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Article (Published Version)

Article

MDM Policy & Practice

MDM Policy & Practice
1–11

DOI: 10.1177/2381468319885871
journals.sagepub.com/home/mdm
SAGE

Medical Students' Knowledge and Attitudes Toward Shared Decision Making: Results From a Multinational, Cross-Sectional Survey

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Abstract

Introduction. We aimed to conduct a multinational cross-sectional online survey of medical students' attitudes toward, knowledge of, and experience with shared decision making (SDM). **Methods.** We conducted the survey from September 2016 until May 2017 using the following: 1) a convenience sample of students from four medical schools each in Canada, the United States, and the Netherlands ($n = 12$), and 2) all medical schools in the United Kingdom through the British Medical School Council ($n = 32$). We also distributed the survey through social media. **Results.** A total of 765 students read the information sheet and 619 completed the survey. Average age was 24, 69% were female. Mean SDM knowledge score was 83.6% (range = 18.8% to 100%; 95% confidence interval [CI] = 82.8% to 84.5%). US students had the highest knowledge scores (86.2%, 95% CI = 84.8% to 87.6%). The mean risk communication score was 57.4% (range = 0% to 100%; 95% CI = 57.4% to 60.1%). Knowledge did not vary with age, race, gender, school, or school year. Attitudes were positive, except 46% believed SDM could only be done with higher educated patients, and 80.9% disagreed that physician payment should be linked to SDM performance (increased with years in training, $P < 0.05$). Attitudes did not vary due to any tested variable. Students indicated they were more likely than experienced clinicians to practice SDM (72.1% v. 48.8%). A total of 74.7% reported prior SDM training and 82.8% were interested in learning more about SDM. **Discussion.** SDM knowledge is high among medical students in all four countries. Risk communication is less well understood. Attitudes indicate that further research is needed to understand how medical schools deliver and integrate SDM training into existing curricula.

Keywords

medical education, risk communication, shared decision making

Date received: August 23, 2018; accepted: August 19, 2019

Shared decision making (SDM) has achieved high policy prominence but adoption into clinical practice remains slow.[1–3] Reported barriers to implementation include time constraints, health system barriers, clinicians' attitudes toward SDM, and limited understanding of the relevance and applicability of SDM.[4–6] SDM training has largely focused on clinicians with limited research on medical students.[7,8] Studies on patient-centered care in medical education indicate medical students become less patient-centered as they advance in their training.[9–14]

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Globally, we know little about the knowledge of and attitudes toward SDM among medical students.

Previous literature on this topic is limited to a survey of Peruvian fourth-year medical students by Zeballos-Palacios and colleagues, which demonstrated interest in SDM but little training and use of the skills: 8% of students reported receiving lecture-based training in SDM and 12% of students reported using an SDM approach in practice.[15] Students' attitudes, however, were positive with 53% of students describing SDM as an ideal approach.

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In the United States, the Patient Protection and Affordable Care Act promotes SDM facilitation.[16] In the United Kingdom, the National Health Service and the National Institute for Health and Care Excellence encourage SDM.[17,18] In Canada, provinces have SDM initiatives and national physician groups emphasize patient-centered care.[1,19,20] In the Netherlands, SDM is incorporated into the national health care agenda.[1,21,22] Medical students in these countries are therefore more likely to receive training in a landscape where SDM and patient-centered principles are nationally promoted. Our objectives were to investigate in these four countries: 1) medical students' knowledge of, attitudes toward, and experience with SDM as well as their preferred consultation style across the medical curriculum, and 2) the factors that may influence medical students' knowledge of and attitudes toward SDM.

Methods

Study Design

We conducted a cross-sectional online survey of medical students in four countries where SDM has been advocated at the policy level (Canada, the Netherlands, the United Kingdom, and the United States). Methods are presented in detail in the study protocol,[23] and described briefly here. We followed the Checklist for Reporting the Results of Internet E-Surveys (CHERRIES; Supplemental File A).[24] We received ethical approval for this study in all four countries.

Study Population

Medical students at least 18 years old who could understand written English in Canada, the Netherlands, the United Kingdom, and the United States were eligible. In the Netherlands, there is no distinction between medical students in undergraduate and graduate training, so students in both categories were eligible. We excluded students in residency or foundational training (in the United Kingdom).[23] In Canada, we collected but excluded French responses from this analysis and will report them separately as we did not test the French translation before distribution.

Survey

The survey began with an information and consent page, indicating that completion was voluntary, then included the following sections (see Supplemental File B).

Preferred Consultation Style. We assessed preferred consultation style through a single-item measure adapted from the control preferences scale[25–28] that asked: "How do you think healthcare decisions should be made?" with five response options. The first three options were considered "active" (patient plays an active role in the decision-making process) and the last two were considered "passive" (patient does not participate in the decision-making process).[27] This measure appeared at the beginning and end of the survey to see if responses changed after being exposed to SDM questions.

Demographics. We asked students to provide their gender, race/ethnicity, country, year in medical school, and medical school name. We used skip logic to present race categories based on country. Students completed this section after the first preferred consultation style question.

