

Changes in Medical Students' Attitudes Towards End-of-Life Decisions Across Different Years of Medical Training

Pascale C. Gruber, MBBS, FRCGA, Charles D. Gomersall, MBBS, FJFICM,
Gavin M. Joynt, MBBCN, FJFICM, Anna Lee, PhD, Pui Yin Grace Tang, Adelina Shuan Young,
Nga Yui Florrie Yu, and Oi Ting Yu

Department of Anaesthesia and Intensive Care, The Chinese University of Hong Kong, New Territories, Hong Kong, China.

BACKGROUND: Decisions to forgo life-sustaining medical treatments in terminally ill patients are challenging, but ones that all doctors must face. Few studies have evaluated the impact of medical training on medical students' attitudes towards end-of-life decisions and none have compared them with an age-matched group of non-medical students.

OBJECTIVE: To assess the effect of medical education on medical students' attitudes towards end-of-life decisions in acutely ill patients.

DESIGN: Cross-sectional study.

PARTICIPANTS: Four hundred and two students at The Chinese University of Hong Kong.

MEASUREMENTS: Completion of a questionnaire focused on end-of-life decisions.

MAIN RESULTS: The number of students who felt that cardiopulmonary resuscitation must always be provided was higher in non-medical students (76/90 (84%)) and medical students with less training (67/84 (80%)) in year 1 vs. 18/67 (27%) in year 5 ($p < 0.001$). Discontinuing life-support therapy was more accepted among senior medical students compared to junior medical and non-medical students (27/66 (41%) in year 5 vs. 18/83 (22%) in year 1 and 20/90 (22%) in non-medical students) ($p = 0.003$). An unexpectedly large proportion of non-medical students (57/89 (64%)) and year 1 medical students (42/84 (50%)) found it acceptable to administer fatal doses of drugs to patients with limited prognosis. Euthanasia was less accepted with more years of training ($p < 0.001$). When making decisions regarding limitation of life-support therapy, students chose to involve patients (98%), doctors (92%) and families (73%) but few chose to involve nurses (38%).

CONCLUSIONS: Medical students' attitudes towards end-of-life decisions changed during medical training and differed significantly from those of non-medical students.

KEY WORDS: medical students; medical education; ethics; euthanasia; life-support therapy.

J Gen Intern Med 23(10):1608–14
DOI: 10.1007/s11606-008-0713-y
© Society of General Internal Medicine 2008

INTRODUCTION

Doctors have the ability to keep severely ill patients alive for prolonged periods in the hope that they may eventually recover. For some terminally ill patients this results in prolonged dying, accompanied by substantial emotional and financial expense.^{1,2} Decisions to forgo life-sustaining medical treatments generate challenging issues that all doctors must face.

Experts agree that experientially based and developmentally appropriate ethics education is needed during medical training to prepare medical students to provide excellent end-of-life care.^{3,4} Studies evaluating the effects of educational intervention on the development of underlying ethical attitudes have shown variable effects.^{5–16} In a longitudinal cohort study, Self et al.¹¹ failed to show an expected increase in scores for moral reasoning over 4 years of medical education. Similarly, Pate-maude et al.⁷ examined the first three years of medical training on the development of moral reasoning stages and concluded that there was a “leveling off effect”. Thus students at a less developed moral reasoning stage on entry improved, but those who started at more highly developed moral reasoning stage regressed. The overall mean change in average weighted scores showed a significant decline in moral reasoning. However, Goldie et al.¹³, who compared medical student views with established medical professional consensus views on ethical dilemmas, showed that student views were most divergent from professional consensus pre-course, maximally convergent post-year 1 and then became gradually less convergent in the 3rd to 5th year, although they remained more convergent than they had been pre-course. This was ascribed to the more intensive style of ethics teaching provided in year 1. It is clear that medical education, both didactic and experience-based exposure at the bedside, has an effect on ethical and moral attitudes, but the effect is variable and poorly understood. In addition, these studies have mainly focused on describing the changes in ethical attitudes of medical students during medical training and their attitudes towards specific end-of-life issues in acutely ill patients are largely unknown.

One study has addressed the specific issue of withdrawal of treatment at the end of life, and demonstrated that student opinions relating to clinical vignettes were largely convergent

Received August 8, 2007

Revised January 29, 2008

Accepted June 20, 2008

Published online July 17, 2008

with professional opinion before, and at all stages of the medical curriculum up to year 5.¹⁴ There was, however, a perceived improvement in the knowledge content of written responses after the first year of training.¹⁴ More information is important in determining whether the medical school experience results in students developing attitudes that are in keeping with generally recognized ethical principles.

We undertook a cross-sectional study to evaluate changes in medical students' attitudes towards specific end-of-life issues in different years of medical training in students who have undergone ethics training relating to end-of-life care and compared them with a group of non-medical students. Although the results would be only applicable in their entirety to our institution we believe that there were sufficient similarities between our curriculum and the curricula of other institutions to make this a useful preliminary study.

Medical students at The Chinese University of Hong Kong undergo a Western medical education with the first 2 years allocated to preclinical training and the remaining 3 years to clinical training, with progressively increasing exposure to experience-based ward teaching. By year five, the curriculum is focused almost exclusively on clinical exposure and ward experience-based learning. Unlike their U.S. counterparts most students have not previously attended a university.

