Moles and melanomas — who's at risk, who knows, and who cares? A strategy to inform those at high risk

ARTHUR JACKSON

CLARE WILKINSON

ROISIN PILL

SUMMARY

Background. *Malignant melanoma is uncommon but potentially fatal. Knowledge and attitudes play an important part in the early detection of this skin cancer.*

Aim. *To assess knowledge, risk perception, and intended behaviour related to melanoma compared with actual risk status. To suggest measures to improve the primary and secondary prevention of melanoma in general practice for a high-risk group.*

Method. *A prospective questionnaire survey was carried out on consecutive adults attending in 16 randomly selected group practices. Applying MacKie's personal risk factor chart for melanoma, the study assessed self-reported risk, knowledge of skin cancer — especially malignant melanoma — and self-reported preventive activity.*

Results. *A total of 3105 (69%) attenders completed the questionnaire. The responders showed greater concern for minor rather than major clinical signs in pre-existing moles. Young people and the professional classes were the least knowledgeable about skin cancer and exhibited the most risky behaviour in terms of sun exposure, failure to check their skin, and to seek medical advice about new or changing moles. The majority of an 8.7% high-risk group showed lack of awareness of their increased risk, and women in this group reported the highest desire for a suntan and the use of sunbeds. In addition to showing less concern than their low risk counterparts about moles growing in size, they were also reluctant to seek medical advice about new moles.*

Conclusion. *Consideration should be given to targeting primary prevention and selective screening in general practice towards a high-risk group for malignant melanoma. Young people and the professional social class should receive particular attention.*

Keywords: malignant melanoma; patient awareness; skin cancer.

Introduction

MALIGNANT melanoma, even in temperate climes, is assuming greater importance with every passing decade. The latest figures from Scotland showed a stabilization of the incidence rate in women, after 1986, with an incidence of 12.3 per 100 000 (male incidence rate of 7.8 per 100 000).[1] However, in the previous decade, the incidence and mortality rates in the United Kingdom (UK) generally, increased by over 50%.[2] The disease has a disproportionate impact on young adults, and is now the second commonest cancer in British women aged between 20 and 35 years.[3]

As the most important prognostic factor in melanoma is the thickness of the lesion, successful treatment depends on its early diagnosis and excision.[4,5] Research has shown that the major reason for delay in diagnosis of cutaneous melanoma is the length of time before the patient seeks medical advice**.** This delay in presentation is at least partly due to the lack of knowledge of the features of early malignant melanoma.[6,7] The decision to consult is likely to be influenced mainly by the patients' and families' interpretations of mole changes and their understanding of the implications. Therefore, the outcome of this potentially fatal disease may be improved through health promotion designed to influence knowledge and behaviour.[8,9]

This has been the rationale for surveys of the general public's knowledge of and attitudes towards a wide range of symptoms, signs, and risky behaviour.[10,11] Other studies have looked more specifically at knowledge and behaviour in an attempt to understand what factors put certain groups most at risk.[12-16] Those who know least, however, may not be those who are in fact most at risk of developing malignant melanoma. It can be argued that the most effective use of limited resources is to identify those in the population who are at particularly high risk of developing the disease and directing primary prevention and selective screening at this group. Such a proposal assumes that (i) it is possible to identify the prevalence of a high-risk group, and (ii) that they can be demonstrated to need a proactive approach because of their lifestyle, and poor knowledge of both skin cancer and primary and secondary preventive measures.

Our research addressed the initial question and is reported elsewhere.[17] A prevalence of 8.7% was found in the sample population, based on four independent risk factors that have previously been combined as a risk score for the disease: the presence of freckles, moles, atypical naevi, and history of bad sunburn. The factors were discussed in MacKie's original research.[18] The high-risk group was defined according to the personal risk factor chart developed in her work.