Attitudes Toward SDM. We included six SDM attitudes questions, each on a 4-point scale from "strongly agree" to "strongly disagree." We adapted these questions from existing literature and the validated OPTION instrument.[29,30] We also included two clinical scenarios where students indicated for each scenario how they would react and how they think a senior clinician would react. Students could select from one of four approaches: shared decision making, informed decision making (IDM), paternalistic, and semipaternalistic. We wrote one scenario where SDM was the appropriate approach (Option 2, Q20 in Supplemental File B), where the patient and provider should work together to come to a decision, and one where IDM was the appropriate approach (Option 3, Q14 in Supplemental File B), where the patient should be made aware of her options in order to make a well-informed decision. A medical student wrote these questions supported by a senior clinician and the research team. We randomized the order of the attitude questions and clinical scenarios.

Knowledge of SDM and Risk Communication. We asked 16 knowledge questions, including 15 true/false statements and one multiple-choice scenario. Three of the knowledge questions assessed risk communication. We developed these questions from existing literature and expert consensus as there were no validated scales available.[3]

SDM Awareness and Training. We asked students if they had heard of SDM before, the extent of their SDM training, and their interest in learning more. We also asked if students felt SDM would affect the length of a clinical encounter. Using adaptive skip logic, students saw three to six questions in this section.

On the final page, students had the option to provide their email address. We did not define SDM in the information sheet or survey since providing a definition of SDM could have influenced students' answers. We piloted and tested the survey questions in spring 2016 with students at two medical schools and revised accordingly, as detailed in the published protocol.[23]

Data Collection

We reached out to medical school faculty contacts in each country to assess interest in the survey. All agreed to participate, including four schools each in Canada, the Netherlands, and the United States and all 32 medical schools in the United Kingdom through the Medical School Council. Administrators or faculty at each school invited students through email lists or social media and sent one reminder 2 to 4 weeks after the initial invitation, except for two schools that did not permit reminders. We also distributed the survey using social media.[23] We incentivized participation by offering a US$20 equivalent gift card to one in every 50 participants, which was given after students completed the survey.

We distributed the survey via Qualtrics, an online survey platform,[31] from September 1, 2016, through May 31, 2017. The survey was open for at least 6 months in each country. Using cookies, we allowed students to resume their response up to 1 week after starting it. We forced responses to all questions but gave the option of "I prefer not to say" for questions about race, ethnicity, and gender. Participants viewed 19 to 23 questions, depending on their answer selections.[23] We did not have a back button. We stored email addresses in password-protected Excel sheets on private servers. We did not specify a minimum completion time a priori and accepted partially completed surveys but did a manual review of all surveys to check for abnormal response patterns.

Analysis

We included responses from students who attended medical school in one of the four participating countries, completed demographics and at least one content-based question. We determined the completion rate by comparing the number of individuals who read past the information sheet to the number who completed the survey. Respondents who completed all 16 knowledge questions received a knowledge score based on the number of items answered correctly (range 0–16). Respondents who

Table 1 Participant Characteristics

Characteristic	Total (N = 685)	Canada (n = 150)	The Netherlands (n = 102)	United Kingdom (n = 172)	United States (n = 261)
Age, mean (SD)	23.9 (3.28)	24.1 (2.51)	22.4 (2.73)	22.6 (3.92)	25.3 (2.76)
Gender, *n* (%)					
Female	471 (68.8)	107 (71.3)	86 (84.3)	110 (64.0)	168 (64.4)
Male	210 (30.7)	42 (28.0)	16 (15.7)	61 (35.5)	91 (34.9)
Other/undisclosed	4 (0.6)	1 (0.7)	0 (0.0)	1 (0.6)	2 (0.8)
Year, *n* (%)					
One	219 (32.0)	55 (36.7)	9 (8.8)	33 (19.2)	122 (46.7)
Two	139 (20.3)	48 (32.0)	6 (5.9)	25 (14.5)	60 (23.0)
Three	96 (14.0)	29 (19.3)	21 (20.6)	22 (12.8)	24 (9.2)
Four	131 (19.1)	18 (12.0)	19 (18.6)	39 (22.7)	55 (21.1)
Five	49 (7.2)	0 (0.0)	17 (16.7)	32 (18.6)	0 (0.0)
Six	51 (7.5)	0 (0.0)	30 (29.4)	21 (12.2)	0 (0.0)
Race, *n* (%)[a]					
Asian	169 (24.7)	52 (34.7)	0 (0.0)	39 (22.7)	78 (29.9)
Black	17 (2.5)	3 (2.0)	0 (0.0)	6 (3.5)	8 (3.1)
White	417 (60.9)	70 (46.7)	96 (94.1)	111 (64.5)	140 (53.6)
Mixed	37 (5.4)	8 (5.3)	4 (3.9)	8 (4.7)	17 (6.5)
Other	40 (5.8)	16 (10.7)	2 (2)	7 (4.1)	15 (5.8)
Undisclosed	5 (0.7)	1 (0.7)	0 (0.0)	1 (0.6)	3 (1.2)
Hispanic, *n* (%)					
Yes	26 (6.3)	0 (0.0)	—	—	26 (10.0)
No	377 (91.7)	149 (99.3)	—	—	228 (87.4)
Undisclosed	8 (2.0)	1 (0.7)	—	—	7 (2.7)

[a]Participants were allowed to select multiple race categories.

completed all three questions on risk communication (items 5, 13, and 16 in Table 2) also received a risk communication score (range 0–3).

