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It takes more than two to tango: a cross-sectional survey of clinicians' knowledge and attitudes about shared decision-making across healthcare professions and specialties

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Abstract

Objective: In this study, we aim to compare shared decision-making (SDM) knowledge and attitudes between United States (US) based physician assistants (PAs), nurse practitioners (NPs), and physicians across surgical and family medicine specialties.

Setting: We administered a cross-sectional, web-based survey between September 20 and November 1, 2017.

Participants: 272 US-based nurse practitioners, physician assistants, and physicians completed the survey. Individuals who met the following exclusion criteria were excluded from participation: 1) lack of English proficiency; 2) area of practice other than family medicine or surgery; 3) licensure other than physician, physician assistant, or nurse practitioner; 4) practicing in a country other than the US.

Results: We found few substantial differences in SDM knowledge and attitudes across clinician types, revealing positive attitudes across the sample paired with low to moderate knowledge. Family medicine professionals (Physician Assistants) were most knowledgeable on selected items. Very few respondents (3%; 95% CI 1.5-6.2%) favored a paternalistic approach to decision-making.

Conclusions: Recent policy-level promotion of SDM may have influenced positive clinician attitudes toward SDM. Positive attitudes despite limited knowledge warrant SDM training across occupations and specialties, while encouraging all clinicians to promote SDM. Given positive attitudes and similar knowledge across clinician types, we recommend that SDM is not confined to the patient-physician dyad but instead advocated among other health professionals.

Strengths and limitations of this study

- This study represents the first US national survey comparing SDM knowledge and attitudes across diverse clinician groups.
- The survey instrument was rigorously developed based on a literature search of high-quality evidence, primarily including systematic reviews.
- The sample was derived from an online panel of respondents and may not be representative of the full US populations of these professionals.
- We were unable to fully field the surgical PA quota in this exploratory study.

Introduction

Team-based care is defined as "the provision of health services to individuals, families, and/or their communities by at least two health providers"[1]. This model is increasingly prominent across the healthcare delivery spectrum, with advanced practice clinicians such as nurse practitioners (NPs) and physician assistants (PAs) working alongside physicians from cardiology wards to primary care clinics[2,3]. Yet little is known about the congruence of team members' perceptions regarding approaches to healthcare practice and communication such as shared decision-making (SDM).

Prior research has explored similarities and differences in care delivered by physicians and advanced practice clinicians [4–6]. However, little attention has been given to differences between professions specific to patient-centered attitudes or behavior. Swan and colleagues found NPs and physicians to receive comparable patient satisfaction ratings in primary care settings[4], while Hojat and colleagues found hospital-based NPs to attain significantly higher empathy scores than hospital-based physicians on the previously-validated Jefferson Scale of Physician Empathy[5]. Further, Laurant and colleagues found nurse practitioners and physician assistants to achieve similar clinical outcomes to those of physicians when working in physician-like roles[6]. Advanced practice clinicians bring diverse clinical backgrounds and valuable perspectives to patient-centered care while maintaining patient satisfaction and clinical outcomes similar to those of their physician colleagues.

Shared decision-making, a process by which clinicians and patients make decisions together using the best available evidence about the likely benefits and harms of each option, and where patients are supported to arrive at informed preferences, is considered to be a key component of patient-centered care[7–9]. However, while the number of advanced practice clinicians participating in routine patient care in the US doubled in the 1990s[10], prior SDM research has largely focused on the patient-physician dyad without accounting for roles of other team members[11]. A review by Clark and colleagues takes stock of the SDM literature and suggests that registered nurses are well-suited to engage in SDM, but does not contribute additional empirical evidence on the topic[12]. Legare and colleagues developed and validated an interprofessional model for SDM[11,13], but did not assess its impact on SDM among a range of clinician types. Further, previous literature has identified high patient-orientation among primary care physicians and lower patient-orientation among surgeons[14]. For this reason, we focus on comparing family medicine and surgical care specialties across several healthcare professions.

A gap exists in the literature examining attitudes and knowledge about SDM among a diverse group of surgical and primary care clinicians, including physicians, nurse practitioners, and physician assistants. Early streams of research in the area of SDM and team-based care, paired with growth and increased focus on the role of advanced practice clinicians in the US, raises important questions about SDM knowledge and attitudes across the varied roles of healthcare team members. In this study, we aim to compare SDM knowledge and attitudes between US-based physician assistants (PAs), nurse practitioners (NPs), and physicians across surgical and family medicine specialties.

Method

This study was designed and reported according to the Checklist for Reporting Results of Internet E-Surveys[15]. We administered a voluntary, cross-sectional, web-based survey to members of an internet panel of healthcare providers organized by SERMO, a healthcare market research company.

Survey Design

Survey development drew on a review of existing literature and was derived from another cross-sectional, web-based survey administered to medical students in four countries[16]. The first iteration of the online survey was developed in 2013 and piloted in a small-scale online study conducted in the UK, recruiting medical students through online forums[16]. It was subsequently refined and reworded for

Durand's study of medical students' attitudes and knowledge about SDM, then revised for the current study[16].

The current web-based survey included 28 items presented over 14 screens, each of which included a 'back' button that allowed for review of prior survey screens. The first question was open-ended, asking participants to define SDM. The following screen provided a definition of SDM adapted from Elwyn et al[7]. Ten attitudinal items with a 4-option Likert-type response scale (1=strongly disagree; 4=strongly agree) were informed by established barriers and facilitators to SDM[17–22] and included one item from the Jefferson Scale of Physician Empathy[5]. Ten subsequent true-false knowledge items were based on prior literature detailing SDM process and outcomes[23–27]. A final multiple-choice item presented a generic clinical scenario and asked which response option best matched how the respondent would make his or her treatment decision, with response options based on Emanuel's four models of the physician-patient relationship[28]. The clinical scenario was initially drafted by experts in SDM with input from clinicians for Durand's study of medical students' attitudes and knowledge about SDM[16]. It was revised for the current study to be made more generic and applicable to multiple fields and practices. The survey closed with two demographic items asking participant gender and number of years in practice. See Appendix A1 for the questionnaire.

No more than ten items were included on any single screen. Participants were required to respond to each item in order to continue through the survey. To attenuate bias from order effects, item order was randomized for 1) the ten attitudinal items and 2) the ten knowledge items. Response option order was randomized for the multiple-choice item. The web-based survey was pre-tested for accuracy, usability, and technical functionality by three members of the research team prior to fielding.

This study was reviewed and approved by Dartmouth College's Committee for the Protection of Human Subjects (study #30303).

Patient involvement

As the survey focused on knowledge and atittudes among clinicians, patients were not directly involved in the design or administration of this resarch study.

Participants

Participants were US-based PAs, NPs, and physicians including doctors of medicine (MD) and doctors of osteopathic medicine (DO), all of whom work in family medicine or surgery. Screening questions were included at the beginning of the survey to exclude respondents meeting the following exclusion criteria: 1) lack of English proficiency; 2) area of practice other than family medicine or surgery; 3) licensure other than physician, physician assistant, or nurse practitioner; 4) practicing in a country other than the US.

This focus on clinicians specializing in family medicine and surgery was intended to pursue maximum variation in SDM knowledge and attitudes among our sample of healthcare professionals, as there is evidence of high patient-orientation among primary care physicians and lower patient-orientation among surgeons[14]. Inclusion of physicians, NPs, and PAs was intended to further explore differences in patient-centeredness and empathy between professions demonstrated in prior research[5,29].

Given the novelty of the survey instrument, we lacked an effect size estimate on which to base sample size calculations. We therefore followed an established rule of thumb recommending a minimum sample size of 50 per comparison group[30]. Our goal was therefore to recruit 50 participants per clinician type (i.e., family medicine physician, surgery physician, family medicine PA, surgery PA, family medicine NP, surgery NP) to total 300 participants and allow the recommended minimum of 10 observations per parameter in logistic regression analysis[31].

Procedure

To advertise the survey, SERMO distributed email invitations to members of its survey panel; see Appendix A2 for the email invitation. Within the email invitation, participants were offered cash honoraria which, per SERMO policy, varied in amount up to $30 upon completion of the survey to incentivize participation. The survey weblink within the email invitation led to an information sheet that included an estimated time commitment for survey completion (five minutes). The information sheet also provided information about the purpose of the study, the name of the principal investigator, data security (i.e., the research team will not have access to participants' personal information), and confirmation that further participation in the survey represented consent to participate in the research study. SERMO tracked and ensured unique responses through a post-submission log file check via internal server-side script. Completeness checks were done via Javascript prior to questionnaire submission. Only complete questionnaires were included in the analysis.

Data analysis

Due to our maximum-variation sampling approach, we did not weight or otherwise adjust the data. For closed-ended item responses, we calculated frequencies and descriptive statistics to allow comparison across clinician groups. We calculated SDM knowledge scores (0-10) representing the number of correct true-false knowledge responses for each participant. Through multiple logistic regression analysis followed by postestimation z-tests, we assessed differences in individual SDM knowledge item responses by profession and area of practice while controlling for previous formal SDM training, clinician gender, preferred decision-making approach, and number of years in practice. We calculated the average predicted probability of answering each knowledge item correctly while adjusting for all other variables in the model. We similarly used multiple regression analysis and postestimation z-tests to assess differences in SDM attitudes by profession and area of practice while controlling for knowledge score, adequacy of SDM definition, previous formal SDM training, clinician gender, preferred decision-making approach, and number of years in practice. We again calculated the average predicted probability of expressing a favorable attitude about SDM for each item while adjusting for all other variables in the model. Statistical significance was defined by an alpha level ≤0.05.

For the single open-ended item (defining SDM), one member of the research team coded responses as adequate if they explicitly mentioned both patient and clinician involvement in decision-making; all other responses were coded as inadequate and/or incomplete. All responses were further coded to indicate whether SDM definitions mentioned incorporating evidence in deciding what to do next with the patient. This coding system was based on Elwyn's definition of SDM as an "approach where physicians and patients make decisions together, using the best available evidence about the likely benefits and harms of each option, and where patients are supported to arrive at informed preferences"[7]. Another member of the research team coded all open-ended responses based on common language and content. The first researcher analyzed all dual-coded data to identify themes arising from respondents' SDM definitions.

Results

Participants

In total, 272 individuals completed the survey between September 20, 2017 and November 1, 2017. The survey participation rate was 98.6%, with 703 of the 713 who accessed the survey agreeing to participate. Of those who agreed to participate, 74% met all inclusion criteria and were eligible to proceed (518/703). The completion rate was 38.7%, with 272 of the 703 individuals who agreed to participate being eligible for participation and fully completing the survey.

By clinician type, 50 surgical NPs, 54 family medicine NPs, 16 surgical PAs, 52 family medicine PAs, 50 surgeons, and 50 family medicine physicians completed the survey. Participants averaged 13.41

years in practice, with 26.5% (72/272; 95% CI 21.3-32.1) receiving previous formal SDM training. A full demographic profile of participants is provided in Table 1.

Table 1. Participant characteristics

	Surgical NP (n=50)	Family Medicine NP (n=54)	Surgical PA (n=16)	Family Medicine PA (n=52)	Surgeon (n=50)	Family Medicine Physician (n=50)
Gender						
Male	20.0%	14.8%	50.0%	38.5%	80.0%	68.0%
Female	78.0%	85.2%	50.0%	59.6%	16.0%	32.0%
Prefer not to say	2.0%	0.0%	0.0%	1.9%	4.0%	0.0%
Years in practice						
Mean (95% CI)	12.94 (10.45-15.43)	11.43 (9.22-13.63)	11.13 (5.97-16.28)	10.85 (8.85-12.84)	14.98 (12.21-17.75)	17.86 (15.07-20.65)
Previous formal SDM training						
Yes	30.0%	33.3%	37.5%	15.4%	26.0%	24.0%
No	48.0%	44.4%	50.0%	55.8%	66.0%	58.0%
Don't know	22.0%	22.2%	12.5%	28.8%	8.0%	18.0%

SDM Knowledge

Knowledge by profession and clinical specialty

Mean knowledge scores, representing the average number of knowledge items answered correctly and ranging 0-10, appeared to be similar across all professions and clinical specialties based on descriptive statistics. Mean knowledge scores were also consistent across those who had (6.04; 95% CI 5.79-6.29) and had not reported to have (5.82; 95% CI 5.62-6.01) previously received SDM training. As shown in Figure 1, surgical NPs averaged 5.6 (SD 1.2) correct responses out of ten total items, family medicine NPs 5.9 (SD 1.2) correct responses, surgical PAs 5.8 (SD 0.9) correct responses, family medicine PAs 6.0 (SD 1.6) correct responses, surgeons 5.8 (SD 1.4) correct responses, and family medicine physicians 6.2 (SD 1.3) correct responses. With regard to individual knowledge items, few participants from any profession or clinical specialty correctly identified that there is limited evidence of the impact of shared decision-making on treatment adherence (27.6%; 95% CI 22.3-33.3) or that shared decision-making interventions have not been shown to affect health outcomes (17.6%; 95% CI 13.3-22.7).

Differences between professions and clinical specialties were identified at the individual item level, including when adjusted for participants' demographic and personal characteristics (see Figure 2). When asked whether using shared decision-making interventions results in fewer patients choosing major surgery, family medicine NPs (33.8%; 95% CI 20.3-47.2; p=0.039), family medicine PAs (53.7%; 95% CI 40.0-67.4; p<0.000), and family medicine physicians (47.5%; 95% CI 33.1-61.9; p=0.002) were all significantly more likely than the surgical NP (15.5%; 95% CI 5.0-26.0) reference group to provide the correct answer of "true"; family medicine PAs (53.7%; 95% CI 40.0-67.4) were more likely than both family medicine NPs (33.8%; 95% CI 20.3-47.2; p=0.045) and surgeons (30.2%; 95% CI 16.8-43.7; p=0.026) to do so. While a majority of all participants incorrectly responded that it is best to use relative

risk when communicating information about risks, family medicine PAs (32.6%; 95% CI 19.7-45.5; p=0.024) were more likely than the surgical NP (13.2%; 95% CI 3.9-22.6) reference group to answer correctly. However, family medicine PAs (53.2%; 95% CI 39.6-66.8; p=0.032) performed worse than the surgical NP (73.0%; 95% CI 60.4-85.6) reference group on the other risk communication knowledge item, as only half correctly identified that most people will understand natural frequency better than a percentage.

