

Contents lists available at ScienceDirect

Preventive Medicine Reports



journal homepage: www.elsevier.com/locate/pmedr

Review article

Barriers and facilitators of shared decision-making in prostate cancer screening in primary care: A systematic review

María Estevan-Vilar^a, Lucy Anne Parker^{b,c}, Juan Pablo Caballero-Romeu^{d,e}, Elena Ronda^{c,f}, Ildefonso Hernández-Aguado^{b,c}, Blanca Lumbreras^{b,c,*}

^a Pharmacy Faculty, Miguel Hernandez University, 03550 San Juan de Alicante, Spain

^b Department of Public Health, History of Science and Gynecology, Miguel Hernandez University, 03550 San Juan de Alicante, Spain

^c CIBER of Epidemiology and Public Health, CIBERESP, 28029 Madrid, Spain

^d Department of Urology, Hospital General Universitario de Alicante, 03010 Alicante, Spain

^e Alicante Institute for Health and Biomedical Research (ISABIAL), 03010 Alicante, Spain

f Public Health Research Group, Alicante University, 03690 San Vicente del Raspeig, Spain

ARTICLE INFO	A B S T R A C T
Keywords: Barriers and facilitators Shared decision-making Primary care Prostate-specific antigen (PSA) Prostate cancer Screening	Objective: To identify barriers and facilitators of the implementation of shared decision-making (SDM) on PSA testing in primary care. Design: Systematic review of articles. Data sources: PubMed, Scopus, Embase and Web of Science. Eligibility criteria: Original studies published in English or Spanish that assessed the barriers to and facilitators of SDM before PSA testing in primary care were included. No time restrictions were applied. Data extraction and synthesis: Two review authors screened the titles, abstracts and full texts for inclusion, and assessed the quality of the included studies. A thematic synthesis of the results were performed and developed a framework. Quality assessment of the studies was based on three checklists: STROBE for quantitative cross-sectional studies, GUIDED for intervention studies and SRQR for qualitative studies. Results: The search returned 431 articles, of which we included 13: five cross-sectional studies, two intervention studies, five qualitative studies and one mixed methods study. The identified barriers included lack of time (healthcare professionals), lack of knowledge (healthcare professionals and patients), and preestablished beliefs (patients). The identified facilitators included decision-making training for professionals, education for patients and healthcare professionals, and dissemination of information. Conclusions: SDM implementation in primary care seems to be a recent field. Many of the barriers identified are modifiable, and the facilitators can be leveraged to strengthen the implementation of SDM.

1. Introduction

Shared decision-making (SDM) is considered the key to successful patient-centered care (Barry and Edgman-Levitan, 2012). For this reason, researchers, physicians, patients and health policy representatives have made a considerable effort to apply this concept in clinical practice (Stacey et al., 2017). SDM helps patients understand their disease and review the potential benefits, harms, and scientific uncertainties of possible treatment options. This process is especially useful when efficacy and outcomes are unclear, or when outcomes are clear,

but the assessment of benefits and risks requires subjective judgment.

Screening with PSA can also cause harm and is associated with falsepositive results and overdiagnosis. The positive predictive value of a biopsy (using 3 ng/ml as cut-off for referral to biopsy) is 55 %, so more than 45 % of positive PSA tests are followed by a negative biopsy (falsepositive results) (Lumbreras et al., 2022). Overdiagnosis is usually defined as the diagnosis resulting from screening, of a cancer usually histologically confirmed, which would not have achieved clinical significance during the lifetime of the host had screening not taken place (Paci et al., 2004). Overdiagnosis is harmful because it turns people into

https://doi.org/10.1016/j.pmedr.2023.102539

Received 5 October 2023; Received in revised form 28 November 2023; Accepted 5 December 2023 Available online 12 December 2023

Abbreviations: PSA, prostate-specific antigen; SDM, shared decision-making.

^{*} Corresponding author at: Department of Public Health, History of Science and Gynecology, Miguel Hernandez University, 03550 San Juan de Alicante, Spain. *E-mail address:* blumbreras@umh.es (B. Lumbreras).