We categorized each attitude question as positive or negative and dichotomized responses, grouping "strongly agree" with "agree" and "strongly disagree" with "disagree." Respondents who completed all attitude questions received an attitude score (range 0–5), excluding the question about SDM compensation, which would not be indicative of a positive or negative attitude.

Using Stata 13 (Stata Corp, College Station, Texas), chi-squared tests evaluated the unadjusted influence of country, demographics, school year, and previous training on SDM knowledge and attitudes. We used the kappa statistic to determine interparticipant agreement for preferred consultation style, calculating a weighted mean using the square of the inverse of the standard errors for each country's kappa.

Two hierarchical linear regressions evaluated the impact of eight categorical variables (gender, country, race for each country, ethnicity, medical school, and school year) and one continuous variable (age) on knowledge and attitude scores. The regression knowledge score was based on the number of 15 true/false knowledge questions answered correctly. We treated medical school as a random effect to account for the likelihood that observations within schools were likely more highly correlated than those between schools. We treated the regression coefficients of all other predictors as fixed effects.

Results

Study Flow

Across all four countries, 765 students read the information sheet, 685 provided demographic information, and responded to at least one content-based question. The majority (619/685, 90.4%) completed all questions. We do not know the number of students who received the survey or clicked on the survey link due to our open-ended distribution methods. The order randomization of questions had no effect on the results.

Participants

A disproportionate number of females responded in the United States, the United Kingdom, and Canada (Table 1).[32–34] Average age and ethnicity were similar to

Table 2 SDM Knowledge Items: Percent Correct by Country, *n* (%)

Question (Answer)	United States	United Kingdom	Canada	The Netherlands
1. Shared decision making is a process in which clinicians and patients work together, sharing information about options and preferred outcomes, in order to reach a mutual agreement on the best course of action. (True)	232/236 (98.3)	170/172 (98.8)	135/138 (97.8)	82/83 (98.8)
2. Shared decision making causes patients to feel uncertain about their decisions. (False)	204/236 (86.4)	133/172 (77.3)	120/138 (87.0)	71/83 (85.5)
3. Shared decision making increases patient decision regret. (False)	216/236 (91.5)	147/172 (85.5)	129/138 (93.5)	71/83 (85.5)
4. Shared decision making results in fewer patients choosing major surgery. (True)	126/236 (53.4)	62/172 (36.1)	47/138 (34.1)	44/83 (53.0)
5. When communicating information about risks, it is best to use relative risk (e.g., there is double the risk of developing thrombosis when using oral contraceptives). (False)	120/236 (50.6)	65/172 (37.8)	48/138 (34.8)	39/83 (47.0)
6. Evidence shows that involving patients in making important healthcare decisions increases knowledge. (True)	234/236 (99.2)	163/172 (84.8)	136/138 (98.6)	78/83 (94.0)
7. To promote shared decision making, the clinician will indicate that alternative treatment or management options exist. (True)	233/236 (98.7)	164/172 (95.4)	137/138 (99.3)	79/83 (95.2)
8. To promote shared decision making, the clinician will give information about the pros and cons of options that are considered reasonable (including taking "no action"). (True)	234/235 (99.6)	171/171 (100.0)	136/138 (99.0)	82/82 (100.0)
9. To promote shared decision making, the clinician will support the patient in becoming informed and comparing options. (True)	234/235 (99.6)	169/171 (98.8)	137/138 (99.3)	80/82 (97.6)
10. There is no need for the clinician to check the patient's understanding. (False)	230/235 (97.9)	171/171 (100.0)	136/138 (98.6)	81/82 (98.8)
11. In the shared decision making process, it is necessary to elicit the patient's preferences. (True)	234/235 (99.6)	166/171 (97.1)	133/138 (96.4)	77/82 (93.9)
12. Whenever possible, the clinician should integrate the patient's preferences in deciding what to do next. (True)	227/233 (97.4)	170/171 (99.4)	137/138 (99.3)	80/82 (97.6)
13. Most people will understand natural frequency (e.g., 1 in every 100 people) better than a percentage. (True)	189/233 (81.1)	139/171 (81.3)	98/138 (71.0)	56/82 (68.3)
14. A majority of patients do not want to engage in shared decision making with their clinician. (False)	214/233 (91.9)	146/171 (85.4)	123/138 (89.1)	71/82 (86.6)
15. Even if the patient does not wish to be involved in the decision making process, it is the clinician's role to encourage the patient to make a decision. (True)	172/233 (73.8)	136/171 (79.5)	99/138 (71.7)	51/82 (62.2)
16. A 40-year-old male with a family history of Cancer A visits his physician to discuss undergoing a scheduled screening for Cancer A. What is considered the most effective way of communicating how screening changes his risk of mortality from Cancer A? (B—Multiple choice)	147/250 (58.8)	86/172 (50.0)	62/143 (43.4)	44/92 (47.8)

national statistics for medical school students. The majority (85.4%) were between years 1 and 4, which was expected since Canada and the United States only have 4 years of medical education. Students from 46 unique schools participated.

