

PAPER

Willingness to treat infectious diseases: what do students think?

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ABSTRACT

Introduction Outbreaks of serious communicable infectious diseases remain a major global medical problem and force healthcare workers to make hard choices with limited information, resources and time. While information regarding physicians' opinions about such dilemmas is available, research discussing students' opinions is more limited.

Methods Medical students were surveyed about their willingness to perform medical procedures on patients with communicable diseases as students and as physicians. Students were asked about their opinions regarding the duty to treat in such cases.

Results 74% of respondents felt that by deciding to enter medical school they were morally obliged to treat any patient despite the risks. Students' willingness to treat as physicians is significantly higher than their willingness to treat as students. HIV was significantly the most tolerated disease with respect to performing mouth to mouth resuscitation. Among preclinical students, we found that willingness to treat during the later years is significantly greater than during the earlier years. Among clinical students, the opposite was observed.

Discussion Students' greater willingness to treat as physicians is mostly attributed to perceptions of higher obligations as a qualified doctor. There is greater but not total willingness to perform resuscitation on patients with HIV relative to other diseases. The increased willingness of preclinical students and the decreased willingness of clinical students both emphasise the importance of patient-physician communication and ethics studies during medical school.

INTRODUCTION

Since ancient times, the willingness of physicians and healthcare workers to treat despite personal risk has been a controversial issue. Noted physicians such as Galen and Sydenham are reported to have fled from their responsibilities during plagues.¹ Others have performed heroically at great risk to their own lives and to have died as a result.

Under normal circumstances most physicians generally treat all patients, assuming a small, but definite, risk as part of the physician's responsibility. Physicians, like fire-fighters and soldiers, clearly understand the inherent risks associated with their profession. However, dilemmas arise when the risks increase significantly during epidemics. There is general agreement that there must be a level of risk beyond which even fire-fighters or physicians are not obliged legally or morally to endanger

themselves. Nonetheless, no clear criteria have been developed to set these limits.

During the AIDS epidemic, when the disease was perceived as uniformly fatal and when the risk of physician exposure was grossly overestimated, the medical literature carried extensive discussions of the issue.²⁻³ These discussions abated as the route of transmission became clearer.

However the SARS epidemic, the panic over swine influenza, the development of multi-drug resistant tuberculosis bacteria, and the threat of biological warfare have reawakened the debate surrounding the degree to which physicians should expose themselves to serious risk while treating patients. Governments are increasingly actively involved in planning for potential pandemic disasters.⁴⁻⁵

In planning for medical disasters it is critical to have agreed standards of behaviour for medical staff. In the event of serious medical disasters it is likely that physicians will be mobilised and that medical students will also find themselves at least exposed to patients who will endanger their lives. For example, in the 1950s during a polio epidemic in Copenhagen many medical students saved lives by hand-ventilating patients with respiratory muscle paralysis.⁶

However, while information regarding physicians' opinions on such dilemmas is available, research on students' opinions is much more limited.⁷ Therefore to provide some data in this important area, a study examining medical students' attitudes was undertaken.

METHODS

A questionnaire (see online supplementary appendix 1) was distributed to students attending the Joyce and Irving Goldman Medical School (6-year course) at Ben Gurion University of the Negev during October 2010 by medical students who were part of the research team, such that no authority figure asked the respondents to fill out the forms.

The survey explores the commitment and willingness of medical students to treat patients with communicable infectious diseases, as students and as physicians, and comprised three sections. The first part sought demographic information including gender, family status, religion and year of study.

The second part consisted of a chart listing several medical procedures (taking a medical history and performing a physical examination,

drawing blood, performing surgery and performing mouth to mouth resuscitation) to be performed on patients with various representative diseases (swine flu, HIV, tuberculosis and SARS). The respondent was asked to rate, on a scale of 1–5 (1—Absolutely not, 5—Definitely agree) their willingness to perform any of the described procedures on the various patients as medical students and as physicians. Brief information on the diseases was also included.

In the third section participants were asked several questions. The first question was whether medical staff treating patients with infectious diseases should receive a salary increase. The second was, if a healthcare provider dies due to illness contracted from a patient, should their family receive compensation from the state. The third question dealt with the responsibility of a hospital employee who is not a part of the medical staff. The fourth question asked whether a person who has decided to become a physician has a moral commitment to treat patients regardless of personal risk. The last yes/no question with six options was whether there should be a law mandating medical staff to treat patients regardless of disease. The respondent could select more than one reason why it might be legitimate to break such a law (the options were: there are no such cases, pregnancy, marriage, parenthood, no proper protection, other reason).

