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Effects of patient decision aids used pre-consult or in-consult on patient-clinician communication - secondary analysis of a systematic review with meta-analysis

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Abstract

Background Patient decision aids (PtDAs) provide benefits and risks of options for a specific decision, and help patients clarify their values. This study examined whether the timing of PtDA use—before (pre-consult) or during (in-consult) the clinical encounter—affects patient-clinician communication.

Methods We conducted a secondary analysis of 209 randomized controlled trials (RCTs) in the 2024 Cochrane review of PtDAs compared to usual care. Eligible studies measured patient-clinician communication using observer-, patient- or clinician-reported instruments.

Results Thirty-six RCTs met inclusion criteria, reporting on communication outcomes: 21 evaluated pre-consult PtDAs and 15 in-consult PtDAs. Pre-consult PtDAs commonly addressed screening and treatment decisions, often using digital formats. In-consult PtDAs focused on treatment and were mostly paper-based. For pre-consult PtDAs, 68.6% of patients discussed the decision with their clinician versus 50.2% in usual care ($p < 0.001$), though no difference was found for patient-reported SDM-Q-9 scores. In-consult PtDAs significantly improved communication measured by the observer-rated OPTION12 instrument.

Conclusions The effects of PtDAs varied by timing and measurement approach, with in-consult PtDAs potentially offering more structured support for shared decision making. No studies directly compared pre- and in-consult PtDAs. Future research should directly compare these approaches and use consistent communication measures.

Keywords Shared decision making, Patient decision aids, Timing of interventions, Communication outcomes

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Introduction

Effective patient-clinician communication is essential to high-quality healthcare. Patients often have to navigate a healthcare system that feels overwhelming, impersonal, and difficult to understand; whereas clinicians are expected to guide patients through the complexity of challenging and uncertain healthcare options [1]. The stakes are high and there is a significant gap between their expertise - patients are experts in their own experiences, values, and priorities, while clinicians bring their expert medical knowledge and technical skills [2].

Despite the critical nature of patient-clinician communication, many clinicians receive minimal training in how to communicate in a way that builds trust and fosters collaboration [3]. Effective communication goes beyond the exchange of medical information; it requires empathy, respect, and a shared understanding of the patient's concerns and values [4]. Further complicating this dynamic is the ongoing shift away from the historically paternalistic model of medicine, where physicians make decisions with little patient input. Patients are increasingly recognized as active participants in their care, with their insights and preferences playing a central role [3]. This shift in patient involvement is particularly important in shared decision-making (SDM), a collaborative approach where patients and clinicians work together to make decisions aligned with the patient's informed values, preferences, and individual circumstances. SDM is a cornerstone of patient-centered care, empowering individuals to take an active role in their health decisions [5]. Given that many clinicians receive little formal preparation in communication or SDM, training may be an important factor influencing patient-clinician communication.

Patient decision aids (PtDAs) are evidence-based tools that can facilitate SDM. PtDAs provide information on options (including benefits and harms) for a specific decision and helps patients clarify their values for features and outcomes of options. Research findings with high GRADE certainty of evidence has shown that PtDAs compared to usual care enhances the patients' knowledge and reduces their decisional conflict related to feeling uninformed and unclear about personal values [6]. However, the influence of PtDAs on effective communication about treatment options was more variable. Poor communication and inadequate information can lead to patient distress, uncertainty, and decision regret; ultimately causing dissatisfaction with the decision-making process [7].

Despite the growing adoption of PtDAs, challenges persist in ensuring these interventions are implemented in a way that truly benefits patients. One major challenge is timing [8]. When introduced before the consultation (pre-consult), PtDAs allow patients to review and reflect upon the information beforehand; but it may potentially overwhelm them with complex medical terminology [8–10]. Clinicians may also struggle to tailor discussions to patients' varying needs when PtDAs are used pre-consult [11]. In contrast, when PtDAs are introduced during the consultation (in-consult), they can help structure the clinical counselling and facilitate SDM; but integrating them seamlessly into clinical workflows can be challenging [9, 12, 13]. Understanding the timing of PtDAs as a potential mechanism to enhance communication is essential for optimizing their use and overcoming barriers undermining the collaborative nature of SDM [9, 14].

In a 2024 Cochrane review of PtDAs [6], the authors concluded that PtDAs improve patients' knowledge, help clarify their values, and reduce decisional conflict compared with usual care. However, the review also showed that the effect of PtDAs on patient-clinician communication was less consistent, and it did not systematically examine whether the timing of PtDA use - before or during the consultation - might influence patient-clinician communication outcomes [6]. This represents an important gap in the evidence base, as the timing of PtDA use could affect how effectively patients and clinicians engage in SDM. To address this gap, the aim of this study was to determine the effect of pre-consult and in-consult PtDAs on patient-clinician communication, instruments used to assess communication, and provision of clinician training.