Knowledge of SDM and Risk Communication

Across all four countries, the mean knowledge score was 83.6% (range = 18.8% to 100%; 95% confidence interval [CI] = 82.8% to 84.5%). Only 10.4% answered all 16 correctly. The mean risk communication score was 57.4% (range = 0% to 100%; 95% CI = 54.6% to 60.1%). About one third (30.8%) answered all three correctly. Less than half (44.4%) correctly indicated that SDM results in fewer patients choosing major surgery.[35] Table 2 presents the responses to all 16 knowledge questions by country. In the hierarchical linear regression, knowledge scores did not vary with age, race, gender, school, or school year; however, US-trained students had statistically significant higher knowledge scores compared with students from other countries (86.2%, range = 18.8% to 100%; 95% CI = 84.8% to 87.6% v. 82.1%, range = 50.0% to 100%; 95% CI = 81.1% to 83.1%). Full regression results are available in Supplementary File C.

Attitudes Toward SDM

Respondents demonstrated positive attitudes toward SDM. Across all four countries, the mean positive attitude score was 4.25 out of 5 (range = 1–5; 95% CI = 4.19–4.32). However, over half (60.5%) of UK respondents agreed that SDM can only be done with patients who are sufficiently educated ($\chi^2 = 19.60$, $P < 0.001$). Most respondents (80.9%) disagreed that physician payment should be based on SDM performance. This increased by year, with only 18.8% in year 1 strongly disagreeing compared with 44.9% in year 6 ($\chi^2 = 28.5$, $P < 0.05$). More US respondents agreed (28.8%) that payment should be associated with SDM performance ($\chi^2 = 26.85$, $P < 0.001$). In the hierarchal linear regression, attitudes did not vary with age, race, gender, school, school year, or country of education. Table 3 presents participants' percent disagreement to each attitude item by country.

For the adapted preferred consultation style questions, the weighted kappa was 0.62, indicating moderate agreement between the opening and closing question. At the beginning of the survey, nearly all respondents (98.5%) selected an active SDM style. About half (47.6%) indicated the patient should make the final decision after seriously considering the clinicians' opinion and about one third (31.53%) felt that the clinician should share responsibility with the patient. About three quarters of respondents (72.8%) believed that engaging in SDM would increase the length of a clinical encounter. Over half (58.7%) believed it would increase the length by at least 5 minutes.

Clinical Scenarios

Students' answers to the two scenarios differed substantially when asked what a senior clinician would do versus what they would do (Table 4). Students favored an SDM approach in both scenarios. In the SDM-appropriate scenario, 48.8% indicated senior clinicians would utilize an SDM approach, while 72.1% indicated they would personally utilize SDM. In the IDM-appropriate scenario, 42.5% indicated senior clinicians would utilize an SDM approach while 65.6% indicated they would utilize an SDM approach. In this scenario, only 11.5% of respondents indicated that senior clinicians would utilize IDM and only 14.0% indicated they would utilize IDM.

Reported Training

The majority (92.6%) had heard of SDM before the survey. Three quarters (74.7%) reported previous SDM training, 66.6% reported theoretical training (e.g., lecture-based), and 47.5% reported practical training (e.g., role-play). Theoretical and practical training both increased by class year. Among respondents, 8.8% reported receiving 0 to 1 hours of combined training, 27.4% reported 1 to 2 hours, 33.2% reported 2 to 5 hours, and 30.6% reported over 5 hours. Overall, 82.8% of respondents were interested in learning more about SDM. This interest decreased as class year increased ($\chi^2 = 69.62$, $P < 0.001$).

Discussion

Summary of Main Findings

In general, this sample of medical students: 1) knew the basic principles of SDM; 2) did not know some nuances of SDM practice such as how to communicate risk and the impact of SDM on surgery choice; 3) considered themselves more likely to engage in SDM than the senior clinicians they interact with and observe; 4) had overall positive attitudes toward SDM but almost half did not believe they could engage in SDM unless the patient was sufficiently educated; and 5) were less likely to believe

Table 3 Attitudes Toward SDM: Percent Disagree by Country ($N = 660$), *n* (%)[a]

Attitude Statement	Canada ($n = 146$)	The Netherlands ($n = 92$)	United Kingdom ($n = 172$)	United States ($n = 250$)
Shared decision making can only be done with patients who are sufficiently educated and confident to discuss treatment or screening options with their clinician.[b]	85 (58.2)	56 (60.9)	68 (39.5)	147 (58.8)
Doing shared decision making is unrealistic because it takes too much time.[b]	135 (92.5)	92 (100.0)	161 (93.6)	223 (89.2)
Doing shared decision making is low on my priority list.[b]	140 (95.9)	90 (92.8)	167 (97.1)	240 (96.0)
Physician payment should be based on how well they do shared decision making.	121 (82.9)	82 (89.1)	153 (89.0)	178 (71.2)
Having resources which summarize the risks and benefits of clinical decisions would be helpful (e.g., patient decision aid).[b]	2 (1.4)	0 (0.0)	3 (1.7)	7 (2.8)
Patients should trust clinicians to make all decisions on their behalf.[b]	137 (93.8)	69 (75.0)	130 (75.6)	219 (87.6)

[a]Each question was asked on a 4-point scale from strongly agree to strongly disagree; strongly agree was combined with agree, and strongly disagree was combined with disagree for analysis.
[b]Indicates question was included in multivariate analysis.