Development of the survey was based on literature review and the opinions of an expert panel. Before distribution, a pilot version was tested among random medical students who did not participate in the later actual survey. All sources of ambiguity were revised.

The research protocol was approved by the IRB committee of Soroka University Medical Center.

Statistics

The willingness of respondents to treat as a student and as a physician was compared using the Wilcoxon signed ranked test for paired non-parametric samples.

In order to compare a student's willingness to perform a certain procedure or to treat a specific patient, new variables were created. Variables that estimate one's willingness to

perform a certain procedure were calculated by choosing the median of one's willingness to perform that procedure for each disease. Variables that estimate one's willingness to treat a patient with a certain procedure were calculated by choosing the median of one's willingness to perform all the mentioned procedures in a patient with this specific disease. The newly created variables were used to compare the willingness of students from different years of medical school. The comparisons were carried out using the Mann–Whitney test for independent and non-parametric samples.

Kruskal–Wallis and Mann–Whitney tests were used to compare willingness to perform a given procedure on patients with various diseases.

Pearson's χ^2 was used to compare the answers of different groups to yes/no questions.

RESULTS

One hundred and ninety out of approximately 450 (42%) students in the school completed the questionnaire. Two of the respondents were of unknown gender, 102 were women and 86 men.

In order to explore the willingness of students to treat patients with infectious diseases, data were compressed as follows (table 1). Ratings of 4 and 5 were considered to indicate 'high willingness', a rating of 3 'medium willingness' and ratings of 1 and 2 'low willingness'.

In all categories, the willingness of the respondents to treat as physicians is significantly higher than their willingness to treat the same patients as students ($p < 0.01$).

There is a clear trend in which the least frightening disease among the options is swine flu, while the most frightening is SARS (figure 1). Performing mouth to mouth resuscitation is the least acceptable procedure, while taking a medical history and performing a physical examination is the most tolerated procedure.

When comparing respondents' willingness to perform mouth to mouth resuscitation a different trend is revealed (figure 2), with the most acceptable disease being HIV, followed by swine flu. Willingness to perform mouth to mouth resuscitation on

Table 1 Distribution of willingness to perform the discussed procedures on patients with the discussed diseases

	Swine flu		HIV positive		TB		SARS	
	As doctor (%)	As student (%)	As doctor (%)	As student (%)	As doctor (%)	As student (%)	As doctor (%)	As student (%)
1. Taking a medical history and performing a physical examination								
L	0	1.6	0.5	2.6	0.5	7.9	2.1	15.3
M	0.5	6.3	0	3.2	2.6	11.1	7.4	16.8
H	97.9	90.5	97.9	92.6	94.7	79.5	88.4	66.3
2. Drawing blood								
L	0.5	5.8	2.1	18.4	0.5	8.4	3.7	14.2
M	1.6	4.7	3.2	10.5	4.2	15.8	8.4	21.2
H	96.3	87.4	93.2	69.5	93.7	74.2	85.8	63.2
3. Performing surgery								
L	0.5	13.7	2.1	27.9	1.1	20.5	3.7	27.9
M	3.2	12.1	7.9	17.9	6.8	18.4	13.2	21.6
H	94.7	71.6	87.9	51.6	90.5	58.4	81.6	47.9
4. Mouth to mouth resuscitation (without protection)								
L	53.2	64.2	40	43.7	71.6	81.6	77.4	86.3
M	15.8	12.1	16.3	18.4	15.3	11.1	12.1	8.4
H	29.5	22.1	42.1	36.3	11.6	5.3	8.9	3.7

N > 180 in all categories.

H, high willingness; L, low willingness; M, medium willingness; TB, tuberculosis.

