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Serious, frightening and interesting conditions: differences in values and attitudes between first-year and final-year medical students

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Context and objective During medical education and training, the values and attitudes of medical students are shaped both by knowledge and by role models. In this study, the aim was to compare the views of first- and final-year students concerning patients with different medical conditions.

Participants and method In the spring of 1998 all first- and final-year medical students at Göteborg and Lund Universities, Sweden, were invited to answer a questionnaire. A total of 20 medical conditions were to be rated on visual analogue scales, according to three aspects: their perceived seriousness, the student's own fear of them and interest in working with these conditions in the future.

Results The overall response rate was 75%. Concerning seriousness, there was a high degree of concordance between the first- and final-year students. Concerning their own fear, the concordance was less pronounced. When the conditions were rated from the aspect of interest, for the final-year students,

gastric or duodenal ulcer replaced infection with Ebola virus for the first-year students, among the five highest-ranked conditions. The correlations between seriousness and fear were lower among the final-year students, but this reached statistical significance only in a few cases.

Discussion A reasonable interpretation of the results is that the values and attitudes of the students were influenced by increased knowledge, as well as by role models encountered during the clinical parts of the training. Conditions less likely to be contracted become less feared, and conditions with effective treatment become more interesting; and the converse was true for each of these changes.

Keywords Attitude of health personnel; cross-sectional studies; disease, *psychology; education medical undergraduate, *methods; knowledge, attitude and practice; questionnaires; Sweden.

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Introduction

The medical consultation can be interpreted in terms of an encounter between a layman and a professional.[1] They bring into the discourse their individual perceptions of health and disease, which in turn are influenced by generally prevailing knowledge, values and attitudes and by personal experience.

Laymen who enter the medical consultation, as patients or individuals at high risk of disease, fear some diseases more than others.[2,3] This does not exclusively

depend on the seriousness of the disease but also on their personal knowledge and experience, and not least on the perceived potential of the disease to stigmatize.[4]

For the medical profession, vocational training and professional experience play important roles. Album demonstrated the perceived hierarchy of diseases and medical specialties, among experienced doctors, other health care staff and medical students.[5] Among the experienced doctors it was evident that diseases and specialties concerned with the heart and the brain were regarded more prestigious, while those dealing with peripheral or inferior parts of the body were regarded as less prestigious. In another dimension, acute and clearly organic conditions were valued more highly than those with a chronic course or a psychosocial component. Diffuse illness and conditions caused by unhealthy lifestyles were ranked at the bottom of the hierarchy.

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Key learning points

The results of this study reflect the transition within medical students from lay to professional values and attitudes.

Perceptions concerning the seriousness of diseases appeared to be influenced mainly by knowledge.

Values and attitudes concerning interest in working with patients with certain diseases could be influenced by knowledge as well as by role models.

The possibility of successful treatment appeared to be an important part of the knowledge which influenced values and attitudes.

These opinions were very similar to those of medical students in later clinical training, but less similar to those of pre-clinical students, who did not yet seem to be fully aware of the principles of the hierarchy.

In the literature, there are two prevailing theories concerning the impact of education on the values of students: one involves the impact of theoretical knowledge, and the other the influence of role models. Knowledge has been shown to counteract negative attitudes. Deary *et al.*, for example, demonstrated that a geriatric medicine course reduced negative attitudes towards diseases in the elderly and their treatment.[6] There is also evidence that negative role models can breed negative attitudes and cynicism in students.[7] Consequently, if experienced doctors convey to students the opinion that it is less interesting and rewarding to take care of patients with chronic and incurable conditions, it would be likely that the students were susceptible to this kind of 'contagion'.

In a previous qualitative study an attempt was made to explore the values of newly admitted medical students, not yet exposed to the influence of medical education and training.[8] The stated values concerning diseases resembled those of the laymen in previous studies.[3,9,10] Thus, diseases believed to disintegrate body or mind, and thereby to be stigmatizing, were most feared by the students. The most common examples of these were cancer, HIV, chronic neurological and mental conditions and, rather surprisingly, infection with Ebola virus. The values regarding cancer and neurological or mental diseases were often related to occurrences in the individual's family or among other relatives, friends and neighbours.