Family medicine PAs (90.3%; 95% CI 82.4-98.3; p=0.036) were also more likely than the surgical NP (74.7%; 95% CI 62.3-87.3%) reference group to provide the correct answer of "false" in response to the item stating that shared decision-making interventions cause patients to feel uncertain about their decisions. Further, surgeons (72.7%; 95% CI 57.2-88.2; p=0.019) were less likely than their surgical NP (92.4%; 95% CI 85.2-99.6) colleagues to correctly identify that shared decision-making leads to improved affective-cognitive outcomes.

SDM definitions

Fewer than half of all participants provided a definition of shared decision-making that explicitly described patient and clinician jointly involved in the decision making process (41.5%, 95% CI 35.6-47.7%). Of those responses (113/272; 41.5%), only nine also included a reference to the evidence upon which shared decisions should be based.

Thematic analysis of the open-ended SDM definition responses revealed further nuance, detailed in Table 2. Four themes were identified: 1) Input or involvement from multiple people; 2) Clinician(s) making the decision for the patient; 3) Patient making the decision autonomously or with clinician support; and 4) Information exchange between patient and clinician(s). The first theme related to the involvement of multiple clinical team members in the decision-making process without referring to the patient and instead specifically referring to multidisciplinary collaboration between healthcare professionals. In an illustrative quote, one participant described shared decision-making as "decisions arrived at with input from multiple h[ealth]c[are] team members." A related theme involving an individual or care team making a decision without explicit patient input was also identified, with particular emphasis on a paternalistic approach to decision-making where clinicians make decisions "for the patient." A theme of information exchange often involved the clinician providing information to the patient. Far less prevalent was a sub-theme of patient-to-clinician information exchange, where reference was made to patients sharing knowledge, insights, or preferences as part of the decision-making process.

Table 2. SDM Definition major themes

Theme	Sub-themes	Illustrative quote(s)
Input or involvement from multiple people	Multidisciplinary collaboration between health care professionals	"Decisions arrived at with input from multiple h[ealth]c[are] team members"; "Discussion within the health care team and deciding what's best for the patient"
	Patient involvement, at times including family	"Team approach using all divisions including patient and family"
	Generic reference to more than one participant in a decision	"Group of people making decision together"; "That more than one person has input into a decision"
Clinician(s) making the decision for the patient		"Working together as a team to collaborate and make decisions for the betterment of the patient"; "Where there is a team of people that share the decision making for the patient"
Patient making the decision autonomously or with clinician support		"Presenting best evidence to the patient and allowing the patient to make an informed decision based on their values with my support"; "doctor makes suggestions, p[atien]t decides"
Information exchange	Clinician-to-patient, sometimes including 'option talk' about risks and benefits	"Doctor provides patient with all necessary medical information and then they both decide on the best course of action for that given patient"; "Presenting patients with enough information regarding risks, benefits, and alternatives of a given therapy for them to feel included in the decision to proceed or not"
	Patient-to-clinician	"Answers to clinical dilemmas that involve both the client and the physician sharing knowledge and possible outcomes"

SDM Attitudes

Attitudes by profession and clinical specialty

Overall, 84.2% (95% CI 79.3-88.3) of participants reported that SDM was compatible with clinical practice guidelines. Additionally, 82% (95% CI 76.9-86.4) of all participants disagreed when asked if they do not feel confident in their ability to engage in shared decision-making. Family medicine NPs (93.0%; 95% CI 85.3-100) reported more confidence in their ability to engage in SDM than did family medicine physicians (73.6%; 95% CI 60.8-86.5; p=0.020) or surgeons (75.0%; 95% CI 61.9-88.2; p=0.038). Three-quarters (75.7%; 95% CI 70.2-80.7) of all participants disagreed that SDM takes too much time; however, family medicine physicians (61.2%; 95% CI 46.9-75.5) were significantly more likely than family medicine NPs (84.5%; 95% CI 74.4-94.6; p=0.016) to think SDM takes too much time. Relating to clinician empathy, nearly all participants said they imagine themselves in their patients' shoes when providing care (96.7% agreed; 95% CI 93.8-98.5).

Half of our sample (50.0%; 95% CI 43.9-56.1) agreed that patients asking clinicians what to do, a commonly cited barrier to shared decision-making, makes SDM challenging. However, a majority of clinicians (71.7%; 95% CI 65.9-77.0) did not think that SDM could increase their legal risk. Physicians in both surgical (70.5%; 95% CI 57.0-84.0; p=0.025) and family medicine (69.3%; 95% CI 55.9-82.7; p=0.031) specialties were significantly more likely than family medicine PAs (47.0%; 95% CI 33.3-60.8) to be comfortable if a shared decision deviated from their preferred course of action. See Figure 3 for full results of SDM attitudinal items, adjusted for observed clinician characteristics.

Preferred approach to decision-making

Preferred approaches to decision-making, as measured through multiple-choice responses to a clinical scenario, were consistent across professions and clinical specialties. A majority of all participants (53%; 95% CI 46.8-59.0) indicated that in the given clinical scenario, they would take an informative approach to decision-making, using "evidence-based information to help the patient understand his health condition and all possible treatment options so he can decide on a treatment plan based on his values." A substantial proportion (37%; 95% CI 31.4-43.2) preferred a deliberative approach aligned with SDM, where they "discuss the patient's health-related values with him and deliberate together using evidence-based information to decide on his treatment plan." Another 7% (95% CI 4.0-10.3) hypothetically chose an interpretive approach, in which they would "help the patient understand his personal values and suggest evidence-based treatment options that fit those values." Only 3% (95% CI 1.5-6.2) favored a paternalistic approach in which they would "determine the patient's clinical situation independent of his values and present him with evidence supporting [their] decision."

Discussion

Key Findings

This survey was the first to compare knowledge and attitudes about SDM across diverse US-based clinician groups. We found knowledge to be limited across professions and clinical specialties. Knowledge about risk communication and the impact of SDM on health and treatment adherence outcomes was lowest. Performance on some individual knowledge items varied by clinician type, with family medicine PAs performing best on select knowledge items and surgeons sometimes least knowledgeable. However, this study did not identify clear overall knowledge differences between NPs, PAs, and physicians across family medicine and surgical specialties. Further, very few participants were able to provide a complete definition of SDM that included reference to patient and clinician participation and to the evidence on which shared decisions should be based.

Despite limited knowledge, confidence in performing SDM was high, particularly among family medicine NPs. Additionally, three-quarters of participants felt that engaging in SDM does not take too much time, which demonstrated a positive attitude toward SDM. Physicians in both specialties were more likely than family medicine PAs to feel that it is okay for a shared decision to stray from their preferred course of action. While half of all participants favored an informative approach to decision-making, a substantial proportion said they would engage in a deliberative approach aligned with SDM when faced with a hypothetical clinical scenario.

Context in Existing Literature

The confidence we observe with regard to clinicians' self-assessment of their ability to engage in SDM paired with limited knowledge and difficulty defining SDM is consistent with previous work suggesting a lack of consistency in use of the term shared decision-making in scholarly and clinical communities[18,32]. The limited knowledge we observed with regard to risk communication also corroborates prior research on SDM knowledge among medical students and health professional

trainees[33]. Further, surgeons performed more poorly than other professions or specialties on select knowledge items, which is consistent with prior research establishing low levels of support for SDM among surgeons[14,19].

More broadly, Kruger and Dunning (1999) previously demonstrated that limited knowledge of a particular domain prevents individuals from being aware of their own lack of competence in that same domain[34]. Our findings of high confidence in performing SDM paired with limited knowledge of SDM may demonstrate this Dunning-Kruger effect. As a quarter of participants in the current study reported previous formal SDM training, that prior exposure to SDM training may have enhanced these individuals' confidence in engaging in SDM despite low to moderate knowledge retention.

Additionally, the preference expressed by many participants for an informative approach to decision-making over a more deliberative SDM approach may reflect prior work on this topic[28], namely, a misconception that SDM leaves patients to make decisions on their own[18]. Medical ethics have long held non-abandonment as a central obligation for physicians[35]. The current study suggests a tendency for clinicians to interpret SDM as a process of informing patients and subsequently allowing them complete autonomy to make clinical decisions, which might be interpreted by a patient as abandonment. However, the guiding ethical principles of SDM recognize autonomy in the context of relationships and mutual dependencies that allow and encourage clinicians and patients to make decisions together[7]. Additionally, despite an expressed preference in this sample for information provision over a full SDM process, it is noteworthy that very few participants preferred a paternalistic approach to clinical decision-making in which the values and preferences of the patient are not considered.

While a compelling accumulation of existing literature cites time constraints as a prominent barrier to shared decision-making[17,18,20,36,37], we find in this sample general disagreement with the idea that SDM takes too much time. More research is needed to further examine and delineate the contexts in which SDM is viewed as a burden due to time constraints versus those in which time is not believed to be a barrier. Further, our finding that most physicians feel it is okay for a shared decision to stray from what they feel is the most clinically appropriate course of action lies in contrast to prior literature finding that physicians tend to support SDM in situations where they do not feel strongly about one treatment alternative[19,38]. In the context of prior research, our results suggest that attitudes toward SDM may be evolving, with clinicians increasingly open to this style of practice. However, knowledge is low and training should become mainstream.

Strengths and Limitations

To our knowledge, this study represents the first US national survey comparing SDM knowledge and attitudes across diverse clinician groups including nurse practitioners, physician assistants, and physicians. The survey instrument was rigorously developed based on a literature search of high-quality evidence, primarily including systematic reviews, and was based on a previously tested survey.

However, our sample was derived from an online panel of respondents and may not be representative of the full US populations of these professionals. Further, we were unable to fully field the surgical PA quota in this exploratory study. Therefore, due to the small sample size, estimates of knowledge and attitudes of surgical PAs are at particular risk of bias. Multiple testing may have, in some cases, caused us to find statistical significance by chance. Additionally, it is possible to interpret the item wording "Shared decision-making can only be done with patients who are sufficiently educated to discuss treatment or screening options" in multiple ways. It is not clear whether it references formal educational attainment or education provided by the clinician about a health condition and possible treatment options. Therefore, responses to this attitude item must be interpreted with caution. Similarly, there are some individual SDM studies that demonstrate an increase in adherence and other health-related outcomes as a result of clinicians' SDM-promoting behaviors[39]. While the knowledge

items related to the impact of SDM on health behaviors and outcomes within this survey were specific to the role of patient-facing SDM interventions and were based upon evidence synthesis within a high-quality Cochrane systematic review[23], it is possible that the existence of related studies with contradictory findings may have inflated the proportion of incorrect answers on the knowledge items relating to the impact of SDM interventions on health behaviors and outcomes.

Conclusions

The positive attitudes toward SDM expressed in this sample suggest that acceptance of SDM may be becoming a norm within the healthcare field. While we see few participants across professions and clinical specialties express negative views about SDM, we also observe high confidence in the face of limited understanding - which may negate the advantage conferred by positive attitudes. As we found knowledge of SDM to be limited despite positive attitudes toward SDM, it may be appropriate to prioritize SDM training among these professional groups in order to encourage all professions to take up SDM, rather than leaving SDM to physicians as has been done in the past.

Author contributions

RCF contributed to the design of the work, analysis and interpretation of data, and drafting the work. RY contributed to the design and revision of the work. MA contributed to the design and revision of the work. PJB contributed to the design and revision of the work. DS contributed to data analysis and revision of the work. GE contributed to design and revision of the work. M-AD contributed to the conception and design of the work, interpretation of data, and revision of the work.

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Competing interests statement

M-A D was involved in developing the Option Grid patient decision aids, which are licensed to EBSCO Health. She receives consulting income from EBSCO Health, and may receive royalties in the future. M-A D is also a consultant for ACCESS Community Health Network, and delivers shared decision making training to ACCESS clinicians.

Glyn Elwyn has edited and published books that provide royalties on sales by the publishers: the books include *Shared Decision Making* (Oxford University Press) and *Groups* (Radcliffe Press). He has in the past provided consultancy for 1) Emmi Solutions LLC who develop patient decision support tools; 2) National Quality Forum on the certification of decision support tools; 3) Washington State Health Department on the certification of decision support tools; 4) SciMentum LLC, Amsterdam (workshops for shared decision making). Glyn Elwyn is Director of &think LLC which owns the registered trademark for Option Grids™ patient decision aids. He provides consultancy in the domain of shared decision making and patient decision aids to: 1) Access Community Health Network, Chicago (Federally Qualified Medical Centers), and to 2) EBSCO Health Option Grids™ patient decision aids. Glyn Elwyn initiated the Option Grid Collaborative, tools that are hosted on a website managed by Dartmouth College, on http://optiongrid.org/). Existing Option Grids hosted at this website are freely available until such time as the tools have expired. He owns copyright in measures of shared decision making and care integration, namely CollaboRATE, IntegRATE, and Observer OPTION. These measures are freely available for use.

Data sharing statement

A deidentified participant-level dataset is available upon request to the corresponding author (Marie-Anne Durand).

