HEALTH PROMOTION INTERNATIONAL Vol. 19. No. 1 © Oxford University Press 2004.
doi: 10.1093/heapro/dah108

Evaluation of a health promotion programme to prevent the misuse of androgenic anabolic steroids among Swedish adolescents

SVERKER NILSSON[1,2,3], PETER ALLEBECK[2], BERTIL MARKLUND[3,4], AMIR BAIGI[3,4] and BENGT FRIDLUND[4,5]

[1]*Department of Primary Health Care, Varberg, Sweden,* [2]*Department of Social Medicine, Göteborg University, Göteborg, Sweden,* [3]*Research and Development Unit, Primary Health Care Halland, Falkenberg, Sweden,* [4]*Department of Primary Health Care, Göteborg University, Göteborg, Sweden and* [5]*Department of Nursing, Lund University, Lund, Sweden*

SUMMARY

The aim of this study was to design an appearance programme in order to prevent the misuse of androgenic anabolic steroids among adolescents and to evaluate the adolescents' perception of this programme. The study was performed in all schools in a primary health care area on the south west coast of Sweden. The intervention targeted all 16- and 17-year-old males and females (n = 921). The intervention and evaluation were completed by 451 boys. The strategy of the appearance programme was to create awareness of and to discuss attitudes towards steroid hormones among these adolescents. Youth leaders and health workers, who discussed these subjects with adolescents over a period of 2 years, carried out the intervention programme. The perception of the programme was analysed anonymously using questionnaires. Effects on the total population of youths were assessed by two cross-sectional surveys. The intervention programme was well received by the adolescents. The misuse of androgenic anabolic steroids had a tendency to decrease after the appearance programme. We demonstrated a method for involving the community in an appearance programme to reduce misuse of anabolic steroids and showed that youth were sensitive to our discussions about appearance and attitudes. This study indicates that drug abuse among adolescents can be decreased by health promotion activities, such as group discussions. Controlled studies are needed before the results of this appearance programme can be generalized.

Key words: adolescents; androgenic anabolics; appearance; intervention

INTRODUCTION

Misuse (non-medical use) of androgenic anabolic steroids is an important public health problem in young males (Andersson and Hibell, 1995; Nilsson, 1995; Kindlundh *et al*., 1999). Surveys have shown that 4–11% of male adolescents report having used anabolics (Buckley *et al*., 1988; Johnson *et al*., 1989; Bahrke *et al*., 1998). This misuse can be harmful to the health of both the misuser and those surrounding them (Pope and Katz, 1988; Su *et al*., 1993; Choi and Pope, 1994; Thiblin *et al*., 1997; Porcerelli and Sandler, 1998). Preventive work is needed to reduce this substance misuse. Studies from intervention programmes designed to prevent drug misuse show that education is not enough and that scare tactics are doomed to failure as adolescent boys accept and even like risk-taking (Tennant *et al*., 1973; Strosburger, 1989; Goldberg *et al*., 1990; Goldberg *et al*., 1991; Anderson *et al*., 1997). Goldberg and colleagues (Goldberg *et al*., 1990;

Goldberg *et al*., 1991) pointed out that informative educational programmes increase misuse of androgenic anabolic steroids among adolescents, as described previously by Tennant and coworkers (Tennant *et al*., 1973) who examined other drug abuse. Goldberg and colleagues (Goldberg *et al*., 1996a; Goldberg *et al*., 1996b; Goldberg *et al*., 2000) have shown positive effects of intervention studies comprising positive advice in training, even though the misuse of anabolics did not decrease significantly. Among athletes, information about healthy behaviour and alternative training methods has resulted in a tendency for decreased desire to misuse steroid hormones (Goldberg *et al*., 1996a; Goldberg *et al*., 1996b; Goldberg *et al*., 2000). As shown by our group and others (Buckley *et al*., 1988; Johnson *et al*., 1989; Andersson and Hibell, 1995; Nilsson, 1995; Anderson, 1997; Bahrke *et al*., 1998; Kindlundh *et al*., 1999), one of the main reasons for misusing androgenic anabolic steroids is to improve appearance. Therefore we developed and evaluated an intervention programme designed not to inform recipients about anabolics, but to focus on appearance, with discussions about attitudes towards appearance, including the other gender's attitudes towards male appearance and behaviour in order to decrease the desire for large muscles to impress girls. We also focused on self-confidence among adolescents, as the aspects concerning preventive work among adolescents regarding anabolics have not been sufficiently studied. Accordingly, the aim of this study was to design an appearance programme in order to prevent the misuse of androgenic anabolic steroids among male adolescents in a primary health care area in Sweden and to evaluate the male adolescents' perception of this programme.

