ORIGINAL ARTICLE

A cross-cultural survey of residents' perceived barriers in questioning/challenging authority

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Qual Saf Health Care 2006;**15**:277–283. doi: 10.1136/qshc.2005.017368

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Accepted for publication 13 May 2006

Objectives: To identify perceived barriers to residents' questioning or challenging their seniors, to determine how these barriers affect decisions, and to assess how these barriers differ across cultures.
Method: A written questionnaire was administered to residents in teaching hospitals in the US and Japan to assess factors affecting residents' willingness to question or challenge their superiors. The responses were analyzed for statistical significance of differences between the two cultures and to determine the importance of issues affecting decisions.
Results: Questionnaires were completed by 175 US and 65 Japanese residents, with an overall response rate of 71%. Trainees from both countries believe that questioning and challenging contribute to safety. The perceived importance of specific beliefs about the workplace differed across cultures in seven out of 22 questions. Residents' decisions to make a challenge were related to the relationships and perceived response of the superiors. There was no statistical difference between the US and Japanese residents in terms of the threshold for challenging their seniors.
Conclusion: We have identified attributes of residents' beliefs of communication, including several cross-cultural differences in the importance of values and issues affecting one's decision to question or challenge. In contrast, there was no difference in the threshold for challenging seniors by the Japanese and US residents studied. Changes in organizational and professional culture may be as important, if not more so, than national culture to encourage ''speaking up''. Residents should be encouraged to overcome barriers to challenging, and training programs should foster improved relationships and communication between trainers and trainees.

Good communication among care providers is essential for ensuring patient safety. Communication between providers can be complex and difficult, especially between supervisors and residents.[1 2] The ability of residents to question or challenge may be a key preventive factor, particularly when communication mishaps may contribute to medical mishaps.[3 4] Residents (even junior residents) have professional responsibility as well as often having the opportunity to intercede and keep human errors from achieving clinical significance.[5]

Accidents caused by miscommunication can occur in any industry. The aviation industry has developed a training program to improve communication with the goal of decreasing accidents.[6–8] Aviation ''Crew Resource Management'' has been translated into the medical field as ''Crisis Resource Management'' (CRM). The importance of simulation and CRM training has been highlighted by the Institute of Medicine in ''*To Err is Human*.''[9] At Harvard University, simulation training was initiated at the Harvard Center for Medical Simulation (CMS) in 1994 and, since 2002, 379 CRM training sessions have been held at the CMS for residents and faculty.[10]

In some anthropological analyses the US culture has been called ''vertical'', whereas Japanese culture has been characterized as ''horizontal.''[11 12] We hypothesized that residents in Japan, where the social framework is more hierarchical than in the US, would be more reluctant to challenge their superiors. Understanding the psychological barriers to ''speaking up'' is a crucial first step towards improving intra-team communication, so a self-administered questionnaire was developed to assess the degree to which personal beliefs affect interaction in the workplace.

METHODS

Questionnaire design and development

The questionnaire comprised four sections with 31 items. The first section addressed demographic characteristics including year of residency training (1 or 2) and years of living in the country. Only those subjects who lived in one country for their entire lifetime were assumed to have had a single cultural effect.

The second section addressed basic characteristics of attitudes towards communication and patient safety. This section consisted of 22 statements reflecting attitudes. Each statement was accompanied by a 5-point Likert scale to reflect consistency of the statements with the residents' beliefs (very inconsistent, somewhat inconsistent, neutral, somewhat consistent, very consistent). The statements in this section were drawn from the Operating Team Resource Management Survey developed by Helmreich and Merritt with several words modified to be applicable to general situations.[13]