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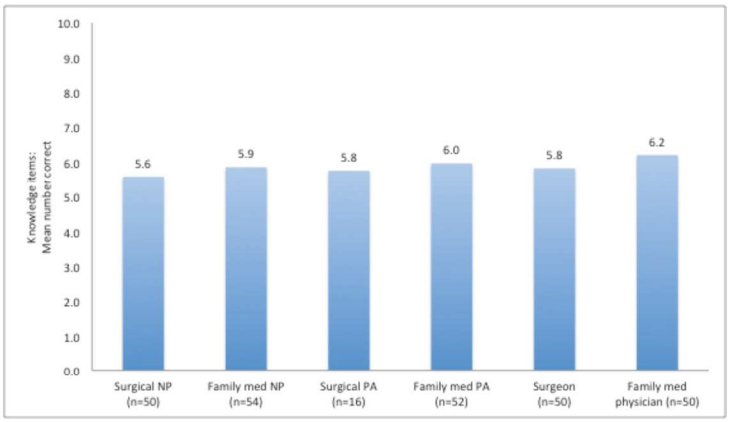


Figure 1. Knowledge scores by clinician type

279x215mm (300 x 300 DPI)

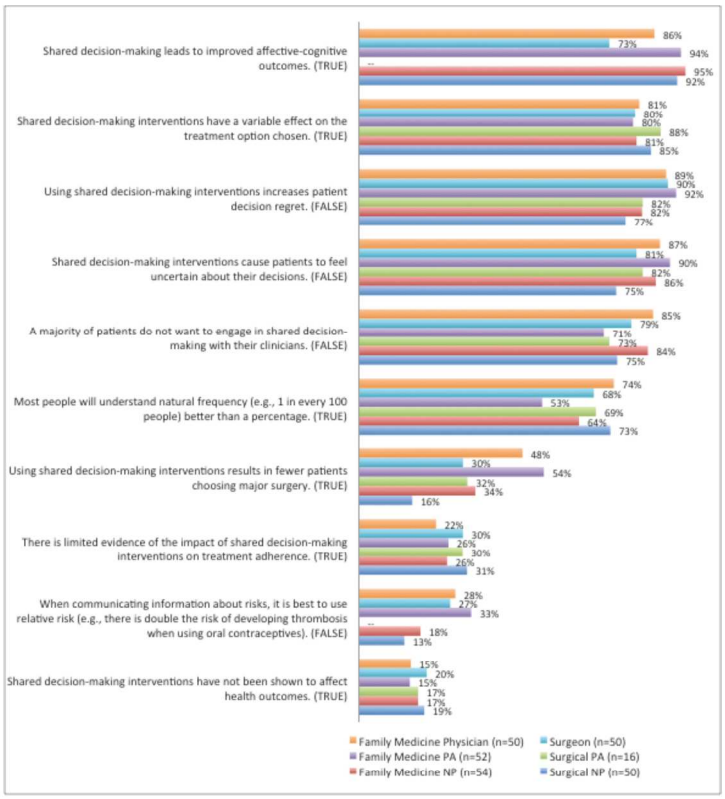


Figure 2. True/False knowledge items: Percent correct by clinician type, adjusted by participant characteristics

215x279mm (300 x 300 DPI)

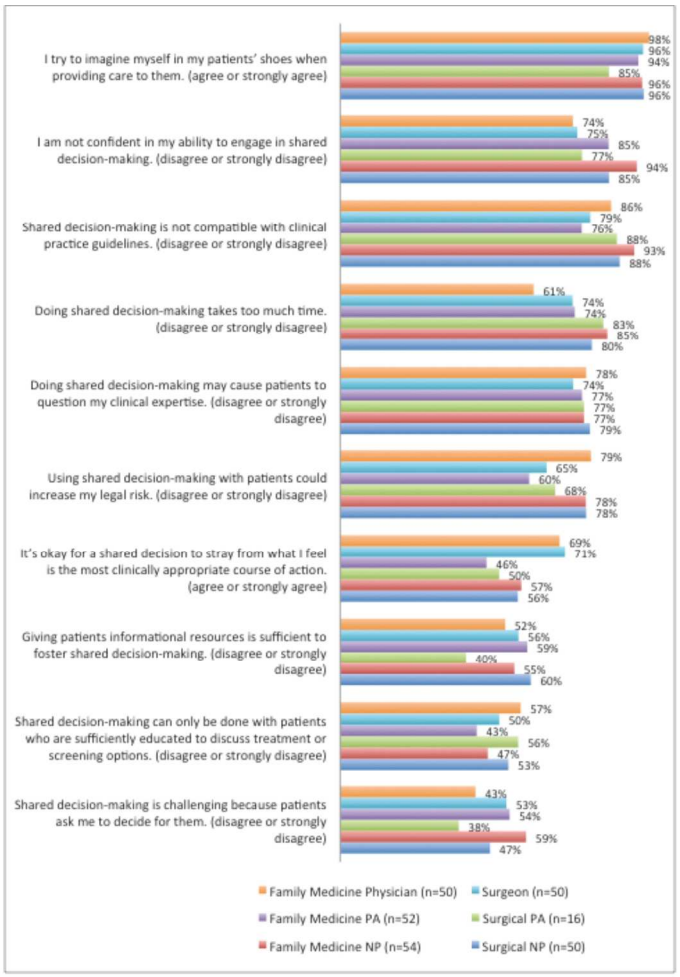


Figure 3. Top box scores: Favorable attitudes toward SDM by clinician type, adjusted for participant characteristics

215x279mm (300 x 300 DPI)

Studying communication in healthcare among physician assistants, nurse practitioners, and physicians who specialize in family medicine or surgery

This study aims to understand health communication knowledge and attitudes among physician assistants, nurse practitioners, and physicians in the United States.

Your participation is voluntary. Participation involves completing a 5-minute online survey focused on health communication.

You may choose to not answer any or all questions. In accordance with SERMO's privacy policy, Dartmouth will never receive names and/or other identifying information. Therefore, this information will never be used in any presentation or report about this project.

Questions about this project may be directed to: [PI CONTACT INFORMATION] during normal business hours.

If you wish to participate in this research project, please press the 'next' button below to view and complete the survey.

S1. Are you comfortable reading and writing in English?

(1) Yes

(2) No **[END SURVEY]**

S2. Which of the following best describes your professional licensure?

(1) Nurse Practitioner

(2) Physician (MD or DO)

(3) Physician Assistant

(4) Other **[END SURVEY]**

S3. Is your main area of practice...

(1) General surgery

(2) A surgical specialty

(3) Family medicine

(4) Other **[END SURVEY]**

[IF S2=1 AND S3=1 OR 2 – COUNTS TOWARD SURGICAL NP QUOTA N=50]

[IF S2=1 AND S3=3 – COUNTS TOWARD FAMILY MED NP QUOTA N=50]

[IF S2=3 AND S3=1 OR 2 – COUNTS TOWARD SURGICAL PA QUOTA N=50]

[IF S2=3 AND S3=3 – COUNTS TOWARD FAMILY MED PA QUOTA N=50]

[IF S2=2 AND S3=1 OR 2 – COUNTS TOWARD SURGEON QUOTA N=50]

[IF S2=2 AND S3=3 – COUNTS TOWARD FAMILY MED PHYSICIAN QUOTA N=50]

S4. Where is your current practice located?

(1) United States

(2) Other **[END SURVEY]**

Q4. How do you define the term 'shared decision-making'?
[OPEN-ENDED RESPONSE]

Q5. Have you previously received formal training in shared decision-making?

(1) Yes

(2) No

(3) Don't know/Can't recall

SHOW TEXT ON NEXT SCREEN:
We define shared decision making as an approach where physicians and patients make decisions together. This is a simplified definition from Elwyn G, Frosch D, et al. Shared decision making: a model for clinical practice. *J Gen Internal Medicine* 2012;**10**:1361–7.

Q1. Please indicate how much you agree or disagree with each of the following statements.
[RANDOMIZE ITEM ORDER A, B, C, E-J; LIST D FIRST]

		Strongly agree	Agree	Disagree	Strongly disagree
d.	I try to imagine myself in my patients' shoes when providing care to them.	**4**	**3**	**2**	**1**
b.	Doing shared decision-making takes too much time.	**4**	**3**	**2**	**1**
c.	Using shared decision-making with patients could increase my legal risk.	**4**	**3**	**2**	**1**
a.	Shared decision-making can only be done with patients who are sufficiently educated to discuss treatment or screening options with their clinician.	**4**	**3**	**2**	**1**
e.	Giving patients informational resources is sufficient to foster shared decision-making.	**4**	**3**	**2**	**1**
f.	Shared decision-making is challenging	**4**	**3**	**2**	**1**

	because patients ask me to decide for them.				
g.	It's okay for a shared decision to stray from what I feel is the most clinically appropriate course of action.	**4**	**3**	**2**	**1**
h.	Shared decision-making is not compatible with clinical practice guidelines.	**4**	**3**	**2**	**1**
i.	Doing shared decision-making may cause patients to question my clinical expertise.	**4**	**3**	**2**	**1**
j.	I am not confident in my ability to engage in shared decision-making.	**4**	**3**	**2**	**1**

Q2. Please indicate whether you think each of the following statements is TRUE or FALSE. **[RANDOMIZE ITEM ORDER]**

		True	False
a.	Shared decision-making interventions cause patients to feel uncertain about their decisions.	**1**	**2**
b.	Using shared decision-making interventions increases patient decision regret.	**1**	**2**
c.	Using shared decision-making interventions results in fewer patients choosing major surgery.	**1**	**2**
d.	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).	**1**	**2**
e.	Most people will understand natural frequency (e.g., 1 in every 100 people) better than a percentage.	**1**	**2**
f.	A majority of patients do not want to engage in shared decision-making with their clinicians.	**1**	**2**
g.	Shared decision-making leads to improved affective-	**1**	**2**

cognitive outcomes.

h.	There is limited evidence of the impact of shared decision-making interventions on treatment adherence.	**1**	**2**
i.	Shared decision-making interventions have a variable effect on the treatment option chosen.	**1**	**2**
j.	Shared decision-making interventions have not been shown to affect health outcomes.	**1**	**2**

Q3. Read the following scenario. Please indicate which decision style you would adopt if you were in this situation. There are no right or wrong answers.

A 40-year-old male presents to his provider seeking treatment for Disease X, and there are two treatment options available. Both options are clinically appropriate for this patient, without a significant difference in terms of survival. However, each option has different harms and benefits. What would you do?

[RANDOMIZE RESPONSE OPTION ORDER]

(1) Determine the patient's clinical situation independent of his values and present him with evidence supporting my treatment decision.

(2) Discuss the patient's health-related values with him and deliberate together using evidence-based information to decide on his treatment plan.

(3) Use evidence-based information to help the patient understand his health condition and all possible treatment options so he can decide on a treatment plan based on his values.

(4) Help the patient understand his personal values and suggest evidence-based treatment options that fit those values.

D1. Are you…

(1) Male

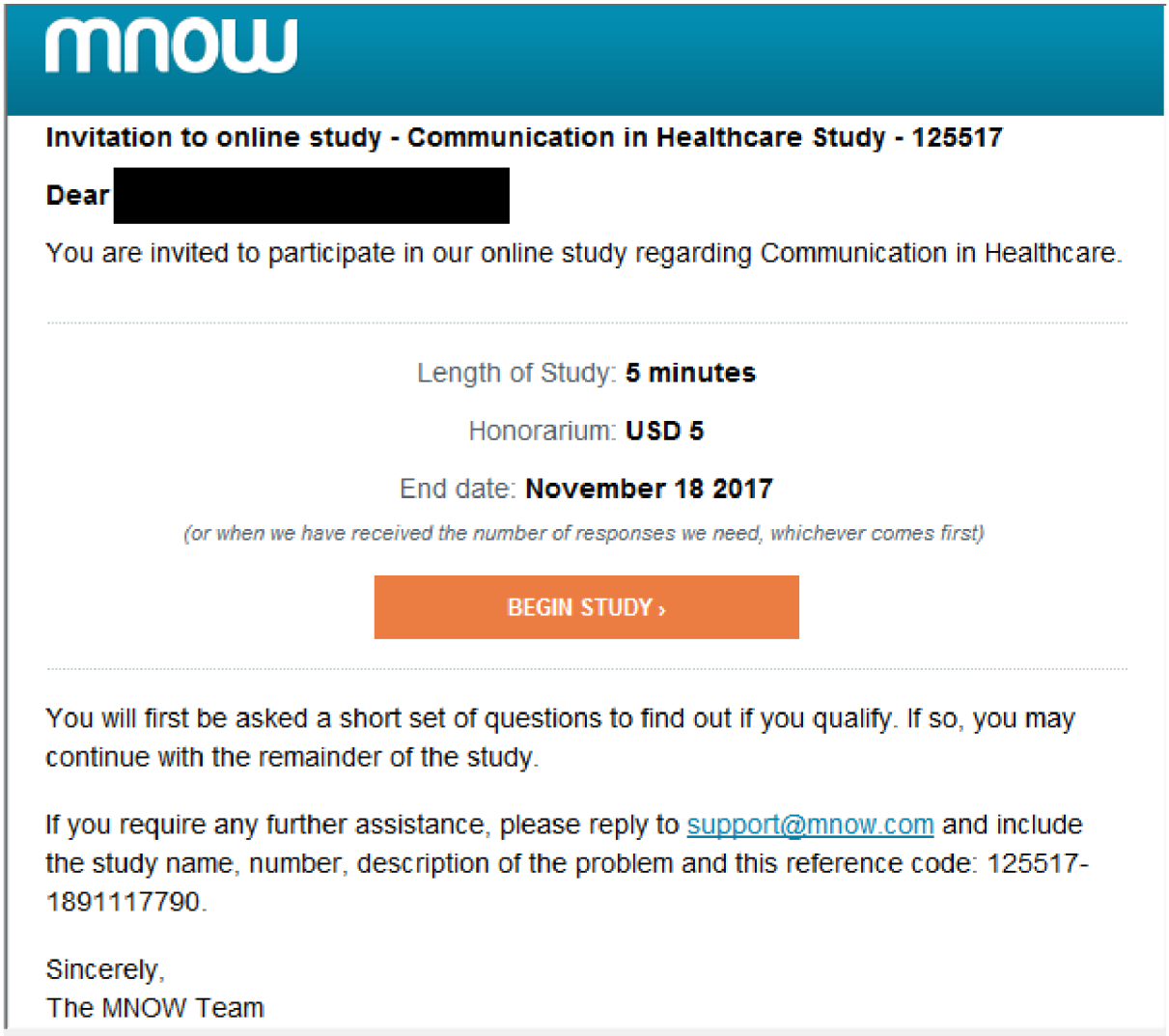
(2) Female

(3) Other gender

(4) Prefer not to say

D2. For how many years have you been in practice? Include only time at your current level of practice, e.g., nurse practitioner, physician, or physician assistant. Do not include residency or fellowships.