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cancer patients and usually leads to overtreatment. The percentage of overdiagnosis has been described as ranging from 27 to 56 % of all screened detected cancers (depending on the screening protocol) (Draisma and Etzioni, 2009) (Smith et al., 2017). Side effects of prostate cancer treatment are usually related to urinary, bowel and sexual functioning and can persist for several years after treatment (Punnen et al., 2015).

Thus, although PSA screening results in a small absolute reduction in disease-specific mortality (Ilic et al., 2018a; Ilic et al., 2018b), it is unclear whether the benefits of screening outweigh the potential harms. This uncertainty is reflected in significant variability in screening practices worldwide (Filella et al., 2019). PCa screening is a preferencesensitive decision because it depends on the value that an individual patient places on it. For this reason, available guidelines recommend that clinicians engage in SDM with patients when considering PCa screening, so that patients can make an informed choice (Mottet et al., 2021; US Preventive Services Task Force et al., 2018). Previous evidence shows that SDM promotes appropriate care, decreases overtreatment, meliorates health outcomes and, by extension, reduces health-care costs (Johnson et al., 2018). According to a previous systematic review with meta-analysis, however, the association of SDM with patient outcomes for decisions about PSA testing, as compared to usual care, was inconclusive (Martínez-González et al., 2018). In contrast, another metaanalysis aimed at identifying and appraising PSA decision aids suggested that they increase users' knowledge about PSA and reduce uptake of the test (Evans et al., 2005).

Research suggests that clinicians have traditionally underestimated the adverse impact of PSA testing (Briss et al., 2004), and rarely explain it to patients (Wilt et al., 2017), although several studies show that most patients want to be informed (Hoffmann and Del Mar, 2015). In addition, most men overestimate the benefits of the screening and are unaware of its limitations, which makes it an especially pertinent focus for physician-patient discussion (Gravel et al., 2006). However, recent findings suggest that the proportion of men participating in SDM before PSA testing has increased since the scientific guidelines were updated, especially among men aged 55–69 years, although it remains below 40 % (Jiang et al., 2021).

In primary care, the PSA blood test remains the first-line screening test of choice based on previous randomized trials of PSA-based screening (Hugosson J et al., 2019) (Hugosson et al., 2018). There is, however, limited evidence regarding other biomarkers for the early detection of PCa. The introduction of prostate multiparametric MRI (mpMRI) has been considered as an adjunct test to PSA for the better identification of patients who require a prostate biopsy for the presence of aggressive forms of prostate cancer (Kasivisvanathan et al., 2018). In fact, the European Association Urology (EAU) (Van Poppel et al., 2021a) has developed a risk-adapted early prostate cancer detection strategy for well-informed men based on PSA testing, risk calculators, and mpMRI, which can distinguish between significant and insignificant prostate cancer. However, a lack of resources in primary care limits the application of this strategy. In this setting, although there have been some improvements in SDM (Belkora et al., 2009; Frosch et al., 2011; Legare et al., 2010) in diagnosis and screening procedures, several factors continue to limit its implementation in PSA testing (Elwyn et al., 2013; Lloyd et al., 2013). Moreover, while researchers have considered the barriers and facilitators perceived by healthcare professionals (Legare et al., 2008; Holmes-Rovner et al., 2000), they have tended to neglect patients' perspectives.

Therefore, the objective of this systematic review was to evaluate the available evidence on the existing barriers and facilitators of SDM in PSA-based PCa screening in the primary care setting, as perceived by patients as well as healthcare professionals.

2. Methods

A systematic review of original articles on barriers and facilitators of

the implementation of SDM before PSA testing was conducted. A qualitative thematic synthesis of the evidence was performed. This review adheres to the recommendations set out in the PRISMA (Preferred Reporting Items for Systematics Reviews and Meta-analyses) statement (Page et al., 2021) and registered with PROSPERO (ID: CRD42023417230).

2.1. Eligibility criteria

The population, intervention, comparator and outcomes (PICO) framework (Akers, 2008) was used to define the eligibility criteria. Studies reporting original research that met the following criteria were included:

• Population—Patients and health professionals in primary care setting.

• Intervention/exposure—Shared decision making before PSA testing in primary care. We defined shared decision making as "an approach where clinicians and patients share the best available evidence when faced with the task of making decisions, and where patients are supported to consider options, to achieve informed preferences" (Elwyn et al., 2010).