The third section was designed to assess the effect of personal values on one's decision to challenge (or not challenge) one's superior. A hypothetical clinical scenario was described, and the residents were asked to rate how much certain values and attitudes affected their decisions using a 5-point Likert scale (very unimportant, unimportant, neutral, important, very important). The eight factors arose from debriefing discussions with residents participating in simulated scenarios at the CMS where they were presented with clinical situations where ''speaking up'' would be appropriate.[14] The description of eight factors can be elaborated as follows: ''Penalty/repercussion'' and ''Reward /prestige'' might result from the residents' ''challenge'' and come directly from superior or from other staff on the floor or

department; ''Social acceptance or rejection'' implies the work climate can allow or reject the challenge from a junior team member; ''Knowledge/experience/understanding'' recognizes how these characteristics of residents affect their choice of actions; ''Image/self-worth/pride'' refers specifically to the self-image, self-worth, and pride of the junior residents; ''Teamwork/professionalism/hierarchy'' refers to the relationships between the superiors and residents. The written scenario described a situation where a clinical problem was recognized only by the resident and required that they question the seniors. The scenario was made simple and generalized so that it could be understood by trainees from multiple clinical disciplines, and to avoid response bias from specific clinical details. The surgical operating room was chosen as the setting, where many communication errors are observed.[15] The description of the scenario involving a hypothetical general surgery situation was worded to be understandable by residents in any specialty. Residents were asked to what degree various factors affected their theoretical decision to ''challenge'' or ''not challenge''. They were also asked about the likelihood of making a second challenge based on the perceived reaction of the supervisor: (1) senior surgeon did not hear or understand; (2) senior surgeon heard and understood but chose not to respond to resident's input; (3) senior surgeon heard and understood but resented resident's input.

In the final section the questionnaire assessed the ''threshold'' for challenging, based on the perceived risk of complication from the error. Residents could report the level of risk at which they would speak up as 10%, 1%, 0.1%, 0.0001% chance, or never challenge regardless of chance. Free comments sections were given at the end of both the third and fourth sections.

The original English version of the questionnaire was translated into Japanese and the accuracy of the translation was confirmed by two bilingual Japanese physicians.

Participants and data collection

The authors administered the survey at Brigham and Women's Hospital (BWH), Massachusetts General Hospital (MGH), and the Nippon Medical School Hospital (NMS). BWH and MGH are academic medical centers affiliated with Harvard Medical School and situated in Boston, Massachusetts. NMS is the primary academic medical center of Nippon Medical School situated in Tokyo, Japan, and has 1164 beds and 27 clinical departments. Two investigators (HK and MP) administered the questionnaires to residents during departmental conferences and collected them after the conference. Junior residents were invited to participate, in recognition of the responsibility they share in ensuring safety and the important role they play in using even basic medical knowledge to identify and react to potential errors.[4 16] Junior residents were surveyed specifically as a sample for whom hierarchical effects could be most profound. In the Japanese graduate medical education system, residents are trained during the PGY 1 and 2 years in general medicine (internal medicine, surgery, obstetrics and gynecology, pediatrics and one elective specialty) before proceeding to an area of specialty. As in the US, Japanese residents are matched with hospital programs and can be recruited from throughout the country. The residents were informed that the questionnaire was totally voluntary, and the Partners Human Research Committee (Institutional Review Board) approved the English version of the questionnaire.

Data analysis

All responses were entered into statistical software SPSS Version 11 and reported as descriptive statistics. Responses were converted into numeric values with Likert scales as follows: consistency with their beliefs (1: very inconsistent, 2: somewhat inconsistent, 3: neutral, 4: somewhat consistent, 5: very consistent), importance of the issues affecting the decision to or not to challenge (1: very unimportant, 2: unimportant, 3: neutral, 4: important, 5: very important). The Wilcoxon rank sum test was performed to identify any differences in response trends between the US and Japan residents and reported with p values. The Kruskal-Wallis test was performed to find a difference in the distribution of grouped residents' barriers.

RESULTS

Demographic data

Two hundred and forty questionnaires were completed, 175 by US residents and 65 by Japanese residents. The response rate, which was based on the number of residents expected to attend the conferences, was 71%. Of the US respondents, 112 (65.9%) had never lived outside the US, 111 (65.3%) had fewer than 24 months of training, and 66 (37.7%) met both criteria for inclusion in the analysis (mean 8.8 months). Of the Japanese respondents, 57 (87%) had never lived outside Japan and had fewer than 24 months of training (mean 5.0 months).