Methods

Study design

We performed a secondary analysis of randomized controlled trials (RCTs) included in the 2024 Cochrane Review. The study is reported using the PRISMA [15]. Methods are summarized below with full details available in the original review [6].

Eligibility criteria

In the original Cochrane review, two independent reviewers assessed citations for eligibility. All published individual or cluster-randomized controlled studies evaluating PtDAs involving adults aged 18 years or older who were making health decisions about screening or treatment options were included. Reviewers ensured that interventions met the International Patient Decision Aid Standards (IPDAS) [16] to qualify as a PtDA. No language or setting restrictions were applied. For this secondary analysis, eligible studies reported on patient-clinician communication outcomes.

Search strategy and selection process

In the original Cochrane review, a comprehensive search was conducted across electronic databases (e.g. MEDLINE, Embase, PsycINFO, CINAHL and Cochrane Central Register of Controlled Trials), trial registries and grey

literature from journal inception to March 2022. Hand searching of key journals and reference lists was also conducted to identify additional relevant studies.

Data extraction

From the original Cochrane review, we used data extracted for the eligible studies in this secondary analysis (e.g., characteristics of study design and participants, format and timing of PtDA, decision type, and measures used to evaluate patient-clinician communication). For this secondary analysis, additional data on clinician training prior to the intervention were extracted from the original study papers by one reviewer and cross-checked by a second reviewer for accuracy. Discrepancies were resolved through discussion between reviewers.

Risk of bias assessment

In the original Cochrane Review, each study was quality appraised using the Cochrane Risk of Bias tool visualized by the Risk-of-bias VISualization (robvis) tool [17]. Studies were classified as having the highest risk of bias if any item on the risk of bias tool was scored at high risk as set out in the criteria provided by Higgins [18].

Effect measures

In the original Cochrane review, instruments measuring patient-clinician communication included in the meta-analysis were the OPTION instruments, the CollaboRATE-SDM and, SDM-Q-9:

- Observer OPTION^{12} instrument [19] is a 12-item instrument used by a third party observer to assess the degree of SDM observed in medical consultations, focusing on the physician behavior. The observation may be conducted in person or by viewing a video of the consultation. Each item is rated on a 5-point Likert scale ranging from 0 (behavior not observed) to 4 (behavior observed and executed to a high standard). Scores are aggregated to create an OPTION sum score, which is then standardized into a 0-100 scale ranging from 0 (least involved) to 100 (most involved).
- Observer OPTION^{5} instrument [2]: Developed as a brief version of Observer OPTION^{12}, this 5-item instrument measures patient involvement in clinical decision making. Each item is rated on a 5-point Likert scale ranging from 0 (zero effort observed) to 4 (exemplary effort observed). The OPTION^{5} sum score is standardized into a scale ranging from 0 (least involved) to 100 (most involved).
- Shared Decision Making Questionnaire 9 (SDM-Q-9) instrument [20]: This 9-item patient-reported measure assesses the patient perceived level of involvement in SDM. Each item is rated on a 6 point Likert scale, from "completely disagree" (0) to "completely agree" (5). To transform the raw score to a 0-100 scale, sum scores for each patient (ranging from 0 to 45) are multiplied by 100/45. A score of 0 indicates the lowest possible level of SDM while 100 reflects the highest level.
- CollaboRATE instrument [21]: This patient-reported measure evaluates the patient's experienced involvement in SDM across three items, each rated on a 10-point Likert scale from 0 ("no effort was made") to 9 ("every effort was made"). For each patient, scores are summed (ranging from 0 to 27), and then transformed to a 0-100 scale by multiplying the raw score, with 100 indicating the highest possible level of involvement.

For this secondary analysis, the primary outcomes of interest were the effect of PtDAs on observer-reported, patient-reported or clinician-reported measures of patient-clinician communication.

Synthesis methods

For this secondary analysis, findings were initially grouped into PtDAs used pre-consult and in-consult. If a study provided outcome data on patient-clinician communication, results were pooled for meta-analysis using Review Manager [22]. Studies were grouped by outcome measure and presented in forest plots, displaying mean communication scores with corresponding CIs.

Dichotomous outcomes were analyzed using risk ratios (RRs) with 95% confidence intervals (CIs), calculated from event counts in intervention and control groups. Continuous outcomes were analyzed using means, standard deviations (SDs), and sample sizes. A weighted average was used to estimate overall effects. The pooled estimate provided an overall effect measure.

