A Scoping Review of Decision Support Tools for Patients with Lower Extremity Arterial Disease: Toward Shared Decision-Making

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Background: In recent years, decision support tools (DSTs) in various fields of medicine have emerged to aid clinicians and patients in the process of shared decision-making (SDM). This scoping review aims to identify the existing DSTs for selecting treatments in lower extremity arterial disease and to evaluate their effectiveness in facilitating SDM.

Methods: The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for scoping reviews were followed. A literature search was conducted across MEDLINE, EMBASE, and Cochrane databases, along with the Decision Aid Library Inventory, for studies published between January 2000 and June 2023. Articles reporting the development and/or clinical application of a DST specific to lower extremity arterial disease were included. A narrative synthesis of the results was performed and findings were presented in tabular formats.

Results: Five studies and 5 unique DSTs were included. Presenting formats included websites, booklets, brochures, and pocket cards. Overall, a high degree of heterogeneity was observed across all DSTs in their format, content, and delivery. A widespread acceptability and satisfaction were reported among patients and clinicians. However, their effect at improving SDM remains uncertain due to the lack of standardized outcome metrics.

Conclusions: The development and implementation of DSTs for lower limb arterial disease treatment discussion remain in the early stages. This review lays the foundation for future studies to continue exploring optimal strategies for DST development and their role in supporting SDM.

INTRODUCTION

Lower extremity arterial disease (LEAD) is a prevalent vascular condition that is associated with high morbidity and mortality.[1] Despite significant advancements and an increasing number of treatment options, the long-term outcome in LEAD remains suboptimal.[2–4] This is particularly evident in chronic limb-threatening ischemia (CLTI).[5] Moreover, selecting a suitable treatment approach to achieve the most optimal health outcome can often be a challenging decision, given the differing risks and benefits associated with each option.

Shared decision-making (SDM) has been increasingly recognized as a way to improve the treatment decision-making process and subsequent health

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Table I. Population-concept-context search algorithm—scoping review using a systematic approach

Population	Patients of any age and sex considering treatments for LEAD
Concept	Development and/or clinical application of a DST for LEAD management that satisfies the definition provided in the eligibility criteria
Context	English language studies Published from 2000 onward[a]

[a]The search was limited to studies published from 2000 onward to identify DSTs that present the latest available treatment options.

outcomes.[6,7] SDM utilizes collaborative partnerships between clinicians and patients to tailor management plans aligned with patients' circumstances and treatment goals.[8,9] However, despite the potential that SDM has at improving patient-centered care, its integration into clinical practice has been impeded by several major factors. These include time constraints on patient consultations, insufficient patient education, variable levels of medical decision-making capacity, and the lack of a standardized framework in approaching SDM.[10,11]

To address these issues, various decision support tools (DSTs) have been developed across multiple medical conditions to facilitate the process of SDM, including decision aids, interview question prompts and communication training programs.[12,13] Based on the definition provided by Elwyn et al.,[14] the term ''decision support tool'' in this study refers to a structured instrument that delivers information regarding 2 or more treatment options along with their corresponding risks and benefits. These DSTs serve to improve patients' disease-specific knowledge, enhance their understanding of available management options, and increase their involvement in treatment decision-making. In the field of vascular surgery, DSTs specific to abdominal aortic aneurysm and carotid stenosis have previously been designed to improve the quality of clinical decisions.[15–17] In comparison, DSTs designed specifically for patients with LEAD have not been well characterized.

As the extent of available literature regarding LEAD-specific DSTs has not previously been reported, we decided to perform a scoping review to identify these DSTs and evaluate them. Through this, we aim to compare the efficacy of DSTs specific to LEAD treatment selection by examining their implementation and reported outcomes, and additionally identify the obstacles encountered by each DST to improve future iterations.

METHODS

This review was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR).[18] The review question was decomposed using the population-concept-context framework as recommended by the Joanna Briggs Institute for scoping reviews[19] to guide the development of search terms and eligibility criteria (Table I).