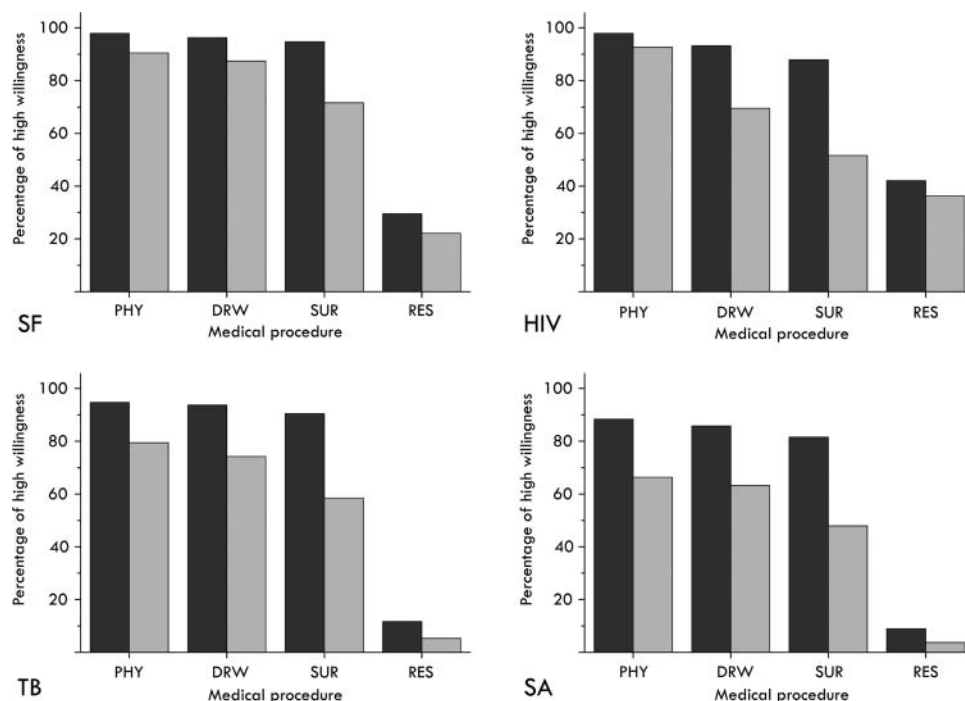


Figure 1 Percentage of high willingness to perform procedures in patients with various diseases. DRW, draw blood; SF, swine flu; HIV, HIV positive; PHY, take a medical history and perform a physical examination; TB, tuberculosis; RES, mouth to mouth resuscitation; SA, SARS; SUR, perform surgery. Dark grey indicates high willingness as a doctor; light grey indicates high willingness as a student.

HIV positive patients was significantly higher both as physicians and as students ($p < 0.01$) than willingness to perform the same procedure on patients with any of the other diseases.

In several cases willingness among second year students was higher than that among first year students; however,

willingness decreased with increasing seniority among clinical students. Willingness to draw blood among second year students (median=5, $n=45$) was significantly higher ($p < 0.05$) than among first year students (median=4, $n=43$), while fifth year students (median=5, $n=9$) were more willing ($p < 0.05$) to

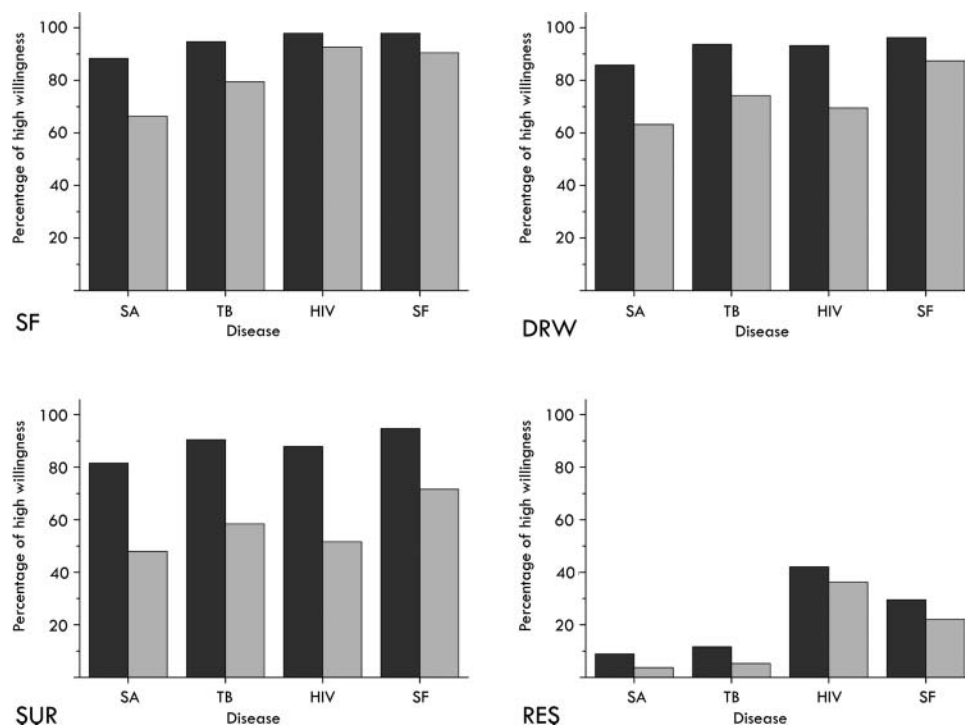


Figure 2 Percentage of high willingness to treat patients with the discussed diseases for every procedure. DRW, draw blood; HIV, HIV positive; PHY, take a medical history and perform a physical examination; RES, mouth to mouth resuscitation; SA, SARS; SF, swine flu; SUR, perform surgery; TB, tuberculosis. Dark grey indicates high willingness as a doctor; light grey indicates high willingness as a student.