Table 4 Participant Responses to Clinical Scenario Questions by Country, *n* (%)

A 45-year-old female presents to the emergency department. She requires an urgent emergency surgical intervention but is capable of giving consent ($N = 643$)

What do you notice experienced clinicians do?	Canada ($n = 142$)	The Netherlands ($n = 86$)	United Kingdom ($n = 172$)	United States ($n = 243$)
Paternalistic	43 (30.3)	39 (45.4)	38 (22.1)	73 (30.0)
Shared decision making	58 (40.9)	21 (24.4)	80 (46.5)	114 (46.9)
Informed decision making[a]	24 (16.9)	5 (5.8)	19 (16.9)	26 (10.7)
Semi-paternalistic	17 (12.0)	21 (24.4)	35 (20.4)	30 (12.4)
Imagine that you are the clinician in this situation, how would you react?	**Canada ($n = 142$)**	**The Netherlands ($n = 86$)**	**United Kingdom ($n = 172$)**	**United States ($n = 243$)**
Paternalistic	17 (12.0)	13 (15.1)	16 (9.3)	27 (11.1)
Shared decision making	94 (66.2)	49 (57.0)	106 (61.6)	173 (71.2)
Informed decision making[a]	26 (18.3)	8 (9.3)	28 (16.3)	28 (11.5)
Semi-paternalistic[a]	5 (3.5)	16 (18.6)	22 (12.8)	15 (6.2)

A 53-year-old male presents to his primary care physician for an annual physical exam. The patient asks his provider about the need to screen for colorectal cancer ($N = 645$)

What do you notice experienced clinicians do?	Canada ($n = 143$)	The Netherlands ($n = 86$)	United Kingdom ($n = 172$)	United States ($n = 244$)
Paternalistic	27 (18.9)	27 (31.4)	25 (14.5)	41 (16.8)
Shared decision making[a]	69 (48.3)	26 (30.2)	96 (55.8)	124 (50.8)
Informed decision making	36 (25.2)	19 (22.1)	32 (18.6)	57 (23.4)
Semi-paternalistic	11 (7.7)	14 (16.3)	19 (11.1)	22 (9.0)
Imagine that you are the clinician in this situation, how would you react?	**Canada ($n = 143$)**	**The Netherlands ($n = 86$)**	**United Kingdom ($n = 172$)**	**United States ($n = 244$)**
Paternalistic	7 (4.9)	10 (11.6)	6 (3.5)	11 (4.5)
Shared decision making[a]	103 (72.0)	53 (61.6)	127 (73.8)	182 (74.6)
Informed decision making	26 (18.2)	15 (17.4)	30 (17.4)	45 (18.4)
Semi-paternalistic	7 (4.9)	8 (9.3)	9 (5.2)	6 (2.5)

[a]Appropriate answer.

payment should be linked to SDM performance if they were further along in their medical education. Attitudes did not vary with age, race, gender, school, school year, or country of education. Knowledge did not vary with age, race, gender, school, or school year. The US-trained sample had the highest knowledge scores and were most likely to agree that reimbursement could be linked to SDM performance.

Comparison With Other Studies

Our findings support previous research indicating that medical students' attitudes toward patient-centered care and SDM are positive.[12–15] Our results differed from Zeballos-Palacios and colleague's 2012–2013 findings regarding the amount of SDM training received.[15] Only 2% of students in their study had received SDM training, compared with 74.7% in our study. Additionally, a larger proportion of students in our survey (72% v. 12%) considered their consultation style as SDM. This could be attributed to increased global awareness of SDM, additional policy support for SDM in the countries sampled in our survey, or local support for SDM at the schools where our survey was conducted. Our results indicating that SDM interest declines by class year also align with a recent study by Perron and colleagues showing that Swiss medical schools focus less on communication in later years of training.[36]

Our results on risk communication support previous studies that clinicians struggle to appropriately present risk to patients,[37,38] even though risk communication is essential to engaging in SDM.[39] Over half of the students in our sample believed it is better to present information as relative risk, which is consistent with research on clinicians' preferences,[38,40] even though there is good evidence that relative risk is not the best format to present risk information to patients.[38,40,41]

Our study is the first to find that students believe SDM can only be done with sufficiently educated patients, suggesting they feel that educational attainment affects patients' abilities to participate in SDM. This reflects previously reported findings among clinicians that patients' characteristics can be a barrier to SDM.[4–6] It is important to understand more about this finding given that patients of higher education are already more likely to take an active decision-making approach,[42] while patients of lower education and socioeconomic status have the most to gain from SDM.[43] Additionally, this study was the first to show that medical students believe they are more likely to utilize SDM than the senior clinicians they work with and observe.

This study was also the first to show that students become less willing to have reimbursement tied to SDM utilization as they progress through medical education. Interpretation of this finding is difficult without additional research, but it is surprising in the context of the high overall knowledge and positive attitudes toward SDM. It is possible that students do not believe SDM is important enough to be associated with payment. Students may also believe that SDM should be a part of general practice and therefore does not require unique compensation. This finding could also be affected by the different payment models in each of the four participating countries.

US students sampled were most in favor of SDM-linked reimbursements and had the highest knowledge scores, perhaps indicative of a larger role SDM has in US medical school curricula. With more exposure to SDM, these students may be more interested in a reimbursement model that integrates utilization of SDM.

Strengths and Limitations of Study

This study was the first international survey of medical students regarding SDM attitudes and knowledge. A major strength is the inclusion of participants from all years of medical education in four countries where SDM has been promoted at the national level.