Eligibility Criteria

Studies reporting the development and/or clinical application of any DSTs specific to LEAD treatment selection were included. Only English language DSTs or DSTs with an available English version were included in this scoping review, primarily to aid direct evaluation and comparison of DSTs without requiring secondary translation to English. The complete eligibility criteria are provided in Table II.

Search and Information Sources

A preliminary search was conducted in MEDLINE (Ovid) to identify the relevant Medical Subject Headings (MeSH) and keywords. A full literature search was then performed in consultation with a professional research librarian across MEDLINE (Ovid), EMBASE, and Cochrane Library for all English language studies from January 2000 to June 2023. The full search strategy for MEDLINE (Ovid) is provided in supplementary Table S1 and adapted search strategies were used for other databases with corresponding subject terms.

Additional DSTs were searched in the Decision Aid Library Inventory (DALI: https://decisionaid.ohri.ca/index.html) developed by the Ottawa Hospital Research Institute (OHRI). This database has been widely used as an additional source of DSTs across multiple studies exploring the topic of SDM in various medical specialties.[20–22] It contains a comprehensive list of publicly available DSTs that have been reviewed by the OHRI team against the qualification criteria of the International Patient Decision Aids Standards (IPDAS)[23] with ongoing updates and submissions from researchers and developers. The manual search of this database was done by looking up the DSTs listed under the topic of ''Peripheral Arterial Disease'' in the A-to-Z

Table II. Eligibility criteria

Inclusion criteria	Exclusion criteria
1. Studies that involved the use of DSTs in patients considering LEAD treatments. 2. Studies of mixed vascular conditions were permitted providing that a DST for LEAD was included 3. Relevant DSTs listed in the DALI database with or without associated literature 4. Comparative or noncomparative study design 5. Quantitative, qualitative, and mixed method study design	1. Studies that did not use or describe a DST 2. DSTs not for treatment of LEAD 3. Non-English language DSTs 4. DSTs from studies that did not contain primary research results, such as in systematic reviews, protocol development, reports, and editorials

inventory, as recommended by the DALI user guidelines.[24] This was completed with a final hand search of the lists of included study articles.

Selection of Sources of Evidence

After removing duplicates, titles and abstracts were screened to identify relevant studies. A full-text review was then performed independently by 2 reviewers (A.Y. and J.D.) against the prespecified eligibility criteria. Selection results were compared with each other and any discrepancies were discussed and resolved by consensus with a third reviewer (L.S.). This was supplemented with a manual search in the DALI and reference lists for any additional eligible studies and DSTs as previously described.

Data Extraction and Synthesis of Results

Following full-text review, data extraction and charting were performed by A.Y. using a predefined template and verified by J.D. Items extracted from eligible studies included general publication information (authors or developers, year of publication, country of origin), study details (study design, objectives, cohort size, and characteristics), characteristics of the DST (format, content, and delivery), and any reported outcomes and key findings. A narrative synthesis with supporting tables was used to present the results. Studies were ordered chronologically to reflect the temporal trends in the development of LEAD-specific DSTs.

RESULTS

Study Selection

The review process is summarized in the PRISMA flowchart (Fig. 1). Of the 853 articles yielded from the database search, 5 studies were included in the final review.[25–29] Search in the DALI identified 2 relevant DSTs.[27,30] One had already been identified through the primary database search,[27] whereas the other one was a web-based decision aid without any associated literature.[30] This DST had not been identified previously through the primary database search and was therefore added. No additional articles were found in the final hand search of the reference lists of included articles. In total, 5 studies with 5 unique DSTs were included in this review.[25–30]

Study Characteristics

An overview of the main study characteristics and key findings are presented in Table III. Of the 5 included studies with a reported total of 307 participants, 3 described the development process and preliminary testings of the DST,[25,27,28] one was a randomized controlled trial,[26] one was a stepped-wedge clustered-randomized trial.[29] One additional DST found through the DALI was a web-based DST without any associated published articles.[30] Various methods were used to collect outcome data, including pre and post consultation questionnaires, surveys, and audio recordings.