With this background, the aim of this study was to compare the values and attitudes of first- and final-year medical students concerning certain diseases, and thus to shed some light on the development of a professional identity.

Our first hypothesis was that the perceptions of newly admitted students would be highly dependent on information obtained from mass media and personal experience, while those of final-year students would have been increasingly influenced by education and training. Our second hypothesis was that the relation between perceived seriousness and the individual's own fear would be weaker in the final-year students. Our third hypothesis was that the relation between perceived seriousness and interest in working with the condition would be less pronounced in the final-year students.

Methods

All students who attended either the first or final year at the medical schools of Göteborg and Lund, Sweden, in the spring of 1998, were invited to participate in the study. A questionnaire was distributed immediately after class, and the students were given 20 min to complete it. Participation was voluntary and the data collection was anonymous. Before it was used in this study, the questionnaire was piloted on a group of second-year students. No difficulties in understanding the questions were reported.

The questionnaire asked the students to rate their opinions on 20 different conditions (Table 1) from three different aspects. The answers were to be given on visual analogue scales (VAS). The medical conditions were selected in order to cover multiple dimensions, e.g. threat to life, acute or chronic, availability of effective treatment, psychosocial involvement and potential for stigmatization.[5,10]

The questions were as follows:

1 How serious do you consider the condition to be for the person who gets it? (This aspect is termed *seriousness*, below.)
2 How frightened are you of getting the condition now or in the future? (This aspect is termed *fear*, below.)
3 How interested are you in working with patients with this condition? (This aspect is termed *interest*, below.)

The questionnaire also recorded data on some individual characteristics, such as age, sex, previous education and work experience, as well as on personal experience of serious illness, motives for career choice and preferences for future specialization. These data, however, were not used for this investigation.

The data analysis first focused on a comparison of how first-year and final-year students rated the condi-

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Table 1 The selected medical conditions

Cerebral aneurysm
Asthma
Fracture of the tibia
Burns (extensive)
Dementia
Insulin-dependent diabetes
Ebola virus infection
Fibromyalgia
Tonsillitis
Myocardial infarction
Hearing impairment
HIV infection
Chlamydia infection (STD)
Acute leukaemia
Gastric or duodenal ulcer
Migraine
Multiple sclerosis
Mental disease
Burn-out syndrome
Rectal cancer

STD, sexually transmitted disease.

Table 2 Study samples and participation

University and year	Included, n	Respondents	
		n	%
Göteborg			
First	86	53	62
Final	129	94	73
Lund			
First	150	121	81
Final	156	122	78
Göteborg + Lund			
First	236	174	74
Final	285	216	76

tions according to *seriousness, fear* and *interest*. Secondly, we investigated how the relation between *seriousness* and *fear* on one hand, and *seriousness* and *interest* on the other differed, between first- and final-year students.

Statistical methods

First the scores of each of the aspects of the medical conditions were calculated and compared between the two groups of students, using a non-parametric test (Mann–Whitney).

In the next step the correlations between *seriousness and fear*, and *seriousness* and *interest*, for each condition were computed, using Spearman's rho. This was done separately for first- and final-year students. Finally the *z*-test was used, after Fisher's transformation,[11] in order to determine whether the differences in correlation coefficients between the first- and final-year students were statistically significant. To adjust for the impact of multiple testing, Bonferroni's correction was used, and thus the critical *P* value was set at <0·001 for the first hypothesis and at <0·003 for the second and third hypotheses.

Results

The questionnaire was returned by 75% of the students (Table 2). There was a lower response rate among first-year students at Göteborg, but this was balanced by a higher response rate among first-year students at Lund,

and the net result provided similar overall participation rates for first- and final-year students. Median age for the first-year students was 21 years and for the final-year students it was 27 years. For three of the conditions (cerebral aneurysm, fibromyalgia and multiple sclerosis) there was a substantial amount of missing data in the forms returned by first-year students, and these conditions were therefore excluded from further analyses. For the remaining conditions, there was a maximum of 14 missing observations per individual, with an average of 8·4 for the first-year and 3·1 for the final-year students. This was regarded acceptable and thus the responses to these 17 conditions were included in the analyses.