• Comparison—Usual care.

• Outcomes—Barriers and facilitators.

Original studies published in English or Spanish that assessed the barriers to and facilitators of SDM before PSA testing in primary care were included. No time restrictions were applied.

2.2. Data sources and searches

The following electronic databases for original articles were included: MEDLINE (through PubMed), Scopus, Embase and Web of Science on the 31st of March 2023. The keywords were terms related to primary care and PSA.

Searches for descriptors were carried out in English and combined by Boolean operators (OR and AND) in five blocks: shared decision making; primary health care; prostate cancer; screening; barriers, and facilitators. The descriptors in each block were combined by the Boolean operator OR. The combination between the blocks was done using the AND operator. Forward and backward citation searching was performed on included papers. The detailed search strategy is outlined in Appendix Table 1.

2.3. Study selection

All records retrieved from the search were imported into EndNote, deduplicated and then imported into Rayyan for screening (Ouzzani et al., 2016). Two review authors (BL and MEV) independently screened the titles and abstracts of the retrieved records, eliminating duplicates and studies that were clearly ineligible. Full-text articles of the remaining records were then retrieved and read, selecting those that met the inclusion criteria. Discrepancies at any stage in the screening process were resolved through discussion with the rest of the team to reach consensus on which articles to include. Study investigators or published studies were not contacted for more additional information.

2.4. Data extraction and quality assessment

Two review authors (BL and MEV) independently extracted the main variables from each included article, resolving any discrepancies by consulting the rest of the review team. The variables recorded were: year of publication, country, objective, study design, population (inclusion and exclusion criteria, sample size, and classified into patients or health professionals), procedure, results (barriers and facilitators), conclusions and limitations.

Quality assessment of the included studies was based on three checklists: for quantitative cross-sectional studies, the STROBE checklist

(Strengthening the Reporting of Observational studies in Epidemiology) was used (von Elm et al., 2007); for intervention studies, the GUIDED checklist (Guidance for Reporting Intervention Development Studies in Health Research) was used(Duncan et al., 2020), and for qualitative studies, the SRQR checklist (Standards for Reporting Qualitative Research) was used (O'Brien et al., 2014). Two review authors (BL and MEV) independently evaluated each included article, resolving any discrepancies by consulting the rest of the review team.

2.5. Data synthesis and analysis

Data were collated and synthesised using narrative and descriptive summaries. No attempt at meta-analysis was made given the heterogeneity in target population, study design and outcome measures across included studies. To improve conceptual clarity and comprehensiveness, two independent researchers (BL and MEV) synthesized for each report the barriers and limitations for the different population (i.e., patient, healthcare professional).

3. Results

3.1. Search and selection

Our search strategies recovered 290 records from MEDLINE and 141 from the remaining databases (Scopus, Embase and Web of Science), giving a total of 431 records. After the title and abstract screen, we retrieved the full-text articles of 18 potentially eligible studies. Of these, we included 13 in our systematic review (O'dell et al., 1999; McFall, 2006; van Vugt et al., 2010; Avery et al., 2012; Allen et al., 2018; Shungu and Sterba, 2021; Dunn et al., 2001; Guerra et al., 2007; Volk et al., 2013; Shungu et al., 2022; Warlick et al., 2017; Denberg et al., 2009; Ilic et al., 2018a; Ilic et al., 2018b). Fig. 1 presents the study selection process in a flow diagram.

3.2. Quality assessment

After applying the STROBE checklist (von Elm et al., 2007), we found that the number of criteria met by the included cross-sectional studies ranged from 12 to 17 out of 21, with a mean of 14 (Appendix Table 2). The most frequently neglected items were those related to statistical methods, description of participants, precision of the main results and description of limitations. Appendix Table 3 shows compliance with the GUIDED checklist by the two included intervention studies (Duncan et al., 2020), with scores of 10 and 11 out of 14. After applying the SRQR checklist (O'Brien et al., 2014), we calculated a mean compliance score among the qualitative studies of 18.6 out of 21, with a range of 15 to 20 items (Appendix Table 4).