Synthesis of Results

Types of decision support tools. The individual characteristics of the 5 included DSTs were summarized in Table IV. All DSTs were LEAD specific with 2 studies[26,28] also described the development of separate DSTs targeting other vascular conditions, such as abdominal aortic aneurysm, carotid stenosis, and varicose veins. A diverse range of presenting formats were employed. The DST from Quigley et al.[25] consisted of paper-based booklets, where information was presented in the layout of figures and infographics. LeBlanc et al.[26] used radiological images as visual aids to facilitate the consultation. The remaining 3 DSTs from Smolderen et al.,[27] de

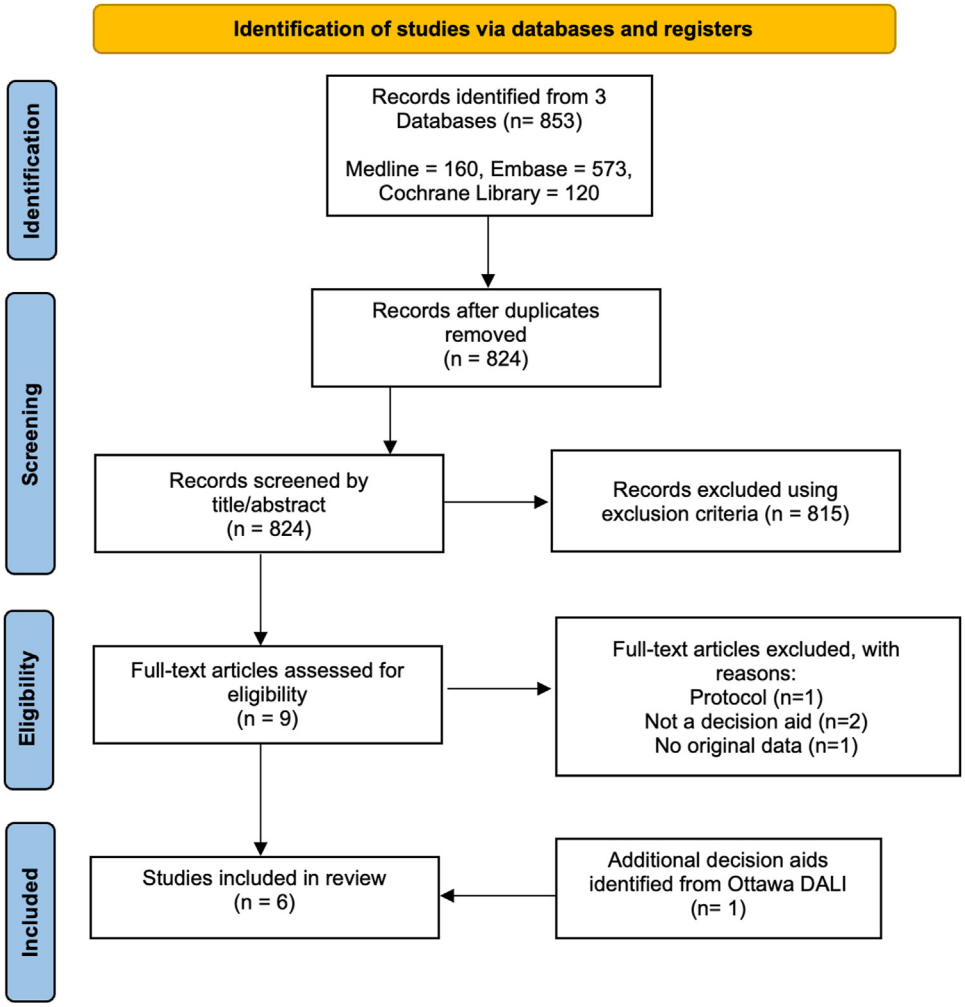

Fig. 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) study inclusion flowchart of the scoping literature review of decision aids in the management of lower limb arterial disease.