In 2003 fewer than 18% of U.S. medical students and residents received formal end-of-life care education.¹⁷ Since then formal medical ethics education in the U.S. has increased with more than 90% of students currently receiving some form of formal end-of-life care education.¹⁸ At our institution, mandatory ethical teaching directly relating to end-of-life issues consists of 3.5 hours of lectures and workshops in year 1, 2 hours of lectures and case studies in year 4, and 4.5 hours of self-learning and lectures in year 5. Spread throughout years 1 to 5, an additional fourteen hours of mandatory general ethics teaching take the form of lectures and facilitated discussion groups. The additional topics covered include patient confidentiality, patient autonomy, consent, medical professionalism, medical negligence, social determinants of health, social welfare system in Hong Kong, medical research ethics, and triage in the intensive care unit.

This study focused on six important areas relating to end-of-life decisions: 1) information delivery; 2) informed consent; 3) cardiopulmonary resuscitation; 4) withholding and discontinuing life-support; 5) key participants in decision-making; 6) intensive care admission.

METHODS

Approval was granted from the Survey and Behavioural Research Ethics Committee of The Chinese University of Hong Kong to undertake this cross-sectional study.

In developing the questionnaire, a previously published questionnaire designed to survey the ethical attitudes of intensive care doctors was modified by the authors to facilitate interpretation by the students.¹⁹ Three items of the original questionnaire related to specific operational or technical intensive care issues were deleted as they were not suitable for modification. One new item (question 18) was added. Content validity of the modified questionnaire was established by evaluating the rating of six experts (senior doctors with regular exposure to end-of-life issues in clinical practice) who

rated the relevance of each question to survey objectives. Ratings of 1 (totally irrelevant) to 4 (extremely relevant) were obtained. All items received a rating of 3 or 4 from all six experts and were retained. The ability of the modified questionnaire to reliably represent the original questionnaire was verified by asking ten senior doctors to complete both original (without omitted items) and modified questionnaires (without the added item). The degree of inter-rater reliability was assessed for correlation using the Kappa coefficient and the inter-reliability was considered acceptable (range 0.6 to 1). The final questionnaire is shown in [Appendix](#).

The questionnaire was distributed in paper format to medical students in years 1, 2, and 5 and by email to medical students in year 3 at The Chinese University of Hong Kong. Medical students in year 4 were omitted as they were on elective at the time of the study. The questionnaire was also distributed in paper format to non-medical students spread out over 4 years of study attending a general education lecture, as we felt they were representative of the students studying at The Chinese University of Hong Kong. The questionnaire was considered valid for analysis if >75% of the questions in each section were answered by the students.

STATISTICAL ANALYSIS

Data were analyzed with Statistical Package for the Social Sciences (SPSS) 14.0 for Windows. Categorical data were analyzed using χ^2 or χ^2 for trends. Continuous data were analyzed using analysis of variance (ANOVA). P-values < 0.05 were considered statistically significant.

RESULTS

Of the 639 questionnaires distributed, 402 were considered valid for analysis. [Table 1](#) presents the respondents' demographic data. The students' response to each question is presented in [Table 2](#).

Information Delivery

Most non-medical students, but only a minority of medical students, felt that medical information provided should always include everything the doctors know ($p < 0.001$). Limitation of information was associated with seniority ($p = 0.01$).

In the event of an iatrogenic incident, more non-medical than medical students felt that doctors should tell the patient and family exactly what happened ($p < 0.001$). There was a significant association between limiting the information given and year of medical training ($p = 0.006$).

Informed Consent

If a sufficiently capable person, generally considered to be an individual who has the ability to understand and retain information and be able to weigh the information given to them before making a free choice, refuses surgery that a doctor considers necessary (whether lifesaving or not), most medical students and non-medical students thought that the doctor should try to convince the patient, but accept the patients' decision if the patient refuses. There were no differences in

Table 1. Demographic Characteristics of the Respondents

| | Non-medical students | Medical students Year 1 | Medical students Year 2 | Medical students Year 3 | Medical students Year 5 | All medical students |
|------------------------|----------------------|-------------------------|-------------------------|-------------------------|-------------------------|----------------------|
| No. of respondents (%) | 90(64) | 85(66) | 101(73) | 59(42) | 67(73) | 312(63) |
| Age (years) mean (SD) | 20.9 (1.5) | 19.2 (1.4) | 20.4 (2.0) | 21.0 (1.1) | 23.7 (1.0) | 21.2 (1.0) |
| Sex | | | | | | |
| Female | 56 | 49 | 49 | 46 | 47 | 191 |
| Male | 30 | 34 | 51 | 13 | 20 | 118 |
| No response | 4 | 2 | 1 | 0 | 0 | 3 |
| Religion | | | | | | |
| Catholic | 3 | 10 | 9 | 4 | 2 | 25 |
| Christian | 18 | 22 | 24 | 15 | 20 | 81 |
| Other | 2 | 1 | 1 | 1 | 2 | 5 |
| Agnostic/ atheist | 63 | 50 | 64 | 39 | 43 | 196 |
| No response | 4 | 2 | 3 | 0 | 0 | 5 |

Data shows number of respondents (% questionnaires valid for analysis unless stated otherwise).

opinion across different years of medical training, but medical students felt more strongly than non-medical students that if the condition is life-threatening the doctor should try to convince the patient, but accept the patients' decision if the patient refuses ($p < 0.001$).