This paper looks at:

- the knowledge and behaviour in relation to sex, age, and social class of the responders in the total sample,
- the knowledge and behaviour in the high-risk group when compared with the low-risk group, and
- possible intervention strategies that might be considered to improve prevention in those most at risk of malignant melanoma.

Method

A prospective questionnaire study was carried out in 16 group practices in the Crewe and Macclesfield Health Districts in Cheshire, UK. These were randomly selected from a possible 46 group practices. Of 18 practices approached, 16 (89%) agreed to participate in the study. In each of the practices taking part, all

A Jackson, MRCGP, MPhil, general practitioner, Holmes Chapel Health Centre, Cheshire. C Wilkinson, MRCGP, professor in general practice, Division of General Practice, UWCM, Academic Unit, Wrexham. R Pill, MSc(Econ), PhD, professor of research, Department of General Practice, UWCM, Llanedeyrn Health Centre, Cardiff.

Submitted: 21 November 1997; final acceptance: 1 November 1998.

patients aged 16 years and over, who attended their surgery for a GP consultation for any reason during a one-week period between September and November 1995, were invited by the reception staff to complete a questionnaire at the time or to return 'freepost' after subsequent completion. The 'Skin Study Questionnaire' asked about:

- individual risk factors in terms of skin type, hair colour, presence of freckles and moles, episodes of severe sunburn, family history of malignant melanoma, and occupation;
- knowledge in terms of the commonest site for malignant melanoma, its serious nature, and what makes people more likely to have one; and
- peoples' attitudes (preventive behaviour) in terms of skin examination, protection from sun exposure, and the action taken in the event of finding a mole with or without various changes.

MacKie's independent risk factors were carefully defined, as these formed the four risk factors from which the prevalence of a high-risk group was calculated.[18] The validity of the self-report questionnaire to determine the high-risk group was tested by a follow-up skin examination on a subsample (n = 388) of the questionnaire sample. All the data collected from the questionnaire survey and the follow-up study were analysed using an SPSS for Windows Version 6.1 computer program. The validity of the self-report questionnaire was assessed using kappa values, and the statistical significance of other comparisons was obtained using chi-squared values or logistic regression.

Results

Overall look at the study sample

The response rate in the questionnaire survey was 69%. Figure 1a shows the age and sex distribution of the 3105 responders and Figure 1b shows the socioeconomic status of the 1330 who were employed, compared with the 1991 National Census.

Numerically (i.e. the percentage of the total from 2844 up to 2942 who responded to each question), people in the study sample were more concerned about minor clinical signs of early melanoma, such as bleeding, oozing, or crusting, and, to a lesser extent, inflammation and itching, than about two of the three major clinical signs: change in shape and colour. Only 21% knew that the commonest site for a malignant melanoma in a male is the back, and 8% that the commonest site in a female is the leg. The main sources of information about skin cancer were television (41.7%) and newspapers (41.0%).

Sex, age, and socioeconomic differences

Table 1 shows that women were significantly more knowledgeable and took more preventive action than men.

The 16 to 24 year-old age group, compared with the older age groups (using chi-squared values):

- had the highest sun exposure and desire for suntan ($0.01<P<0.05$),
- most frequently took sunny holidays ($P\leq0.01$),
- were the least knowledgeable age group about skin cancer ($P\leq0.01$),
- were the least likely to seek medical advice about new or changing moles ($P\leq0.01$),
- contained the lowest percentage of mole checkers ($P\leq0.01$) (except for 75+ year-olds), and
- contained the lowest percentage of those who knew of the major clinical signs for early melanoma ($P\leq0.01$) (except for 65 to 75+ year-olds).

Table 2 highlights the fact that the manual skilled group and the professional class were least knowledgeable about melanoma and its early clinical signs. It also shows that the professional class, who spent most of their working day indoors, took the most sunny holidays and yet were the least likely group to check their skin for moles or to seek medical advice about mole changes.