[NUMERIC BOX, RANGE 0-60] years



mnow

Invitation to online study - Communication in Healthcare Study - 125517

Dear [redacted]

You are invited to participate in our online study regarding Communication in Healthcare.

Length of Study: **5 minutes**

Honorarium: **USD 5**

End date: **November 18 2017**

(or when we have received the number of responses we need, whichever comes first)

BEGIN STUDY ›

You will first be asked a short set of questions to find out if you qualify. If so, you may continue with the remainder of the study.

If you require any further assistance, please reply to support@mnow.com and include the study name, number, description of the problem and this reference code: 125517-1891117790.

Sincerely,
The MNOW Team

CHERRIES Checklist (Eysenbach):

			Described on manuscript page
	Describe survey design	Describe target population, sample frame. Is the sample a convenience sample? (In "open" surveys this is most likely.)	2
IRB (Institutional Review Board) approval and informed consent process			
	IRB approval	Mention whether the study has been approved by an IRB.	3
	Informed consent	Describe the informed consent process. Where were the participants told the length of time of the survey, which data were stored and where and for how long, who the investigator was, and the purpose of the study?	4
	Data protection	If any personal information was collected or stored, describe what mechanisms were used to protect unauthorized access.	4
Development and pre-testing			
	Development and testing	State how the survey was developed, including whether the usability and technical functionality of the electronic questionnaire had been tested before fielding the questionnaire.	2-3
Recruitment process and description of the sample having access to the questionnaire			
	Open survey versus closed survey	An "open survey" is a survey open for each visitor of a site, while a closed survey is only open to a sample which the investigator knows (password-protected survey).	

	Contact mode	Indicate whether or not the initial contact with the potential participants was made on the Internet. (Investigators may also send out questionnaires by mail and allow for Web-based data entry.)	4
	Advertising the survey	How/where was the survey announced or advertised? Some examples are offline media (newspapers), or online (mailing lists – If yes, which ones?) or banner ads (Where were these banner ads posted and what did they look like?). It is important to know the wording of the announcement as it will heavily influence who chooses to participate. Ideally the survey announcement should be published as an appendix.	4
Survey administration			
	Web/E-mail	State the type of e-survey (eg, one posted on a Web site, or one sent out through e-mail). If it is an e-mail survey, were the responses entered manually into a database, or was there an automatic method for capturing responses?	2
	Context	Describe the Web site (for mailing list/newsgroup) in which the survey was posted. What is the Web site about, who is visiting it, what are visitors normally looking for? Discuss to what degree the content of the Web site could pre-select the sample or influence the results. For example, a survey about vaccination on a anti-immunization Web site will have different results from a Web survey conducted on a government Web site	2
	Mandatory/voluntar	Was it a mandatory survey to be filled in by every visitor who wanted to enter the Web	2

	y	site, or was it a voluntary survey?	
	Incentives	Were any incentives offered (eg, monetary, prizes, or non-monetary incentives such as an offer to provide the survey results)?	4
	Time/Date	In what timeframe were the data collected?	4
	Randomization of items or questionnaires	To prevent biases items can be randomized or alternated.	3
	Adaptive questioning	Use adaptive questioning (certain items, or only conditionally displayed based on responses to other items) to reduce number and complexity of the questions.	3
	Number of Items	What was the number of questionnaire items per page? The number of items is an important factor for the completion rate.	3
	Number of screens (pages)	Over how many pages was the questionnaire distributed? The number of items is an important factor for the completion rate.	3
	Completeness check	It is technically possible to do consistency or completeness checks before the questionnaire is submitted. Was this done, and if “yes”, how (usually JAVAScript)? An alternative is to check for completeness after the questionnaire has been submitted (and highlight mandatory items). If this has been done, it should be reported. All items should provide a non-response option such as “not applicable” or “rather not say”, and selection	4

		of one response option should be enforced.	
	Review step	State whether respondents were able to review and change their answers (eg, through a Back button or a Review step which displays a summary of the responses and asks the respondents if they are correct).	3
Response rates			
	Unique site visitor	If you provide view rates or participation rates, you need to define how you determined a unique visitor. There are different techniques available, based on IP addresses or cookies or both.	4
	View rate (Ratio of unique survey visitors/unique site visitors)	Requires counting unique visitors to the first page of the survey, divided by the number of unique site visitors (not page views!). It is not unusual to have view rates of less than 0.1 % if the survey is voluntary.	
	Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors)	Count the unique number of people who filled in the first survey page (or agreed to participate, for example by checking a checkbox), divided by visitors who visit the first page of the survey (or the informed consents page, if present). This can also be called “recruitment” rate.	4

	Completion rate (Ratio of users who finished the survey/users who agreed to participate)	The number of people submitting the last questionnaire page, divided by the number of people who agreed to participate (or submitted the first survey page). This is only relevant if there is a separate "informed consent" page or if the survey goes over several pages. This is a measure for attrition. Note that "completion" can involve leaving questionnaire items blank. This is not a measure for how completely questionnaires were filled in. (If you need a measure for this, use the word "completeness rate".)	4
Preventing multiple entries from the same individual			
	Cookies used	Indicate whether cookies were used to assign a unique user identifier to each client computer. If so, mention the page on which the cookie was set and read, and how long the cookie was valid. Were duplicate entries avoided by preventing users access to the survey twice; or were duplicate database entries having the same user ID eliminated before analysis? In the latter case, which entries were kept for analysis (eg, the first entry or the most recent)?	4
	IP check	Indicate whether the IP address of the client computer was used to identify potential duplicate entries from the same user. If so, mention the period of time for which no two entries from the same IP address were allowed (eg, 24 hours). Were duplicate entries avoided by preventing users with the same IP address access to the survey twice; or were duplicate database entries having the same IP address within a given period of time eliminated before analysis? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	4

	Log file analysis	Indicate whether other techniques to analyze the log file for identification of multiple entries were used. If so, please describe.	4
	Registration	In “closed” (non-open) surveys, users need to login first and it is easier to prevent duplicate entries from the same user. Describe how this was done. For example, was the survey never displayed a second time once the user had filled it in, or was the username stored together with the survey results and later eliminated? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	
Analysis			
	Handling of incomplete questionnaires	Were only completed questionnaires analyzed? Were questionnaires which terminated early (where, for example, users did not go through all questionnaire pages) also analyzed?	3
	Questionnaires submitted with an atypical timestamp	Some investigators may measure the time people needed to fill in a questionnaire and exclude questionnaires that were submitted too soon. Specify the timeframe that was used as a cut-off point, and describe how this point was determined.	
	Statistical correction	Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for the non-representative sample; if so, please describe the methods.	4

BMJ Open

A US-based cross-sectional survey of clinicians' knowledge and attitudes about shared decision-making across healthcare professions and specialties

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Secondary Subject Heading:	Patient-centred medicine, Communication, Medical education and training
Keywords:	Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Quality in health care < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, MEDICAL EDUCATION & TRAINING

A US-based cross-sectional survey of clinicians' knowledge and attitudes about shared decision-making across healthcare professions and specialties

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Abstract

Objective: In this study, we aim to compare shared decision-making (SDM) knowledge and attitudes between United States (US) based physician assistants (PAs), nurse practitioners (NPs), and physicians across surgical and family medicine specialties.

Setting: We administered a cross-sectional, web-based survey between September 20 and November 1, 2017.

Participants: 272 US-based nurse practitioners, physician assistants, and physicians completed the survey. 250 physicians were sent a generic email invitation to participate, of whom 100 completed the survey. 3300 nurse practitioners and physician assistants were invited, among whom 172 completed the survey. Individuals who met the following exclusion criteria were excluded from participation: 1) lack of English proficiency; 2) area of practice other than family medicine or surgery; 3) licensure other than physician, physician assistant, or nurse practitioner; 4) practicing in a country other than the US.

Results: We found few substantial differences in SDM knowledge and attitudes across clinician types, revealing positive attitudes across the sample paired with low to moderate knowledge. Family medicine professionals (Physician Assistants) were most knowledgeable on several items. Very few respondents (3%; 95% CI 1.5-6.2%) favored a paternalistic approach to decision-making.

Conclusions: Recent policy-level promotion of SDM may have influenced positive clinician attitudes toward SDM. Positive attitudes despite limited knowledge warrant SDM training across occupations and specialties, while encouraging all clinicians to promote SDM. Given positive attitudes and similar knowledge across clinician types, we recommend that SDM is not confined to the patient-physician dyad but instead advocated among other health professionals.

Strengths and limitations of this study

- This study represents the first US national survey comparing SDM knowledge and attitudes across diverse clinician groups.
- The survey instrument was rigorously developed based on a literature search of high-quality evidence, primarily including systematic reviews.
- The sample was derived from an online panel of respondents and may not be representative of the full US populations of these professionals.
- We were unable to fully field the surgical PA quota in this exploratory study.

Introduction

Team-based care is defined as "the provision of health services to individuals, families, and/or their communities by at least two health providers."[1] This model is increasingly prominent across the healthcare delivery spectrum, with advanced practice clinicians such as nurse practitioners (NPs) and physician assistants (PAs), who have their own patient panels, order and perform tests and procedures, and prescribe medications, working alongside physicians from cardiology wards to primary care clinics.[2,3] Yet little is known about the congruence of team members' perceptions regarding approaches to healthcare practice and communication such as shared decision-making (SDM).

Prior research has explored similarities and differences in care delivered by physicians and advanced practice clinicians.[4–6] However, little attention has been given to differences between professions specific to patient-centered attitudes or behavior. Swan and colleagues found NPs and physicians to receive comparable patient satisfaction ratings in primary care settings,[4] while Hojat and colleagues found hospital-based NPs to attain significantly higher empathy scores than hospital-based physicians on the previously-validated Jefferson Scale of Physician Empathy.[5] Further, Laurant and colleagues found nurse practitioners and physician assistants to achieve similar clinical outcomes to those of physicians when working in physician-like roles.[6] Advanced practice clinicians bring diverse clinical backgrounds and valuable perspectives to patient-centered care while maintaining patient satisfaction and clinical outcomes similar to those of their physician colleagues.

Shared decision-making, a process by which clinicians and patients make decisions together using the best available evidence about the likely benefits and harms of each option, and where patients are supported to arrive at informed preferences, is considered to be a key component of patient-centered care.[7–9] However, while the number of advanced practice clinicians participating in routine patient care in the US doubled in the 1990s,[10] prior SDM research has largely focused on the patient-physician dyad without accounting for roles of other team members.[11] A review by Clark and colleagues takes stock of the SDM literature and suggests that registered nurses are well-suited to engage in SDM, but does not contribute additional empirical evidence on the topic.[12] Legare and colleagues developed and validated an interprofessional model for SDM,[11,13] but did not assess its impact on SDM among a range of clinician types. Further, previous literature has identified high patient-orientation among primary care physicians and lower patient-orientation among surgeons.[14] For this reason, we focus on comparing family medicine and surgical care specialties across several healthcare professions.

A gap exists in the literature examining attitudes and knowledge about SDM among a diverse group of surgical and primary care clinicians, including physicians, nurse practitioners, and physician assistants. Early streams of research in the area of SDM and team-based care, paired with growth and increased focus on the role of advanced practice clinicians in the US, raises important questions about SDM knowledge and attitudes across the varied roles of healthcare team members. In this study, we aim to compare SDM knowledge and attitudes between US-based physician assistants (PAs), nurse practitioners (NPs), and physicians across surgical and family medicine specialties.

Method

This study was designed and reported according to the Checklist for Reporting Results of Internet E-Surveys.[15] We administered a voluntary, cross-sectional, web-based survey to members of an internet panel of healthcare providers organized by SERMO, a healthcare market research company.

Survey Design

Survey development drew on a review of existing literature and was derived from another cross-sectional, web-based survey administered to medical students in four countries.[16] The first iteration of the online survey was developed in 2013 and piloted in a small-scale online study conducted in the UK, recruiting medical students through online forums.[16] It was subsequently refined and reworded for Durand's study of medical students' attitudes and knowledge about SDM, then revised for the current study.[16]

The current web-based survey included 28 items presented over 14 screens, each of which included a 'back' button that allowed for review of prior survey screens. The first question was open-ended, asking participants to define SDM. The following screen provided a definition of SDM adapted from Elwyn et al.[7] Ten attitudinal items with a 4-option Likert-type response scale (1=strongly disagree; 4=strongly agree) were informed by established barriers and facilitators to SDM[17–22] and included one item from the Jefferson Scale of Physician Empathy.[5] Ten subsequent true-false knowledge items were based on prior literature detailing SDM process and outcomes.[23–27] A final multiple-choice item presented a generic clinical scenario and asked which response option best matched how the respondent would make his or her treatment decision, with response options based on Emanuel's four models of the physician-patient relationship.[28] The clinical scenario was initially drafted by experts in SDM with input from clinicians for Durand's study of medical students' attitudes and knowledge about SDM.[16] It was revised for the current study to be made more generic and applicable to multiple fields and practices. The survey closed with two demographic items asking participant gender and number of years in practice. See Appendix A1 for the questionnaire.

No more than ten items were included on any single screen. Participants were required to respond to each item in order to continue through the survey. To attenuate bias from order effects, item order was randomized for 1) the ten attitudinal items and 2) the ten knowledge items. Response option order was randomized for the multiple-choice item. The web-based survey was pre-tested for accuracy, usability, and technical functionality by three members of the research team prior to fielding.

This study was reviewed and approved by Dartmouth College's Committee for the Protection of Human Subjects (study #30303).

Patient involvement

As the survey focused on knowledge and atittudes among clinicians, patients were not directly involved in the design or administration of this resarch study.

Participants

Participants were US-based PAs, NPs, and physicians including doctors of medicine (MD) and doctors of osteopathic medicine (DO), all of whom work in family medicine or surgery. Screening questions were included at the beginning of the survey to exclude respondents meeting the following exclusion criteria: 1) lack of English proficiency; 2) area of practice other than family medicine or surgery; 3) licensure other than physician, physician assistant, or nurse practitioner; 4) practicing in a country other than the US.