Cardiopulmonary Resuscitation (CPR)

More non-medical students than medical students felt that CPR should always be provided to restart the heart (76/90 (84%) vs. 194/311 (62%), $p < 0.001$). Significantly fewer medical students felt CPR should always be provided to restart the heart as medical training increased ($p < 0.001$). Medical students' perceptions of likelihood of hospital discharge following successful CPR declined with increased medical training ($p = 0.02$).

In mentally capable patients, more medical students felt that doctors should discuss with patients before deciding to withhold CPR compared with non-medical students ($p = 0.02$). There were no differences observed across different years of medical training ($p = 0.72$). Both medical and non-medical students felt that families should also be involved in the decision to withhold CPR ($p = 0.35$); however medical students felt more strongly that this issue should be discussed with the family as year of training increased ($p = 0.004$). In unconscious or mentally incapable patients, more medical than non-medical students felt that the decision to withhold CPR should be discussed with the family before being finalized ($p = 0.02$) and no differences were observed across different years of medical training ($p = 0.89$).

Withholding and Discontinuing Life-support

There was no difference between medical and non-medical students in their attitude towards limitation (withholding or discontinuing) of life-support therapy ($p = 0.07$ and $p = 0.29$, respectively). Limitation of life-support therapy was found to be more acceptable among medical students as medical training progressed ($p < 0.001$ and $p = 0.003$, respectively). Both medical and non-medical students were more comfortable with withholding than discontinuing life-support therapy. Surprisingly, non-medical and junior medical students thought that more deaths were preceded by limitation of life-support than year 5 medical students ($p = 0.01$).

In the event that a patient has no real chance of recovering a good quality of life, an unexpectedly large proportion of non-medical and medical students found it acceptable for doctors to deliberately administer fatal doses of drugs. The wording

"deliberate administration of fatal doses of drugs to ensure that death occurs after discussing with the patient/the patient's family and obtaining their consent" was used in the questionnaire as it is compatible with commonly held definitions of euthanasia.²⁰ Medical students found this less acceptable than non-medical students ($p < 0.001$) and as year of training increased deliberate administration of fatal doses of drugs to patients with no real chance of recovering good quality of life became less acceptable ($p < 0.001$).

If the family of a patient with no real chance of recovering a good quality of life insisted on maximal medical treatment, year 1, 2 and 3 medical students and non-medical students chose to continue maximal medical treatment including CPR if the patient's heart stopped. However, most year 5 medical students chose to continue present care but withhold sophisticated treatments.

Key Participants in Decision-making

In conscious and mentally capable patients, medical and non-medical students felt that the decision to limit life-support therapy should involve patients (390/396 (98%)), doctors (355/387 (92%)) and families (272/374 (73%)); however few chose to involve nurses (132/350 (38%)). In unconscious or mentally incapable patients, most students also chose to involve families (376/396 (95%)) and doctors (367/394 (93%)) but again few (166/354 (47%)) chose to involve nurses.

Intensive Care (ICU) Admission

There was little difference between the proportion of medical and non-medical students who felt that patients with limited chances of survival should be admitted to the intensive care unit; however there was a significant association between increasing year of medical training and limiting ICU admission in this group of patients ($p < 0.001$).

Overall, there were no significant differences observed in medical students' responses according to either gender or religion with the exception of whether or not CPR should always be provided, male medical students being more inclined to always provide CPR (odds ratio (OR) 1.71; 95% CI 1.05–2.78 $p = 0.04$).

Amongst the non-medical students, there were no age, gender or religious differences in the responses to any items. To identify a possible non-specific effect of general university education or age-related effect on response, the responses of non-medical students were examined for any change with increased year of study. There were no significant changes identified (data not shown).