draw blood than sixth year students (median=3.5, n=18). Regarding willingness to perform surgery as a student, first year students (median=4, n=43) were significantly less willing ($p<0.01$) than second year students (median=5, n=45), while second year students were significantly more willing ($p<0.05$) than third year students (median=3.5, n=46) and fifth year students (median=5, n=9) were significantly more willing ($p<0.05$) than sixth year students (median=3, n=18). In addition, willingness to treat patients with SARS among second year students (median=4, n=45) was significantly higher ($p<0.05$) than among first year students (median=3.5, n=43), while third year students (median=3, n=47) were significantly less willing ($p<0.01$) than second year students, as were fifth year students (median=4.5, n=9) compared to sixth year students (median=2.5, n=18) ($p<0.05$). Moreover, sixth year students were significantly less willing ($p<0.05$) than first year students to treat SARS. No significant differences between groups were found in student willingness to treat specific diseases or to perform certain procedures as physicians.

When asked whether a member of a medical team that treats contagious diseases should receive a salary increase, 55% (n=105) of respondents agreed and 42.6% (n=81) disagreed.

Overall, 89.5% (n=170) of respondents felt that the family of a member of a medical team who died as a result of a disease contracted while treating a patient should receive compensation from the state, while 8.9% (n=17) disagreed.

Interestingly, 71.6% (n=136) believed that the same obligation that applies to a member of the medical team also applies to auxiliary staff (eg, secretaries, kitchen employees, cleaners, etc), while 24.7% (n=47) did not.

Of the medical students, 73.7% (n=140) felt that by deciding to become a physician, they were morally committed to treat all patients, irrespective of the risks involved, while 24.2% (n=46) did not agree.

Only 33.2% (n=63) of respondents considered that the law should oblige members of a medical team to treat any patient regardless of disease, while 65.8% (n=125) felt such a law should not be enacted. If there were such a law, only 5.3% (n=7) of respondents believed that there are no extenuating circumstances justifying refusal of a member of a medical team to abide by it, while as many as 94.7% (n=180) felt that the law should not apply in certain situations, such as pregnancy (n=86), marriage (n=8), parenthood (n=18) and lack of appropriate protection (n=154), which was chosen by most respondents.

Several statistically significant differences between men and women were found among the answers to the last question. Of the 86 who thought that pregnancy would justify refusal of treatment, 61 were women and only 25 were men ($p<0.01$). In addition, of the 18 who thought that parenthood justified refusal of treatment, 15 were women and three were men ($p<0.01$).

DISCUSSION

The present study, to our knowledge, is the first detailed examination of medical student attitudes towards their exposure to risks of communicable diseases. The risks were stratified according to disease, procedure and professional experience/training at exposure. Student attitudes were examined at different stages of their studies.

As regards their general attitude towards their obligation to assume risks, 74% of students felt that by deciding to become physicians they had assumed a moral obligation to treat all patients in spite of the risks involved. Alexander and Wynia, in

contrast, reported that 45% of American physicians surveyed denied that physicians have a duty to provide care in epidemics when there is potential danger to their own life.⁸ This difference might be explained by the generally high solidarity that characterises Israeli society, and by the attitude towards authority of the majority of students who experienced compulsory military service. However, it should be kept in mind that this study was conducted among students rather than physicians, as will be discussed later.

When asked about specific areas of treatment and involvement, over 80% of respondents expressed willingness as physicians to treat patients in any of the situations except mouth to mouth resuscitation. Willingness to perform these tasks as students was lower than as physicians but nevertheless was impressively high. In keeping with the magnitude of the risks involved, willingness to perform was inversely proportional to the perceived risk. There are several possible explanations for the significant difference between students' willingness to perform as students and as doctors. Students may not consider themselves as taking an active part in patient treatment, but rather as involved in patient care in order to learn new skills. They may therefore feel that it is not worth putting themselves at risk in order to just learn. Furthermore, medical students might consider themselves primarily to be consumers of education, and as consumers should be supplied with rather than supply a service, especially when this service entails risk. In addition, the natural tendency of humans to delay risks is quite common⁹ and may be exaggerated by the long duration of the training demanded of the medical profession. Moreover, according to the prospect theory of Kahneman and Tversky,¹⁰ the subjective value of a gain for an objective is lower than that of a loss. Specifically in the present study, the potential damage caused by SARS contamination is considered to be much greater than the satisfaction of saving someone's life by any of the mentioned procedures. Students felt that this decision must be taken in light of their current status and they chose accordingly. However, in making the choice as a doctor, the gains and losses are less easy to distinguish.