3.3. Study characteristics

All studies were published between 1999 and 2022. Most were published in or after 2010 (N = 8; 62 %) (van Vugt et al., 2010; Avery et al., 2012; Allen et al., 2018; Shungu and Sterba, 2021; Volk et al., 2013; Shungu et al., 2022; Warlick et al., 2017; Ilic et al., 2018). Ten studies (77 %) were set in the USA (O'dell et al., 1999; McFall, 2006; Allen et al., 2018; Shungu and Sterba, 2021; Dunn et al., 2001; Guerra et al., 2007; Volk et al., 2013; Shungu et al., 2022; Warlick et al., 2017; Denberg et al., 2009). Only two (15 %) took place in European counties (the Netherlands (van Vugt et al., 2010)) and the UK (Avery et al., 2012)) and one took place in Australia (Ilic et al., 2018) (Table 1).

Seven studies (54 %) were quantitative. Of these, five were crosssectional studies based on questionnaires or surveys (O'dell et al., 1999; McFall, 2006; Dunn et al., 2001; Volk et al., 2013; Shungu et al., 2022), and two were intervention studies (van Vugt et al., 2010; Denberg et al., 2009). Five (38 %) of the included studies had a qualitative design (Avery et al., 2012; Allen et al., 2018; Shungu and Sterba, 2021; Guerra et al., 2007; Ilic et al., 2018). Of these, three used focus groups (O'dell et al., 1999; McFall, 2006; Volk et al., 2013) and the other two used semi-structured interviews (Avery et al., 2012; Guerra et al., 2007). One study used mixed methods, combining focus groups and



Fig. 1.

Table 1

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Description of the main variables collected from the 13 included studies.

Study ID	Country	Objective	Study design	Inclusion criteria	Exclusion criteria	Sample size
Patients O'dell et al., 1999	USA (Alabama, Texas)	To assess the knowledge of male primary care patients on prostate cancer and PSA testing, and examine how this knowledge relates to future PSA testing preferences and whether patients wish to participate in device patients.	Questionnaire-based quantitative study	Men aged 45–70 years with no history of prostate cancer	People with chronic physical illness, cognitive impairment, or incomplete records of prostate cancer history	160 participants
McFall, 2006	USA, Texas	In decision-making To determine the proportion of men who had discussed the advantages and disadvantages of PSA-based prostate cancer screening with their physician before having the test, and determine the characteristics correlated with such discussions	Questionnaire-based quantitative study	Men aged over 50 years who had previously had a PSA test for prostate cancer screening	Men with prostate cancer and men who had a PSA test for a reason other than prostate cancer screening	2184 participants
van Vugt et al., 2010	Netherlands	To assess the effect of providing a leaflet that shows individualized risk estimates on informed decision-making on the PSA test	Intervention study	Men aged 55–65 years randomly selected from a population registry	Men with a history of prostate cancer or a history of PSA-based prostate cancer screening	2000 men were sent questionnaire 1 (patient characteristics), and 1027 completed it. Of these, 601 completed questionnaire 2 (knowledge, attitude towardshaving a PSA test and intention to have a PSA test, before and after receiving the leaflet with risk indicator).
Avery et al., 2012	UK	To identify predictors of attendance for PSA testing and prostate biopsy	Qualitative study (semi-structured interviews)	Men aged 50–69 years participating in the ProtecT trial recruited from 2 primary care centers in the UK		468 participants out of 810 men invited to participate (57.8 %)
Allen et al., 2018	USA (Massachusetts)	To examine the role of women in educating their partners about prostate cancer screening	Qualitative study (focus groups)	African American women who have an African American male partner aged over 45 years with no personal history of prostate cancer		52 women
Shungu and Sterba, 2021	USA (South Carolina)	To assess issues related to barriers to and facilitators of informed decision-making on prostate cancer screening	Qualitative study (focus groups)	Black men aged 55–69 years, recruited in a primary care clinic	Men with a history of prostate cancer, being treated for any type of cancer, with a terminal illness, or unable to give informed consent	21 men.
Healthcare						
Dunn et al., 2001	USA (New York)	To examine the likelihood that doctors will discuss breast cancer and prostate cancer screening with their patients, and determine the factors that influence the frequency and quality of these discussions	Questionnaire-based quantitative study	Medical house staff and attending physicians practicing primary care	Physicians who do not devote at least 25 % of their time to primary care	83 resident physicians and 86 attending physicians
Guerra et al., 2007	USA (Pennsylvania)	To assess whether primary care physicians routinely discuss prostate cancer screening, and explore the barriers to and facilitators of these discussions	Qualitative study (semi-structured interviews)	Primary care physicians from the University of Pennsylvania Health System (UPHS)	Retired or in training	The investigators invited 99 people to participate: 21 refused and 59 did not respond. 19 people completed the interview, but 1 was excluded owing to poor quality of the audio recording. In the end there were 18 participants.
Volk et al., 2013	USA (Texas, Illinois, Missouri, Colorado)	To examine the use of discussions about potential benefits and risks by primary care physicians prior to requesting a PSA test. The study authors also assessed the role of physicians' beliefs about the efficacy of PSA testing and the contextual factors that influence the discussions.	Questionnaire-based quantitative study	Physician members of the American Academy of Family Physicians National Research Network	Physicians in training	243 physicians answered the questionnaire.