METHODS

Population and setting

The study was carried out in all schools in the primary health care area of Falkenberg, an area with 39 000 inhabitants, situated in the county of Halland on the south-west coast of Sweden. There were five high schools and one upper secondary school in the area, as well as five gyms and several active sports associations. All adolescents aged 16 and 17 years in the primary health care area ($n = 965$) were involved in the study. All social classes were represented. The study was completed by 921 teenagers. Drop-outs (5%) were due to absence from school when the data collection was performed. Half of the population tested were 16 years of age (the rest were 17 years) and half of the population were boys ($n = 451$). These male adolescents were compared with those male adolescents in the same area aged 16 and 17 years who were examined before the intervention programme started ($n = 345$).

Local politicians, the schools' headteachers and the Research Ethics Committee of the Medical Faculty, Göteborg University, approved the study. As the data collection was performed in a way securing anonymity, written informed consent from participants and their parents was not required.

Intervention strategy

The basic strategy of the 2-year-intervention programme was to raise the self-confidence and awareness of appearance ideals among young men in order to decrease their incitement to use androgenic anabolic steroids to improve muscle size in order to impress girls. The main point was to stress that good behaviour is more important than appearance in the social life of youth. Awareness of, as well as attitudes towards the steroid hormones were also concentrated upon instead of focusing on the dangerous side-effects of androgenic anabolic steroids. An important part of the intervention programme was to increase the self-confidence of the adolescents, as Bremberg (Bremberg, 1998) has shown mental aspects to be important in preventive work among adolescents. We wanted to raise the awareness of each young person's strengths and to help them think and decide by themselves rather than looking at other adolescents' appearance and behaviour. These aspects formed the basis of the whole intervention programme. The rationale was that this should modify the participants' view of appearance as a key to popularity and attention.

Procedure

The informants who performed the intervention were health workers specifically selected for the project. We selected persons who were well educated and used to discussing with teenagers. A total of 150 health workers were educated in order to reach many adolescent boys and girls in

a short time. They were selected from different institutions in the community that work closely with adolescents, for example gym instructors, nurses, physicians, physiotherapists, psychologists, social workers, teachers and trainers. The pedagogical attitudes as well as the pedagogical tools were implemented among the health-workers. This was done using 12 lectures by different experts in the field, practical training in small groups and written material. Each of them had a personal tutor during the intervention period. They were provided with educational materials such as overhead materials, posters, videos and brochures, with information for adolescents designed in an attractive, 'teenager-friendly' manner.

Group discussions

The intervention strategy was implemented among adolescents, mainly using teaching sessions and group discussions. The health workers were used as catalysts in order to induce adolescents to discuss their attitudes towards appearance and behaviour. They were instructed not to adapt an adult educational role, but to use the confidence of the youths to implement the ideas of the intervention programme. The presence of female adolescents was important in two ways. First, they were involved in these discussions, in order to make male adolescents aware of their true attitudes towards appearance. The teenaged girls stressed that positive behaviour and performance were more important than big muscles and aggressiveness. Secondly, we used their antipathies against anabolic users' aggressiveness and their fear of violent behaviour and injuries as positive peer pressure.

Self-confidence strengthening

Self-confidence strengthening was pursued in the group discussions as well as in the messages given in posters, brochures and trailers. The health workers used informal ways to arrange study sessions or lectures and to start discussion groups. The discussions were held frequently in small groups with teenagers during the intervention period of 2 years. The activities were monitored by checking school schedules, training schedules, etc., showing that each adolescent participated in at least three group discussions. Very often these discussions resulted in further lectures and special works. During the same 2-year period, information on androgenic anabolic steroids was spread on posters as well as using advertisements on local television and in cinemas. This information highlighted the consequences of anabolic steroid use on social life, focusing on the relationship with the other gender, and in particular sexual activities. The posters had striking, somewhat provoking pictures (e.g. male genital organs) and were presented in locations visited by adolescents and on advertisement places in the community. The posters were printed by a professional advertising agency according to our intervention strategy, including attractive pictures for teenagers. The cinema advertisement was a daily trailer, shown before a movie, over a period of 2 years. The trailer showed how a male adolescent gradually lost his vigour and appearance due to the use of anabolics.