Table 3 shows how the *seriousness* of the 17 medical conditions was rated by the two groups of students. As further illustrated in Fig. 1a, there was a remarkably high degree of concordance in the ratings by the first-year and final-year student groups. Thus, for both, there was a common entity of five conditions which were given the highest ratings, i.e. infection with Ebola virus, HIV infection, acute leukaemia, myocardial infarction and extensive burns. However for some of the conditions, there were significant differences between the groups in the magnitude of the ratings. Thus, the rating of extensive burns, insulin-dependent diabetes mellitus and hearing impairment was significantly higher among final-year students, while that of HIV-infection and acute leukaemia was lower.

Table 4 demonstrates how *fear* of the 17 medical conditions was rated by the two groups of students. As further illustrated in Fig. 1b, there was a lesser degree of concordance in the ratings by the two student groups than for *seriousness*. For both groups, four out of the first five conditions were common, i.e. dementia, acute leukaemia, myocardial infarction and extensive burns. The first-year students also included HIV infection and
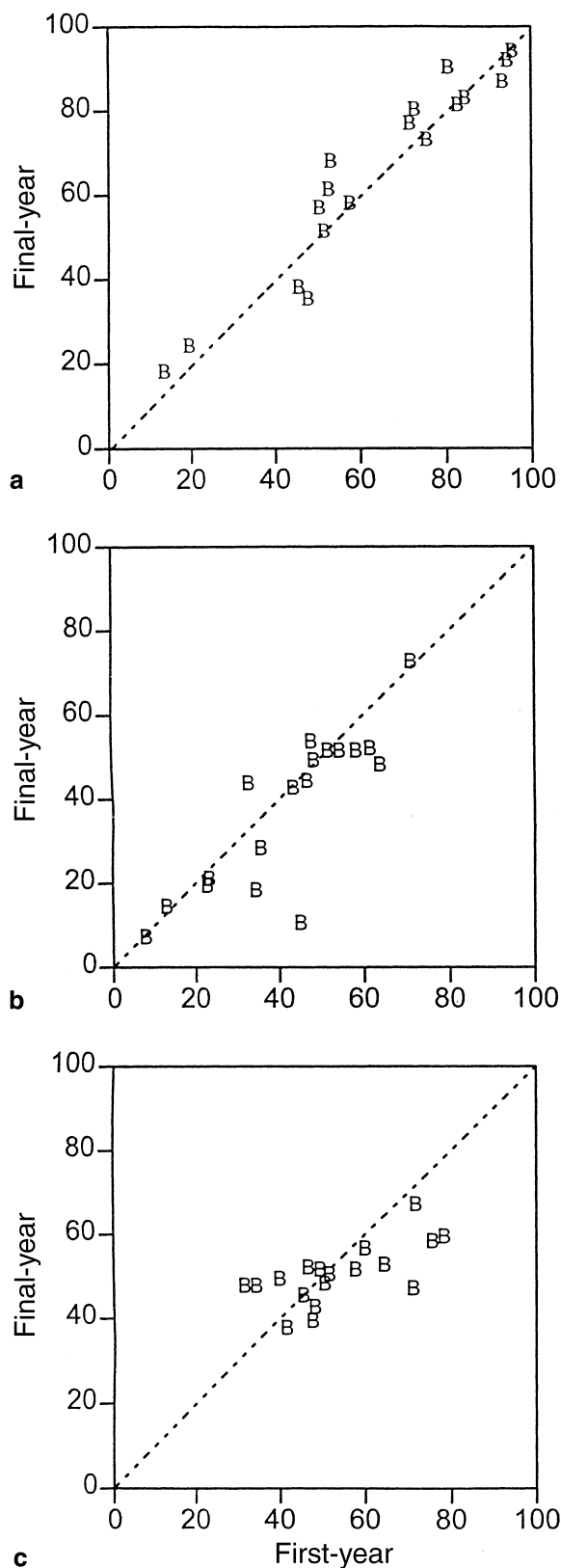
Table 3 Median ratings of first-year and final-year students with regard to seriousness