Table 2. Number of Students' "Yes" Responses to Each Question

| Non-medical students (NMS) (n=90) | Medical students (MS) year 1 (n=85) | Medical students year 2 (n=101) | Medical students year 3 (n=59) | Medical students year 5 (n=67) | All medical students (n=312) | χ^2 for differences between MS & NMS | X2 for trend amongst MS |
|--|-------------------------------------|---------------------------------|--------------------------------|--------------------------------|------------------------------|---|-------------------------|
| INFORMATION DELIVERY | | | | | | | |
| Medical information given to patients and their family should include everything | | | | | | | |
| 54/89 (61) | 27/81 (33) | 36/98 (37) | 16/59 (27) | 11/66 (17) | 90/304 (30) | p<0.001 | p=0.01 |
| Medical information given to patients and their family should be limited | | | | | | | |
| 35/89(39) | 54/81(67) | 62/98(63) | 43/59(73) | 55/66(83) | 214/304(70) | p<0.001 | p=0.01 |
| Information given in the event of an iatrogenic incident should include everything | | | | | | | |
| 64/90 (71) | 48/85 (56) | 57/101 (56) | 25/59 (42) | 25/67 (37) | 155/312(50) | p<0.001 | p=0.006 |
| Information given in the event of an iatrogenic incident should be limited or no information provided | | | | | | | |
| 26/90 (29) | 37/85 (44) | 44/101 (44) | 34/59 (58) | 42/67 (63) | 157/312(50) | p<0.001 | p=0.006 |
| INFORMED CONSENT | | | | | | | |
| If a sufficiently capable person refuses surgery that is necessary and life-threatening doctors should: | | | | | | | |
| Try and convince the patient but if patient refuses, accept the patient's decision | | | | | | | |
| 67/90 (74) | 80/85 (94) | 92/101 (91) | 58/59 (98) | 65/67 (97) | 295/312(95) | p<0.001 | p=0.18 |
| Treat the patient according to what the doctor thinks is right | | | | | | | |
| 18/90 (20) | 3/85 (4) | 7/101 (7) | 0/59 (0) | 2/67 (3) | 12/312 (4) | p<0.001 | p=0.40 |
| Inform the patient that the doctor is no longer able to look after them | | | | | | | |
| 5/90 (6) | 2/85 (2) | 2/101 (2) | 1/59 (2) | 0/67 (0) | 5/312 (2) | p=0.05 | p=0.26 |
| If a sufficiently capable person refuses surgery that is necessary but NOT life-threatening doctors should: | | | | | | | |
| Try and convince the patient but if patient refuses, accept the patient's decision | | | | | | | |
| 78/90 (87) | 83/84 (99) | 97/100 (97) | 59/59 (100) | 66/67 (99) | 305/310(98) | p=0.64 | p=0.76 |
| Treat the patient according to what the doctor thinks is right | | | | | | | |
| 5/90 (6) | 1/84 (1) | 1/100 (1) | 0/59 (0) | 0/67 (0) | 2/310 (1) | p=0.008 | p=0.27 |
| Inform the patient that the doctor is no longer able to look after them | | | | | | | |
| 7/90 (8) | 0/84 (0) | 2/100 (2) | 0/59 (0) | 1/67 (1) | 3/310 (1) | p=0.002 | p=0.62 |
| CARDIOPULMONARY RESUSCITATION (CPR) | | | | | | | |
| CPR must always be provided | | | | | | | |
| 76/90 (84) | 67/84 (80) | 74/101 (73) | 35/59 (59) | 18/67 (27) | 194/311(62) | p<0.001 | p<0.001 |
| Discussion when withholding CPR: | | | | | | | |
| In mentally capable patients, withholding CPR should be discussed with patients | | | | | | | |
| 11/14 (79) | 16/16 (100) | 25/27 (93) | 24/24 (100) | 46/47 (98) | 111/114(97) | p=0.02 | p=0.72 |
| In mentally capable patients, withholding CPR should be discussed with the family | | | | | | | |
| 8/14 (57) | 10/17 (59) | 12/27 (44) | 20/24 (83) | 38/47 (81) | 80/115 (70) | p=0.35 | p=0.004 |
| In mentally incapable patients, withholding CPR should be discussed with the family | | | | | | | |
| 10/14 (71) | 14/15 (93) | 25/27 (93) | 23/24 (96) | 44/47 (94) | 106/113(94) | p=0.02 | p=0.89 |
| WITHHOLDING AND DISCONTINUING LIFE-SUPPORT | | | | | | | |
| Withholding life-support therapy is acceptable | | | | | | | |
| 41/90 (46) | 44/83 (53) | 41/101 (41) | 35/58 (60) | 54/66 (82) | 174/308(56) | p=0.07 | p<0.001 |
| Discontinuing life-support therapy is acceptable | | | | | | | |
| 20/90 (22) | 18/83 (22) | 21/98 (21) | 19/58 (33) | 27/66 (41) | 85/305 (27) | p=0.29 | p=0.003 |
| Euthanasia is acceptable | | | | | | | |
| 57/89 (64) | 42/84 (50) | 51/97 (53) | 25/58 (43) | 15/66 (23) | 133/305(44) | p<0.001 | p<0.001 |
| For patients who have no real chance of recovering good quality of life, if the family insists on maximal medical therapy: | | | | | | | |
| Doctors should continue maximal medical therapy including CPR | | | | | | | |
| 55/86 (64) | 39/74 (53) | 55/95 (58) | 32/59 (54) | 13/61 (21) | 139/289(48) | p=0.01 | p<0.001 |
| Doctors should continue maximal medical therapy excluding CPR | | | | | | | |
| 5/86 (6) | 2/74 (3) | 3/95 (3) | 2/59 (3) | 5/61 (8) | 12/289 (4) | p=0.56 | p=0.13 |
| Doctors should continue present care but withhold sophisticated treatments | | | | | | | |
| 18/86 (21) | 18/74 (24) | 16/95 (17) | 18/59 (31) | 35/61 (57) | 87/289 (30) | p=0.10 | p<0.001 |
| Doctors should continue present care but withhold additional treatments | | | | | | | |
| 8/86 (9) | 7/74 (9) | 11/95 (12) | 2/59 (3) | 2/61 (3) | 22/289 (8) | p=0.61 | p=0.06 |
| Other responses | | | | | | | |
| 5/86 (6) | 8/74 (11) | 10/95 (11) | 5/59 (8) | 6/61 (10) | 29/289 (10) | p=0.29 | p=0.75 |
| KEY PARTICIPANTS IN DECISION-MAKING | | | | | | | |
| In conscious and capable patients, the decision regarding limitation of life support therapy should involve: | | | | | | | |
| Patients | | | | | | | |
| 86/89 (97) | 82/84 (98) | 97/97 (100) | 59/59 (100) | 66/67 (99) | 304/307(99) | p=0.13 | p=0.58 |
| Families | | | | | | | |
| 69/87 (79) | 55/76 (72) | 62/88 (70) | 38/59 (64) | 48/64 (75) | 203/287(71) | p=0.13 | p=0.95 |
| Doctors | | | | | | | |
| 70/87 (80) | 69/81 (85) | 86/94 (91) | 51/59 (86) | 59/66 (89) | 265/300(88) | p=0.06 | p=0.64 |
| Nurses | | | | | | | |
| 28/80 (35) | 23/70 (33) | 36/82 (44) | 18/59 (31) | 27/59 (46) | 104/270(39) | p=0.33 | p=0.37 |
| In unconscious and incapable patients, the decision regarding limitation of life support therapy should involve: | | | | | | | |
| Families | | | | | | | |
| 80/88 (91) | 78/84 (93) | 95/99 (96) | 57/59 (97) | 66/66 (100) | 296/308(96) | p=0.05 | p=0.03 |
| Doctors | | | | | | | |
| 75/87 (86) | 75/83 (90) | 95/98 (97) | 57/59 (97) | 65/67 (97) | 292/307(95) | p=0.004 | p=0.08 |