Costs

This extensive intervention programme, involving the whole youth community in the town, was carried out at low cost as most of the activities were performed during normal school schedules and at other places where adolescents could be found. Each institution (gyms, health services, schools, etc.) paid the salary of their own personnel and the programme was a part of their ordinary work, which made it possible to perform the intervention at a low cost. The posters were printed at cost price, as the agency had the opportunity to receive attention from the community. The remaining cost for the 2-year-intervention programme of 150 000 SEK (approximately US$20 000) was paid by the County Council involved.

Evaluation

The evaluation was performed in two ways. Participants' views were assessed by distributing questionnaires to those involved in the educational activities over a specific period of time. The effect on the total youth community in the targeted age groups was assessed by two independent cross-sectional surveys, built on the pre-/post-measure design performed before and after the intervention.

Participants' views

Repeated measures of participants' views were assessed by distributing a questionnaire to those

involved in the interventional activities over a specific period of time. An anonymous questionnaire was handed out after the school group discussions in order to analyse the immediate participant response to them. In order to analyse not only the specific reaction to our appearance programme, but also to compare it with other youth activities, this was done during weeks with health promoting lectures, including anabolic discussions and activities wanted by the youth. These evaluations were performed at each school in the area studied and included one open and 10 multiple-choice questions about their perception of the intervention programme, with items being answered according to an ordinal scale. For example, respondents were asked about their opinions of the lectures given, using the answering items 'excellent', 'good', 'ordinary', 'less good' and 'bad'. The questionnaire was tested, without any changes, by personnel at schools and primary health care units as well as by teenagers before the study was performed, and was also used locally before and found to be reliable.

Cross-sectional surveys

A questionnaire on the misuse of androgenic anabolic steroids in the area was administered before the intervention programme was implemented. In order to demonstrate trends of misuse of anabolic steroids, the total population of male adolescents in the groups aged 16 and 17 years was asked the questions after the appearance programme by a well tested 33-item questionnaire constructed by the Swedish Council for Information on Alcohol and other Drugs (CAN) (Andersson and Hibell, 1995; Kindlundh *et al*., 1999). The questionnaire measured the use of and the administration of androgenic anabolic steroids, as well as growth hormones, alcohol and narcotic drugs. The adolescents were at the same time questioned on their knowledge of and attitudes towards the drugs. The questioning was performed using open as well as multiple-choice questions, with answer items on the ordinal scale level. The questionnaire included questions about non-existing compounds in order to detect false answers. CAN has tested the instrument and found it to be valid and reliable (Andersson and Hibell, 1995; Kindlundh *et al*., 1999). The instrument was tested by personnel at schools and primary health care units as well as by teenagers before the study was performed, and it was well received.

Data collection

Data collection of reported drug misuse before and after the intervention was performed in the same way in both surveys. The total population of male adolescents in the groups aged 16 and 17 years was questioned using the CAN questionnaire. The questionnaires were distributed in all the schools in the area during ordinary classroom time. Health workers delivered and collected the questionnaires. Each teenager answered the questionnaire on their own, put it in an envelope and sealed it, securing anonymity. Attitudes to the intervention activities were studied in the same way, thereby ensuring anonymity.

Data analysis

Descriptive and analytical statistics were used to analyse the adolescents' response to the activities. In order to analyse the difference between the misuse of androgenic anabolic steroids before and after the appearance programme, χ^2 test and Fisher's exact test were used (Wonnacott and Wonnacott, 1977). Statistical significance was set at a level of $p < 0.05$.

RESULTS

The evaluation of the intervention programme showed that the adolescents valued these group discussions more than the other activities performed during the same period, and that 99% of the adolescents graded the anabolic discussions as excellent or good (Table 1). The misuse of androgenic anabolic steroid pills in the primary health care area among 16-year-old boys

Table 1: Evaluation of adolescent perception (frequency in numbers) of the different activities during a health week in one of the schools examined (n = 149, males and females, age 16–17 years)

	Excellent	Good	Less good	Bad
Police	0	39	48	62
Civil defence	0	19	49	81
Concert	42	33	49	25
Sports activities	49	36	39	25
Resuscitation	25	44	41	40
Women's aid	31	36	41	41
Anabolic discussion	111	37	1	0
Follow-up discussion on anabolics	87	59	3	0
Self-care	3	72	22	52

Table 2: Frequency (%) of misuse of androgenic anabolic steroid tablets and injections in the total population of male adolescents before ($n = 345$) and after ($n = 451$) the intervention in a Swedish primary health care area

