 32% for other non-traumatic orthopaedic diseases, 18% for surgical conditions, and 28% for other miscellaneous diseases, such as acute infections, skin, ear, eye, nose and throat diseases.

Use of oral contraception was investigated through questions about the duration of each episode of use in months, the age at first and at last use, and, whenever possible, the brand.

Standard methods of analysis of case-control

study, based on unconditional logistic regression, were used to derive odds ratios (OR), and the corresponding 95% confidence intervals (CI).³

Results: A total of 2.8% of cases versus 1.3% of controls were current users of oral contraceptives and 17.1% versus 9.7% were past users. The multivariate OR were 2.0 for current and 1.8 for past users. The risk of acute myocardial infarction decreased with increasing time since last use, although it was still high, but not significantly, two or more years since last use (Table).

With reference to the combined effect of oral contraceptives and major covariates, compared with non-smokers who were non-users of oral contraceptives, the OR of acute myocardial infarction for smokers who were oral contraceptive users was 6.1 (95% CI 3.4, 11.0). Compared with normotensive women who had never used oral contraceptives, the OR was 28.4 (95% CI 6.7, 120.1) for hypertensive women who had ever used oral contraceptives (17 cases and 2 controls). In hyperlipidaemic women who had ever used oral contraceptives the OR was 4.4 (95% CI 1.3, 15.2) compared to never users who were normolipidaemic.

Discussion: Some studies found an increased risk of acute myocardial infarction limited to current oral contraceptive users, and a decreased risk with time since stopping oral contraceptive use, with a sharp reduction in the risk after stopping.⁴ In other investigations there was some persistence of risk also after stopping.⁵

The persistence, in this study, of some increased risk in women who had stopped using oral contraceptives supports some effect of these drugs on atherogenesis, which would be consistent with their action on the lipid profile.

This study confirms the substantially raised risk in women exposed to both oral contraceptive use and smoking, and suggests an action of both risk factors on similar aspects of the patho-

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