This focus on clinicians specializing in family medicine and surgery was intended to pursue maximum variation in SDM knowledge and attitudes among our sample of healthcare professionals, as there is evidence of high patient-orientation among primary care physicians and lower patient-orientation among surgeons.[14] Inclusion of physicians, NPs, and PAs was intended to further explore differences in patient-centeredness and empathy between professions demonstrated in prior research.[5,29]

Given the novelty of the survey instrument, we lacked an effect size estimate on which to base sample size calculations. We therefore followed an established rule of thumb recommending a minimum sample size of 50 per comparison group.[30] Our goal was therefore to recruit 50 participants

per clinician type (i.e., family medicine physician, surgery physician, family medicine PA, surgery PA, family medicine NP, surgery NP) to total 300 participants and allow the recommended but flexible minimum of five to 10 observations per parameter in logistic regression analysis.[31,32]

Procedure

To advertise the survey, SERMO distributed email invitations to members of its survey panel; see Appendix A2 for the email invitation. Within the email invitation, participants were offered cash honoraria which, per SERMO policy, varied in amount up to $30 upon completion of the survey to incentivize participation. The survey weblink within the email invitation led to an information sheet that included an estimated time commitment for survey completion (five minutes). The information sheet also provided information about the purpose of the study, the name of the principal investigator, data security (i.e., the research team will not have access to participants' personal information), and confirmation that further participation in the survey represented consent to participate in the research study. SERMO tracked and ensured unique responses through a post-submission log file check via internal server-side script. Completeness checks were done via Javascript prior to questionnaire submission. Only complete questionnaires were included in the analysis.

Data analysis

Due to our maximum-variation sampling approach, we did not weight or otherwise adjust the data. For closed-ended item responses, we calculated frequencies and descriptive statistics to allow comparison across clinician groups. We calculated SDM knowledge scores (0-10) representing the number of correct true-false knowledge responses for each participant. We compared mean knowledge scores across responses to the multiple choice item representing Emanuel's four models of the physician-patient relationship[28], as well as by response to the SDM definition item. Through multiple logistic regression analysis followed by postestimation z-tests, we assessed differences in individual SDM knowledge item responses by profession and area of practice while controlling for previous formal SDM training, clinician gender, preferred decision-making approach, and number of years in practice. We calculated the average predicted probability of answering each knowledge item correctly while adjusting for all other variables in the model. We similarly used multiple regression analysis and postestimation z-tests to assess differences in SDM attitudes by profession and area of practice while controlling for knowledge score, adequacy of SDM definition, previous formal SDM training, clinician gender, preferred decision-making approach, and number of years in practice. We again calculated the average predicted probability of expressing a favorable attitude about SDM for each item while adjusting for all other variables in the model. Statistical significance was defined by an alpha level ≤ 0.05.

For the single open-ended item (defining SDM), one member of the research team coded responses as adequate if they explicitly mentioned both patient and clinician involvement in decision-making; all other responses were coded as inadequate and/or incomplete. All responses were further coded to indicate whether SDM definitions mentioned incorporating evidence in deciding what to do next with the patient. This coding system was based on Elwyn's definition of SDM as an "approach where physicians and patients make decisions together, using the best available evidence about the likely benefits and harms of each option, and where patients are supported to arrive at informed preferences."[7] Another member of the research team coded all open-ended responses based on common language and content. The first researcher analyzed all dual-coded data to identify themes arising from respondents' SDM definitions.

Results

Participants

250 physicians received generic email invitations to participate in the survey, of whom 100 completed the survey. 3300 nurse practitioners and physician assistants were invited, among whom 172 completed the survey. In total, 272 individuals completed the survey between September 20, 2017 and November 1, 2017. Among those accessing the survey link, the rate of initial agreement to participate was 98.6%, with 703 of the 713 who accessed the survey agreeing to participate. Of those who agreed to participate, 74% met all inclusion criteria and were eligible to proceed (518/703). The completion rate was 38.7%, with 272 of the 703 individuals who agreed to participate being eligible for participation and fully completing the survey. With regard to survey non-completers, 15 dropped out in the first several screening items establishing eligibility, 230 were excluded from participation because their respective quotas were full at the time they accessed the survey, 149 were excluded because they did not meet the inclusion criterion requiring a specialization in family medicine or surgery, and one person dropped out in the main body of the survey.

By clinician type, 50 surgical NPs, 54 family medicine NPs, 16 surgical PAs, 52 family medicine PAs, 50 surgeons, and 50 family medicine physicians completed the survey. Participants averaged 13.41 years in practice, with 26.5% (72/272; 95% CI 21.3-32.1) receiving previous formal SDM training. A full demographic profile of participants is provided in Table 1.

Table 1. Participant characteristics

	Surgical NP (n=50)	Family Medicine NP (n=54)	Surgical PA (n=16)	Family Medicine PA (n=52)	Surgeon (n=50)	Family Medicine Physician (n=50)
Gender						
Male	20.0%	14.8%	50.0%	38.5%	80.0%	68.0%
Female	78.0%	85.2%	50.0%	59.6%	16.0%	32.0%
Prefer not to say	2.0%	0.0%	0.0%	1.9%	4.0%	0.0%
Years in practice						
Mean (95% CI)	12.94 (10.45-15.43)	11.43 (9.22-13.63)	11.13 (5.97-16.28)	10.85 (8.85-12.84)	14.98 (12.21-17.75)	17.86 (15.07-20.65)
Previous formal SDM training						
Yes	30.0%	33.3%	37.5%	15.4%	26.0%	24.0%
No	48.0%	44.4%	50.0%	55.8%	66.0%	58.0%
Don't know	22.0%	22.2%	12.5%	28.8%	8.0%	18.0%

SDM Knowledge

Knowledge by profession and clinical specialty

Mean knowledge scores, representing the average number of knowledge items answered correctly and ranging 0-10, appeared to be similar across all professions and clinical specialties based on descriptive statistics. Mean knowledge scores were relatively consistent across responses to the multiple-choice item representing four models of the physician-patient relationship. The few

respondents (n=9) favoring a paternalistic approach demonstrated the least SDM knowledge (5.11; 95% CI 3.51-6.72) and respondents favoring deliberative (5.92; 95% CI 5.68-6.16) and informative (5.92; 95% CI 5.69-6.14) approaches had the highest average knowledge scores. Descriptions of the four models of the physician-patient relationship are available under the 'Preferred approach to decision-making' subheading below. Mean knowledge scores were also consistent across those who had (6.04; 95% CI 5.79-6.29) and had not reported to have (5.82; 95% CI 5.62-6.01) previously received SDM training. As shown in Figure 1, surgical NPs averaged 5.6 (SD 1.2) correct responses out of ten total items, family medicine NPs 5.9 (SD 1.2) correct responses, surgical PAs 5.8 (SD 0.9) correct responses, family medicine PAs 6.0 (SD 1.6) correct responses, surgeons 5.8 (SD 1.4) correct responses, and family medicine physicians 6.2 (SD 1.3) correct responses. With regard to individual knowledge items, few participants from any profession or clinical specialty correctly identified that there is limited evidence of the impact of shared decision-making on treatment adherence (27.6%; 95% CI 22.3-33.3) or that shared decision-making interventions have not been shown to affect health outcomes (17.6%; 95% CI 13.3-22.7).

Differences between professions and clinical specialties were identified at the individual item level, including when adjusted for participants' demographic and personal characteristics (see Figure 2). When asked whether using shared decision-making interventions results in fewer patients choosing major surgery, family medicine NPs (33.8%; 95% CI 20.3-47.2; p=0.039), family medicine PAs (53.7%; 95% CI 40.0-67.4; p<0.000), and family medicine physicians (47.5%; 95% CI 33.1-61.9; p=0.002) were all significantly more likely than the surgical NP (15.5%; 95% CI 5.0-26.0) reference group to provide the correct answer of "true"; family medicine PAs (53.7%; 95% CI 40.0-67.4) were more likely than both family medicine NPs (33.8%; 95% CI 20.3-47.2; p=0.045) and surgeons (30.2%; 95% CI 16.8-43.7; p=0.026) to do so. While a majority of all participants incorrectly responded that it is best to use relative risk when communicating information about risks, family medicine PAs (32.6%; 95% CI 19.7-45.5; p=0.024) were more likely than the surgical NP (13.2%; 95% CI 3.9-22.6) reference group to answer correctly. However, family medicine PAs (53.2%; 95% CI 39.6-66.8; p=0.032) performed worse than the surgical NP (73.0%; 95% CI 60.4-85.6) reference group on the other risk communication knowledge item, as only half correctly identified that most people will understand natural frequency better than a percentage.

Family medicine PAs (90.3%; 95% CI 82.4-98.3; p=0.036) were also more likely than the surgical NP (74.7%; 95% CI 62.3-87.3%) reference group to provide the correct answer of "false" in response to the item stating that shared decision-making interventions cause patients to feel uncertain about their decisions. Further, surgeons (72.7%; 95% CI 57.2-88.2; p=0.019) were less likely than their surgical NP (92.4%; 95% CI 85.2-99.6) colleagues to correctly identify that shared decision-making leads to improved affective-cognitive outcomes. Full logistic regression results are available in Supplementary Materials 1.

SDM definitions

Fewer than half of all participants provided a definition of shared decision-making that explicitly described patient and clinician jointly involved in the decision making process (41.5%, 95% CI 35.6-47.7%). Of those responses (113/272; 41.5%), only nine also included a reference to the evidence upon which shared decisions should be based. We did not identify substantial differences in mean knowledge scores by SDM definition, as the few respondents who defined SDM as patient and clinician jointly involved and included a reference to evidence had a mean knowledge score of 5.44 (95% CI 4.35-6.54), those who correctly identified the participants in SDM but did not mention evidence averaged 5.94 (95% CI 5.69-6.18), and those who defined SDM incorrectly averaged 5.83 (95% CI 5.62-6.04).

Thematic analysis of the open-ended SDM definition responses revealed further nuance, detailed in Table 2. Four themes were identified: 1) Input or involvement from multiple people; 2) Clinician(s) making the decision for the patient; 3) Patient making the decision autonomously or with clinician support; and 4) Information exchange between patient and clinician(s). The first theme related

to the involvement of multiple clinical team members in the decision-making process without referring to the patient and instead specifically referring to multidisciplinary collaboration between healthcare professionals. In an illustrative quote, one participant described shared decision-making as “decisions arrived at with input from multiple h[ealth]c[are] team members.” A related theme involving an individual or care team making a decision without explicit patient input was also identified, with particular emphasis on a paternalistic approach to decision-making where clinicians make decisions “for the patient.” A theme of information exchange often involved the clinician providing information to the patient. Far less prevalent was a sub-theme of patient-to-clinician information exchange, where reference was made to patients sharing knowledge, insights, or preferences as part of the decision-making process.

Table 2. SDM Definition major themes

Theme	**Sub-themes**	**Illustrative quote(s)**
Input or involvement from multiple people	Multidisciplinary collaboration between health care professionals	"Decisions arrived at with input from multiple h[ealth]c[are] team members"; "Discussion within the health care team and deciding what's best for the patient"
	Patient involvement, at times including family	"Team approach using all divisions including patient and family"
	Generic reference to more than one participant in a decision	"Group of people making decision together"; "That more than one person has input into a decision"
Clinician(s) making the decision for the patient		"Working together as a team to collaborate and make decisions for the betterment of the patient"; "Where there is a team of people that share the decision making for the patient"
Patient making the decision autonomously or with clinician support		"Presenting best evidence to the patient and allowing the patient to make an informed decision based on their values with my support"; "doctor makes suggestions, p[atien]t decides"
Information exchange	Clinician-to-patient, sometimes including 'option talk' about risks and benefits	"Doctor provides patient with all necessary medical information and then they both decide on the best course of action for that given patient"; "Presenting patients with enough information regarding risks, benefits, and alternatives of a given therapy for them to feel included in the decision to proceed or not"
	Patient-to-clinician	"Answers to clinical dilemmas that involve both the client and the physician sharing knowledge and possible outcomes"

SDM Attitudes

Attitudes by profession and clinical specialty

Overall, 84.2% (95% CI 79.3-88.3) of participants reported that SDM was compatible with clinical practice guidelines. Additionally, 82% (95% CI 76.9-86.4) of all participants disagreed when asked if they do not feel confident in their ability to engage in shared decision-making. Family medicine NPs (93.0%; 95% CI 85.3-100) reported more confidence in their ability to engage in SDM than did family medicine physicians (73.6%; 95% CI 60.8-86.5; p=0.020) or surgeons (75.0%; 95% CI 61.9-88.2; p=0.038). Three-quarters (75.7%; 95% CI 70.2-80.7) of all participants disagreed that SDM takes too much time; however, family medicine physicians (61.2%; 95% CI 46.9-75.5) were significantly more likely than family medicine NPs (84.5%; 95% CI 74.4-94.6; p=0.016) to think SDM takes too much time. Relating to clinician empathy, nearly all participants said they imagine themselves in their patients' shoes when providing care (96.7% agreed; 95% CI 93.8-98.5).

Half of our sample (50.0%; 95% CI 43.9-56.1) agreed that patients asking clinicians what to do, a commonly cited barrier to shared decision-making, makes SDM challenging. However, a majority of clinicians (71.7%; 95% CI 65.9-77.0) did not think that SDM could increase their legal risk. Physicians in both surgical (70.5%; 95% CI 57.0-84.0; p=0.025) and family medicine (69.3%; 95% CI 55.9-82.7; p=0.031) specialties were significantly more likely than family medicine PAs (47.0%; 95% CI 33.3-60.8) to be comfortable if a shared decision deviated from their preferred course of action. See Figure 3 for full results of SDM attitudinal items, adjusted for observed clinician characteristics. Full logistic regression results are available in Supplementary Materials 2.