	Before	After	*p*-value
Tablets, 16-year-olds	11.0	6.0	0.084
Tablets, 17-year-olds	3.9	3.0	0.61
Injections, 16-year-olds	5.3	1.2	0.035
Injections, 17-year-olds	0.48	1.0	0.62

did not change significantly, as it was 11% before and 6.0% after the intervention; however, the misuse of injections of androgenic anabolic steroids significantly decreased from 5.3% before to 1.2% after the intervention (Table 2). Among 17-year-old boys, no significant changes occurred after the intervention (Table 2). Concerning the attitudes towards the steroid hormones after the intervention, the results showed that 2% approved and 77% disapproved of androgenic anabolic steroids. With respect to appearance, 95% of male adolescents expressed the sentiment that females do not prefer men with big muscles. The rest of the boys expressed that they do. A subanalysis of boys who had used androgenic anabolic steroids showed that there were significant differences between them and other male adolescents, as they trained more at gyms to improve their muscle volume, and used more alcohol and more narcotic drugs. These boys reported that the drugs were not as harmful as they were thought to be by non-misusers, and that girls prefer boys with big muscles; both results were significant.

DISCUSSION

Designing a strategy to reduce the use of androgenic anabolic steroids among youth is a difficult issue. Most studies have been performed at the school level, where it has been difficult in evaluations to detect effects on behaviour (Levin *et al*., 1988; Bremberg and Arborelius, 1994; Dusenbury *et al*., 1997). Previous studies (Goldberg *et al*., 1990; Goldberg *et al*., 1991; Dusenbury *et al*., 1997) have even shown that the misuse of androgenic anabolic steroids increased after educational programmes. Therefore information about androgenic anabolic steroids was not given in this study unless the teenagers themselves asked for it. A previous intervention programme among athletes showed positive effects on the attitudes towards anabolic steroids after sex-specific, team-centred, positive alternative training education (Goldberg *et al*., 1996a; Goldberg *et al*., 1996b; Goldberg *et al*., 2000). These experiences inspired us to concentrate on positive information regarding teenage lifestyles and interests. In this appearance programme, we focused on the key issues behind some male adolescents' ambitions about improving their appearance using anabolic steroids, as appearance has been shown to be the most common reason for misuse of this drug (Buckley *et al*., 1988; Johnson *et al*., 1989; Andersson and Hibell, 1995; Nilsson, 1995; Anderson *et al*., 1997; Bahrke *et al*., 1998; Kindlundh *et al*., 1999). The intervention programme was well received by the adolescents, who obviously found the study sessions and discussions valuable. Health workers tried to influence the adolescents' attitudes towards appearance by making them aware of appearance ideals presented in the media, and teenage girls' views on appearance and behaviour. The fact that the two-wave cross-sectional survey showed a tendency to decrease the use of anabolics among 16- to 17-year-old males confirms that at least the use of these drugs did not increase after the programme, as was reported by other authors (Goldberg *et al*., 1990; Goldberg *et al*., 1991; Dusenbury *et al*., 1997). It therefore appears that our strategy, based on study sessions and group discussions led by youth leaders, was successful.

It is sometimes difficult to disentangle programme effects from those of initiatives taken by individual teachers or other health workers, who all have individual personalities and special interests. Furthermore, other information may have influenced the adolescents to avoid steroid hormones, as these drugs were discussed frequently in the media during this period. Our pre-study education of all selected health workers focused on a similarity in the strategy of using youth confidence by the selected leaders, and training these in conducting group discussions focusing on strengthening self-confidence. We used the fact that adolescents are sensitive to peer pressure. Peer pressure is sometimes negative, but can also be used in a positive way, as in this study. We tried to focus some boys' negative attitudes towards anabolics in the group discussion and to help youths strengthen this view in the groups. It was also important to have girls present

throughout the discussions, since we have shown previously (Nilsson *et al*., 2001) that girls have more negative attitudes than boys towards androgenic anabolic steroids. These positive effects seemed to manifest after the intervention, but we do not know if this is a result of our intervention or something that happened spontaneously among youth at this time.

Designing a strategy to reduce the use of androgenic anabolic steroids among youth is a difficult issue. The evaluation of such a programme is also difficult. We have used self-reported questionnaires, which have limitations but have been evaluated and found to be valid, for example for comparative studies (Andersson and Hibell, 1995); these provided a good overview, but not a definite answer. The potential problem of teenagers over-reporting misuse in order to act as 'tough guys' or under-reporting, as the misuse is not allowed in school, has been minimized by securing anonymity for the teenagers during the examination. It might also have been valuable to perform drug tests on the teenagers, but would have been very expensive (US$250 for each test) and ethically questionable.