Beliefs about communication and safety

Questions about beliefs were each repeated, with differing language, to assure consistency of individuals' responses. Both US and Japanese residents were consistent in their responses to these reworded queries. There was no specific question value which the US residents thought was important but that Japanese residents thought was unimportant or vice versa. Seven out of 22 items had differences at the 0.05 level of significance of responses between the US and Japanese residents. The statements of the questions and results are shown with the percentage response and p values in table 1.

Four statements were deemed more consistent with US than with Japanese residents' beliefs: Question 2 ''Senior staff should encourage questions from junior medical staff if appropriate'' ($p<0.01$); Question 5 ''Team members in charge should verbalize plans for procedures or actions and should be sure that the information is understood and acknowledged by the others'' ($p<0.01$); Question 7 ''I try to be a person that others will enjoy working with'' ($p<0.01$); and Question 20 ''Human error is inevitable'' ($p<0.01$). Question 3 ''Doctors who encourage suggestions from other junior members are weak leaders'' ($p<0.01$) was found to be less consistent with US beliefs that with those in Japan. Japanese residents found Question 9 ''The pre-session team briefing is important for safety and for effective team management'' ($p<0.01$) to be more consistent with their beliefs than did the US residents, and had more disagreement with Question 6 ''Junior team members should not question the decisions made by senior personnel'' ($p<0.01$).

All the responses were converted into scores (1: very inconsistent, 2: somewhat inconsistent, 3: neutral, 4: somewhat consistent, 5: very consistent) as described in the methodology section, and means were expressed in the same scale. The results are described below. For 13 questions there were no significant differences between the US and Japanese respondents, and means of the two groups combined are expressed. For the nine questions to which responses differed, the means of the responses are separately expressed.

There were three statements for which mean responses fell between ''very inconsistent'' (score = 1) and ''somewhat inconsistent'' (score = 2): Question 3 ''Doctors who encourage suggestions from other junior members are weak leaders'' (mean: US = 1.23, JP = 1.70); Question 6 ''Junior

Table 1 Percentage of US and Japanese (JP) residents responding to questions about consistency of statements with their own personal beliefs*

No	Level of consistency		Very inconsistent	Somewhat inconsistent	Neutral	Somewhat consistent	Very consistent	p value†
Q1	The senior person should take over and make all decisions in life threatening emergencies	US	5.7	32.9	11.4	35.7	14.3	0.86
		JP	10.3	24.1	19	31	15.5	
Q2	Senior staff should encourage questions from junior medical staff if appropriate	US	1.4	2.9	0	7.1	88.6	<0.01‡
		JP	8.6	12.1	22.4	37.9	19	
Q3	Doctors who encourage suggestions from other junior members are weak leaders	US	86.8	10.3	0	0	2.9	<0.01‡
		JP	58.6	19	17.2	5.2	0	
Q4	A regular debriefing of procedures and decisions after difficult activities or shift is an important part of developing and maintaining effective team coordination	US	4.3	0	4.3	20	71.4	0.32
		JP	0	0	6.9	12.1	81	
Q5	Team members in charge should verbalize plans for procedures or actions and should be sure that the information is understood and acknowledged by the others	US	1.4	0	2.9	18.6	77.1	<0.01‡
		JP	1.8	5.3	14	31.6	47.4	
Q6	Junior team members should not question the decisions made by senior personnel	US	53.6	31.9	7.2	5.8	1.4	<0.01‡
		JP	78.9	14	7	0	0	
Q7	I try to be a person that others will enjoy working with	US	2.9	0	0	18.8	78.3	<0.01‡
		JP	0	3.4	13.8	48.3	34.5	
Q8	It is better to agree with other team members than to voice a different opinion	US	23.2	56.5	13	4.3	2.9	0.06
		JP	24.1	25.9	39.7	10.3	0	
Q9	The pre-session team briefing is important for safety and for effective team management	US	2.9	2.9	19.1	33.8	41.2	<0.01‡
		JP	0	0	6.9	6.9	86.2	
Q10	I am more likely to make errors or mistakes in tense or hostile situations	US	1.5	5.9	19.1	51.5	22.1	0.36
		JP	3.4	8.6	24.1	43.1	20.7	
Q11	The doctor's responsibilities include coordination between his or her work team and other support areas	US	4.4	0	4.4	36.8	54.4	0.86
		JP	0	3.4	12.1	27.6	56.9	
Q12	As long as the work gets done, I don't care what others think of me	US	47.8	23.2	14.5	11.6	2.9	0.06
		JP	62.1	17.2	17.2	1.7	1.7	
Q13	A good reputation in the department or floor is important to me	US	1.4	2.9	10.1	53.6	31.9	0.99
		JP	1.7	1.7	17.2	44.8	34.5	
Q14	Errors are a sign of incompetence	US	14.5	44.9	20.3	18.8	1.4	0.39
		JP	26.3	33.3	29.8	8.8	1.8	
Q15	If I perceive a problem with the management of a patient I will speak up regardless of who might be affected	US	1.5	7.4	13.2	52.9	25	0.05
		JP	1.8	3.5	35.1	43.9	15.8	
Q16	I am ashamed when I make a mistake in front of other team members	US	4.4	17.6	17.6	50	10.3	0.27
		JP	10.5	3.5	17.5	50.9	17.5	
Q17	Team members should not question the decisions or actions of senior staff except when they threaten the safety of the operation	US	20.9	49.3	14.9	10.4	4.5	0.81
		JP	28.1	26.3	31.6	12.3	1.8	
Q18	To resolve conflicts, team members should openly discuss their differences with each other	US	0	7.6	10.6	37.9	43.9	0.73
		JP	0	3.5	15.8	33.3	47.4	
Q19	There are no circumstances where a junior team member should assume control of patient management	US	43.9	36.4	12.1	6.1	1.5	0.06
		JP	32.1	25	35.7	3.6	3.6	
Q20	Human error is inevitable	US	3	1.5	10.6	13.6	71.2	0.01‡
		JP	3.5	7	17.5	28.1	43.9	
Q21	Effective team coordination requires members to take into account the personalities of other team members	US	1.6	1.6	6.3	28.6	61.9	0.98
		JP	0	0	8.8	31.6	59.6	
Q22	I always ask questions when I feel there is something I don't understand	US	1.5	10.8	16.9	46.2	24.6	0.90
		JP	0	7	28.1	36.8	28.1	