(continued on next page)

Table 2. (continued)

| Non-medical students (NMS) (n=90) | Medical students (MS) year 1 (n=85) | Medical students year 2 (n=101) | Medical students year 3 (n=59) | Medical students year 5 (n=67) | All medical students (n=312) | χ^2 for differences between MS & NMS | X ² for trend amongst MS |
|---|-------------------------------------|---------------------------------|--------------------------------|--------------------------------|------------------------------|---|-------------------------------------|
| Nurses | | | | | | | |
| 30/82 (37) | 33/69 (48) | 44/86 (51) | 27/59 (46) | 32/58 (55) | 136/272(50) | p=0.03 | p=0.58 |
| INTENSIVE CARE UNIT ADMISSION | | | | | | | |
| Admit patients with no hope of survival for more than a few weeks | | | | | | | |
| 52/88 (59) | 60/81 (74) | 53/99 (54) | 29/59 (49) | 13/66 (20) | 155/305(51) | p=0.17 | p<0.001 |
| Admit patients who may live for several years but whose quality of life is very poor according to the doctor's opinion | | | | | | | |
| 59/89 (66) | 72/83 (87) | 80/98 (82) | 50/59 (85) | 47/66 (71) | 249/306(81) | p=0.003 | p=0.03 |
| Admit patients who may live for several years but whose quality of life is very poor according to the patient's opinion | | | | | | | |
| 55/88 (63) | 65/83 (78) | 71/97 (73) | 42/59 (71) | 44/66 (67) | 222/305(73) | p=0.06 | p=0.11 |
| Admit patients with limited chances of survival | | | | | | | |
| 69/89 (78) | 60/81 (74) | 82/97 (85) | 42/59 (71) | 26/65 (40) | 210/302(70) | p=0.14 | p<0.001 |

Data shown as number of "yes" responses over total possible responses by category (% "yes" responses)

DISCUSSION

There were several important differences in the attitudes of medical students and non-medical students identified from this preliminary study. Those students with more years of medical training demonstrated significantly different attitudes in relation to completeness of information delivery, admission practices to the intensive care unit, limitation of life-support therapy, and provision of CPR in patients with limited prognosis. The views of year 5 medical students were in line with those of practicing clinicians documented in previous studies.^{19,21-28} These changes with the years of medical education suggest that the differences between medical and non-medical students are due to the medical school experience and not selection of people with intrinsically different views. The absence of an age-related effect in non-medical students suggests that these changes are not an age-related phenomenon but are related to the medical school experience.

We are unable to clearly separate the effects of clinical exposure, role models and formal ethics teaching, but our data do suggest a substantial effect of experience-based learning. Although most direct teaching relating to end-of-life occurs in years 1, 4 and 5, changes in attitudes show a gradual shift, rather than sudden changes in these years, suggesting that clinical exposure and experience-based learning, which is continuous from the end of the second year, may have significant influence in shaping attitudes.

The attitude among medical students to provision of information was clearly discordant to that of non-medical students. Medical students preferred to limit the information given to patients when discussing medical information (diagnosis, treatment) or an iatrogenic incident. This tendency to limit information increased with increasing years of medical education, a worrisome trend. Clearly this attitude is contrary to the moral standard of veracity expected of doctors and ethical teaching however it is concordant with the findings in qualified doctors¹⁹, suggesting that the change in attitude may be due to experience-based learning. Previous studies investigating students' moral attitudes and reasoning have demonstrated discrepant findings, with some suggesting poor moral development^{7,10,11}, but others specifically reporting an increase in medical students views that patients are entitled to be told the truth, particularly in the setting of end-of-life.^{9,12}

A striking finding is the unexpectedly large proportion of non-medical and medical students who considered euthanasia

acceptable. Euthanasia is contrary to the medical council code of conduct and is illegal in Hong Kong.²⁹ However 64% of non-medical, 50% of year 1 and 23% of final year medical students still found it acceptable. Again, with increasing years of training the percentage of medical students who found euthanasia acceptable became more dissimilar to their non-medical peers and more similar to qualified doctors.²¹

Whereas most students chose to involve the patient and family before making the decision to limit life-support therapy, only a few chose to involve the nurses in the decision-making process. This suggests that a multidisciplinary approach to decisions such as limitation of therapy needs greater emphasis during medical education.