Preferred approach to decision-making

Preferred approaches to decision-making, as measured through multiple-choice responses to a clinical scenario, were consistent across professions and clinical specialties. A majority of all participants (53%; 95% CI 46.8-59.0) indicated that in the given clinical scenario, they would take an informative approach to decision-making, using "evidence-based information to help the patient understand his health condition and all possible treatment options so he can decide on a treatment plan based on his values." A substantial proportion (37%; 95% CI 31.4-43.2) preferred a deliberative approach aligned with SDM, where they "discuss the patient's health-related values with him and deliberate together using evidence-based information to decide on his treatment plan." Another 7% (95% CI 4.0-10.3) hypothetically chose an interpretive approach, in which they would "help the patient understand his personal values and suggest evidence-based treatment options that fit those values." Only 3% (95% CI 1.5-6.2) favored a paternalistic approach in which they would "determine the patient's clinical situation independent of his values and present him with evidence supporting [their] decision."

Discussion

Key Findings

This survey was the first to compare knowledge and attitudes about SDM across diverse US-based clinician groups. We found knowledge to be limited across professions and clinical specialties. Knowledge about risk communication and the impact of SDM on health and treatment adherence outcomes was lowest. Performance on some individual knowledge items varied by clinician type, with family medicine PAs performing best on several knowledge items and surgeons sometimes least knowledgeable. However, this study did not identify clear overall knowledge differences between NPs, PAs, and physicians across family medicine and surgical specialties. Further, very few participants were able to provide a complete definition of SDM that included reference to patient and clinician participation and to the evidence on which shared decisions should be based.

Despite limited knowledge, confidence in performing SDM was high, particularly among family medicine NPs. Additionally, three-quarters of participants felt that engaging in SDM does not take too much time, which demonstrated a positive attitude toward SDM. Physicians in both specialties were more likely than family medicine PAs to feel that it is okay for a shared decision to stray from their preferred course of action. While half of all participants favored an informative approach to decision-making, a substantial proportion said they would engage in a deliberative approach aligned with SDM when faced with a hypothetical clinical scenario.

Context in Existing Literature

The confidence we observe with regard to clinicians' self-assessment of their ability to engage in SDM paired with limited knowledge and difficulty defining SDM is consistent with previous work suggesting a lack of consistency in use of the term shared decision-making in scholarly and clinical communities.[18,33] The limited knowledge we observed with regard to risk communication also corroborates prior research on SDM knowledge among medical students and health professional trainees.[34] Further, surgeons performed more poorly than other professions or specialties on several knowledge items, which is consistent with prior research establishing low levels of support for SDM among surgeons.[14,19]

More broadly, Kruger and Dunning (1999) previously demonstrated that limited knowledge of a particular domain prevents individuals from being aware of their own lack of competence in that same domain[35]. Our findings of high confidence in performing SDM paired with limited knowledge of SDM may demonstrate this Dunning-Kruger effect. As a quarter of participants in the current study reported previous formal SDM training, that prior exposure to SDM training may have enhanced these individuals' confidence in engaging in SDM despite low to moderate knowledge retention.

Additionally, the preference expressed by many participants for an informative approach to decision-making over a more deliberative SDM approach may reflect prior work on this topic,[28] namely, a misconception that SDM leaves patients to make decisions on their own.[18] Medical ethics have long held non-abandonment as a central obligation for physicians.[36] The current study suggests a tendency for clinicians to interpret SDM as a process of informing patients and subsequently allowing them complete autonomy to make clinical decisions, which might be interpreted by a patient as abandonment. However, the guiding ethical principles of SDM recognize autonomy in the context of relationships and mutual dependencies that allow and encourage clinicians and patients to make decisions together.[7] Additionally, despite an expressed preference in this sample for information provision over a full SDM process, it is noteworthy that very few participants preferred a paternalistic approach to clinical decision-making in which the values and preferences of the patient are not considered. Further, as respondents were asked about their preferred physician-patient relationship model at the end of the survey after respondents were primed with two batteries of SDM-related items, it is possible that this item reflects knowledge of SDM as much, if not more, than it demonstrates respondents' preferred approaches to clinical decision-making.

While a compelling accumulation of existing literature cites time constraints as a prominent barrier to shared decision-making,[17,18,20,37,38] we find in this sample general disagreement with the idea that SDM takes too much time. More research among diverse and representative samples is needed to validate these findings, and to further examine and delineate the contexts in which SDM is viewed as a burden due to time constraints versus those in which time is not believed to be a barrier. Further, our finding that most physicians feel it is okay for a shared decision to stray from what they feel is the most clinically appropriate course of action lies in contrast to prior literature finding that physicians tend to support SDM in situations where they do not feel strongly about one treatment alternative.[19,39] In the context of prior research, our results suggest that attitudes toward SDM may

be evolving, with clinicians increasingly open to this style of practice. However, knowledge is low and training should become mainstream.

Strengths and Limitations

To our knowledge, this study represents the first US national survey comparing SDM knowledge and attitudes across diverse clinician groups including nurse practitioners, physician assistants, and physicians. The survey instrument was rigorously developed based on a literature search of high-quality evidence, primarily including systematic reviews, and was based on a previously tested survey. We used a healthcare market research company to implement the survey for ease of recruitment, survey administration, and disbursement of honoraria. Use of a healthcare market research company for survey administration and disbursement of honoraria allowed the research team no access to respondents' personally identifiable information, which may have favorable implications in limiting social desirability bias.

However, our sample was derived from an online panel of respondents and may not be representative of the full US populations of these professionals, allowing for possible selection bias. Further, we were unable to fully field the surgical PA quota in this exploratory study. Therefore, due to the small sample size, estimates of knowledge and attitudes of surgical PAs are at particular risk of bias. Multiple testing may have, in some cases, caused us to find statistical significance by chance. Additionally, it is possible to interpret the item wording "Shared decision-making can only be done with patients who are sufficiently educated to discuss treatment or screening options" in multiple ways. It is not clear whether it references formal educational attainment or education provided by the clinician about a health condition and possible treatment options. Therefore, responses to this attitude item must be interpreted with caution. Similarly, there are some individual SDM studies that demonstrate an increase in adherence and other health-related outcomes as a result of clinicians' SDM-promoting behaviors[40]. While the knowledge items related to the impact of SDM on health behaviors and outcomes within this survey were specific to the role of patient-facing SDM interventions and were based upon evidence synthesis within a high-quality Cochrane systematic review,[23] it is possible that the existence of related studies with contradictory findings may have inflated the proportion of incorrect answers on the knowledge items relating to the impact of SDM interventions on health behaviors and outcomes. Additionally, the true-false design of the knowledge items without a 'don't know' option limits our ability to differentiate incorrectly-answered items as reflective of a lack of knowledge versus an incomplete understanding of the currently available research evidence.

Conclusions

The positive attitudes toward SDM expressed in this select sample suggest the possibility that acceptance of SDM may be an emerging norm within the healthcare field. While we see few participants across professions and clinical specialties express negative views about SDM, we also observe high confidence in the face of limited understanding - which may negate the advantage conferred by positive attitudes. As we found knowledge of SDM to be limited despite positive attitudes toward SDM, it may be appropriate to prioritize SDM training among these professional groups in order to encourage all professions to take up SDM, rather than leaving SDM to physicians as has been done in the past.

Author contributions

RCF contributed to the design of the work, analysis and interpretation of data, and drafting the work. RY contributed to the design and revision of the work. MA contributed to the design and revision of the work. PJB contributed to the design and revision of the work. DS contributed to data analysis and revision of the work. GE contributed to design and revision of the work. M-AD contributed to the conception and design of the work, interpretation of data, and revision of the work.

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Competing interests statement

M-A D was involved in developing the Option Grid patient decision aids, which are licensed to EBSCO Health. She receives consulting income from EBSCO Health, and may receive royalties in the future. M-A D is also a consultant for ACCESS Community Health Network, and delivers shared decision making training to ACCESS clinicians.

Glyn Elwyn has edited and published books that provide royalties on sales by the publishers: the books include *Shared Decision Making* (Oxford University Press) and *Groups* (Radcliffe Press). He has in the past provided consultancy for 1) Emmi Solutions LLC who develop patient decision support tools; 2) National Quality Forum on the certification of decision support tools; 3) Washington State Health Department on the certification of decision support tools; 4) SciMentum LLC, Amsterdam (workshops for shared decision making). Glyn Elwyn is Director of &think LLC which owns the registered trademark for Option Grids™ patient decision aids. He provides consultancy in the domain of shared decision making and patient decision aids to: 1) Access Community Health Network, Chicago (Federally Qualified Medical Centers), and to 2) EBSCO Health Option Grids™ patient decision aids. Glyn Elwyn initiated the Option Grid Collaborative, tools that are hosted on a website managed by Dartmouth College, on http://optiongrid.org/). Existing Option Grids hosted at this website are freely available until such time as the tools have expired. He owns copyright in measures of shared decision making and care integration, namely CollaboRATE, IntegRATE, and Observer OPTION. These measures are freely available for use.

Data sharing statement

A deidentified participant-level dataset is available upon request to the corresponding author (Marie-Anne Durand).

Figure legend

Figure 1. Knowledge scores by clinician type

Figure 2. True/False knowledge items: Percent correct by clinician type, adjusted by participant characteristics

Figure 3. Top box scores: Favorable attitudes toward SDM by clinician type, adjusted for participant characteristics

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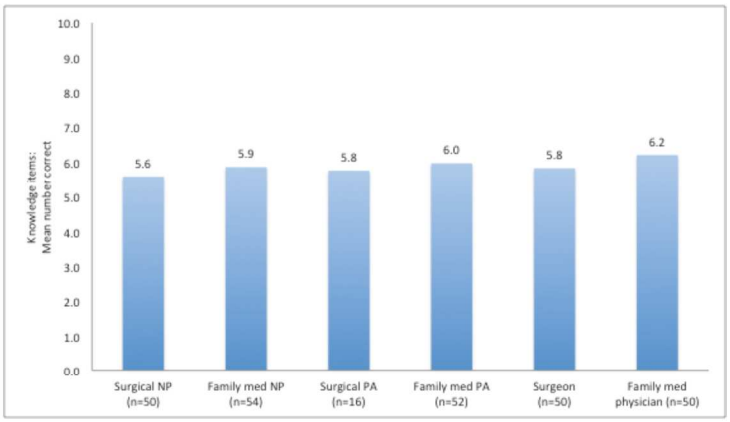

Figure 1. Knowledge scores by clinician type

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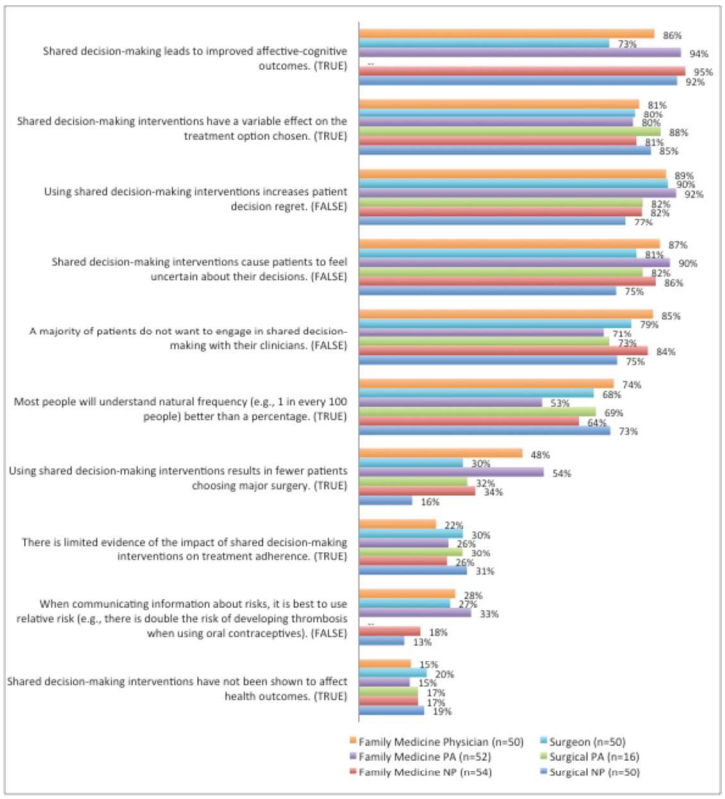


Figure 2. True/False knowledge items: Percent correct by clinician type, adjusted by participant characteristics

215x279mm (300 x 300 DPI)

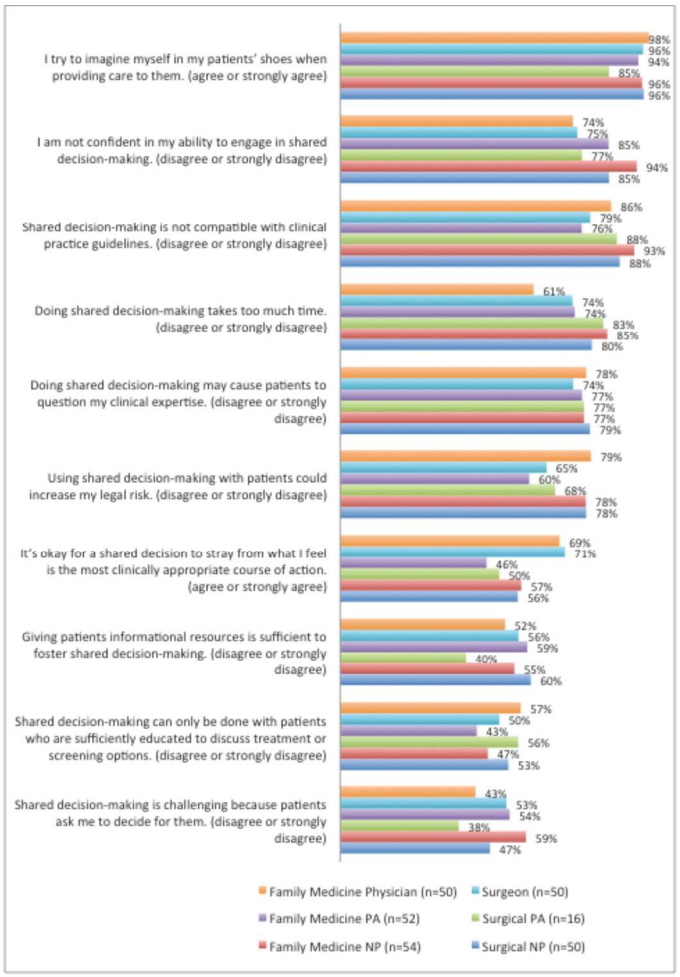


Figure 3. Top box scores: Favorable attitudes toward SDM by clinician type, adjusted for participant characteristics

215x279mm (300 x 300 DPI)

Studying communication in healthcare among physician assistants, nurse practitioners, and physicians who specialize in family medicine or surgery

This study aims to understand health communication knowledge and attitudes among physician assistants, nurse practitioners, and physicians in the United States.