*The statements were drawn from the Operating Team Resource Management Survey developed by Helmreich and Merritt and several words were modified to apply more generally.[12]
†Calculated by Wilcoxon rank sum test between the US and Japan.
‡Statistically significant difference at $p<0.05$ level.

team members should not question the decisions made by senior personnel'' (mean: US = 1.74, JP = 1.29); and Question 12 ''As long as the work gets done, I don't care what others think of me'' (mean = 1.85).

There were four statements for which mean responses fell between ''somewhat inconsistent'' (score = 2) and ''neutral'' (score = 3): Question 19 ''There are no circumstances where a junior team member should assume control of patient management'' (mean = 2.03); Question 8 ''It is better to agree with other team members than to voice a different opinion'' (mean = 2.21); Question 17 ''Team members should not question the decisions or actions of senior staff except when they threaten the safety of the operation'' (mean = 2.33); and Question 14 ''Errors are a sign of incompetence'' (mean = 2.34).

Mean responses fell between ''neutral'' (score = 3) and ''somewhat consistent'' (score = 4) for five statements (plus a sixth statement for the Japanese respondents): Question 1 ''The senior person should take over and make all decisions in life-threatening emergencies'' (mean = 3.22); Question 2 ''Senior staff should encourage questions from junior medical staff if appropriate'' (mean of Japanese responses = 3.46); Question 16 ''I am ashamed when I make a mistake in front of other team members'' (mean = 3.52); Question 10 ''I am more likely to make errors or mistakes in tense or hostile situations'' (mean = 3.78); Question 15 ''If I perceive a problem with the management of a patient, I will speak up regardless of who might be affected'' (mean = 3.83); and Question 22 ''I always ask questions when I feel there is something I don't understand'' (mean = 3.85).

Mean responses fell between ''somewhat consistent'' (score = 4) and ''very consistent'' (score = 5) for nine statements (plus a tenth statement for the US respondents): Question 20 ''Human error is inevitable'' (mean: US = 4.46,

Table 2 Percentage of US and Japanese residents who identified each issue as important in making a decision to challenge and not to challenge their seniors

Scenario: Suppose you are in the OR and doing a difficult operation with a senior surgeon who is concentrating deeply on the procedure. You notice that the senior surgeon has done something that might lead to a serious complication for the patient but the surgeon either does not seem to be aware of the problem or, in your view, has made a poor judgment.