Another limitation of the study is the use of two independent cross-sectional surveys, built on the pre-/post-measure design, since we did not follow the same group over time. As misuse among 14- and 15-year-olds is less frequent than among 16- and 17-year-olds, especially as we measure the lifetime misuse of anabolics, we have chosen to measure the prevalence figures among the 16- and 17-year-olds in the study area after the intervention, and to compare the results with those of 16- and 17-year-olds in the same area before the intervention. By using this pre-/post-measure design, we generated representative material in order to compare misuse before and after the intervention in a proper manner.

Bremberg (Bremberg, 1998) stressed the importance of focusing on mental aspects in health promotion for adolescents, a strategy that we have used in the intervention programme by aiming to strengthen self-confidence during discussions. Health workers tried to help the teenagers decide by themselves and to be more aware of their qualities. We also discussed normal behaviour and everybody's unique appearances, as well as specific appearances and positions of photo models. The ideals focused upon by the ordinary mass media were brought up and discussed. Our discussions have also been reported and highlighted in local mass media in an attractive way for teenagers, which we feel has helped our programme.

If a safe way to prevent the misuse of anabolics is found, it may also be possible to decrease the misuse of other drugs, as boys who misuse androgenic anabolic steroids use alcohol and narcotic drugs more often than others (Nilsson, 1995). Unlike most other studies (Tennant *et al*., 1973; Strosburger, 1989; Goldberg *et al*., 1990; Goldberg *et al*., 1991), this study may indicate that drug abuse among adolescents can be decreased by preventive work focusing on appearance. Even though all the misuse figures did not decrease significantly, the health message has been well heeded, as most of the male adolescents stated that appearance is not the most important aspect in relationships and they disapproved of the use of androgenic anabolic steroids. This appearance programme was frequently discussed in the local media with good results, as the outcome of the studied intervention programme did not increase the misuse of anabolic steroids. This means that the overall effect of the message of this intervention programme and other information has been positive and has created a positive inter-adolescent atmosphere, and a group teenage attitude against the misuse of anabolics may be formed as a result. It is difficult to analyse whether the the outcome of this study has been influenced by our sessions, teenagers' own attitude changes, medial ideas or other aspects. However, the main thing is that the outcome shows a positive tendency, especially as the intervention programme probably had an impact by all these means. Our experience should inspire future work based upon these ideas.

CONCLUSIONS AND IMPLICATIONS

We have reported the design and evaluation of an appearance programme, which was performed in order to prevent the misuse of androgenic anabolic steroids among adolescents in a primary health care area in Sweden. The educational content of the message was well received. This appearance programme reached and influenced the male adolescents, who are the main users. We have shown that there is a chance that this programme may decrease the misuse of androgenic anabolic steroids. Controlled studies are needed to evaluate the effect of the programme more conclusively.

ACKNOWLEDGEMENTS

The authors wish to thank the County Council for the financial support that made this study possible.

Address for correspondence:
Dr Sverker Nilsson
Department of Primary Health Care
S Hamnvägen 4
SE-432 44 Varberg
Sweden
E-mail: s.nilsson@neptunuskliniken.nu

REFERENCES

Anderson, S. J., Bolduc, S. P., Coryllos, E., Grisemer, V., Mc Lain, L., Rowland, T. W. *et al*. (1997) Adolescents and anabolic steroids: a subject review. *Journal of Pediatrics*, **99**, 904–908.

Andersson, B. and Hibell, B. (1995) *Drug Misuse Among Pupils in Sweden, 1995*. CAN, Stockholm.

Bahrke, M. S., Yesalis, C. E. and Brower, K. J. (1998) Anabolic-androgenic steroid abuse and performance-enhancing drugs among adolescents. *Child and Adolescent Psychiatric Clinics of North America*, **7**, 821–838.

Bremberg, S. (1998) Health promotion in school age children. *Scandinavian Journal of Social Medicine*, **26**, 81–84.

Bremberg, S. and Arborelius, E. (1994). Effects on adolescent alcohol consumption of a school based student-centred health counselling programme. *Scandinavian Journal of Social Medicine*, **22**, 113–119.