(continued on next page)

Table 1 (continue	ed)					
Study ID	Country	Objective	Study design	Inclusion criteria	Exclusion criteria	Sample size
Shungu et al., 2022	USA (South Carolina, Georgia)	To describe how family physicians approach prostate cancer screening in general. To identify demographic variables associated with engaging patients in SDM discussions	Questionnaire-based quantitative study	Family physician members of the Council of Academic Family Medicine (CAFM)	Program directors, administrative directors and department heads	1192 participants.
Patients and healthcare professionals		·				
Warlick et al., 2017	USA (Minnesota)	Evaluate the impact of a PSA screening decision aid on SDM	Mixed methods study: a) qualitative (focus groups); b) quantitative (questionnaire)	Men aged 50–75 years, English- speaking, scheduled to see a physician. Family physicians and residents	Patients with prostate cancer, previous prostate biopsy, PSA test in the last 12 months, urnary problems as reason for the visit, or who had scheduled the appointment on the same day they were being seen (for urgent problems)	68 participants (each focus group consisting of 8–15 participants), all of whom answered the questionnaire
Denberg et al., 2009	USA (Colorado)	To assess a patient intervention for reducing barriers to decision-making discussions on prostate cancer screening in primary care	Intervention study	Men aged 50–74 years who had an attending primary care physician, who had seen their primary care physician at least once in the last 18 months, and who had not had a PSA test in the last 12 months	Men with active or terminal prostate cancer or who did not appear to receive medical care. Men in whom PSA testing was not warranted for screening because of a history of prostate cancer because of a history of PA result	The final sample comprised 23 patients and 37 physicians.
Ilic et al., 2018a; Ilic et al., 2018b	Australia	To examine men's, nurses', and physicians' perception of patient decision coaching for prostate cancer screening	Qualitative study (focus groups)	General practitioners and practice nurses. Men aged over 45 years	Men with a diagnosis of prostate cancer	47 participants (16 physicians, 12 nurse; 19 male patients)
PSA: prostate-spo	ecific antigen; SDM:	shared decision-making.				

quantitative assessment through questionnaires (Warlick et al., 2017) (Table 1).

Six studies (46 %) included only patients (O'dell et al., 1999; McFall, 2006; van Vugt et al., 2010; Avery et al., 2012; Allen et al., 2018; Shungu and Sterba, 2021), four (31 %) included only healthcare professionals (Dunn et al., 2001; Guerra et al., 2007; Volk et al., 2013; Shungu et al., 2022), and three (23 %) included both patients and healthcare professionals (Warlick et al., 2017; Denberg et al., 2009; Ilic et al., 2018) (Table 1).