Condition	First-year, median	Final-year, median	P value for difference
Asthma	51·0	57·0	0·005
Fracture of the tibia	20·0	24·5	0·12
Burns (extensive)	81·0	90·0	0·000
Dementia	72·0	77·0	0·02
Insulin-dependent diabetes	54·0	68·0	0·000
Ebola virus infection	96·0	94·0	0·02
Tonsillitis	14·0	18·0	0·03
Myocardial infarction	85·0	83·0	0·08
Hearing impairment	53·0	61·0	0·001
HIV infection	95·0	92·0	0·000
Chlamydia infection (STD)	48·0	35·0	0·004
Acute leukaemia	94·0	87·0	0·000
Gastric or duodenal ulcer	52·0	51·0	0·56
Migraine	46·0	38·0	0·12
Mental disease	73·5	80·0	0·004
Burn-out syndrome	58·0	58·0	0·65
Rectal cancer	76·0	73·0	0·42

the final-year students mentioned burn-out syndrome. There were also significant differences between the groups in the magnitude of the ratings of some of the conditions. Thus, while no conditions were rated relatively higher among the final-year students, Ebola virus infection, HIV infection and chlamydia (sexually transmitted disease) were rated significantly lower.

Table 5 shows how *interest* in the 17 medical conditions was rated by the two groups of students. Figure 1c illustrates that there were some differences in the ratings between the two student groups. Regardless of this, four out of the five highest-ranked conditions were identical, namely, HIV infection, acute leukaemia, myocardial infarction and extensive burns. In addition to these, the first-year students, ranked Ebola virus and the final-year students ranked gastroduodenal ulcer among the five highest. Also with regard to *interest* there were statistically significant differences between the groups in the magnitude of the ratings for some conditions. Thus, the ratings of the final-year students were significantly higher for tonsillitis, while they were lower for Ebola virus infection, HIV-infection and acute leukaemia.

In the next step, we calculated the group-specific correlations between the ratings of perceived *seriousness*

Figure 1 Plots of median response from first- and final-year medical students to questions about selected medical conditions, with regard to: (a) seriousness; (b) fear, and (c) interest.

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Table 4 Median ratings of first-year and final-year students with regard to fears

Condition	First-year, median	Final-year, median	P value for difference
Asthma	24·0	20·5	0·38
Fracture of the tibia	13·0	14·0	0·44
Burns (extensive)	55·0	51·0	0·31
Dementia	71·5	72·0	0·69
Insulin-dependent diabetes	33·0	43·5	0·25
Ebola virus infection	45·5	10·0	0·000
Tonsillitis	8·0	6·5	0·22
Myocardial infarction	59·0	51·0	0·14
Hearing impairment	44·0	42·0	0·39
HIV infection	64·5	48·0	0·000
Chlamydia infection (STD)	35·0	18·0	0·000
Acute leukaemia	62·0	51·5	0·02
Gastric or duodenal ulcer	36·0	28·0	0·02
Migraine	23·5	19·0	0·08
Mental disease	47·0	44·0	0·81
Burn-out syndrome	52·0	51·0	0·94
Rectal cancer	49·0	49·0	0·98

Table 5 Median ratings of first-year and final-year students with regard to interest

Condition	First-year, median	Final-year, median	P value for difference
Asthma	50·0	51·0	0·40
Fracture of the tibia	49·0	42·0	0·03
Burns (extensive)	60·5	56·0	0·65
Dementia	48·5	39·0	0·05
Insulin-dependent diabetes	51·0	48·0	0·66
Ebola virus infection	71·5	46·5	0·000
Tonsillitis	32·0	47·0	0·000
Myocardial infarction	72·0	66·5	0·02
Hearing impairment	42·0	37·0	0·23
HIV infection	76·0	58·0	0·000
Chlamydia infection (STD)	35·0	47·0	0·005
Acute leukaemia	79·0	59·0	0·000
Gastric or duodenal ulcer	47·0	51·5	0·01
Migraine	40·5	49·0	0·03
Mental disease	58·0	51·0	0·002
Burn-out syndrome	46·0	45·0	0·76
Rectal cancer	52·0	50·0	0·11

and *fear* for each condition. The correlations were lower for the final-year students in a majority of the cases. However this difference reached statistical significance only for three conditions, namely extensive burns, insulin-dependent diabetes and Ebola virus infection.