Mik et al.[28] and Healthwise[30] developed web-based applications with incorporated quizzes, questionnaires, 3D animations, and prerecorded videos, of which Smolderen et al.[27] and de Mik et al.[28] also created paper-based brochures and pocket-sized discussion cards. Additionally, 2 of the DSTs[25,27] were created following the IPDAS[23]; one was created following the model described by Coulter et al.[31] Finally, 2 of the DSTs[27,30] have been registered and listed in the OHRI shared decision aid database.[32]

Content and delivery of decision support tools. In contrast to the wide array of presenting formats, the content addressed across the DSTs shared a considerable degree of similarity in themes. With the exception of LeBlanc et al.,[26] which utilized patients' radiological images as visual references, the remaining 4 DSTs predominantly focused on providing an overview of LEAD, outlining available treatment options and highlighting their respective risks and benefits, alongside outcomes and potential complications. The most common topics covered in the LEAD overview include signs and symptoms, risk factors, diagnostic tests, and a simplified explanation of the underlying pathophysiology. Additionally, 4 of the DSTs[25,27,28,30] also integrated questionnaires with rating scales at the end to encourage active self-reflection and evaluation.

With regard to the clinical integration of DSTs, 2 of the 5 DSTs were designed for patients to use outside of consultations,[27,30] one was intended to be used during the consultations[26] and the other 2 contained separate sections to be used both during as well as outside of consultations.[25,28] In terms of

Table III. Overview of included study characteristics and findings

First author/ Developer and year	Name of DST[a]	Study design	Aim	Study population, size (*n*), gender (F), mean age (years)	Summary of study methodology	Outcome measures	Key findings
Quigley 2018[20]	Amputation decision aid and discussion guide	Observational, (alpha testing)	To describe the development process of the DSTs for patients facing dysvascular amputations	Patients with PFA[b] and clinicians that were not involved in the development process not reported	DSTs were evaluated by clinicians (vascular and orthopedic surgeons, rehabilitation physicians, prosthetists, academics, and a SDM[c] expert) and patients living in the community with PFA	Content comprehensibility, appropriateness, and usability	Feedback to improve the content clarity (lengthy text to be simplified using bullet points), questioned the need to include difficult topics (mortality, limitations of current evidence)
LeBlanc 2018[21]	Preoperative computed tomography or angiogram	Randomized controlled trial	To assess the effect of showing patients their radiological images at improving their preoperative discussion satisfaction, understanding, trust, and anxiety	Patients awaiting elective AAA[d] repair or lower limb revascularization Lower limb revascularization: CG[e]: $n = 16$ IG[f]: $n = 14$. Age and gender for the lower limb revascularization groups were not reported	CG received standard discussions with the vascular surgeon; IG received standard discussion and imaging review. Vascular surgeons were instructed to point out the findings on the images and to illustrate the proposed procedure using the images as a visual reference. A 15-item survey was administered to the patient straight after the preoperative discussion	Primary: patient satisfaction with the preoperative discussion (SAPS[g] scale). Secondary: patient's anxiety, understanding of the information, and trust in the surgeon. Each item was scored on a 5-point scale. The length of the consultation was also recorded using a timer.	No significant difference in patient satisfaction between IG and CG (mean score 24.8 vs. 24.9, $P = 0.88$). No significant difference between IG and CG in patients' anxiety for surgery (2.12 vs. 2.35, $P = 0.41$), understanding of information presented (3.64 vs. 3.42, $P = 0.18$), or level of trust for the surgeon (30.2 vs. 31.6, $P = 0.08$). Average length of discussion was longer for IG but nonsignificant (8.18 vs. 6.35 mins, $P = 0.07$)
Smolderen 2021[22]	SHOW-ME PAD	Observational, (alpha testing)	To report the development process and preliminary testing outcomes of the DSTs	Patients with PAD[h] and clinicians (vascular surgeons, cardiologists, and allied health) Patients ($n = 20$, F: 60%, 70 y), clinicians ($n = 23$, gender and mean age not reported)	Prototype decision aids were sent to the participants. Following the DST review, participants filled out a 44-item survey via REDCap. Clinicians also evaluated the DSTs against the IPDAS[i] quality criteria.	Clarity, volume, and presentation of the information being included, user-friendliness and satisfaction with the decision aid prototypes	All participants thought information provided in the brochure was relevant and 90% thought it was user-friendly. 75% patients and 65% clinicians thought the brochure would be a useful instrument for PAD decision-making, and 85.7% patients and 76.5% clinicians thought the same for the website
de Mik 2021[23]	DSTs for AAA, carotid stenosis, PAD, and varicose veins	Observational (alpha testing)	To describe the development process of three DSTs to help patients and vascular surgeons to apply SDM	Patients recruited from heart council and vascular surgeons from Dutch Society of Vascular Surgery. Patients ($n = 52$), vascular surgeons ($n = 18$), age, and gender not reported	DST prototypes and an evaluation survey were sent to the participants via emails	Clarity and comprehensibility of the information presented; usability and satisfaction with the DST prototypes	From the patient participants, the web-based decision aid was ranked as the most preferred DST out of the 3 types (45 out of 52 patients ranked it as the top preference). In contrast, the decision cards were ranked as the most preferred DST from the vascular surgeons (10 out of 18 vascular surgeons ranked it as the top preference).