Your participation is voluntary. Participation involves completing a 5-minute online survey focused on health communication.

You may choose to not answer any or all questions. In accordance with SERMO's privacy policy, Dartmouth will never receive names and/or other identifying information. Therefore, this information will never be used in any presentation or report about this project.

Questions about this project may be directed to: [PI CONTACT INFORMATION] during normal business hours.

If you wish to participate in this research project, please press the 'next' button below to view and complete the survey.

S1. Are you comfortable reading and writing in English?

(1) Yes

(2) No **[END SURVEY]**

S2. Which of the following best describes your professional licensure?

(1) Nurse Practitioner

(2) Physician (MD or DO)

(3) Physician Assistant

(4) Other **[END SURVEY]**

S3. Is your main area of practice...

(1) General surgery

(2) A surgical specialty

(3) Family medicine

(4) Other **[END SURVEY]**

[IF S2=1 AND S3=1 OR 2 – COUNTS TOWARD SURGICAL NP QUOTA N=50]

[IF S2=1 AND S3=3 – COUNTS TOWARD FAMILY MED NP QUOTA N=50]

[IF S2=3 AND S3=1 OR 2 – COUNTS TOWARD SURGICAL PA QUOTA N=50]

[IF S2=3 AND S3=3 – COUNTS TOWARD FAMILY MED PA QUOTA N=50]

[IF S2=2 AND S3=1 OR 2 – COUNTS TOWARD SURGEON QUOTA N=50]

[IF S2=2 AND S3=3 – COUNTS TOWARD FAMILY MED PHYSICIAN QUOTA N=50]

S4. Where is your current practice located?

(1) United States

(2) Other **[END SURVEY]**

Q4. How do you define the term 'shared decision-making'?
[OPEN-ENDED RESPONSE]

Q5. Have you previously received formal training in shared decision-making?

(1) Yes

(2) No

(3) Don't know/Can't recall

SHOW TEXT ON NEXT SCREEN:
We define shared decision making as an approach where physicians and patients make decisions together. This is a simplified definition from Elwyn G, Frosch D, et al. Shared decision making: a model for clinical practice. *J Gen Internal Medicine* 2012;**10**:1361–7.

Q1. Please indicate how much you agree or disagree with each of the following statements.
[RANDOMIZE ITEM ORDER A, B, C, E-J; LIST D FIRST]

		Strongly agree	Agree	Disagree	Strongly disagree
d.	I try to imagine myself in my patients' shoes when providing care to them.	**4**	**3**	**2**	**1**
b.	Doing shared decision-making takes too much time.	**4**	**3**	**2**	**1**
c.	Using shared decision-making with patients could increase my legal risk.	**4**	**3**	**2**	**1**
a.	Shared decision-making can only be done with patients who are sufficiently educated to discuss treatment or screening options with their clinician.	**4**	**3**	**2**	**1**
e.	Giving patients informational resources is sufficient to foster shared decision-making.	**4**	**3**	**2**	**1**
f.	Shared decision-making is challenging	**4**	**3**	**2**	**1**

	because patients ask me to decide for them.				
g.	It's okay for a shared decision to stray from what I feel is the most clinically appropriate course of action.	**4**	**3**	**2**	**1**
h.	Shared decision-making is not compatible with clinical practice guidelines.	**4**	**3**	**2**	**1**
i.	Doing shared decision-making may cause patients to question my clinical expertise.	**4**	**3**	**2**	**1**
j.	I am not confident in my ability to engage in shared decision-making.	**4**	**3**	**2**	**1**

Q2. Please indicate whether you think each of the following statements is TRUE or FALSE. **[RANDOMIZE ITEM ORDER]**

		True	False
a.	Shared decision-making interventions cause patients to feel uncertain about their decisions.	**1**	**2**
b.	Using shared decision-making interventions increases patient decision regret.	**1**	**2**
c.	Using shared decision-making interventions results in fewer patients choosing major surgery.	**1**	**2**
d.	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).	**1**	**2**
e.	Most people will understand natural frequency (e.g., 1 in every 100 people) better than a percentage.	**1**	**2**
f.	A majority of patients do not want to engage in shared decision-making with their clinicians.	**1**	**2**
g.	Shared decision-making leads to improved affective-	**1**	**2**

cognitive outcomes.

h.	There is limited evidence of the impact of shared decision-making interventions on treatment adherence.	**1**	**2**
i.	Shared decision-making interventions have a variable effect on the treatment option chosen.	**1**	**2**
j.	Shared decision-making interventions have not been shown to affect health outcomes.	**1**	**2**

Q3. Read the following scenario. Please indicate which decision style you would adopt if you were in this situation. There are no right or wrong answers.

A 40-year-old male presents to his provider seeking treatment for Disease X, and there are two treatment options available. Both options are clinically appropriate for this patient, without a significant difference in terms of survival. However, each option has different harms and benefits. What would you do?

[RANDOMIZE RESPONSE OPTION ORDER]

(1) Determine the patient's clinical situation independent of his values and present him with evidence supporting my treatment decision.

(2) Discuss the patient's health-related values with him and deliberate together using evidence-based information to decide on his treatment plan.

(3) Use evidence-based information to help the patient understand his health condition and all possible treatment options so he can decide on a treatment plan based on his values.

(4) Help the patient understand his personal values and suggest evidence-based treatment options that fit those values.

D1. Are you…

(1) Male

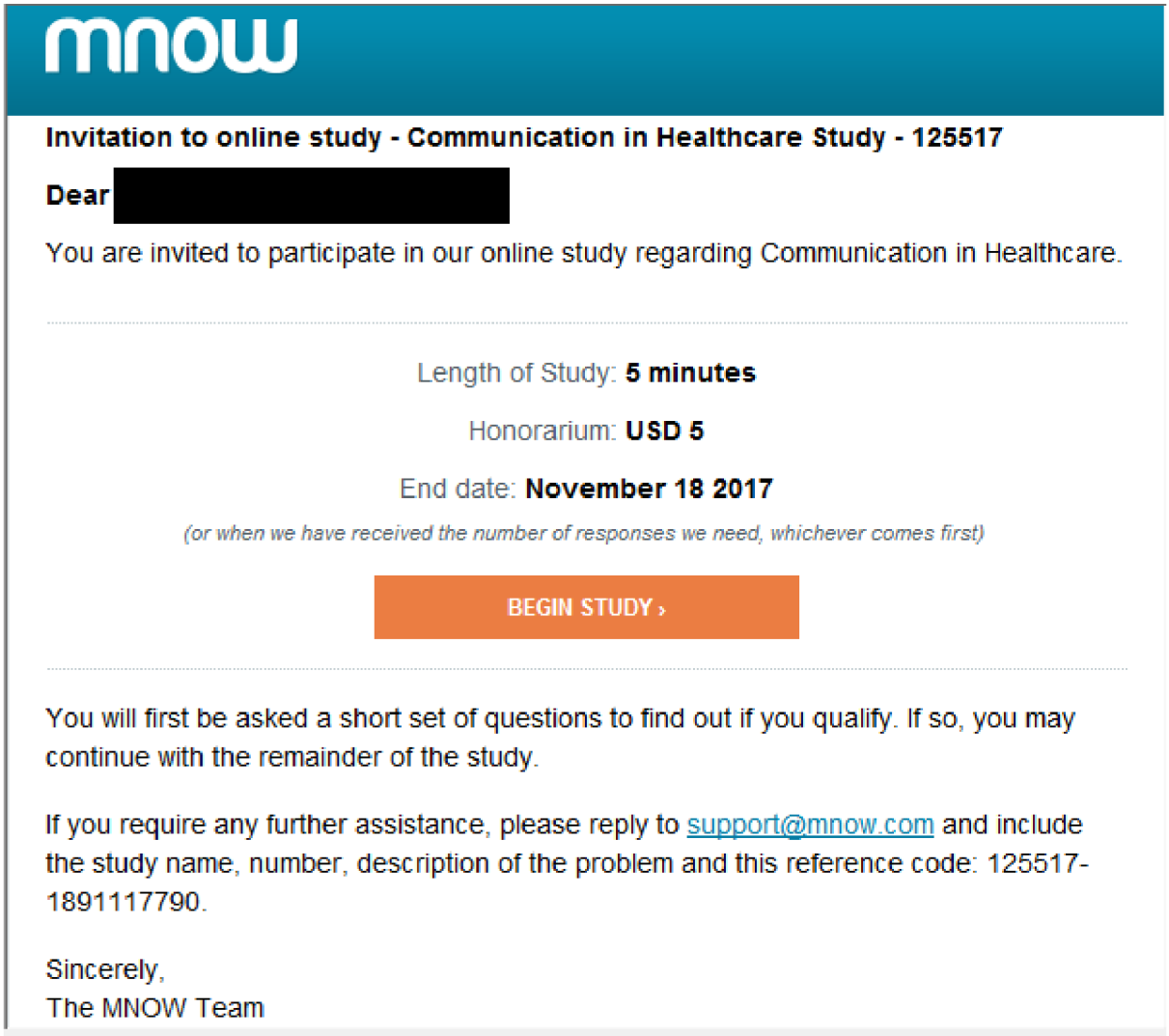
(2) Female

(3) Other gender

(4) Prefer not to say

D2. For how many years have you been in practice? Include only time at your current level of practice, e.g., nurse practitioner, physician, or physician assistant. Do not include residency or fellowships.

[NUMERIC BOX, RANGE 0-60] years



mnow

Invitation to online study - Communication in Healthcare Study - 125517

Dear [redacted]

You are invited to participate in our online study regarding Communication in Healthcare.

Length of Study: **5 minutes**

Honorarium: **USD 5**

End date: **November 18 2017**

(or when we have received the number of responses we need, whichever comes first)

BEGIN STUDY ›

You will first be asked a short set of questions to find out if you qualify. If so, you may continue with the remainder of the study.

If you require any further assistance, please reply to support@mnow.com and include the study name, number, description of the problem and this reference code: 125517-1891117790.

Sincerely,
The MNOW Team

Supplementary materials 1. Logistic regression results: True-false knowledge items

	Outcome variables									
	Shared decision-making interventions cause patients to feel uncertain about their decisions.	Using shared decision-making interventions increases patient decision regret.	Using shared decision-making interventions results in fewer patients choosing major surgery.	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).	Most people will understand natural frequency (e.g., 1 in every 100 people) better than a percentage.	A majority of patients do not want to engage in shared decision-making with their clinicians.	Shared decision-making leads to improved affective-cognitive outcomes.	There is limited evidence of the impact of shared decision-making interventions on treatment adherence.	Shared decision-making interventions have a variable effect on the treatment option chosen.	Shared decision-making interventions have not been shown to affect health outcomes.
Predictors: OR (95% CI)										
Paternalistic approach	**0.088 (0.018-0.438)**	0.503 (0.080-3.169)	1.046 (0.221-4.947)	0.665 (0.121-3.643)	0.491 (0.115-2.100)	0.951 (0.195-4.632)	0.216 (0.040-1.155)	0.592 (0.107-3.290)	1.194 (0.211-6.762)	3.691 (0.842-16.176)
Deliberative approach	**0.456 (0.217-0.961)**	1.055 (0.471-2.362)	1.152 (0.652-2.036)	**0.515 (0.266-0.995)**	0.902 (0.510-1.596)	1.379 (0.704-2.702)	1.414 (0.554-3.610)	1.065 (0.592-1.915)	1.482 (0.748-2.936)	0.947 (0.458-1.957)
Informative approach (reference)	--	--	--	--	--	--	--	--	--	--
Interpretive approach	0.600 (0.148-2.439)	0.328 (0.098-1.095)	**3.700 (1.269-10.787)**	0.310 (0.066-1.458)	**0.289 (0.103-0.805)**	0.676 (0.211-2.165)	1.110 (0.217-5.673)	0.469 (0.124-1.776)	1.399 (0.371-5.276)	2.678 (0.880-8.148)
Surgical NP (reference)	--	--	--	--	--	--	--	--	--	--
Family medicine NP	2.345 (0.766-7.175)	1.257 (0.411-3.839)	**2.884 (1.056-7.878)**	1.449 (0.499-4.212)	0.631 (0.266-1.498)	1.691 (0.585-4.890)	1.492 (0.311-7.166)	0.777 (0.304-1.986)	0.690 (0.249-1.916)	0.789 (0.265-2.350)
Surgical PA	1.722 (0.364-8.140)	1.342 (0.283-6.363)	2.592 (0.660-10.173)	--	0.818 (0.227-2.944)	0.860 (0.211-3.504)	--	1.056 (0.293-3.802)	1.225 (0.225-6.670)	0.839 (0.177-3.981)
Family medicine PA	**3.593 (1.100-11.847)**	2.978 (0.839-10.566)	6.735 (2.482-18.274)	**3.255 (1.170-9.059)**	**0.388 (0.163-0.923)**	0.740 (0.426-3.580)	1.209 (0.267-5.469)	0.783 (0308-1.992)	0.621 (0.218-1.763)	0.595 (0.192-1.845)
Surgeon	1.601 (0.537-4.775)	2.475 (0.735-8.329)	2.436 (0.817-7.265)	2.607 (0.825-8.235)	0.827 (0.312-2.194)	1.236 (0.426-3.580)	**0.178 (0.042-0.751)**	1.105 (0.424-2.876)	0.704 (0.221-2.247)	0.994 (0.331-2.981)
Family medicine physician	2.658 (0.842-8.388)	2.327 (0.670-8.087)	5.220 (1.845-14.767)	2.690 (0.886-8.172)	1.055 (0.400-2.781)	1.942 (0.653-5.774)	0.450 (0.104-1.944)	0.667 (0.250-1.782)	0.740 (0.237-2.311)	0.686 (0.222-2.121)
Prior SDM training	2.693 (1.102-6.583)	1.812 (0.729-4.507)	1.034 (0.539-1.984)	1.045 (0.493-2.217)	1.826 (0.943-3.536)	**2.735 (1.201-6.226)**	1.338 (0.428-4.179)	0.726 (0.368-1.430)	0.659 (0.315-1.378)	0.669 (0.300-1.496)
No prior SDM training (reference)	--	--	--	--	--	--	--	--	--	--
Can't recall about prior SDM training	3.227 (1.083-9.616)	1.689 (0.609-4.685)	1.334 (0.662-2.689)	0.888 (0.396-2.000)	1.875 (0.910-3.861)	1.319 (0.595-2.928)	0.600 (0.211-1.701)	0.695 (0.323-1.495)	1.008 (0.427-2.379)	0.809 (0.331-1.980)