The discussed diseases might be classified according to transmission pathway. SARS is transmitted by close contact, HIV is blood-borne and both swine flu and tuberculosis are airborne. The four procedures expose the performer to different routes of transmission. Physical examination creates transient contact; drawing blood poses a very small risk of self-injury that might present a potential route; surgery can be associated with both air and blood-borne routes, depending on the role and type of surgery; and mouth to mouth resuscitation exposes the performer to close contact and airborne routes, and in some situations to potential blood-borne routes. According to this classification, one might wonder why in figure 1, willingness to perform resuscitation on HIV positive patients, is the lowest among all procedures. However, when examining figure 2, it is clear that willingness to resuscitate HIV positive patients is the highest among all diseases. These encouraging findings may indicate decline in prejudice and application of medical knowledge by respondents. Although there was a general reluctance to perform resuscitation, this trend is lower regarding HIV, a disease known not to be airborne. Nevertheless, given that HIV transmission from mouth to mouth resuscitation has never been documented, the question is why the high willingness to resuscitate HIV positive patients is not even higher. This anomaly might be explained by classifying the discussed diseases according to their severity rather than their transmission pathways. As stated, SARS and swine flu are the least and

most tolerated diseases, respectively, probably because SARS is a life-threatening situation, while swine flu is considered an easily treated disease. With regard to HIV, although much progress has been achieved in treating carriers and preventing progression to AIDS, the life expectancy of these patients is still significantly lower than that of the general population.¹¹ In addition, patients must take a lot of medication for the rest of their lives and are sexually limited, making this a serious disease. Alternatively, Caves and Irwin¹² showed that among medical students in Hong Kong, where a SARS outbreak took place, the tendency to withhold mouth to mouth resuscitation because of the presence of blood and vomiting was greater because of SARS. The respondents of our study might have considered blood and vomiting to be inhibiting factors as there was only a 36.3% high willingness to resuscitate HIV positive patients as students. On the other hand, despite the fact that the present study deals with supposedly well informed medical students, it is possible that stigmas and lack of updated medical knowledge contributed to the low willingness to perform resuscitation in HIV positive patients.

The greater willingness to treat found among early clinical students than late clinical students is consistent with previous works by Newton *et al*¹³ and Hojat *et al*¹⁴ who demonstrated a decline in empathy during medical school. Neumann *et al*¹⁵ reviewed a variety of studies on empathy among medical students and residents, and found that the distress caused by several aspects of the curricula is the main reason for the decline in empathy. However, unlike Newton *et al*, who reported on decreased empathy after the freshman year, the present results reveal a higher willingness to treat among second year than first year students. Newton's explanations for this decrease in empathy included student stress and competitiveness, the discovered differences between the media's presentation of doctors as heroes and doctors in reality, and the medical school's hostile educational environment, which treated students like children. Feighny *et al*¹⁶ showed that appropriate early medical school training could strengthen communication skills and behavioural empathy among students. The first year curriculum in our medical school places great emphasis on humanistic values, communication skills and medical ethics, and perhaps this approach may contribute to the difference in attitude between the first and second year students in the present study.

As Israel is a country with mandatory military service, debate over whether a physician highly exposed to contagious disease should get a salary increase is not surprising. Those who answered 'No' might have thought that the risk taken by a physician cannot be compared to those taken by a combat soldier, while these who answered 'Yes' probably felt that work benefiting society and involving risk should be appropriately compensated. The question whether compensation should be granted to the family of a physician dying through contact with a

contagious disease was answered unambiguously. Apparently respondents felt that a doctor who dies is equivalent to a fallen soldier because they both died 'in the line of duty'.

The study is limited by the relatively low response rate of ~42% and the fact that the survey was carried out in a single medical school. Generalisation to other institutions is affected by the fact that this medical school is in Israel, a country with compulsory military service. In addition, while other studies on changes in empathy follow the same group of students for several years and use paired samples statistical tests, this study sampled students from different years of medical school simultaneously and used independent samples tests.

Contributors DZM contributed to study design, survey development, literature review, data gathering, data analysis and manuscript writing; RBY and DA contributed to study design, survey development, data gathering and manuscript writing; SMG contributed to study design, survey development, literature review, manuscript writing and editing; AJ contributed to study design, survey development, manuscript writing and editing.

Competing interests None.

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