The proportion of patients engaging in discussions with their clinician was calculated with 95% CIs. A proportion of 1 indicated full discussion, while values below 1 indicated minimal discussions with the clinician [23]. A random-effects model with inverse variance (IV) weighting was used to account for expected heterogeneity due to differences in study populations and PtDA topics.

Patient and public involvement

Patients and members of the public were not involved in the design, conduct, reporting, or dissemination of this study.

Results

Characteristics of studies

Of the 209 RCTs included in the 2024 Cochrane Review, 36 studies reported on patient-clinician communication [24–59], involving 13,418 patients making a

health-related treatment or screening decision (Table 1). The majority of studies were conducted in the USA (30 studies, 83%), while the remaining six studies were carried out in the UK, Germany, the Netherlands, Australia and Taiwan.

Risk of bias

A summary of the risk of bias percentages across all included studies and domains is presented in Fig. 1. Of the 36 included RCTs, seven studies (19%) had a high risk of bias due to various factors. One pre-consult study was rated high risk due to failure to account for clustering in the analysis [56]. The remaining six in-consult studies had high risk of bias attributed to lack of blinding of assessors for observer-reported outcomes [37, 40], potential contamination at the clinician level [39], conflicts of interest and imbalanced allocation to arms and socioeconomic status [29], selective recruitment of cluster participants [51], and high attrition rates [57]. Risk of bias assessment for each study included in the meta-analysis is available in Figs. 2, 3 and 4.

Characteristics of the PtDAs

The PtDA interventions addressed a range of health decisions (Table 1).

Among 36 studies, 21 (58%) evaluated pre-consult PtDAs with a total of 7,716 patients. Of these, 62% addressed treatment or preventive decisions and 38% addressed screening decisions and obstetrics. Formats for the PtDAs were 62% digital (e.g., videos, web-pages or online programs), 29% paper-based, and 9% both.

Fifteen studies (42%) examined the use of in-consult PtDAs with a total of 5,702 patients. Of these studies, 80% addressed treatment decisions, 20% investigation, and 0 screening decisions. The in-consult PtDAs were 67% paper-based, 20% digital (e.g. online or web-based), and 13% both.

Patient-clinician communication

Among the 36 studies, patient-clinician communication was measured using various approaches. Observer-reported measures were used in 11 studies (31%), with one study conducted pre-consult and the remaining 10 in-consult. Patient-reported measures were used in 8 studies (22%), split evenly between pre-consult (4 studies) and in-consult (4 studies). All 11 studies (31%) that measured communication based on discussion of the decision with the clinician were conducted pre-consult. None of the 36 studies included clinician-reported measures of patient-clinician communication. Ten studies (16%) did not provide suitable data for meta-analysis.

Pre-consultation PtDAs

For the pre-consult group, five studies were included in the meta-analysis for continuous measures (Fig. 2). Only one study, by Stubenrouch [56], used an observer-reported measure, showing PtDA improved communication compared to usual care (mean difference 9.10; 95% CI: 6.45 to 11.75). For patient-reported measures, there was no statistically significant difference for CollaboRATE [36] or meta-analysis of SDM-Q-9 [26, 38].

In 11 studies, patients reported discussion of the decision with their clinician (Fig. 3). Compared to usual care, 68.6% of patients in the pre-consult PtDA group discussed the decision with their clinician compared to 50.2% in the usual care group (95% CI 1.19 to 1.70).

In-consult PtDAs

Ten studies of in-consult PtDAs were included in the meta-analysis (Fig. 4). Nine studies employed an observer-reported instrument and one used a patient-reported instrument. Compared to usual care, PtDA participants had improved communication with clinicians using OPTION^{12} (mean difference 12.14; 95% CI 8.12 to 16.16). Durand et al. [29] reported a significantly higher mean OPTION^{5} score in the PtDA group compared to the usual care group (mean difference 32; 95% CI 27.20 to 36.80). There was no difference for patient-reported communication measured using CollaboRATE [25].

Training

Of the 36 studies, 16 (44%) stated clinicians were trained in SDM and/or use of PtDA, 5 (%) stated no training, and 15 (%) did not report on training (Table 1). Of the 16 studies reporting on training, six were for pre-consult PtDAs and ten for in-consult PtDAs. Ten studies reported details on the training, and it ranged from brief, three-minute demonstrations on how to use a decision aid to three-hour training sessions.

