supports the suggestion that puppies are a possible source of campylobacter infection in the 0-5 year age group. Young children have particularly close contact with pets and are therefore more susceptible to faecal-oral spread, and the association between puppies, young children, and diarrhoea is strengthened by the identification of campylobacter and diarrhoeal symptoms in some of the puppies.

Although no young child came to any permanent physical harm, at least five were diagnosed as having the infection while in hospital; campylobacter might thus have been a factor contributing to admission. The symptoms of diarrhoea and abdominal pain may be very distressing to both the child and the parent. We suggest that parents should be made aware of this association and that if young children are in contact with puppies the need for hygienic precautions should be emphasised.

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(Accepted 2 October 1986)

Darlington Health Authority, Memorial Hospital, Darlington DL3 6HX
NICK J SALFIELD, MB, BS, senior registrar in community medicine
EDWIN J PUGH, MB, MRCGP, senior registrar in community medicine

Correspondence to: Dr E Pugh, Wellhouse, East View, Sadberge, County Durham DL2 1FF.

Lean body mass and non-rapid eye movement sleep

The restorative theory of sleep suggests that sleep is influenced by metabolic rate. Evidence of such an association is provided by cross species phylogenic studies and the observation of disease states in humans (for example, of hyperthyroidism) and the effect of exercise and fitness on sleep patterns. There are no studies, however, directly linking daily metabolic rate and sleep patterns. Total body mass has been shown to be related to total duration of sleep and duration of rapid eye movement sleep.[1] We have shown a relation between body composition and slow wave sleep, but the methods used (tests for skinfold thickness and urinary creatinine concentration) have limitations, and the relation shown seemed to depend on the subject's fitness.[2]

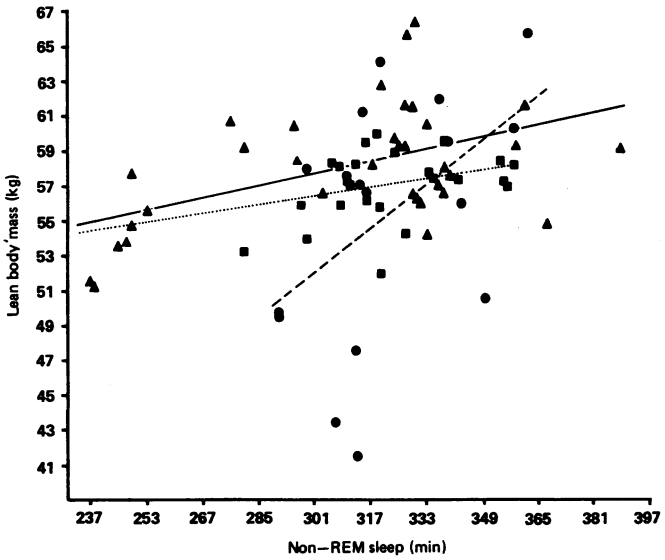
In this study we report three separate experiments in which we studied the relation between lean body mass and sleep parameters. In all cases lean body mass was calculated from measurements of total body potassium concentration using a whole body counter to monitor potassium-40 at the Scottish Universities Research and Reactor Centre at East Kilbride. The techniques used have been described.[3] The method is considered to be very reliable for the measurement of lean body mass, and lean body mass measured in this way has been shown to have the highest correlation with metabolic rate when compared with seven other relevant anthropometric measures.[4]

Patients, methods, and results

In the first study, which investigated the effect of a nutritional supplement on sleep patterns, 18 subjects (12 men and six women, aged 20-40) had lean body mass measured within one month of having their sleep patterns recorded in the sleep laboratory. A significant correlation was shown between lean body mass and non-rapid eye movement sleep in the first seven hours of sleep (figure), and that between lean body mass and slow wave sleep was 0·44 ($p<0·04$).

In a second study eight subjects were studied on three occasions nine weeks apart.[5] These subjects were undergoing their initial army training. On each occasion lean body mass was measured within one week of the sleep recordings. These subjects (aged 17-20), who were untrained initially, showed significant improvement in their anaerobic threshold during the training period in addition to significant changes in lean body mass. In this group lean body mass was shown to be significantly correlated with non-rapid eye movement sleep during the first seven hours of sleep (see figure). Slow wave sleep was not significantly correlated with lean body mass in this group ($p<0·07$).

In a final experiment 34 men (aged 17-29) were studied. These subjects had participated in various studies in the sleep laboratory. One third of these subjects were competitive athletes. In this group not all subjects slept for over seven hours, and therefore lean body mass was correlated with non-rapid eye movement sleep during the first six hours of sleep. Once again a significant correlation was found (figure).



Correlation of lean body mass and duration of non-rapid eye movement sleep in three groups. ---●---=First study (n=18, r=0·49, $p<0·02$). ---■---=Second study (n=8×3, r=0·37, $p<0·04$). ——▲——=Third study (n=34, r=0·48, $p<0·01$).

Comment

In three separate studies we found a significant correlation between lean body mass and non-rapid eye movement. Although the correlations were not particularly strong, indicating that other factors influence sleep patterns, the uniformity of significance in three very different groups is noteworthy. These results support the suggestion of a relation between metabolic activity and sleep patterns.

We thank the Scottish Universities Research and Reactor Centre, Edblo Ltd, and Glencorse Barracks for the use of facilities. Dr C Shapiro was supported by Roussel Laboratories Ltd, Paris, during the study.

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(Accepted 19 September 1986

Edinburgh University, Morningside Park, Edinburgh EH10 5HF
C M SHAPIRO, PHD, MRCPSYCH, senior lecturer, department of psychiatry
J CATTERALL, BSC, MRCP, senior registrar, department of respiratory medicine
P WARREN, PHD, lecturer, department of respiratory medicine
I OSWALD, DSC, FRCPSYCH, professor, department of psychiatry

Department of Psychology, University of Tasmania
J TRINDER, PHD, lecturer
S PAXTON, BSC, PHD, lecturer

Scottish Universities Research and Reactor Centre, East Kilbride
B W EAST, PHD, head, nuclear medicine

Correspondence to: Dr Shapiro.