Most study limitations are related to the nature of online survey research. Since we distributed our survey on open forums and social media, we could not calculate a response rate. We targeted medical school students; however, others might have taken the survey. We did not indicate that the survey's topic was SDM but did say it was "health communication"; therefore, students with an interest in health communication might have been more likely to respond. We administered the survey in areas where English was not the primary language (Quebec province in Canada and the Netherlands), which could have caused interpretation errors. Our sample of students was homogenous enough across the four countries that measurement invariance calculations were not warranted; however, national group-level influences cannot be ruled out.

Social desirability bias could have led students to respond based on social expectations rather than their true attitudes toward SDM.[44] Notably, in the scenario where SDM was not the most appropriate consultation style, SDM was still overwhelmingly selected. We did not account for common method bias in our analyses but we believe this is only a slight limitation since we had a small sample size and our focus was not on building a

predictive model for the industry. We did not define SDM; therefore, some students may have reported SDM training without recognition that it covered the requisite skills. Furthermore, while we wrote the clinical scenarios with expert consensus and with the intent that SDM would be appropriate in only one scenario, some could argue that in both scenarios use of SDM may or may not be warranted.

We did not validate our SDM knowledge and attitudes questions and therefore do not know how accurately they assess knowledge and attitudes. The absolute framing of our question on physician payment could have biased respondents against agreement with this statement.

The survey was not disseminated to all medical schools in all countries leading to potential selection bias. In Canada, the Netherlands, and the United States, our sample was limited by existing contacts and networks. Because of this, it is important to expand this survey, and broader topic of understanding SDM among medical school students, to other countries and continents.

Conclusions and Implications

Our sample of medical school students in Canada, the Netherlands, the United Kingdom, and the United States understand the principles of SDM. The nuances of SDM strategies (e.g., risk communication) are not thoroughly understood in our sample. Research has shown that students become significantly more competent at communicating risk when they are exposed to a targeted risk communication curriculum,[45] and that better risk communication strategies can improve patient understanding.[3] Considering this, future research should explore how these techniques might be best integrated into an SDM curriculum.

Attitudes toward SDM were overwhelmingly positive and a willingness to use this approach seems to be higher than in previous generations of physicians. However, the results of specific knowledge and attitude questions show that additional research is needed to understand how SDM training should be integrated into medical school curricula. The high willingness to learn more about SDM indicates that curricula changes could lead to increased uptake of SDM by students. Wild and colleagues found that among recent medical school students in residency, patient-centered communication training improved patient-centered care.[46] Previous research has also shown that an integrated SDM curriculum improves SDM attitudes and confidence.[7,47] From our results, it is unclear which factors may influence medical students' knowledge of and attitudes toward SDM.

Designing an approach where students both learn SDM skills and feel prepared and willing to utilize them is paramount for long-term viability of SDM integration into clinical practice. Previous research has shown the positive impact of SDM on patients' decision-making processes and other outcomes.[48] Effectively educating medical students about SDM principles is key to ensuring this beneficial approach to care can be promoted and sustained in routine practice. Future research should determine the appropriate pathways for SDM curricula to become systematically integrated into medical school education, including long-term follow-up of SDM retention. In order to further examine the results of the survey and assess what SDM integration into medical school curricula should look like, a stakeholder analysis is being completed through interviews with medical school students and curriculum specialists. From this, we aim to understand when and how SDM training should be introduced in medical school as well as what tools are required to make SDM integration successful. SDM attitudes and knowledge after medical school also remain unknown, and future research is warranted to determine if the positive attitudes toward SDM we found continue once students reach residency programs.

Authors' Note

Full dataset and supplementary materials available from the corresponding author at marie-anne.durand@dartmouth.edu.

Acknowledgments

We thank Matthew Wesley for his contribution to the development of the clinical scenarios and support in recruiting medical students for the pilot study. We also thank Tim Lahey, Brendin R. Beaulieu-Jones, and the Geisel School of Medicine students who took part in the pilot study. We thank Drs. Politi and Bussières for circulating the survey to medical students in their medical schools, and Drs. Mills and Fortin for their help with ethics approval at University of California, San Francisco, and Yale University. We thank Catherine H. Saunders for copy editing the manuscript.

Ethics Approval

Institutional Review Boards at Dartmouth College (US, Approval Number: STUDY00029369), University of California San Francisco (US, 16-20756), McGill University (Canada, Approval Number: A12-M80-16B), Université Laval (Canada, Approval Number: 2016-219/16-11-2016), and University of Ottawa (Canada, Approval Number: #H11-16-10), and Brighton and Sussex Medical School Research Governance and Ethics Committee (UK). Survey participants were advised that entering the survey after reading the information sheet was an indication of willingness to participate.

Author Contributions

M-A D planned the study and designed the initial iteration of the survey. RWY and M-A D developed the second iteration of the survey, in collaboration with PJB, NC, and GE. RWY obtained ethical approval in the United States and piloted the survey. JWA facilitated the recruitment of medical schools in the Netherlands. MR obtained ethical approval in the United Kingdom and facilitated the recruitment of medical schools in partnership with the UK Medical School Council. FL and GPG facilitated the recruitment of medical schools in Canada, and related ethical approval process, and translated materials into French. PS supported the ethical approval process in Canada, translation of materials into French, and contributed to the statistical analysis of the results. GB and CR contributed to the statistical analysis of the survey results. AJO provided guidance on the statistical analysis. RWY and M-A D drafted the manuscript. All authors contributed to writing the manuscript and approved the final draft.