Discussion

The findings of this secondary analysis of 36 RCTs provide new insights into how the timing of PtDA implementation influences patient-clinician communication. Both pre-consult and in-consult PtDAs showed improvements in patient-clinician communication, but the effects varied depending on the type of outcome measure used. For pre-consult PtDAs, meta-analysis showed statistically significant improvement in the proportion of patients who discussed the topic with their clinician and no difference in patient-reported SDM-Q-9 instrument. For in-consult PtDAs, meta-analysis showed statistically significant improvements in using the observer-rated OPTION^{12} instrument that measures SDM and inadequate reporting to conduct meta-analysis on patient-reported measures. These findings underscore that both

Table 1 Characteristics of included studies ($n = 36$)

Author, year	Country	Study participants	Clinicians training	Decision type	Format PtDA	Outcome measure
Pre-consult PtDA						
Berger-Hoger 2019 [24]	Germany	36	Yes	Treatment of breast cancer	64 page decision aid	MAPPIN-O
Chen 2021 [26]	Taiwan	66	Yes	Treatment of lumbar degenerative diseases	Booklet	SDM-Q-9
Cox 2019 [27]	USA	121	Yes	Treatment of mechanical ventilation	Web based	Quality of communication
Fraenkel 2012 [30]	USA	69	NR	Treatment of cardiovascular disease	Computerized PtDA	Discussed risk of stroke
Hanson 2011 [31]	USA	126	NR	Treatment of feeding tube	Booklet + audio	Discussed feeding
Ibrahim 2013 [35]	USA	331	No	Treatment of knee osteoarthritis	Video	Discussed knee pain
Kostick 2018 [36]	USA	27	NR	Treatment of left ventricular assist device	Paper and web-based	CollaboRATE
Kuppermann 2020 [38]	USA	664	NR	Obstetric: Childbirth procedure	Web-based	SDM-Q-9
Lepore 2012 [41]	USA	215	Yes	Screening of prostate cancer	Pamphlet + telephone call	Discussed PSA testing
Lewis 2018 [42]	USA	209	NR	Screening of colorectal cancer	Paper-based	Discussed screening
Madden 2020 [43]	USA	161	NR	Obstetric: Birth control method	Tablet-based	Discussed contraception
McGrath 2017 [44]	Australia	30	No	Obstetric: Considering pregnancy	PDF booklet	Items on motherhood decision
Miller 2018 [46]	USA	197	NR	Screening of colorectal cancer	Video	Discussed screening
Politi 2020 [49]	USA	60	No	Treatment of breast cancer	Web-based	CollaboRATE
Schonberg 2020 [50]	USA	279	NR	Screening of breast cancer	Pamphlet	Discussed mammography
Sheridan 2006 [52]	USA	41	No	Prevention of cardiovascular disease	computerized DA	Discussed CHD
Sheridan 2011 [53]	USA	79	Yes	Prevention of cardiovascular disease	computer program	Discussed CHD
Singh 2019 [54]	UK	151	NR	Treatment of lupus	Web-based	Interpersonal Processes of Care short form
Smallwood 2017 [55]	USA	29	NR	Treatment of osteoporosis	Web-based	Items adapted by Fowler
Stubenrouch 2022 [56]	Netherlands	171	Yes	Treatment of cardiovascular disease	Web-based	OPTION^5
Tebb 2021 [57]	USA	320	NR	Obstetric: Birth control method	Web-based	Discussed contraception
In-consult PtDA						
Bergeron 2018 [25]	USA	24	Yes	Treatment of sleep apnea	OPTION grid	CollaboRATE
Coylewright 2016 [28]	USA	34	Yes	Treatment of cardiovascular disease	Paper-based	OPTION^{12}
Durand 2021 [29]	USA	66	Yes	Treatment of breast cancer	Paper-based	DQI decision process score
Hess 2012 [32]	USA	101	Yes	Investigation of chest pain	1 page printout	OPTION^{12}
Hess 2016 [33]	USA	264	NR	Investigation of chest pain	Paper-based	OPTION^{12}
Hess 2018 [34]	USA	267	Yes	Investigation of brain injury	Paper-based	OPTION^{12}
Kunneman 2020 [37]	USA	419	Yes	Treatment of cardiovascular disease	Online	OPTION^{12}
LeBlanc 2015 [39]	USA	25	NR	Treatment of osteoporosis	Leaflet	OPTION^{12}
LeBlanc 2015b [40]	USA	57	Yes	Treatment of mental health	Laminated cards	OPTION^{12}
Meier 2019 [45]	USA	48	No	Treatment of sleep apnea	Paper	OPTION^{12}
Montori 2011 [60]	USA	38	NR	Treatment of osteoporosis	Worksheet	OPTION^5
Mullan 2009 [48]	USA	48	Yes	Treatment of diabetes	Decision cards	OPTION^{12}