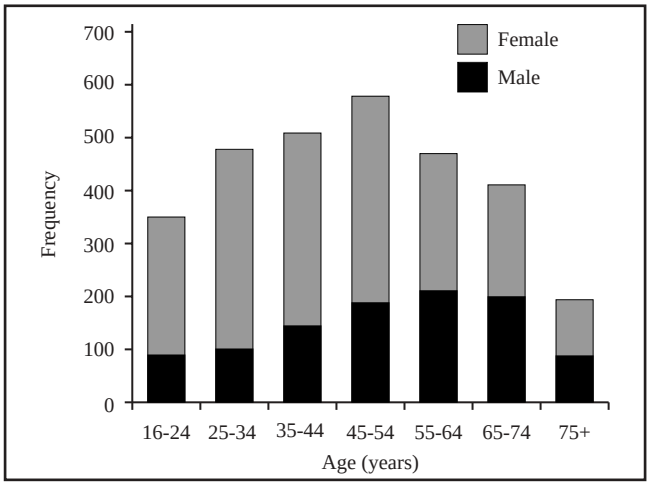

Figure 1a. Age and sex distribution of sample (n = 3105).

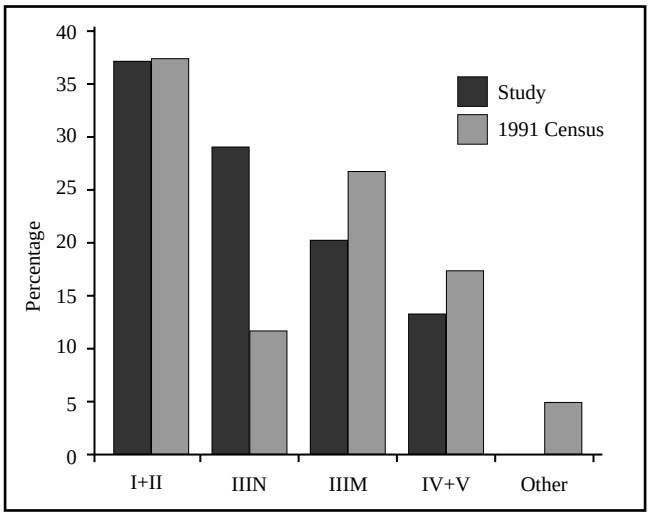

Figure 1b. Professional status of employee (n = 1330).
I = Professional; II = Semi-professional; IIIN = Non-manual skilled; IIIM = Manual skilled; IV = Semi-skilled worker; V = Unskilled worker.

The high-risk group

When the responders in the 8.7% high-risk group (as per MacKie's risk factor chart) were asked, 'My chance of getting skin cancer compared with other people of my age is less likely, the same, or more likely', 75% (79% of males and 72% of females) perceived themselves as being in the first two categories. However, comparison of the knowledge, attitude, and behaviour of this group with that of those in the low-risk group showed some significant differences (Table 3).

Discussion

Misconceptions about moles and early features of malignant melanoma

Many people have misconceptions about the early clinical signs

Table 1. Differences in knowledge, attitudes, and behaviour between males and females.

Positive factor	Sex difference	Negative factor	Sex difference
Do you do anything to protect your skin when on holiday?	F>M	On an average week do you spend more time during summer (7.00am–7.00pm) outdoors (indoors, or an equal mixture of both)?	M>F
If yes, do you wear a hat?	F>M		
If yes, do you apply sunscreen?	F>M		
Do you ever check your skin for moles?	F>M	Do you try to get a suntan when on holiday?	F>M
If yes, 1 or 2 times a year; once a month; more frequently (all three)?	F>M		
If you noticed a new mole would you visit your GP?	F>M	Have you used or do you use a sunbed?	F = 2M
Which of the following skin cancers have you heard of:			
Malignant melanoma?	F>M	If you noticed a new mole, would you ignore it?	M>F
Rodent ulcer?	F>M		
Squamous cell carcinoma?	F>M		
Can a malignant melanoma:		If a mole came to your attention for the first time, would you seek medical advice immediately or within 3 months (both) (i.e. males delay seeking advice	F>M
Heal or go away without treatment (% correct answer)?	F>M		
Be cured if treated early (% correct answer)?	F>M		
How worried would you be if you noticed a mole for the first time that:			
Grew in size (% worried)?	F>M		
Became irregular in colour?	F>M		
Became irregular in shape?	F>M		