Question (1) You are considering speaking up and ultimately choose to CHALLENGE the senior surgeon about the problem. How do these issues affect your decision to challenge?

Importance of the items		Very unimportant	Unimportant	Neutral	Important	Very important	p value*
Penalty/repercussion	US	3	7.6	15.2	62.1	12.1	<0.01†
	JP	5.2	17.2	32.8	36.2	8.6	
Reward/prestige	US	6.1	30.3	30.3	28.8	4.5	0.04†
	JP	0	19	36.2	34.5	10.3	
Social acceptance or rejection	US	1.5	18.2	31.8	43.9	4.5	0.02+
	JP	5.2	6.9	22.4	43.1	22.4	
Knowledge/experience/understanding	US	3	0	7.6	41.3	47.6	0.13
	JP	0	1.7	17.2	46.6	34.5	
Image/self-worth/pride	US	0	18.5	20	47.7	13.8	0.02†
	JP	10.3	8.6	46.6	27.6	6.9	
Teamwork/professionalism/hierarchy	US	1.5	4.6	15.4	50	29	0.09
	JP	1.7	6.9	27.6	43.1	20.7	
Communication skills	US	1.5	9.2	9.2	52.3	27.7	0.03†
	JP	0	0	19	29.3	51.7	
Relationship/personality of superiors	US	1.8	3.6	14.5	56.4	23.6	0.16
	JP	0	1.7	17.2	39.7	41.4	
Question (2) You are considering speaking up and ultimately you choose NOT TO CHALLENGE the senior surgeon about the problem. How important are these issues in affecting your decision not to challenge?							
Penalty/repercussion	US	3.1	17.2	7.8	59.4	12.5	0.04†
	JP	8.8	15.8	22.8	40.4	12.3	
Reward/prestige	US	10.9	42.2	17.2	29.7	0	0.38
	JP	14	22.8	33.3	21.1	8.8	
Social acceptance or rejection	US	4.7	17.2	20.3	51.6	6.3	0.03†
	JP	3.5	5.3	19.3	49.1	22.8	
Knowledge/experience/understanding	US	6.3	12.7	19	42.9	19	0.06
	JP	3.5	5.3	17.5	40.4	33.3	
Image/self-worth/pride	US	9.5	22.2	28.6	31.7	7.9	0.87
	JP	10.5	14	35.1	26.3	14	
Teamwork/professionalism/hierarchy	US	3.2	6.5	11.3	67.7	11.3	0.31
	JP	7	5.3	21.1	50.9	15.8	
Communication skills	US	1.6	21	19.4	46.8	11.3	0.06
	JP	1.8	5.3	28.1	33.3	31.6	
Relationship/personality of superiors	US	1.8	5.5	20	41.8	30.9	0.77
	JP	3.5	5.3	17.5	38.6	35.1	

*p values calculated by Wilcoxon rank sum test between the US and Japan.
†Statistically significant difference at $p<0.05$ level.

JP = 4.05); Question 9 ''The pre-session team briefing is important for safety and for effective team management'' (mean: US = 4.09, JP = 4.79); Question 13 ''A good reputation in the department or floor is important to me'' (mean = 4.09); Question 5 ''Team members in charge should verbalize plans for procedures or actions and should be sure that the information is understood and acknowledged by the others'' (mean: US = 4.7, JP = 4.16); Question 7 ''I try to be a person that others will enjoy working with'' (mean: US = 4.68, JP = 4.16); Question 18 ''To resolve conflicts, team members should openly discuss their differences with each other'' (mean = 4.19); Question 11 ''The doctor's responsibilities include coordination between his or her work team and other support areas'' (mean = 4.35); Question 21 ''Effective team coordination requires members to take into account the personalities of other team members'' (mean = 4.47); Question 4 ''A regular debriefing of procedures and decisions after difficult activities or shift is an important part of developing and maintaining effective team coordination'' (mean = 4.66); and Question 2 ''Senior staff should encourage questions from junior medical staff if appropriate'' (mean of US respondents = 4.77).