Table 1 (continued)

Author, year	Country	Study participants	Clinicians training	Decision type	Format PtDA	Outcome measure
Schott 2021 [51]	USA	32	Yes	Treament of cardiovascular disease	Web-based	CollaboRATE
Weymiller 2007 [58]	USA	23	NR	Treatment of diabetes	Decision board + pamphlet	OPTION^{12}
Wyld 2021 [59]	UK	71	Yes	Treatment of breast cancer	Web-based and booklet	CollaboRATE

NR: Not reported

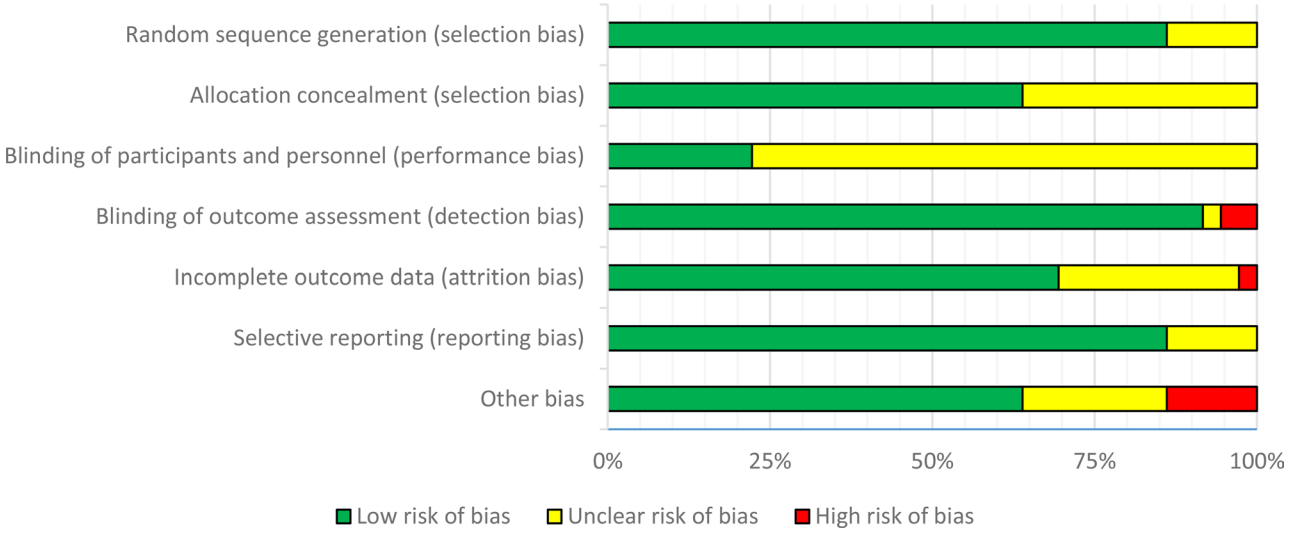

Fig. 1 Risk of bias summary as percentages across all included studies and domains

the timing of PtDA use and the choice of measurement instrument critically influence the observed effects on communication.

Patient-clinician communication is measured differently in studies that evaluated pre-consult versus in-consult PtDAs. In-consult studies were more likely to use observer-rated instruments, while pre-consult studies typically used patient-reporting of discussions about the decision. This variation complicates indirect comparisons between pre-consult and in-consult PtDA findings. If the goal is to assess the quality of SDM, observer-rated tools may offer greater sensitivity than patient-reported measures [21]. The discrepancy between observer-reported and patient-reported measures highlights the complexity of evaluating communication outcomes and raises an important question about the potential utility of observer-rated measures for pre-consult PtDAs, which could help assess their impact on patient involvement in communication about decisions. Studies generally show that patient-reported results tended to be high, suggesting ceiling effects in some of these instruments (i.e. CollaboRATE, SDM-Q-9) [61–65]. The observer OPTION^{5} and OPTION^{12} instruments, recognized for their minimal ceiling effects [21], may provide a more comprehensive evaluation when used across different timing strategies. The observed discrepancy between patient-reported and observer-rated measures further underscores the value of incorporating both perspectives to achieve a balanced understanding of the effect of PtDAs on patient-clinician communication, recognizing that patient- and observer-rated measures capture different but equally important aspects of communication quality and SDM.