Male (reference)	--	--	--	--	--	--	--	--	--	--
Female	1.438 (0.644-3.210)	2.776 (1.176-6.551)	0.707 (0.381-1.312)	1.244 (0.607-2.553)	0.962 (0.519-1.783)	1.331 (0.652-2.717)	0.625 (0.226-1.724)	**0.418 (0.218-0.803)**	0.847 (0.401-1.791)	0.605 (0278-1.318)
Prefers not to report gender	0.122 (0.011-1.371)	0.270 (0.033-2.222)	--	1.015 (0.089-11.617)	2.083 (0.166-26.105)	0.399 (0.050-3.216)	0.689 (0.059-8.066)	1.535 (0.191-12.325)	0.183 (0.022-1.521)	2.730 (0.335-22.235)
Years in practice	1.010 (0.979-1.052)	1.027 (0.981-1.074)	1.000 (0.970-1.032)	0.997 (0.962-1.033)	1.012 (0.980-1.044)	**0.960 (0.928-0.994)**	1.035 (0.983-1.089)	0.999 (0.967-1.031)	0.992 (0.956-1.028)	1.015 (0.978-1.053)

bold type: p<0.05

Supplementary materials 2. Logistic regression results: Attitude items

	Outcome variables									
	Shared decision-making can only be done with patients who are sufficiently educated to discuss treatment or screening options with their clinician.	Doing shared decision-making takes too much time.	Using shared decision-making with patients could increase my legal risk.	I try to imagine myself in my patients' shoes when providing care to them.	Giving patients informational resources is sufficient to foster shared decision-making.	Shared decision-making is challenging because patients ask me to decide for them.	It's okay for a shared decision to stray from what I feel is the most clinically appropriate course of action.	Shared decision-making is not compatible with clinical practice guidelines.	Doing shared decision-making may cause patients to question my clinical expertise.	I am not confident in my ability to engage in shared decision-making.
Predictors: OR (95% CI)										
Paternalistic approach	0.137 (0.016-1.154)	0.342 (0.076-1.544)	**0.155 (0.033-0.735)**	--	**0.082 (0.010-0.707)**	0.209 (0.040-1.082)	2.691 (0.488-14.839)	**0.130 (0.272-0.623)**	**0.106 (0.023-0.485)**	0.306 (0.071-1.321)
Deliberative approach	1.037 (0.616-1.745)	1.587 (0.836-3.014)	0.545 (0.297-1.000)	0.968 (0.207-4.527)	0.965 (0.567-1.643)	**0.437 (0.256-0.745)**	0.932 (0.547-1.589)	**0.323 (0.148-0.704)**	0.773 (0.413-1.447)	1.500 (0.714-3.151)
Informative approach (reference)	--	--	--	--	--	--	--	--	--	--
Interpretive approach	0.937 (0.346-2.541)	1.322 (0.399-4.380)	0.538 (0.175-1.657)	--	0.456 (0.164-1.272)	0.511 (0.186-1.406)	1.259 (0.431-3.676)	0.296 0.079-1.108)	0.649 (0.210-2.002)	0.614 (0.194-1.944)
Surgical NP	--	--	--	--	--	--	--	--	--	2.069 (0.684-6.257)
Family medicine NP	0.720 (0.329-1.576)	1.416 (0.503-3.992)	0.971 (0.341-2.759)	0.760 (0.041-14.078)	0.840 0.374-1.887)	1.645 (0.738-3.671)	1.083 (0.493-2.380)	1.772 (0.385-8.150)	0.872 (0.333-2.285)	**5.384 (1.309-22.137)**
Surgical PA	1.069 (0.328-3.490)	1.283 (0.295-5.577)	0.581 (0.145-2.325)	0.195 (0.009-4.170)	0.441 (0.132-1.475)	0.668 (0.201-2.214)	0.794 (0.249-2.536)	0.833 (0.131-5.305)	0.895 (0.224-3.582)	1.192 (0.309-4.607)
Family medicine PA	0.614 (0.272-1.383)	0.731 (0.280-1.907)	**0.377 (0.145-0.981)**	0.571 (0.045-7.185)	1.004 (0.435-2.320)	1.318 (0.581-2.991)	0.708 (0.316-1.583)	0.399 (0.123-1.290)	0.814 (0.306-2.163)	1.876 (0.669-5.258)
Surgeon	0.783 (0.323-1.899)	0.704 (0.244-2.033)	0.527 (0.189-1.468)	0.750 (0.055-10.240)	0.963 (0.389-2.386)	1.313 (0.535-3.222)	1.937 (0.774-4.849)	0.397 (0.112-1.398)	0.764 (0.266-2.195)	1.161 (0.453-2.971)
Family medicine physician	1.091 (0.460-2.586)	0.393 (0.146-1.056)	1.102 (0.385-3.153)	1.457 (0.073-28.948)	0.758 (0.315-1.827)	0.843 (0.352-2.020)	1.827 (0.750-4.455)	0.723 (0.201-2.605)	0.926 (0.325-2.642)	--
Prior SDM training	0.992 (0.547-1.797)	1.131 (0.552-2.318)	1.839 (0.902-3.751)	--	0.815 (0.443-1.499)	1.441 (0.787-2.639)	0.975 (0.528-1.800)	**3.748 (1.305-10.766)**	0.796 (0.399-2.072)	1.186 (0.527-2.667)

No prior SDM training (reference)	--	--	--	--	--	--	--	--	--	--
Can't recall about prior SDM training	0.710 (0.368-1.373)	1.239 (0.566-2.713)	1.158 (0.545-2.460)	3.154 (0.347-28.630)	0.654 (0.337-1.270)	1.356 (0.695-2.646)	0.759 (0.393-1.467)	1.560 (0.620-3.922)	1.155 (0.517-2.583)	1.022 (0.425-2.458)
Male (reference)	--	--	--	--	--	--	--	--	--	--
Female	1.248 (0.700-2.227)	1.075 (0.549-2.104)	**2.016 (1.046-3.886)**	2.664 (0.476-14.913)	1.724 (0.957-3.106)	1.010 (0.560-1.810)	1.243 (0.687-2.247)	1.269 (0.574-2.803)	1.050 (0.542-2.072)	1.350 (0.637-2.860)
Prefers not to report gender	0.493 (0.044-5.458)	--	3.587 (0.252-50.970)	0.120 (0.007-2.016)	1.433 (0.152-13.495)	0.378 (0.034-4.144)	0.588 (0.072-4.822)	1.471 (0.104-20.850)	1.713 (0.118-24.802)	1.280 (0.111-14.745)
Years in practice	0.987 (0.959-1.016)	1.032 (0.995-1.069)	0.978 (0.947-1.010)	0.989 (0.908-1.077)	1.010 (0.981-1.040)	1.01 (0.980-1.040)	1.015 (0.985-1.046)	1.014 (0.973-1.057)	1.013 (0.978-1.048)	1.020 (0.981-1.061)

bold type: p<0.05

CHERRIES Checklist (Eysenbach):

			Described on manuscript page
	Describe survey design	Describe target population, sample frame. Is the sample a convenience sample? (In "open" surveys this is most likely.)	2
IRB (Institutional Review Board) approval and informed consent process			
	IRB approval	Mention whether the study has been approved by an IRB.	3
	Informed consent	Describe the informed consent process. Where were the participants told the length of time of the survey, which data were stored and where and for how long, who the investigator was, and the purpose of the study?	4
	Data protection	If any personal information was collected or stored, describe what mechanisms were used to protect unauthorized access.	4
Development and pre-testing			
	Development and testing	State how the survey was developed, including whether the usability and technical functionality of the electronic questionnaire had been tested before fielding the questionnaire.	2-3
Recruitment process and description of the sample having access to the questionnaire			
	Open survey versus closed survey	An "open survey" is a survey open for each visitor of a site, while a closed survey is only open to a sample which the investigator knows (password-protected survey).	

	Contact mode	Indicate whether or not the initial contact with the potential participants was made on the Internet. (Investigators may also send out questionnaires by mail and allow for Web-based data entry.)	4
	Advertising the survey	How/where was the survey announced or advertised? Some examples are offline media (newspapers), or online (mailing lists – If yes, which ones?) or banner ads (Where were these banner ads posted and what did they look like?). It is important to know the wording of the announcement as it will heavily influence who chooses to participate. Ideally the survey announcement should be published as an appendix.	4
Survey administration			
	Web/E-mail	State the type of e-survey (eg, one posted on a Web site, or one sent out through e-mail). If it is an e-mail survey, were the responses entered manually into a database, or was there an automatic method for capturing responses?	2
	Context	Describe the Web site (for mailing list/newsgroup) in which the survey was posted. What is the Web site about, who is visiting it, what are visitors normally looking for? Discuss to what degree the content of the Web site could pre-select the sample or influence the results. For example, a survey about vaccination on a anti-immunization Web site will have different results from a Web survey conducted on a government Web site	2
	Mandatory/voluntar	Was it a mandatory survey to be filled in by every visitor who wanted to enter the Web	2

	y	site, or was it a voluntary survey?	
	Incentives	Were any incentives offered (eg, monetary, prizes, or non-monetary incentives such as an offer to provide the survey results)?	4
	Time/Date	In what timeframe were the data collected?	4
	Randomization of items or questionnaires	To prevent biases items can be randomized or alternated.	3
	Adaptive questioning	Use adaptive questioning (certain items, or only conditionally displayed based on responses to other items) to reduce number and complexity of the questions.	3
	Number of Items	What was the number of questionnaire items per page? The number of items is an important factor for the completion rate.	3
	Number of screens (pages)	Over how many pages was the questionnaire distributed? The number of items is an important factor for the completion rate.	3
	Completeness check	It is technically possible to do consistency or completeness checks before the questionnaire is submitted. Was this done, and if “yes”, how (usually JAVAScript)? An alternative is to check for completeness after the questionnaire has been submitted (and highlight mandatory items). If this has been done, it should be reported. All items should provide a non-response option such as “not applicable” or “rather not say”, and selection	4

		of one response option should be enforced.	
	Review step	State whether respondents were able to review and change their answers (eg, through a Back button or a Review step which displays a summary of the responses and asks the respondents if they are correct).	3
Response rates			
	Unique site visitor	If you provide view rates or participation rates, you need to define how you determined a unique visitor. There are different techniques available, based on IP addresses or cookies or both.	4
	View rate (Ratio of unique survey visitors/unique site visitors)	Requires counting unique visitors to the first page of the survey, divided by the number of unique site visitors (not page views!). It is not unusual to have view rates of less than 0.1 % if the survey is voluntary.	
	Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors)	Count the unique number of people who filled in the first survey page (or agreed to participate, for example by checking a checkbox), divided by visitors who visit the first page of the survey (or the informed consents page, if present). This can also be called “recruitment” rate.	4

	Completion rate (Ratio of users who finished the survey/users who agreed to participate)	The number of people submitting the last questionnaire page, divided by the number of people who agreed to participate (or submitted the first survey page). This is only relevant if there is a separate "informed consent" page or if the survey goes over several pages. This is a measure for attrition. Note that "completion" can involve leaving questionnaire items blank. This is not a measure for how completely questionnaires were filled in. (If you need a measure for this, use the word "completeness rate".)	4
Preventing multiple entries from the same individual			
	Cookies used	Indicate whether cookies were used to assign a unique user identifier to each client computer. If so, mention the page on which the cookie was set and read, and how long the cookie was valid. Were duplicate entries avoided by preventing users access to the survey twice; or were duplicate database entries having the same user ID eliminated before analysis? In the latter case, which entries were kept for analysis (eg, the first entry or the most recent)?	4
	IP check	Indicate whether the IP address of the client computer was used to identify potential duplicate entries from the same user. If so, mention the period of time for which no two entries from the same IP address were allowed (eg, 24 hours). Were duplicate entries avoided by preventing users with the same IP address access to the survey twice; or were duplicate database entries having the same IP address within a given period of time eliminated before analysis? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	4

	Log file analysis	Indicate whether other techniques to analyze the log file for identification of multiple entries were used. If so, please describe.	4
	Registration	In “closed” (non-open) surveys, users need to login first and it is easier to prevent duplicate entries from the same user. Describe how this was done. For example, was the survey never displayed a second time once the user had filled it in, or was the username stored together with the survey results and later eliminated? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	
Analysis			
	Handling of incomplete questionnaires	Were only completed questionnaires analyzed? Were questionnaires which terminated early (where, for example, users did not go through all questionnaire pages) also analyzed?	3
	Questionnaires submitted with an atypical timestamp	Some investigators may measure the time people needed to fill in a questionnaire and exclude questionnaires that were submitted too soon. Specify the timeframe that was used as a cut-off point, and describe how this point was determined.	
	Statistical correction	Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for the non-representative sample; if so, please describe the methods.	4