In the later years of medical training medical students are less likely to believe that CPR should always be provided and their perceptions of likelihood of hospital discharge following successful CPR diminished. It is plausible that there is a causal relationship. It is interesting that the proportion of medical students who felt that the number of deaths was preceded by limitation of medical treatment decreased with increasing years of medical training and was inversely related to their acceptance of limitation of therapy.

The study has several limitations. It was cross-sectional not longitudinal, single-centered and omitted year 4 medical students. The possibility that some of the changes in attitudes in medical students were age-related also cannot be completely excluded as no year 5 and few year 4 non-medical students were surveyed. The questions were written in English, which was not the first language for most of the respondents. Translation of the questionnaire into Chinese was carefully considered. The disadvantage of translation was the risk that translation could lead to subtle changes in meaning that might have introduced systematic bias. On the other hand, a good standard of English is an entrance requirement for all students of The Chinese University of Hong Kong and is the official language used throughout the medical curriculum. In particular, the ethics curriculum is taught and examined exclusively in English. After much deliberation, it was decided that for this preliminary exploratory study an English questionnaire was more appropriate. Given some of the trends noted, it may be interesting to establish whether language interpretation has influenced results by comparing the results of English questions and formal translations in a follow-up study. In particular, issues such as the apparent lack of understanding of the implications of euthanasia and attitudes to truthful disclosure related to iatrogenic incidents require further study.

It is possible that our results are unique to our medical school and our cultural milieu and cannot be generalized. Previous medical studies have highlighted some subtle cultural differences between Hong Kong and the Western countries.^{21,30-32} In Chinese society there is less emphasis on individual rights, self-expression and self-determination and more emphasis on community qualities such as harmony, function, and responsibility. Thus health care decisions within Chinese culture may be more family centered, with decisions made by the family as a group rather than the individual. Nevertheless we believe this preliminary study provides a new insight into the attitudes of medical students to end-of-life decisions. It has also identified areas of concern. In particular the trend to limited disclosure of the truth related to iatrogenic incidents and the high proportion of students that consider euthanasia acceptable, despite its illegality, warrant further investigation to determine whether these attitudes are widespread.

In summary, there are a number of differences in medical student attitudes towards end-of-life decisions with increasing year of medical training with a convergence towards that of qualified doctors and away from views held by non-medical students. This difference may reflect exposure to a unique set of professional experiences during medical training. Studies such as this aid better understanding of different ethical perspectives and assist medical educators in shaping the medical ethics curriculum.

Conflict of Interest: None disclosed.

Financial support received: None.

Corresponding Author: Pascale C. Gruber, MBBS, FRCA; Department of Anaesthesia and Intensive Care, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong, China (e-mail: pascalegruber@yahoo.com).