Although comparisons of findings between PtDA pre-consult or in-consult was limited due to methodological variability and measurement inconsistencies among studies, this meta-analysis highlights important differences in the effect of pre-consult and in-consult PtDAs on patient-clinician communication. Pre-consult PtDAs showed moderate improvement in communication, compared to usual care, although one pre-consult study using the OPTION^{5} observer measure showed a statistically significant improvement [56]. In contrast, in-consult PtDAs demonstrated a significantly greater improvement in communication. The stronger overall effect observed for in-consult PtDAs suggests that PtDAs integrated directly into the clinical encounter may be more effective in facilitating communication aimed at achieving SDM. One factor that may explain this is that in-consult PtDAs provide real-time support and structure to the conversation, when used appropriately, ensuring that both patients and clinicians actively engage in communications relevant to

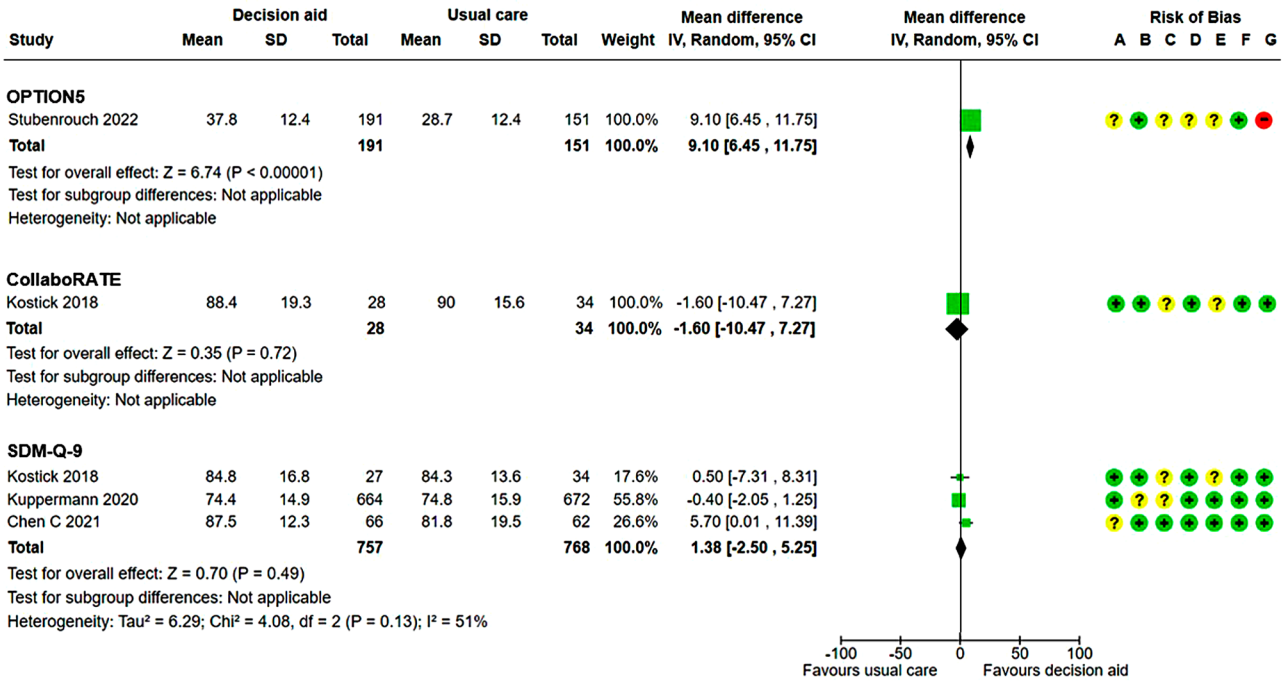

Fig. 2 Outcomes related to patient-clinician communication for pre-consult PtDA by instrument