Importance of barriers to affecting a decision to question or challenge

All the responses were converted into scores (1: very unimportant, 2: unimportant, 3: neutral, 4: important, 5: very important) as described in the methodology section, and means were expressed in the same scale. The percentage of responses and p value of differences between the US and Japanese are shown in table 2.

Residents from the two countries differed with regard to the importance of ''Reward/prestige''. This value was of lesser importance for the US residents (mean = 2.98) and was more important for Japanese residents (mean = 3.37, $p = 0.04$). ''Penalty/repercussion'' ($p<0.01$) and ''Image/self-worth/pride'' ($p = 0.02$) were more important to US residents than to Japanese residents, while ''Social acceptance or rejection'' ($p = 0.02$) and ''Communication skills'' ($p = 0.03$) were more important to Japanese residents.

Factors which influenced the decision of US residents to challenge in decreasing order of importance were: ''Knowledge/experience/understanding'' (mean = 4.32), ''Teamwork/professionalism/hierarchy'' (mean = 4.02), ''Communication skills'' (mean = 3.98), ''Relationship/personality of superiors'' (mean = 3.98), ''Penalty/repercussion'' (mean = 3.73), ''Image/self-worth/pride'' (mean = 3.56), ''Social acceptance or rejection'' (mean = 3.35), ''Reward/prestige'' (mean = 2.97). Factors which influenced the decision of Japanese residents to challenge in decreasing order of importance were: ''Communication skills'' (mean = 4.33), ''Relationship/personality of superiors'' (mean = 4.21), ''Knowledge/experience/understanding'' (mean = 4.14), ''Teamwork/professionalism/hierarchy'' (mean = 3.74), ''Social acceptance or rejection'' (mean = 3.7), ''Reward/prestige''

Table 3 Percentage of US and Japanese residents who reported on the relative likelihood of making a second challenge after varying reactions from superiors

Scenario		Very unlikely	Unlikely	Neutral	Likely	Very likely	p value*
You thought the senior surgeon did not hear or understand?	US	3	6.1	6.1	57.6	27.3	0.59
	JP	1.7	10.3	15.5	41.4	31	
You thought the senior surgeon heard and understood but chose not to respond to your input?	US	11	42.4	16.7	22.7	7.6	0.09
	JP	26	31	24.1	12.1	6.9	
You thought the senior surgeon heard and understood but resented your input?	US	27	37.9	12.1	16.7	6.1	0.18
	JP	38	32.8	19	3.4	6.9	

*p values calculated by Wilcoxon rank sum test between the US and Japan.

(mean = 3.37), ''Penalty/repercussion'' (mean = 3.25), and ''Image/self-worth/pride'' (mean = 3.12).

Given the same scenario, the residents were asked how much their decision NOT to challenge was affected by certain values or issues. Both US and Japanese residents responded that ''Reward/prestige'' was less important. The residents thought all the other issues significantly affected the decision not to challenge. The US respondents placed more importance on ''Penalty/repercussion'' than did the Japanese ($p = 0.04$), and the Japanese placed more importance on ''Social acceptance or rejection'' than did the US residents ($p = 0.03$).

Factors which influenced the decision of US residents not to challenge in decreasing order of importance were: ''Relationship/personality of superiors'' (mean = 3.96), ''Knowledge/experience/understanding'' (mean = 3.95), ''Communication skills'' (mean = 3.88), ''Social acceptance or rejection'' (mean = 3.82), ''Teamwork/professionalism/hierarchy'' (mean = 3.63), ''Penalty/repercussion'' (mean = 3.3), ''Image/self-worth/pride'' (mean = 3.18), ''Reward/prestige'' (mean = 2.88). Factors which influenced the decision of Japanese residents not to challenge in decreasing order were: ''Relationship/personality of superiors'' (mean = 3.94), ''Teamwork/professionalism/hierarchy'' (mean = 3.83), ''Penalty/repercussion'' (mean = 3.7), ''Knowledge/experience/understanding'' (mean = 3.59), ''Communication skills'' (mean = 3.52), ''Social acceptance or rejection'' (mean = 3.45), ''Image/self-worth/pride'' (mean = 3.14), ''Reward/prestige (mean = 2.68). There were significant differences in (1) the order of importance of barriers between US and Japanese trainees and (2) the importance of individual factors for challenging or not challenging within each country's group ($p<0.01$).