(*Continued*)

Table III. Continued

First author/ Developer and year	Name of DST[a]	Study design	Aim	Study population, size (*n*), gender (F), mean age (years)	Summary of study methodology	Outcome measures	Key findings
Stubenrouch 2022[24] OVIDIUS[j] trial	DSTs for AAA, PAD, and varicose veins	Stepped wedge cluster-randomized trial	To evaluate the effectiveness of 3 types of DSTs at improving SDM in treating AAA, PAD, and varicose veins	Patients with AAA, PAD, or varicose veins, where multiple treatment options are possible, were recruited from the outpatient clinics of 13 Dutch hospitals PAD groups: IG: $n = 76$ CG: $n = 67$. Mean age for all PAD participants was 67 years and 27% were female	The online decision aid was emailed to the patients. Decision cards were used by clinicians during consultations. Clinicians received trainings on the communication steps involved in SDM and using DSTs during consultations. Data were collected via questionnaires before and after the consultations, consultation audio recordings, and the web-based decision aid's management system.	Primary outcome: level of SDM (OPTION-5[k] score). Secondary outcomes: SDM perceived by patients (SDM-Q-9[l], CollaboRATE[m], and CPS[n]) and vascular surgeons (SDM-Q-DOC[o]), degree of desired patient involvement (CPS), decisional conflict (DCS[p]), patient's QoL[q] scored after the consultation and 6 weeks after treatment (QoL, SF12[r]), patient's disease-specific knowledge, treatment choice, and consultation duration	A 9.3-point increase in OPTION-5 score between CG and IG (24.5 vs. 33.8, $P < 0.001$). The largest improvement was seen in item 4 ''preference elicitation.'' No significant differences in SDM-Q9, CollaboRATE, and DCS between IG and CG. The median SDM-Q-DOC score was higher in IG and CG (80%, IQR 71.1%, 86.7% vs. 73.3%, IQR 64.4%, 84.4%). The disease-specific knowledge score was significantly higher in IG than CG (20% increase, $P = 0.006$). More patients in IG preferred nonsurgical treatments than CG (16% increase for supervised exercise training and 9% increase for conservative treatment).
Healthwise 2022 (latest update)[25]	PAD: should I have surgery?	Not reported					

[a]DST, decision support tool.
[b]PFA, partial foot amputation.
[c]SDM, shared decision-making.
[d]AAA, abdominal aortic aneurysm.
[e]CG, controlled group.
[f]IG, intervention group.
[g]SAPS, Short Assessment of Patient Satisfaction.
[h]PAD, peripheral artery disease.
[i]IPDAS, International Patient Decision Aids Standards.
[j]OVIDIUS, Operative Vascular Intervention Decision-making Improvement Using SDM tools.
[k]OPTION-5, 5-item observing patient involvement instrument.
[l]SDM-Q-9, a 9-item Shared Decision Making patient questionnaire.
[m]CollaboRATE, a 3-question patient-reported measure of shared decision making.
[n]CPS, Control Preference Scale and Control Perception scale.
[o]SDM-Q-DOC, a 9-item Shared Decision Making doctor questionnaire.
[p]DCS, Decisional Conflict Scale.
[q]QoL, quality of life.
[r]SF12, Short Form Health Survey.