REFERENCES

1. **McCue JD.** The naturalness of dying. *JAMA*. 1995;273:1039-43.
2. **Callahan D.** *The Troubled Dream of Life: Living With Mortality*. New York, NY: Simon & Schuster; 1993.
3. **Billings JA, Block S.** Palliative care in undergraduate medical education. *JAMA*. 1997;278:733-8.
4. **Caralis AV, Hammond JS.** Attitudes of medical students, housestaff, and faculty physicians towards euthanasia and termination of life-sustaining treatment. *Crit Care Med*. 1992;20:683-90.
5. **Self DJ, Olivarez M, Baldwin DC.** Clarifying the relationship of medical education and moral development. *Acad Med*. 1998;73:517-20.
6. **Herbert PC, Meslin EM, Dunn EV.** Measuring the ethical sensitivity of medical students: a study at the University of Toronto. *J Med Ethics*. 1992;18:142-7.
7. **Patenaude J, Niyonsenga T, Farfad D.** Changes in students' moral development during medical school: a cohort study. *J Can Med Assoc*. 2003;168:840-4.
8. **Wolf TM, Balson PM, Faucett JM, Randall HM.** A retrospective study of attitude change during medical education. *Med Educ*. 1989;23:19-23.
9. **Price J, Price D, Williams G, Hoffenberg R.** Changes in medical students attitudes as they progress through a medical course. *J Med Ethics*. 1998;24:110-7.
10. **Self DJ, Wolinsky FD, Baldwin DC.** The effect of teaching medical ethics on medical students' moral reasoning. *Acad Med*. 1989;64:755-9.
11. **Self DJ, Schrader DE, Baldwin DC, Wolinsky FD.** The moral development of medical students: A pilot study of the possible influence of medical education. *Med Educ*. 1993;27:26-34.
12. **Hayes RP, Stoudemire AS, Kinlaw K, Dell ML, Loomis A.** Changing attitudes about end-of-life decision making during third-year clinical clerkships. *Psychosomatics*. 1999;40:205-11.
13. **Goldie J, Schwartz L, McConnachie A, Morrison J.** The impact of a modern medical curriculum on students' proposed behaviour on meeting ethical dilemmas. *Med Educ*. 2004;38:942-9.
14. **Goldie J, Schwartz L, Morrison J.** Students' attitudes and potential behaviour to a competent patient's request for withdrawal of treatment as they pass through a modern medical curriculum. *J Med Ethics*. 2004;30:371-6.
15. **Hipshman L.** Attitudes towards informed consent, confidentiality, and substitute treatment decisions in southern African medical students: a case study from Zimbabwe. *Soc Sci Med*. 1999;49:313-28.
16. **Goldie J, Schwartz L, McConnachie A, Morrison J.** The impact of three years' ethics teaching, in an integrated medical curriculum, on students' proposed behaviours on meeting ethical dilemmas. *Med Educ*. 2002;36:489-97.
17. **Sullivan AM, Lakoma MD, Block SD.** The status of medical education in end-of-life care: A National Report. *J Gen Intern Med*. 2003;18:685-95.
18. **Soleymani Lehmann L, Kasoff WS, Koch P, Federman DD.** A survey of medical ethics education at U.S. and Canadian Medical Schools. *Acad Med*. 2004;79:682-9.
19. **Vincent JL.** European attitudes towards ethical problems in intensive care medicine: results of an ethical questionnaire. *Intensive Care Med*. 1990;16:256-64.
20. Netherlands State Commission on Euthanasia. Final Report of the Netherlands State Commission on Euthanasia: An English Summary (anonymous translation). *Bioethics*. 1987; 1:163-174.
21. **Yap HY, Joynt GM, Gomersall CD.** Ethical attitudes of intensive care physicians in Hong Kong: questionnaire survey. *Hong Kong Med J*. 2004;10:244-50.
22. **Vincent JL.** Foregoing life support in western European Intensive care units: The results of an ethical questionnaire. *Crit Care Med*. 1999;27:1626-34.
23. **Asch DA, Hansen-Flaschen J, Lanke PN.** Decisions to limit or continue life-sustaining treatment by critical care physicians in the United States: Conflicts between physicians' practices and patients' wishes. *Am J Resp Crit Care Med*. 1995;151:288-92.
24. **Sprung CL, Eidelman LA.** World wide similarities and differences in the foregoing of life-sustaining treatments. *Intensive Care Med*. 1996;22:1003-5.
25. **Lee DK, Swinburne AJ, Fedullo AJ, Wahl GW.** Withdrawing care. Experience in a medical intensive care unit. *JAMA*. 1994;271:1358-61.
26. **Prendergast TJ, Luce JM.** Increasing incidence of withholding and withdrawal of life support from the critically ill. *Am J Respir Crit Care Med*. 1997;155:15-20.
27. **Turner JS, Mitchell WL, Morgan CJ, Benatar SR.** Limitation of life support: frequency and practice in a London and Cape Town intensive care unit. *Intensive Care Med*. 1996;22:1020-5.
28. **Keenan SP, Busche KD, Chen LM, McCarthy L, Inman KJ, Sibbald WJ.** A retrospective review of a large cohort of patients undergoing the process of withholding and withdrawal of life support. *Crit Care Med*. 1997;25:1324-31.
29. **Watts J.** Hong Kong debates where to draw the line with passive euthanasia. *Lancet*. 2000;355:633.
30. **Ip M, Gilligan T, Koenig B, et al.** Ethical decision making in critical care in Hong Kong. *Crit Care Med*. 1998;26:447-51.
31. **Buckley TA, Joynt GM, Tan PY, et al.** Limitation of life support: frequency and practice in a Hong Kong intensive care unit. 2004;32:415-20.
32. **Chong AML, Fok SY.** Attitudes towards euthanasia in Hong Kong-A comparison between physicians and the general public. *Death Stud*. 2004;29:29-54.

APPENDIX

Questionnaire

Part A: Demographic features

- 1) Age:
- 2) Sex:
- 3) Religion:
- 4) Year:
- 5) Medical student Non-medical student