Key: F = female (n = 1987); M = male (n = 1019). P-value (obtained using chi-squared value) comparing male and female for particular characteristics = <0.01 in each case.

Table 2. Knowledge, attitudes, and behaviour between socio-economic groups in relation to malignant melanoma given as percentage of each group involved.

	Socioeconomic group				
	I = Professional (n = 184)	II = Semi-professional (n = 302)	IIIN = Non-manual skilled (n = 388)	IIIM = Manual skilled (n = 272)	IV/V = Semi-skilled and unskilled worker (n = 182)
Knowledge					
Malignant melanoma	79%	86% (+)	82%	63% (–)	74%
Major clinical signs					
% worried about					
change in shape	81%	86%	91% (+)	77% (–)	84%
change in colour	88%	89%	92% (+)	8% (–)	88%
Attitudes					
Desire for suntan	78%	73% (–)	81% (+)	73% (–)	76%
Do check moles	44% (–)	58% (+)	56%	46%	44% (–)
Behaviour					
Three or more sunny holidays in 5 years	66% (+)	62%	54%	37%	25% (–)
Use a sunbed	33%	46%	50% (+)	28% (–)	33%
Spend more time outdoors than indoors	21% (–)	23%	28%	41% (+)	34%
Seek medical advice about mole changes	38% (–)	42%	51% (+)	42%	46%

+ = group with highest percentage involved; – = group with lowest percentage involved.

in moles that relate to the key characteristics of melanoma.[19] People in our study were concerned about bleeding, which may be associated with minor conditions such as traumatized skin tags or benign papilloma and itching, which is not uncommon with sebhorroeic warts — all benign lesions. Changes in shape and colour in a mole — two more reliable early major signs for melanoma — were less well known and caused less concern. These two mole changes, which, along with an increase in size, make up the three early major clinical features of a melanoma, must be clearly emphasized in any preventive education programme designed to encourage patients to present for diagnosis at the 'early, good prognosis' stage of melanoma.[20]

Sex, age, and socioeconomic differences

Our results supported Cody's findings that females have greater knowledge and stronger intention to prevent skin cancer than males.[13] The females in our sample, however, reported more high-risk behaviour in terms of sunbathing activity and use of sunbeds. Keeling and others showed that sunbathing is clearly related to having a positive attitude towards risk taking, and having friends who sunbathe and engage in activities relating to

Table 3. Features of the high-risk group when compared with the low-risk group.

	Feature	Odds ratio (95%CI)	Conclusion
Age and sex	Likelihood of women to be in high-risk group	0.25 (0.17, 0.38)	The high-risk group had a higher proportion of men than women
	Likelihood of older age groups to be in high-risk group (for each increase of 10 years)	0.82 (0.75, 0.90)	The high-risk group had a higher proportion of young people
Knowledge	Likelihood of males and females in the high-risk group to assess risk as high	3.31 (2.46, 4.46)	Males and females in the high-risk group are more likely than those in the low-risk group to assess their risk as being high
	Likelihood of women in the high-risk group *not* to worry about a mole growing in size	1.20 (1.05, 1.34)	Women in the high-risk group were less likely than those in the low-risk group to be worried about a mole growing in size
Behaviour	Likelihood of males and females in the high-risk group to check for moles	2.32 (1.71, 3.15)	Males and females in the high-risk group were more likely than those in the low-risk group to check for moles
	Likelihood of males and females in the high-risk group to protect skin on holiday	5.14 (2.05, 12.93)	Males and females in the high-risk group were more likely than those in the low-risk group to protect their skin while on holiday
	Likelihood of women who used a sunbed to be in the high-risk group	1.23 (1.03, 1.47)	Women in the high-risk group were more likely than anyone else to use a sunbed
	Likelihood of women in the high-risk group to see GP about a new mole	0.77 (0.65, 0.92)	Women in the high-risk group were less likely than anyone else to consult a GP about a new mole