Table IV. Overview of included decision support tools

First author/ Developer and year	Name of DST[a]	Country	Intended audience	Interventions of interest	Description of DST
Quigley 2018[20]	Amputation decision aid	Australia and United States	Patients who require PFA[b] due to PAD[c]	Different levels of partial foot amputation Partial foot and transtibial amputation	A booklet of infographics describing PFA and transtibial amputation along with their complications. The outcomes for each intervention are presented in a comparison table, supported with bar graphs and pie charts. A list of questions is included at the end to help patients at recognizing their concerns and decision preferences.
	Amputation discussion aid	Australia and United States	Health professionals involved in the preoperative discussion for PFA	Same as above	A booklet containing examples of patient questions, conversation starters, and question prompts to assist clinicians at facilitating the preoperative discussion with patients and to elicit their preferences and treatment goals. Focused outcomes include wound healing, complications, risk of future amputation, quality of life, mobility, pain, mortality, and psychosocial impact.
LeBlanc 2018[21]	Preoperative computed tomography or angiogram	Canada	Patients awaiting elective AAA[d] repair or lower limb revascularization	Elective AAA repair Lower limb revascularization	Radiological images were shown to patients by the vascular surgeon during the preoperative discussion to point out areas of the disease and to outline the proposed procedure using the images as a visual reference.
Smolderen 2021[22]	SHOW-ME PAD	United States	Patients with mild to severe symptoms of PAD	Noninvasive options (medication and exercise therapy) Invasive options (angioplasty, stents, and bypass surgery)	Website and brochures that provide information on PAD, pros and cons of different treatment options along with their outcomes, videos of patient stories and clinician perspectives, and a list of questions with 5-point scales to help patients at eliciting their preferences and treatment goals. Focused outcomes include PAD symptom relief, quality of life, cost, risk of amputation, and timeline of returning to normal activities.

(*Continued*)

Table IV. Continued

First author/ Developer and year	Name of DST[a]	Country	Intended audience	Interventions of interest	Description of DST
de Mik 2021[23] Stubenrouch 2022[24] OVIDIUS[e] trial	Decision aid intermittent claudication	Netherlands	Individual decision aids were each developed for patients with AAA, carotid stenosis, PAD, or varicose veins	Supervised exercise training. Endovascular revascularization (with or without stenting) Open surgery (endarterectomy or bypass)	A web-based interactive application with 3D animations that outlines the pathophysiology and symptoms of PAD, treatment options along with their risks and benefits, a disease-specific knowledge test and a list of questions with 10-point scales at the end to designed to help patients at eliciting their preferences and treatment goals.
	Consultation cards	Netherlands	Vascular surgeons and patients	Same as above	A one-page tool that presents the characteristics and outcomes of treatment options in tables, allowing clinicians and patients to compare treatment options during the consultation.
	Decision cards	Netherlands	Vascular surgeons and patients	Same as above	Five pocket-sized cards that present mirrored information as consultation cards with the addition of images that serve as visual aids. The 5 decision cards each focus on treatment options, treatment effect, risks and downsides, anesthesia and hospital stay, and ways to optimize cardiovascular risk factors.
Healthwise 2022[25] (latest update)	PAD: should I have surgery?	United States	Patients with symptomatic PAD	Angioplasty bypass surgery lifestyle changes, exercise, and medication	A webpage that presents information on PAD in questions and answers format, an overview of treatment options along with their risks and benefits summarized in a comparison table, shared patient stories, disease-specific knowledge tests, and a list of questions using 7-point scales to help patients to elicit their preferences and treatment goals