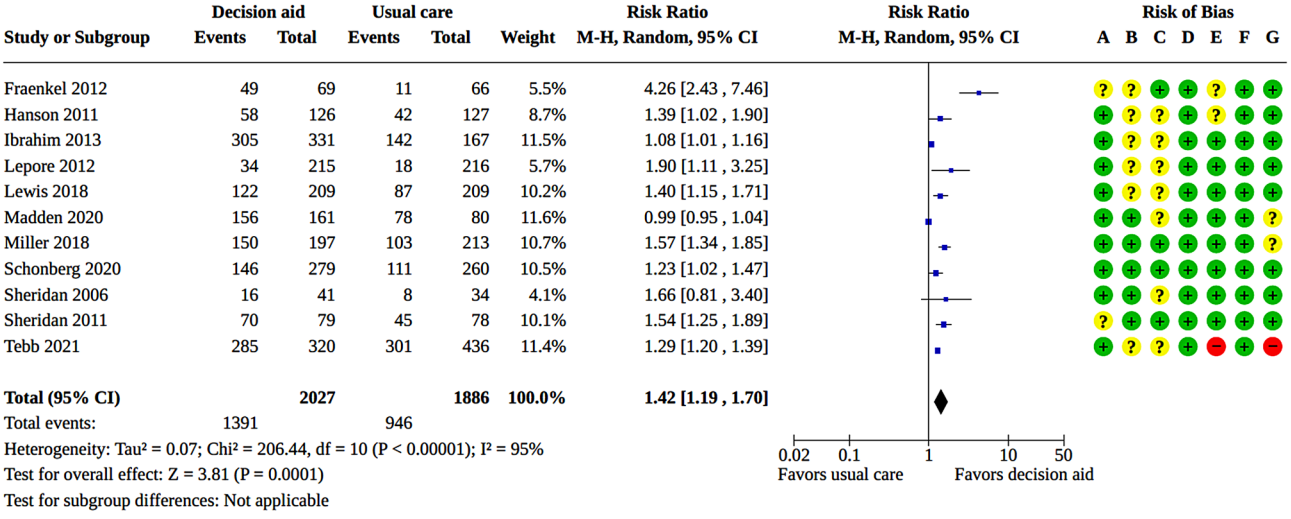

Fig. 3 Patient reported decision discussed with clinician for pre-consult PtDAs

the decision-making process. This may be particularly important for complex treatment decisions that require immediate clarification and discussion.

While use of PtDAs pre-consult and in-consult appear to support patient-clinician communication, differences in content and format may reflect the contexts in which they are typically used. Pre-consult PtDAs were predominantly used in screening and preventive decisions, where digital tools facilitated patient reflection before the clinical encounter. In contrast, in-consult PtDAs were primarily paper-based and used in treatment decisions, supporting real-time discussions between patients and clinicians. These findings suggest that the nature of the decision-making context may indicate the optimal PtDA timing and format; an important consideration for future interventions. While this secondary analysis focused on studies comparing PtDAs to usual care, a review of RCTs that compared multiple PtDAs [66–69] found that each study either focused on the use of PtDAs pre or in consultations and did not directly address timing effects or compare PtDA use at different time points. This gap highlights the need for research explicitly focused on evaluating how timing effects PtDA outcomes, but also the way PtDAs are used