All occupations were equally likely to be in the high-risk group. Statistics were achieved by logistic regression.

maintaining a positive physical appearance.[21,22] Our study also supported Bourke's findings that it was teenagers and young adults that tended to be relatively ignorant of melanoma.[11] Carmel *et al* found that, in spite of being highest at risk for skin cancer as a result of sun exposure habits, the youngest age group were least likely to change their behaviour, even after health education programmes.[10,15] Basically, our findings confirm the fact that young people are particularly in need of education and habit change.

Recent epidemiological studies suggest that the relative risk for melanoma is more severe in individuals who normally experience an indoor environment, and that it is the intermittent intense sun exposure in susceptible individuals, rather than occupational or long-term sun exposure, that is important in the aetiology of melanoma.[12,23,24] Osterland[25] and Bourke[11] showed significantly increased risk for cutaneous melanoma with severe sunburn in children before the age of 15, sunbathing, boating, and holidays spent in the sun. What has not been highlighted by previous studies, and is apparent from our research, is that the professional social class is a very vulnerable group (Table 2) because:

- they spend most of their working day indoors,
- they take the most sunny holidays with intense sun exposure,
- they have a low awareness of the early features of melanoma,
- they are the worst socioeconomic group at checking for moles, and
- they are the poorest group at seeking medical advice about moles that change.

While it is not possible to apply logistic regression analysis to these findings, they show a definite trend and need to be further explored.

The high-risk group

In our study, while 75% of the high-risk group were unaware of their increased risk of skin cancer (i.e. only 25% were aware of their increased risk), individuals in this group were more likely than those in the low-risk group (in which 7% considered themselves at increased risk) to assess their risk as increased. The high-risk group in our sample had a higher proportion of men than women compared with the low-risk group, and also more young people (Table 3). From what has been discussed above, these are the two groups who most require melanoma education. The women in our high-risk group were more likely than men in the high-risk group, as well as both sexes in the low-risk group, to use a sunbed. They were also least likely to seek medical advice about new moles.

Work has shown that, contrary to popular belief, a sunbed tan does not offer much protection against sunburn and skin damage: perhaps no more than a sunscreen of SPF (sun protection factor) 2 in most people.[26] While the risk of sunbed use in the general population may be relatively small, the risk has been shown to be definitely harmful in the type of individuals that make up our high-risk group, as defined by MacKie's melanoma risk factors.[18,27-29]

Intervention strategies

This research suggests that a high-risk group for malignant melanoma can be identified in the population by use of a self-report questionnaire. Such a group could be selectively screened in primary care. This would be cost-effective in terms of doctor or nurse time and in the use of health service resources.[17,30] It would also reduce the risk of creating unnecessary anxiety in the population at large.[31,32]

The individuals in this high-risk group would need to be encouraged to check their skin and to get a partner or friend to check inaccessible areas such as the back. They would need clear advice about the major clinical signs to look for in a mole, with respect to melanoma, and to seek early medical advice about any mole changes or new moles. The risk in trying to acquire a sun-

tan and the danger of sunbed use would need to be emphasized in this high-risk group, particularly to women.

When undertaking selective screening, it would be important to look out for and make contact with non-responders from the initial questionnaire. This high-risk group could be examined and given appropriate advice about primary and secondary prevention by the doctor or nurse involved in the screening process.[17] This personal contact with the high-risk group is more likely to achieve melanoma prevention and early detection than encouraging the population at large to seek advice about moles or worrying skin lesions. Appropriate follow-up or surveillance of patients could be arranged, as could examination of families and relatives of affected patients.