[a]DST, decision support tool.
[b]PFA, partial foot amputation.
[c]PAD, peripheral artery disease.
[d]AAA, abdominal aortic aneurysm.
[e]OVIDIUS, Operative Vascular Intervention Decision-making Improvement Using SDM tools.

targeted audience, 2 DSTs were designed for patient-use only,[27,30] one was intended to be used by clinicians as a visual aid in conjunction to the standard consultation,[26] and the remaining 2 DSTs consisted separate sections to be used specifically by patients, clinicians, or both.[25,28]

Effectiveness of decision support tools. The effectiveness of DSTs was tested to varying degrees across studies. Three studies performed preliminary testings on the developed DST prototype, assessing its comprehensibility and user-friendliness among selected groups of patients and clinicians, with the aim to enhance information clarity and presentation.[25,27,28] Two studies conducted clinical assessments on the effectiveness of the described DSTs at improving patient satisfaction and decision-making.[26,29] LeBlanc et al.[26] reported no significant difference between the controlled group and the intervention group in terms of patient satisfaction with the consent discussion, preoperative anxiety level, understanding of the information presented in the consultation and the patient's trust toward the surgeon. In comparison, Stubenrouch et al.[29] reported an improvement in the patient involvement (9.3 points increase in 5-item observing patient involvement instrument [OPTION-5] score, $P < 0.001$) and knowledge about LEAD and treatment options (median increase in score by 20%, $P = 0.006$). Overall, 3 main targets were identified across the studies for future research into DSTs for LEAD. These include (i) large-scale testing of DSTs in clinical settings to validate their effectiveness, (ii) regular optimization of DSTs to ensure integration of the most up-to-date information, and (iii) using comparative study design to identify the most beneficial method of facilitating SDM in LEAD treatment decision-making.

DISCUSSION

DSTs have previously been devised and applied across other areas of vascular surgery with demonstrated impact at facilitating SDM.[33] For instance, in the management of intact abdominal aortic aneurysm, DSTs were shown to be effective at enhancing patients' understanding of the available treatment options,[34] improving their disease-specific knowledge,[16] and achieving better alignment between their preferences and the type of treatment received.[35] Overall, DSTs for LEAD remain in their infancy, with most of the studies included being early adopters, limited to small groups of patients and health professionals in nonclinical settings. In this review, a total of 5 studies featuring 5 distinct DSTs were identified with major variation in format, content, delivery, and efficacy measures across these studies. This degree of heterogeneity has made comparison between the DSTs challenging.

Previously, studies have shown that patients often wish to be more actively involved in the treatment decision-making process,[36,37] given the substantial impact that LEAD has on their physical health and psychological wellbeing.[38] In contrast to the traditional clinician-directed approach, using DSTs as a supplement during clinical consultations allows patients to gain disease specific understanding play a more autonomous role in decision-making,[39] while also offering an opportunity for clinicians to gain insights into their patient's personal values and priorities. The questionnaires developed by Smolderen et al.[27] and de Mik et al.[28] exemplify this patient-centered approach, including questions aiding patients to consider their preferences and treatment goals in the context of their individual values and beliefs. The benefit of DST use is also supported by the statistically significant increase in the OPTION-5 score reported by Stubenrouch et al.,[29] illustrating that DST use has led to a greater sense of patient ownership and understanding over their treatment decisions.

Despite these benefits, it is still important to recognize that DSTs should serve as adjuncts rather than replacements to the actual clinical consultations. As pointed out by de Mik et al.,[28] excessive patient reliance on information provided in the DSTs may result in negligence of the suggestions proposed by their clinicians. This important point is highlighted in 3 of the 5 included DSTs.[25,27,28]

With regard to their clinical implementation, DSTs can be broadly divided into patient-centered DSTs and intra-consultation DSTs. Patient-centered DSTs are intended to be used prior or outside of consultations and can effectively prepare patients for the clinical consultation by allowing them an opportunity to review and consider the information privately with family and friends. Conversely, intra-consultation DSTs, such as discussion cards and question prompts, aim to foster stronger and better-informed patient engagement within the consultation. In the study by de Mik et al.,[28] it was observed that patients exhibited a preference toward the web-based decision aids, whereas clinicians favored the use of decision cards. This disparity was primarily attributed to the differing levels of information contained in the 2 options. Patients preferred the web-based decision aids given their comprehensive nature, enabling them to gain a well-rounded understanding and potentially serve to enhance their ability to make informed decisions.

