12 year old and 19% of 18 year old Finns.¹ These differences may be related to the socioeconomic climate in the two countries when the studies were undertaken. The Finnish study was undertaken in February 1983, when the percentage of unemployment was 6% (abstracts from the Finnish Embassy's annual statistical year book, 1984 (unpublished)), whereas unemployment in the United Kingdom in March 1984 was 13% and within the city of Nottingham 12%.³

War was the second most cited source of anxiety in adolescents from Nottingham (133 (25%) of 538 aged 11-12; 127 (21%) of 626 aged 15-16; and 333 (20%) of 1669 aged 11-16), though these proportions were considerably smaller than those reported in the Finnish¹ (79% aged 12 and 57% aged 16) and American² (58% aged 11-19 from a forced choice response) studies. A higher degree of awareness of the threat of war in American compared with English adolescents is not surprising given the state of power of America, and such a difference between England and Finland is not unexpected. Finland has no nuclear weapons, but its proximity to the Soviet Union by a shared border may contribute as much to the degree of public awareness of the nuclear threat as the country's own arms control policy.

This study shows that, in addition to the fear of war, problems of immediate and more personal relevance such as unemployment, poverty, and, especially in girls, unhappy marriages are major concerns of English adolescents. The effects, if any, of these anxieties on the mental and physical health of adolescents are unknown, but the high prevalence of these anxieties suggests that the effects on health of unemployment may extend to those who are at risk of unemployment.

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Rapid estimation of plasma theophylline concentrations

Methyl xanthines are used in the treatment of both chronic airways obstruction and asthma. As they have a narrow therapeutic index a knowledge of their plasma concentration is helpful in optimising their clinical effect while avoiding side effects.¹ It is sometimes desirable to give parenteral methyl xanthines in an emergency, but without knowledge of the patient's plasma theophylline concentration this can be hazardous. In outpatients an increase in theophylline dosage may be clinically desirable but has to be delayed until the plasma concentration is known, which is often not until the patient's next visit. Though measurement of plasma theophylline concentrations is now widely available, only rarely can the result be obtained immediately. Recently a technique of solid phase immunochemistry and reflectance photometry has been developed to measure several variables of blood biochemistry, including theophylline concentrations (Seralyser, Ames Division, Miles Laboratories Ltd).² This machine is designed for use in chemical pathology departments but is portable and simple enough to be operated outside the laboratory. We used this machine to make rapid estimations of plasma theophylline concentrations in the chest clinic.

Patients, methods, and results

We measured plasma theophylline concentrations in 65 consecutive patients attending our outpatient clinics who had been prescribed a methyl xanthine

preparation. Samples were analysed by two different operators using a Seralyser and compared with samples taken simultaneously and assayed by a fluorescence polarisation immunoassay (Abbott TDX).

Venous blood (10 ml) was removed from each patient and centrifuged and the plasma separated into three aliquots. One was sent for independent assay, and the two others were diluted for immediate estimation of the theophylline concentration. The reagent strip was placed on the stage of the photometer and 30 μ l diluted plasma pipetted on to it. The photometer was activated, the stage replaced, and the result displayed 80 seconds later. If the plasma concentration was lower than 3 mg/l the machine reported it as zero; if it was greater than 30 mg/l a further dilution had to be performed. The Seralyser was calibrated with two standard concentrations fortnightly and was checked with an intermediate standard (15 mg/l) before each outpatient session. Fifty of the patients had measurable concentrations (that is, > 3 mg/l).

There was a good correlation between the analyses performed by each of the two operators using the Seralyser and the reference assay in the 50 patients with measurable concentrations (figure). The slopes of the regression lines were 1.02 and 0.99 respectively, and these lines were not significantly different from the line of identity. The 95% confidence limits about the regression lines were 1.9 and 2.0 mg/l respectively. The coefficient of variation of repeated measurements for the Seralyser at 15 mg/l was between 4% and 5%.

Plasma concentrations in the remaining 15 patients were all recognised by the Seralyser as being below 3 mg/l. Thus there were no false positive results.

Plasma theophylline concentrations (mg/l) obtained by two different operators using a Seralyser compared with concentration obtained from reference fluorescence immunoassay (n=50). Line of identity is plotted on each graph.

Comment

This technique of estimating plasma theophylline concentrations gives good results within five minutes, even when used by relatively inexperienced operators outside a chemical pathology laboratory. It has been suggested that measuring plasma theophylline concentrations adds little to the clinical benefit of administration of methyl xanthines,³ and this is probably the case when the result is delayed. We believe that the therapeutic effect of theophylline could be achieved with more speed and certainty by monitoring drug concentrations with a rapid technique. Certainly, immediate estimation of plasma theophylline concentrations would facilitate safer and more confident use of parenteral theophylline in casualty departments. Probably, therefore, the ready availability of plasma theophylline concentrations would lead to more rational and safer use of methyl xanthine preparations.

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