No significant difference was seen in the likelihood of challenging again in the three scenarios shown in table 3.

Most of the residents in the U.S. (84.9%) and Japan (72.4%) were likely or very likely to challenge again when they thought the senior surgeon did not hear or understand. 53% of U.S. and 70.7% of Japanese residents in the second scenario were unlikely or very unlikely to challenge again when they thought the senior surgeon heard and understood but chose not to respond to their input. When the residents thought the senior surgeon heard and understood but resented their input, 65.2% of the U.S. and 70.7% of Japanese residents were unlikely or very unlikely to challenge again.

Threshold for challenging and probability of patient complication

We asked residents how the probability of patient complication affected their decision to challenge and the results are shown in table 4. Despite the potential for risk to the patient, 5.5% of Japanese and none of the US residents responded that they would ''never challenge''. On the other hand, 9.4% of the US residents and 3.6% of the Japanese residents responded that they were ''likely to challenge with 0.0001% chance of complication''. The overall responses to this question were not statistically different between the US and Japanese residents ($p = 0.07$).

DISCUSSION

As shown in table 1, both the US and Japanese residents agreed that everyone (faculty and superiors, as well junior residents) can potentially make errors. Even junior residents recognized their role and responsibility to identify errors and prevent potentially dangerous outcomes. Residents' decisions to question or challenge are affected by the climate of their workplace. Universally, work environments that welcome and foster the ''speaking up'' of residents encourage learning and a team approach to patient safety. Specifically, the contribution of debriefing as a formal style of communication for patient safety was acknowledged by trainees in both countries.

Helmreich and Merritt argued that behaviors are affected by national, organizational, and professional cultures.[13] The US and Japanese cultures differ in terms of the acceptance and prevalence of challenging one's superiors.[12] Seniority in the medical field is of greater significance in Japan where early trainees can be quite young: students usually attend Medical University after graduation from high school and start residency after graduation from Medical University in Japan. These cultural differences may affect residents' beliefs about communication and safety. The roles of superiors to encourage questions from junior members of the team are more clearly understood and more welcomed in the US than in Japan. US residents' beliefs are more consistent with the idea of verbalizing and confirming the understanding of plans than

Table 4 Percentage of US and Japanese residents who reported the risk of patient complication at which they would speak up

Scenario: Suppose you are in the OR and doing a difficult operation with a senior surgeon who is concentrating deeply on the procedure. You notice that the senior surgeon has done something that might lead to a serious complication for the patient but the surgeon either does not seem to be aware of the problem or, in your view, has made a poor judgment. You are considering speaking up to ''challenge'' the senior surgeon.

Chance of the serious complication	Never challenge†	10%	1%	0.10%	0.0001%	p value*
US residents with 2 years of training or less	0	34.4	43.8	12.5	9.4	0.07
JP residents with 2 years of training or less	5.5	47.3	30.9	12.7	3.6	

*p value calculated by Wilcoxon rank sum test.
†Regardless of the chance of the complication, the subject would not challenge seniors

those of the Japanese. However, Japanese residents agree more strongly about the importance of planning for safety and team management. Also, Japanese residents are less likely to believe that human error is inevitable than do residents in the US. This notion might have an effect on the perception of need for challenge by residents.

Issues related to relationship and personalities of superiors affected the willingness of residents to challenge; in fact, this was identified as the most important factor in NOT challenging in both countries. Two residents noted that they would challenge whenever patient safety was an issue. However, residents' behavior can be affected by the response of seniors. An unwelcoming response by a senior discourages subsequent questions and challenges from residents. Thus, effective and appreciative communication between trainer and trainee should be optimized.