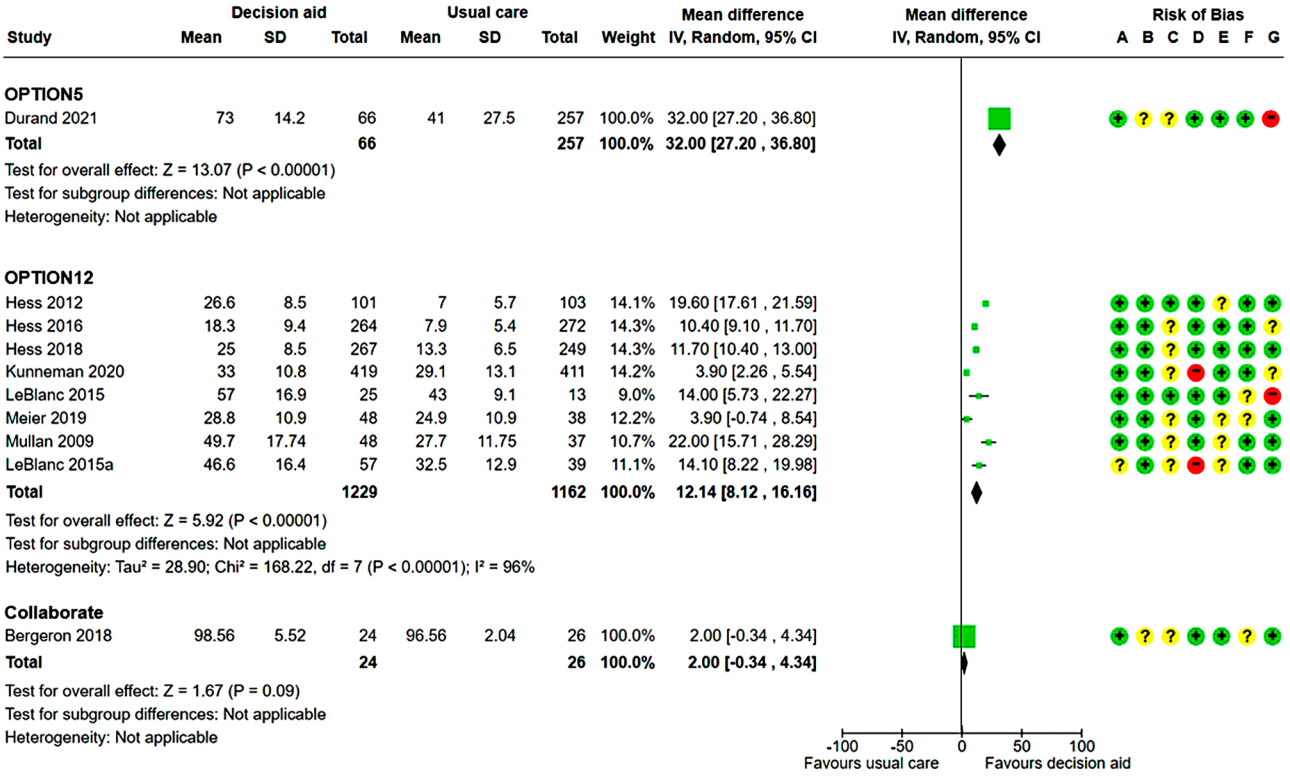

Fig. 4 Outcomes related to patient-clinician communication for in-consult PtDA by instrument

in consultations, which may be influenced by the PtDA format or the clinician.

For 36 included studies, 7 (19%) were rated as high risk of bias, which may have influenced the findings, particularly regarding how outcomes were measured and how the PtDA interventions were delivered. Notably, the risk of bias assessment varied between pre-consult (one with high risk) and in-consult PtDAs (six with high risk). The greater proportion of high-risk studies in the in-consult category suggests that methodological issues, such as clinician-level contamination and difficulties in blinding (e.g. subjective measures), may have disproportionately affected these findings. Additionally, issues such as potential contamination at the clinician level and selective recruitment of cluster participants suggest that the delivery of PtDA interventions may not have been consistent or adequately controlled. These considerations emphasize that the implications of findings from studies with high risk of bias should be interpreted cautiously, as they may influence the reliability and generalizability of the reported outcomes.

Another important factor that may influence the effectiveness of PtDA is the training provided to clinicians. Among the 36 studies included in this secondary analysis, only 16 explicitly reported providing clinician training, with considerable variability in the duration and content. This lack of standardization in clinician preparation may impact the integration of PtDAs into patient-clinician consultations and the overall effect on patient-clinician communication. Among the 21 pre-consult PtDA studies, fewer than one-third reported on clinician training, indicating that training may be overlooked when implementing PtDAs in pre-consult contexts. In contrast, 67% of in-consult PtDA studies reported providing training. Future research should explore whether training needs differ when PtDAs are introduced before the consultation compared to during the consultation, and how such training could support effective use of PtDAs in both contexts. In addition, patients may also benefit from communication and SDM training. Preparing both parties could further enhance the quality of patient-clinician communication, and future interventions might therefore consider training both patients and clinicians.

This analysis has several limitations. We did not conduct sensitivity analyses excluding high-risk studies. Subgroup analyses were limited, and heterogeneity related to setting, condition, or training was not fully explored. Additionally, the search period of the Cochrane Review ended in March 2022, which may have excluded relevant recent publications.

Conclusion

Our findings suggest that while both pre- and in-consult PtDAs have a positive effect on patient-clinician communication, the outcome has been measured differently based on the timing of when the PtDA was used. The findings indicate that patients given pre-consult PtDAs are more likely to report discussion about the decision with their clinician, and in-consult PtDAs are more likely to result in observer-rated patient-clinician communication indicating SDM.

Despite these insights, this secondary analysis also revealed gaps in evidence and limitations. Variability in measurement instruments and methodological inconsistencies across studies hindered synthesis of findings. The observed discrepancies between patient-reported and observer-rated measures underscore the need for integrating multiple perspectives to achieve a better understanding of the influence of PtDAs on patient-clinician communication.

Future research should prioritize addressing these gaps by conducting comparative studies that explicitly evaluate the timing effects of PtDAs. Research should aim to address methodological limitations, explore hybrid timing approaches that combine pre-consult reflection with in-consult support to optimize decision-making and enhance communication, and ensure consistency in measurement tools to advance our understanding of how to optimize PtDA use.

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Author contributions
Conception – BMK, DS, KDS. Extraction of data – BMK, SRS, MC. Data analysis – BMK, DS, KDS. Methodology and supervision – DS, KDS. Original draft of the manuscript – BMK. All authors reviewed and approved the final manuscript.

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Data availability
The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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