Buckley, W. E., Yesalis, C. E., Friedl, K. E., Anderson, W. A., Streit, A. L. and Wright, J. E. (1988) Estimated prevalence of anabolic steroids among male high school seniors. *Journal of American Medical Association*, **260**, 3441–3415.

Choi, P. Y. and Pope, H. G. (1994) Violence toward women and illicit androgenic anabolic steroid use. *Annals of Clinical Psychiatry*, **6**, 21–25.

Dusenbury, L., Falco, M. and Lake, A. (1997) A review of the evaluation of 47 drug abuse prevention curricula availing nationally. *Journal of School Health*, **67**, 127–132.

Goldberg, L., Bents, R. T., Bosworth, E. E., Trevisan, L. and Elliot, D. L. (1990) Effect of an anabolic steroid education program on knowledge and attitudes of high school football players. *Journal of Adolescent Health Care*, **11**, 210–214.

Goldberg, L., Bosworth, E. E., Bents, R. T. and Trevisan, L. (1991) Anabolic steroid education and adolescents: do scare tactics work? *Journal of Pediatrics*, **87**, 283–286.

Goldberg, L., Elliot, D., Clarke, G. N., Mac Kinnon, D. P., Moe, E., Zoref, L. *et al*. (1996a) Effects of a multidimensional anabolic steroid prevention intervention. The adolescents training and learning to avoid steroids (ATLAS) program. *Journal of American Medical Association*, **276**, 1555–1562.

Goldberg, L., Elliot, D. L., Clarke, G. N., Mac Kinnon, D. T., Zoref, L., Moe, E. *et al*. (1996b) The adolescents training and learning to avoid steroids (ATLAS) prevention program. Background and results of a model intervention. *Archives of Pediatrics and Adolescent Medicine*, **150**, 713–721.

Goldberg, L., Mac Kinnon, D. P., Elliot, D. L., Moe, E. L., Clarke, G. and Cheong, J. (2000) The adolescents training and learning to avoid steroids program: preventing drug use and promoting health behaviors. *Archives of Pediatrics and Adolescent Medicine*, **154**, 332–338.

Johnson, M. D., Jay, M. S., Shoup, B. and Ricker, V. I. (1989) Anabolic steroid use by male adolescents. *Journal of Pediatrics*, **83**, 921–924.

Kindlundh, A. M., Isacsson, D. G., Berglund, L. and Nyberg, F. (1999) Factors associated with adolescent use of doping agents. *Anabolic Androgenic Steroids Addiction*, **94**, 543–545.

Levin, J. E., Persson, H., Bjurulf, P. and Bremberg, S. (1988) Health careers—a method of health education at school for adolescents. *Scandivian Journal of Social Medicine*, **16**, 95–100.

Nilsson, S. (1995) Androgenic anabolic steroid use among male adolescents in Falkenberg. *European Journal of Clinical Pharmocology*, **8**, 9–11.

Nilsson, S., Baigi, A., Marklund, B. and Fridlund, B. (2001) The prevalence of the use of androgenic anabolic steroids by adolescents in a county of Sweden. *European Journal of Public Health*, **11**, 95–97.

Pope, H. G. and Katz, D. L. (1988) Affective disorders and psychotic symptoms associated with anabolic steroids. *American Journal of Psychiatry*, **145**, 487–490.

Porcerelli, J. H. and Sandler, B. A. (1998) Anabolic-androgenic steroid abuse and psychopathology. *Psychiatric Clinics of North America*, **21**, 829–833.

Strosburger, V. C. (1989) Prevention of adolescent drug abuse: Why 'just say no' just won't work. *Journal of Pediatrics*, **114**, 676–681.

Su, T. P., Pagliaro, M., Schmidt, P. J., Pickard, D., Wolkowitz, O. and Rubinow, D. R. (1993) Neuropsychiatric effects of anabolic steroids in male normal volunteers. *Journal of American Medical Association*, **269**, 2760–2764.

Tennant, F. S., Weaver, S. C. and Lewis, C. E. (1973) Outcomes of drug education: four case studies. *Journal of Pediatrics*, **52**, 246–251.

Thiblin, I., Kristiansson, M. and Rajs, J. (1997) Anabolic androgenic steroids and behavioural patterns among violent offenders. *Journal of Forensic Psychiatry*, **8**, 299–310.

Wonnacott, T. and Wonnacott, R. (1977) *Introductory Statistics for Business and Economics*. 2nd edition. Wiley/Hamilton Publishing, Santa Barbara, CA.