''Image/self-worth/pride'' and ''Reward/prestige'' were not important factors for either US or Japanese residents in deciding whether or not to challenge. US and Japanese residents both deemed ''Knowledge/experience/understanding'' as important since the decision to challenge or not to challenge is basically initiated from it. For Japanese residents, ''Relationship/personality of superiors'' was important for both challenging and not challenging. This could be explained by the national culture and/or beliefs of residents. It was clearly seen in the comments of one Japanese resident: *''(If I find something I need to challenge) we have to convey our thoughts and discuss it knowledgeably. However, when the seniors are overbearing, it is hard to discuss*.'' ''Good communication skills'' facilitate constructive challenging, since this factor was found to be more important in the decision to challenge than not to challenge. One Japanese resident reported: *''If we challenge others, we should pay the fullest attention to speak politely, be friendly and respect the others' position*''. The importance of communication skills is intuitively recognized, but current medical education does not necessarily emphasize communication training. Non-threatening, non-critical methods of questioning/challenging should become a common model for communication between care providers for patient safety. In a parallel manner, supervisors and faculty need to learn to accept this type of input professionally and to respond with constructive, explanatory, and timely feedback.

There is no formal training focused on provider communication and safety in most Japanese hospitals or medical universities. This observation supports a substantial need for communication training in the curriculum. One of the US residents noted: *''Challenges are difficult coming from an inferior position, but should be done if patient safety is at stake*''. Challenging seniors is certainly difficult for residents and efforts are needed to facilitate speaking up for patient safety.

Our research supports the usefulness of a CRM training curriculum in Japan. To customize the program to meet the specific needs of Japanese trainees, our results suggest a slightly different emphasis in the content. We advocate acknowledging that human errors are made regardless of one's position in a work hierarchy. Interpersonal cross-checking, questioning, discussion, and constructive feedback should be welcomed to foster safety. Conveying the importance of effective verbal communication as an essential tool for patient safety is an important message in Japan, where a decreased amount of verbal communication is a hallmark of closer relationships. As in any situation where change is advocated, acceptance by all involved parties is needed for successful implementation. Thus, CRM training should be instituted not only for residents, but also for superiors (faculty) to foster a culture that understands, accepts, and is appropriately responsive to the improved communication style.

We expected cultural differences to be reflected in different thresholds for challenging. Aside from Japanese respondents who would not challenge under any circumstances, US and Japanese trainees had similar thresholds for challenging, based on risk of potential patient complication. This result may reflect a universal commitment to personal safety that transcends cultural barriers, or may reflect a lack of differentiation based on limits of the questionnaire tool, sample proportion, or sample size.

A possible limitation of this study is the existence of response bias. Response bias is common in cross-cultural surveys and there are several arguments and strategies for adjusting for it.[17–19] We include the response bias for comparison of national cultures. However, broader study and standardization are needed for more complete analysis. Another limitation is the possible discordance of residents' attitudes and their actual behavior. While self-reported questionnaires have limitations, they offer an important first step towards understanding the motivations that underlie possible actions. We are in the process of developing a course for residents to (1) see how they are able to challenge superiors in an immersive, high definition simulation environment, and (2) offer a debriefing session for self-reflection and to teach them the language and skills of ''speaking up''. We expect this continued work will more tangibly link personal beliefs about barriers with observable actions.

Key messages

- A study was undertaken to identify the attitudes of US and Japanese residents to communication, differences in values affecting decisions to question and challenge, and the threshold for challenging senior staff.
- There was no significant difference in the threshold to challenge between Japanese and US residents, despite differences in culture and communication norms between the two countries.
- Despite the fact that Japanese culture does not foster challenging superiors, Japanese residents perceived themselves as challenging their seniors at the same rate as US residents.
- Organizational and professional cultures could override the national culture in this specific area of speaking up to seniors.
- In both countries the willingness of residents to speak up a second time was affected by the perceived response of seniors to the first challenge.
- Improving trainer-trainee interactions will ultimately improve residents' communication, the quality of medical education, and patient care and safety.

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Dr Kobayashi is grateful to the Risk Management Foundation of Harvard Medical Institutions for the opportunity to perform this study. The study was supported in part by a Research in Education Grant (REG) of the Foundation for Anesthesia Education and Research (FAER) awarded to Dr Pian-Smith.

Competing interests: none declared.

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