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Supplemental Material

Supplementary material for this article is available on the *Medical Decision Making Policy & Practice* website at https://journals.sagepub.com/home/mpp.

References

1. Härter M, van der Weijden T, Elwyn G. Policy and practice developments in the implementation of shared decision making: an international perspective. *Z Evid Fortbild Qual Gesundhwes*. 2011;105(4):229–33.
2. Couët N, Desroches S, Robitaille H, et al. Assessments of the extent to which health-care providers involve patients in decision making: a systematic review of studies using the OPTION instrument. *Health Expect*. 2015;18(4):542–61. doi:10.1111/hex.12054
3. Stacey D, Légaré F, Col NF, et al. Decision aids for people facing health treatment or screening decisions. *Cochrane Database Syst Rev*. 2014;(1):CD001431. doi:10.1002/14651858.CD001431.pub4
4. Gravel K, Légaré F, Graham ID. Barriers and facilitators to implementing shared decision-making in clinical practice: a systematic review of health professionals' perceptions. *Implement Sci*. 2006;1(1):16.
5. Holmes-Rovner M, Valade D, Orlowski C, Draus C, Nabozny-Valerio B, Keiser S. Implementing shared decision-making in routine practice: barriers and opportunities. *Health Expect*. 2000;3(3):182–91.
6. Légaré F, Ratté S, Gravel K, Graham ID. Barriers and facilitators to implementing shared decision-making in clinical practice: update of a systematic review of health professionals' perceptions. *Patient Educ Couns*. 2008;73(3):526–35.
7. Hoffmann TC, Bennett S, Tomsett C, Del Mar C. Brief training of student clinicians in shared decision making: a single-blind randomized controlled trial. *J Gen Intern Med*. 2014;29(6):844–9.
8. Diouf NT, Menear M, Robitaille H, Guérard GP, Légaré F. Training health professionals in shared decision making: update of an international environmental scan. *Patient Educ Couns*. 2016;99(11):1753–8.
9. Tsimtsiou Z, Kirana PS, Hatzichristou D. Determinants of patients' attitudes toward patient-centered care: a cross-sectional study in Greece. *Patient Educ Couns*. 2014;97(3):391–5.
10. Hook KM, Pfeiffer CA. Impact of a new curriculum on medical students' interpersonal and interviewing skills. *Med Educ*. 2007;41(2):154–9.
11. Pfeiffer C, Madray H, Ardolino A, Willms J. The rise and fall of students' skill in obtaining a medical history. *Med Educ*. 1998;32(3):283–8. doi:10.1046/j.1365-2923.1998.00222.x
12. Shankar PR, Dubey AK, Subish P, Deshpande VY. Attitudes of first-year medical students towards the doctor patient relationship. *JNMA J Nepal Med Assoc*. 2006;45(161):196–203.
13. Shankar PR, Dubey AK, Subish P, Deshpande VY. Student attitudes towards the doctor-patient relationship in a medical college in western Nepal. *Med Teach*. 2006;28(2):199.
14. Tsimtsiou Z, Kerasidou O, Efstathiou N, Papaharitou S, Hatzimouratidis K, Hatzichristou D. Medical students' attitudes toward patient-centred care: a longitudinal survey. *Med Educ*. 2007;41(2):146–53. doi:10.1111/j.1365-2929.2006.02668.x
15. Zeballos-Palacios C, Quispe R, Mongilardi N, et al. Shared decision making in senior medical students: results from a national survey. *Med Decis Making*. 2015;35(4):533–8. doi:10.1177/0272989X15573746
16. Senate and House of Representatives. *Patient Protection and Affordable Care Act*. Washington: Senate and House of Representatives; 2010.
17. Elwyn G, Laitner S, Coulter A, Walker E, Watson P, Thomson R. Implementing shared decision making in the NHS. *BMJ*. 2010;341:c5146. doi:10.1136/bmj.c5146
18. National Institute for Health and Care Excellence. Shared decision making [cited December 5, 2016]. Available from: https://www.nice.org.uk/about/what-we-do/our-programmes/nice-guidance/nice-guidelines/shared-decision-making
19. Légaré F, Stacey D, Forest PG, et al. Milestones, barriers and beacons: shared decision making in Canada inches ahead. *Z Evid Fortbild Qual Gesundhwes*. 2017;123–4:23–7.