Part B: Questionnaire

| | Yes | No |
|---|--------------------------|--------------------------|
| 1) In your opinion do you think doctors should admit to ICU the following patients? | | |
| a) with no hope of survival for more than a few weeks | <input type="checkbox"/> | <input type="checkbox"/> |
| b) who may live for several years but whose quality of life is very poor according to the doctors opinion | <input type="checkbox"/> | <input type="checkbox"/> |
| c) who may live for several years but whose quality of life is very poor according to the patients opinion | <input type="checkbox"/> | <input type="checkbox"/> |
| d) with limited chances of survival | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) Medical information (diagnosis, treatment) given to the patient and family should: (Choose one) | | |
| a) Always include everything we know so far, without exception | <input type="checkbox"/> | |
| b) Depend on the type of disease and chance of survival | <input type="checkbox"/> | |
| c) Depend on the type of patient (e.g. personality, wishes, education level, etc.) | <input type="checkbox"/> | |
| d) Depend on both b and c | <input type="checkbox"/> | |
| 3) Do you think doctors should tell the patient and family if an avoidable mistake occurs? (Choose one) | | |
| a) yes, exactly what happened, including problems that were probably due to human error | <input type="checkbox"/> | |
| b) yes, that problems occurred but limit the information given to avoid unnecessary distress and blame | <input type="checkbox"/> | |
| c) no, nothing should be mentioned | <input type="checkbox"/> | |
| 4) If a sufficiently capable person refuses surgery that a doctor considers <i>necessary and life-saving</i> , do you think the doctor should? (Choose one) | | |
| a) try to convince the patient but if he/she still refuses, accept the patient's decision | <input type="checkbox"/> | |
| b) treat the patient according to what the doctor thinks is right, contrary to the patient's wish | <input type="checkbox"/> | |
| c) Inform the patient that he/she (the doctor) is no longer be able to look after them | <input type="checkbox"/> | |
| 5) If a sufficiently capable person refuses surgery that a doctor considers <i>necessary but not life-saving</i> , do you think the doctor should? (Choose one) | | |
| a) try to convince the patient but if he/she still refuses, accept the patient's decision | <input type="checkbox"/> | |
| b) treat the patient according to what the doctor thinks is right, contrary to the patient's wish | <input type="checkbox"/> | |
| c) Inform the patient that he/she (the doctor) is no longer be able to look after them | <input type="checkbox"/> | |
| The last event in any terminal illness is when the heart stops beating. Cardiopulmonary resuscitation (CPR) involves pushing on the chest to compress the heart and giving electrical shocks to the heart to try and restart the heart when the heart has stopped beating. The success rate of CPR to restart the heart is low and the patient, at best, may return to the same state of illness as before the event. | | |
| | Yes | No |
| 6) Must CPR always be provided to try and restart the heart? | <input type="checkbox"/> | <input type="checkbox"/> |
| If your answer is yes, please go to Q 10. | | |
| 7) Do you think doctors should discuss with patients (if they are conscious and mentally capable) before deciding whether to withhold CPR? | <input type="checkbox"/> | <input type="checkbox"/> |
| 8) Do you think doctors should discuss with families of patients before deciding whether to withhold CPR even if the patient is conscious and mentally capable? | <input type="checkbox"/> | <input type="checkbox"/> |
| 9) Do you think doctors should discuss with families of patients who are unconscious or mentally incapable before deciding whether to withhold CPR? | <input type="checkbox"/> | <input type="checkbox"/> |
| 10) For patients who have no real chance of recovering good quality of life, do you think it is acceptable for doctors to <i>withhold</i> (not increasing level of support) sophisticated life support treatments (e.g., breathing machines)? | <input type="checkbox"/> | <input type="checkbox"/> |
| 11) For patients who have no real chance of recovering good quality of life, do you think it is acceptable for doctors to <i>discontinue</i> (reducing level of support) sophisticated life support treatments (e.g., breathing machines)? | <input type="checkbox"/> | <input type="checkbox"/> |
| If your answers to 10 and 11 are yes, please answer Q 12. Otherwise, please go to Q 13. | | |
| 12) Would you feel more comfortable with 10 rather than 11? | <input type="checkbox"/> | <input type="checkbox"/> |
| 13) For patients who have no real chance of recovering <i>good quality of life</i> , do you think it is acceptable for doctors to deliberately administer large doses of drugs (e.g., morphine) to ensure that death occurs | | |
| a) after discussing with the patient/the patient's family and obtaining their consent? | <input type="checkbox"/> | <input type="checkbox"/> |
| b) without obtaining the consent of the patient/the patient's family? | <input type="checkbox"/> | <input type="checkbox"/> |
| 14) For patients who have no real chance of recovering good quality of life, do you think doctors should continue life support treatments regardless of the consequence? | <input type="checkbox"/> | <input type="checkbox"/> |
| 15) For patients who have no real chance of recovering good quality of life, if the family insists on maximal medical treatment, do you think doctors should (Choose one): | | |
| a) continue maximal medical treatment <i>including</i> CPR if the heart stops | <input type="checkbox"/> | |
| b) continue maximal medical treatment <i>excluding</i> CPR if the heart stops | <input type="checkbox"/> | |
| c) continue present care but withhold sophisticated treatment (e.g., operations) | <input type="checkbox"/> | |
| d) continue present care but withhold additional treatment (e.g., antibiotics) | <input type="checkbox"/> | |
| e) discontinue the breathing machine to allow the patient to die | <input type="checkbox"/> | |
| f) discontinue all treatments (e.g., feeding) except the breathing machine | <input type="checkbox"/> | |
| g) continue maximal therapy pending a judge's decision | <input type="checkbox"/> | |
| 16) In a <i>conscious and sufficiently capable</i> person should the decision regarding limitation (withhold/withdrawal) of medical treatment involve: | Yes | No |
| a) the patient | <input type="checkbox"/> | <input type="checkbox"/> |
| b) the family | <input type="checkbox"/> | <input type="checkbox"/> |
| c) doctors | <input type="checkbox"/> | <input type="checkbox"/> |
| d) nurses | <input type="checkbox"/> | <input type="checkbox"/> |
| 17) In an <i>unconscious or mentally incapable</i> person should the decision regarding limitation (withhold/withdrawal) of medical treatment involve: | | |
| a) family | <input type="checkbox"/> | <input type="checkbox"/> |
| b) doctors | <input type="checkbox"/> | <input type="checkbox"/> |
| c) nurses | <input type="checkbox"/> | <input type="checkbox"/> |
| 18) If you take a group of people whose hearts have stopped where doctors have managed successfully to restart the heart. What do you think their chances of leaving hospital alive are? | | % |
| 19) What % of deaths do you think are preceded by some limitation (withhold/withdrawal) of medical treatment in ICU? | | % |