However, as Elwood (1994) and Sinclair (1998) have pointed out, not all melanomas presenting will arise in the high-risk group.[33,34] Hence, the usual access for patients presenting spontaneously to their GP with moles and melanomas would have to remain in place. Education of the general population about cutaneous melanoma would need to continue through the most cost-effective channels.

From the findings of our study and others, such primary prevention activity might be most effectively carried out through well-prepared, well-targeted television programmes that would appeal to younger people, and through newspapers and magazines, which would attract the readership of all social classes but in particular the higher socioeconomic group. Preventive melanoma education could also be focused on young people by means of school education programs. In general practice, the risk of early childhood exposure could be taught in parenting classes. Opportunistic advice during routine surgery consultations or travel clinics could also be made available to the most vulnerable groups along with Cancer Research Campaign leaflets on preventing melanoma.

In conclusion, a prospective study using a simple self-completion questionnaire in general practice found that a high-risk group for cutaneous melanoma can be identified by self-report. We propose that this group should be targeted for primary prevention and selective screening for malignant melanoma. Within this group, young people and the professional social class would need greatest education and advice in terms of knowledge and risk behaviour with respect to moles, sun-related activities, and early signs of melanoma. Effective melanoma education and access to medical advice would also have to remain in place for the population at large.

References

1. MacKie RM, Hole D, Hunter JAA, *et al*. Cutaneous malignant melanoma in Scotland: incidence, survival and mortality, 1979-1994. *BMJ* 1997; **315:** 1117-1121.
2. Coleman MP, Esteve J, Damiecki P, *et al*. *Trends in cancer incidence and mortality*. [IARC Scientific Publication No 121.] Lyons, France: International Agency for Research on Cancer, 1993.
3. The Cancer Research Campaign Factsheets. Factsheet 4.1: *Malignant Melanoma.* UK: CRC, 1995.
4. Higgins E, Du Vivier A. Malignant melanoma - a review: early diagnosis is the key. *Br J Clin Pract* 1991; **45(2):** 109-115.
5. Lowitt MH, Lowitt NR. Recent advances in dermatology. Prognostic factors in malignant melanoma. *BMJ* 1995; **311:** 1616-1617.
6. Doherty VR, MacKie RM. Reasons for poor prognosis in British patients with cutaneous malignant melanoma. *BMJ* 1986; **292:** 987-990.
7. Dunkley MP, Morris AM. Cutaneous malignant melanoma: audit of the diagnosis process. *Am R Coll Surg Eng* 1991; **73(4):** 248-252.
8. Hennrikus D, Girges A, Redman S, Sanson-Fisher RW. A community study of delay in presenting with signs of a melanoma to medical practitioners. *Arch Dermatol* 1991; **127(3):** 356-361.
9. Kringe JE, Isaacs S, Hudson DA, *et al*. Delay in the diagnosis of cutaneous melanoma. A prospective study in 250 patients. *Cancer* 1991; **68(9):** 2064-2068.
10. Hill D, White V, Mark R, Borland R. Changes in sun-related attitudes and behaviours, and reduced prevalence in the population at high risk of melanoma. *Eur J Cancer Prevention* 1993; **2(6):** 447-456.
11. Bourke JF, Healsmith MF, Graham-Brown RA. Melanoma awareness and sun exposure in Leicester. *Br J Dermatology* 1995; **132:** 251-256.