20. The College of Family Physicians of Canada. Four principles of family medicine [cited March 22, 2018]. Available from: http://www.cfpc.ca/Principles/
21. van der Weijden T, van Veenendaal H, Drenthen T, et al. Shared decision making in the Netherlands, is the time ripe for nationwide, structural implementation? *Z Evid Fortbild Qual Gesundhwes*. 2011;105(4):283–8.
22. van der Weijden T, Post H, Brand PLP, et al. Shared decision making, a buzz-word in the Netherlands, the pace quickens towards nationwide implementation. *Z Evid Fortbild Qual Gesundhwes*. 2017;123–4:69–74.
23. Durand MA, Yen RW, Barr PJ, et al. Assessing medical student knowledge and attitudes about shared decision making across the curriculum: protocol for an international online survey and stakeholder analysis. *BMJ Open*. 2017;7(6):e015945. http://bmjopen.bmj.com/lookup/doi/10.1136/bmjopen-2017-015945.
24. Eysenbach G. Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). *J Med Internet Res*. 2004;6(3):e34.
25. Degner LF, Sloan JA, Venkatesh P. The Control Preferences Scale. *Can J Nurs Res*. 1997;29(3):21–43.
26. Emanuel EJ, Emanuel LL. Four models of the physician-patient relationship. *JAMA*. 1992;267(16):2221–6.
27. Lavelle K, Sowerbutts AM, Bundred N, et al. Is lack of surgery for older breast cancer patients in the UK explained by patient choice or poor health? A prospective cohort study. *Br J Cancer*. 2014;110(3):573–83.
28. Janz NK, Wren PA, Copeland LA, Lowery JC, Goldfarb SL, Wilkins EG. Patient-physician concordance: preferences, perceptions, and factors influencing the breast cancer surgical decision. *J Clin Oncol*. 2004;22(15):3091–8. http://ascopubs.org/doi/10.1200/JCO.2004.09.069.
29. Elwyn G, Hutchings H, Edwards A, et al. The OPTION scale: measuring the extent that clinicians involve patients in decision-making tasks. *Health Expect*. 2005;8(1):34–42. doi:10.1111/j.1369-7625.2004.00311.x
30. Pollard S, Bansback N, Bryan S. Physician attitudes toward shared decision making: a systematic review. *Patient Educ Couns*. 2015;98(9):1046–57.
31. Qualtrics. Security statement [cited December 8, 2016]. Available from: https://www.qualtrics.com/security-statement/
32. General Medical Council. The state of medical education and practice in the UK [cited March 22, 2018]. Available from: https://www.gmc-uk.org/SOMEP_2016_Full_Report_Lo_Res.pdf_68139324.pdf
33. The Association of Faculties of Medicine of Canada. Canadian medical education statistics [cited March 22, 2018]. Available from: https://www.afmc.ca/sites/default/files/CMES2017-Complete.pdf
34. Association of American Medical Colleges. 2018 Facts: applicants and matriculants data [cited March 22, 2018]. Available from: https://www.aamc.org/data/facts/applicantmatriculant/
35. Stacey D, Légaré F, Lewis K, et al. Decision aids for people facing health treatment or screening decisions. *Cochrane Database Syst Rev*. 2017;4:CD001431. doi:10.1002/14651858.CD001431.pub5
36. Perron NJ, Cronauer CK, Hautz SC, et al. How do Swiss medical schools prepare their students to become good communicators in their future professional careers: a questionnaire and interview study involving medical graduates, teachers and curriculum coordinators. *BMC Med Educ*. 2018;18(1):285.
37. Gaissmaier W, Gigerenzer G. Statistical illiteracy undermines informed shared decision making. *Z Evid Fortbild Qual Gesundhwes*. 2008;102(7):411–3.
38. Gigerenzer G, Gaissmaier W, Kurz-Milcke E, Schwartz LM, Woloshin S. Helping doctors and patients make sense of health statistics. *Psychol Sci Public Interest*. 2007;8(2):53–96.
39. Edwards A. Risk communication—making evidence part of patient choices. In: Edwards A, Elwyn G, eds. *Shared Decision-Making in Health Care: Achieving Evidence-Based Patient Choice*. 2nd ed. Oxford: Oxford University Press; 2009. p 135–41.
40. Marcatto F, Rolison JJ, Ferrante D. Communicating clinical trial outcomes: effects of presentation method on physicians' evaluations of new treatments. *Judgement Decis Making*. 2013;8(1):29–33. http://journal.sjdm.org/12/12913/jdm12913.html.
41. Covey J. A meta-analysis of the effects of presenting treatment benefits in different formats. *Med Decis Making*. 2007;27(5):638–54.
42. Say R, Murtagh M, Thomson R. Patients' preference for involvement in medical decision making: a narrative review. *Patient Educ Couns*. 2006;60(2):102–14.
43. Durand MA, Carpenter L, Dolan H, et al. Do interventions designed to support shared decision-making reduce health inequalities? A systematic review and meta-analysis. *PLoS One*. 2014;9(4):e94670.
44. Phillips DL, Clancy KJ. Some effects of "social desirability" in survey studies. *Am J Sociol*. 1972;77(5):921–40.
45. Han PKJ, Joekes K, Elwyn G, et al. Development and evaluation of a risk communication curriculum for medical students. *Patient Educ Couns*. 2014;94(1):43–9.
46. Wild D, Nawaz H, Ullah S, Via C, Vance W, Petraro P. Teaching residents to put patients first: creation and evaluation of a comprehensive curriculum in patient-centered communication. *BMC Med Educ*. 2018;18(1):266. https://bmcmededuc.biomedcentral.com/articles/10.1186/s12909-018-1371-3.
47. Durand MA, DiMilia PR, Song J, Yen RW, Barr PJ. Shared decision making embedded in the undergraduate medical curriculum: a scoping review. *PLoS One*. 2018;13(11):e0207012. doi:10.1371/journal.pone.0207012.
48. Shay LA, Lafata JE. Where is the evidence? A systematic review of shared decision making and patient outcomes. *Med Decis Making*. 2015;35(1):114–31.