We also calculated the group-specific correlations between the ratings of perceived *seriousness and interest* for each condition. The correlations were lower for the final-year students in a majority of the cases, but in no case was the difference statistically significant.

Discussion

For the student, medical education and training implies a transition from layman to professional. It is reasonable to believe that information and attitudes acquired during the training years exert a strong influence, not only on knowledge, but also on values concerning medical conditions. The results of this study provided some support for that hypothesis. Thus, we found that the lower correlation between perceived seriousness on the one hand and fear and interest on the other in the final-year students could be explained by experience from education.

The distribution and anonymous collection of the questionnaire in class provided a response rate of 75%, which would probably not have been the case if a postal questionnaire had been used.

However, three conditions turned out to have a high number of missing responses among the first-year students, probably because of their lack of biomedical knowledge. Thus, we had to exclude from subsequent analyses three conditions whose data would have further elucidated the research question. This problem had not become apparent when the questionnaire was piloted. The missing responses, however, indicate that the students took the questionnaire seriously and did not respond when they believed their knowledge to be insufficient. This interpretation is supported by the fact that, for the remaining 17 conditions, missing data were also more abundant among the first-year students.

The study was cross-sectional, which limits the options for drawing conclusions concerning development over time. There have been a number of minor changes in the admission criteria and there have also been local variations, but the difference in median age between the student groups was 6 years, which is close to what would be expected.

It is a reasonable interpretation that the students' perceptions concerning seriousness may have been modified by facts about clinical course, prognosis and opportunities for treatment. Examples could be the significantly higher magnitudes of the ratings by the final-year students for extensive burns and insulin-dependent diabetes.

The students' own fears about contracting particular conditions may have been modified by knowledge

about prevalence, risk factors and perceived own risk, as well as about opportunities for prevention and treatment. An example is the shift in fears in which burn-out syndrome replaced HIV infection as one of the five most feared conditions. This finding could perhaps be regarded as an impact of clinical experience on perceived susceptibility, a view that has some support from recent reports of deteriorating work conditions among doctors in Sweden.

Conditions with a chronic course, with effects on appearance or behaviour and for which curative treatment is lacking, such as dementia and mental diseases, are apparently less interesting for the advanced students than for the newly admitted. On the contrary, conditions such as duodenal ulcer and migraine, where therapeutic opportunities have undergone a dramatic improvement in recent years, seemed more attractive to the final-year students. Treating those conditions, and even the more common tonsillitis, can provide the doctor with almost immediate reward and gratitude. The advanced students perceived some conditions such as asthma and diabetes to be more serious, but this was not related to any significant change in fear or interest. In those instances, treatment does exist which is effective but not curative.

As cited above, the cross-sectional design limits the possibilities of drawing conclusions with regard to development over time, and consequently a prospective approach would be more appropriate. Therefore, the next step could be to reinvestigate the group of first-year students when they are in their final year. It would also be of interest to compare a group of newly admitted medical students with another newly admitted student group, for instance those who are studying engineering. A selection bias based on interest, i.e. that the knowledge and attitudes of medical students have already changed before they begin their studies, could be resolved with such a design. Previous studies have reached different conclusions about this 'anticipatory socialization',[12,13] but it could be a possible explanation of the relatively modest differences documented in this study between the first- and final-year students.

The results of the study suggest that final-year students are more interested in conditions for which effective treatment is available, and less frightened by conditions, which are unlikely to afflict them. Moreover, the results indicate that not only knowledge, but also values and attitudes are transmitted to students during the process of professionalization.[14]

Contributors

The four authors planned the study together. AB and GH conducted the data collection. AB performed the data analysis and prepared the manuscript. All authors were involved in the process of editing the manuscript.

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