12. D'Arcy C, Holman J, Armstrong BK, Heenan PJ. Relationship of cutaneous malignant melanoma to individual sunlight-exposure habits. *JNCI* 1986; **76(3):** 403-415.
13. Cody R, Lee C. Behaviours, beliefs and intentions in skin cancer prevention. *J Behav Med* 1990; **13(4):** 373-389.
14. Hughes B, Altman D, Newton J. Melanoma and skin cancer: evaluation of a health education programme for secondary schools. *Br J Dermatol* 1993; **128:** 412-417.
15. Carmel S, Shani E, Rosenberg L. The role of age and an expanded health belief model in predicting skin cancer protective behaviour. *Health Ed Res* 1994; **9(4):** 433-447.
16. Arthey S, Clarke V. Sun tanning and sun protection: a review of the psychology literature. *Soc Sci Med* 1995; **40(2):** 265-274.
17. Jackson A, Wilkinson C, Ranger M, *et al*. Can primary prevention and selective screening for melanoma be more precisely targeted through general practice? A prospective study to validate a self administered risk score. *BMJ* 1998; **316:** 34-39.
18. MacKie RM, Freudenberger T, Aitchinson TC. Personal risk factor chart for cutaneous malignant melanoma. *Lancet* 1989; **26:** 487-490.
19. Borland R, Marks R, Noy S. Public knowledge about characteristics of moles and melanomas. *Aust J Pub Health* 1992; **16(4):** 370-375.
20. MacKie RM. Clinical recognition of early invasive malignant melanoma. *BMJ* 1990; **301:** 1005-1006.
21. Keesling B, Friedman HS. Psychological factors in sunbathing and sunscreen use. *Health Psychol* 1987; **6:** 477-493.
22. Fiala B, Kopp M, Gunther V. Why do young women use sunbeds? A comparative psychological study. *Br J Dermatol* 1997; **137:** 950-954.
23. Green A, Siskind V, Bain C, Alexander J. Sunburn and malignant melanoma. *Br J Cancer* 1985; **51(3):** 393-397.
24. Armstrong BK, Kricker A. Skin cancer review. *Dermatol Clinics* 1995; **13(3):** 583-594.
25. Osterland A, Tucker MA, Stone BJ, Jensen OM. The Danish case-control study of cutaneous malignant melanoma. II. Importance of UV-light exposure. *Int J Cancer* 1988; **42(3):** 319-324.
26. Diffey BL. Tanning with ultraviolet sun beds. *BMJ* 1990; **301:** 773-774.
27. Swerdlow AJ, English JS, MacKie RM, *et al*. Fluorescent lights, ultraviolet lamps and risk of cutaneous melanoma. *BMJ* 1998; **297:** 1172.
28. Walter SD, Marrett LD, From L, *et al*. The association of cutaneous malignant melanoma with the use of sunbeds and sunlamps. *Am J Epidemiol* 1990; **131(2):** 232-243.
29. Westerdal J, Olsson H, Masback A, *et al*. Use of sunbeds or sunlamps and malignant melanoma in southern Sweden. *Am J Epidemiol* 1994; **140(8):** 691-699.
30. Holland J. Screening: reasons to be cautious. *BMJ* 1993; **306:** 1222-1223.
31. Morris J. Screening for malignant melanoma. *J Med Screening* 1994; **1(1):** 2.
32. Fallowfield L. Psychological intervention in cancer. *BMJ* 1995; **311:** 1316-1317.
33. Elwood JM. Screening for melanoma and options for its evaluation. *J Med Screening* 1994; **1:** 22-38.
34. Sinclair Rod. Start with the KISS principle. [Commentary.] *BMJ* 1998; **316:** 38-39.

Acknowledgements

Thanks are due to Professor Nigel Stott and fellow researchers at the Department of General Practice in Cardiff; to Margaret Ranger for her dedication during the questionnaire survey; to all the patients and reception staff in the practices who took part in the study; to Dr Paul August and Dr Tim Kingston for their dermatological input; and to Kerry Hood for her statistical advice.

Address for correspondence

Dr Arthur Jackson, Holmes Chapel Health Centre, London Road, Holmes Chapel, Cheshire, CW4 7BB. Email: abmtjackson@compuserve.com