In comparison, clinicians preferred decision cards due their succinct and concise nature with the additional use of images, facilitating the ease of communication during discussions.

The contrasting preferences above between patients and clinicians highlight the subtle differences in their expectations toward DSTs. Furthermore, it revealed the need to tailor the DST according to the target audience and specific application. A mixed or multiple approach to DST delivery may help in this regard, with the DST used by patients outside of consultations being the primary focus, and the intra-consultation DST serving as a supplementary resource to enhance the consultation.

Lastly, the delivery and accessibility of DSTs warrant further investigation. Given that the DSTs in this review are early adopters, their effectiveness in the real-world has yet to be demonstrated or proven. Some considerations not specifically described across all studies that may greatly influence the effectiveness of DSTs include provision of adequate training in the use of DSTs, readability of included content and mode of delivery. While implementing an online DST has the benefit of enabling the use of interactive and visually engaging content, it is important to recognize that access to these tools may be technically challenging for elderly patients, who form a large proportion of patients with LEAD.[40] The DSTs by Smolderen[27] and de Mik[28] address this issue by including both written and web-based information, which not only benefits elderly patients but those who have limited access to the internet in general. Further consideration should be given to improve the accessibility of web-only DSTs or at least provide alternative methods of content delivery.

Limitations of This Study

Unpublished data, such as online materials and conference presentations, were not explored in this review. Furthermore, we did not search the gray literature for any additional DSTs. This might have limited the number of DSTs identified, considering that DSTs in the earliest stages of development may not be published in journals. However, these DSTs may not have gone through the same rigorous development and testing processes as those identified in the published literature. Given that this is a scoping review on a relatively novel field, we decided that limiting the study to published literature may have improved the overall quality of the DSTs found and served as a better reference base for future DSTs. Additionally, we did not search for any non-English studies, which may have also limited the number of studies identified. To further assess the impact of this on the current review, a post hoc search was performed by removing the ''English language'' limit from our initial search strategies. This yielded a further 53 studies. However, no additional eligible studies were identified after screening of the titles and abstracts.

Another major limitation of this study was the significant variation in the study design describing each DST. The studies included in this review ranged from observational descriptive studies outlining the process of DST development to randomized trials evaluating the efficacy of established DSTs. This made direct comparison of DST efficacy and outcomes impossible, and thus the focus of the discussion was to evaluate positive elements found in the included DSTs, while identifying points to be improved upon. As more DSTs for LEAD become available, the establishment of a standardized framework for outcome measures could be explored in future studies to enable meaningful comparisons.

CONCLUSION

The development and clinical integration of DSTs for LEAD treatment decision-making remain in their infancy. Our study provides an overview of the current LEAD-specific DSTs available, showcasing a diverse array of presentation, content, and delivery. Preliminary investigation of outcomes demonstrated a widespread acceptance of DSTs among both patients and clinicians. However, the lack of real-world implementation and standardized outcome measures cast some uncertainty on the extent to which DSTs might improve treatment decision-making. Overall, the current review serves as a precursor to future research in exploring the role of DSTs at facilitating SDM in LEAD treatment selection.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Annie X. Yu: Writing — review & editing, Writing — original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Joel B. Ding:** Writing — review & editing, Validation, Formal analysis. **Alun H. Davies:** Writing — review & editing, Supervision, Formal analysis. **Leonard L. Shan:** Writing — review & editing, Supervision, Methodology, Formal analysis, Conceptualization.

SUPPLEMENTARY DATA

Supplementary data related to this article can be found at https://doi.org/10.1016/j.avsg.2024.02.014.

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