3.4. Synthesis of the results

We divided the main results into barriers and facilitators. Eight articles (62%) measured both barriers and facilitators (O'dell et al., 1999; Allen et al., 2018; Shungu and Sterba, 2021; Dunn et al., 2001; Guerra et al., 2007; Warlick et al., 2017; Denberg et al., 2009; Ilic et al., 2018). Three (23 %) evaluated only barriers (Avery et al., 2012; Volk et al., 2013; Shungu et al., 2022), and two (15 %) measured only facilitators (McFall, 2006; van Vugt et al., 2010). Out of the 13 studies included, 9 (69.2 %) described patients' perceptions (O'dell et al., 1999; McFall, 2006: van Vugt et al., 2010: Avery et al., 2012: Allen et al., 2018: Shungu and Sterba, 2021; Warlick et al., 2017; Denberg et al., 2009; Ilic et al., 2018) and 7 (53.8 %) described health professionals' perceptions (Dunn et al., 2001; Guerra et al., 2007; Volk et al., 2013; Shungu et al., 2022; Warlick et al., 2017; Denberg et al., 2009; Ilic et al., 2018 (Appendix Table 5).

3.5. Barriers for healthcare professionals

The main barrier described by healthcare professionals was the limited time allocated to patient consultations (Dunn et al., 2001; Guerra et al., 2007; Shungu et al., 2022; Warlick et al., 2017; Denberg et al., 2009; Ilic et al., 2018), as it was unclear when was the best time to use a decision aid, or when physician-patient conversations could take place. The PSA test discussion did not always fit the patient's agenda, and if they were visiting their physician for an urgent reason, there may not be time for patients and health professionals to talk about this topic and take a shared decision (Table 2).

Another barrier for healthcare professionals was lack of knowledge (Dunn et al., 2001; Shungu et al., 2022; Warlick et al., 2017; Ilic et al., 2018), both on the benefits and risks of PSA-based screening, and on how to lead a shared decision-making discussion with patients. Physicians may also be concerned about seeming less knowledgeable than their patients (Table 2).

Physicians' lack of acceptance and negative attitudes towards PCa screening constituted another barrier (Dunn et al., 2001; Guerra et al., 2007; Warlick et al., 2017). Some physicians did not consider PSA testing an important issue, and did not believe that talking with patients will influence whether they patient requested the test (Table 2).

Other barriers to use of SDM included lack of consensus within the medical profession, inconsistent clinical practice guidelines (Guerra et al., 2007), and the medico-legal concerns associated with not screening patients (Volk et al., 2013). Language barriers and the concern that discussing the test may discourage patients from having it also represent barriers to the implementation of SDM (Dunn et al., 2001) (Table 2).

3.6. Barriers for patients

Barriers for patients reported in the articles were lack of knowledge of PCa and PCa screening, of the benefits and limitations of PSA testing, of the adverse effects of interventions if PSA levels are elevated, and of the impact of a false positive result and the subsequent unnecessary tests (O'dell et al., 1999; Allen et al., 2018; Shungu and Sterba, 2021; Ilic et al., 2018). Patients with less knowledge of PCa tended to leave decisions to their physician, so for some, reluctancy to get involved in

medical decisions was also a barrier (Legare et al., 2008). Certain patient characteristics, such as the presence of comorbidities or low level of educational or health literacy, could also limit SDM implementation (Holmes-Rovner et al., 2000). Educational level and health literacy affect patients' enthusiasm about getting involved in decision-making conversations, which require some understanding of medical terms (Table 2).

Other barriers included preconceived ideas from the patients about the usefulness of the test or about PCa make it difficult to get involved in a SDM conversation with their healthcare provider. For example, messages presented in the media stating that men must undergo a prostate exam (Denberg et al., 2009); and patient beliefs such as fear of diagnosis and treatment, economic concerns, and the desire to appear manly rather than weak (Allen et al., 2018; Shungu and Sterba, 2021). Finally, other aspects that prevented SDM were patients' lack of trust in the healthcare system, perceived lack of access to screening, and lack of knowledge of PSA testing availability (Shungu and Sterba, 2021) (Table 2).

3.7. Facilitators for healthcare professionals

An important facilitator for healthcare professionals, according to the included studies, was training (Warlick et al., 2017; Ilic et al., 2018), both on SDM (focused on increasing SDM rather than increasing PSA testing per se) and on current recommendations regarding PSA-based screening. Providing healthcare professionals with effective methods to integrate SDM skills into practice within a limited time frame would also facilitate SDM implementation (Warlick et al., 2017; Ilic et al., 2018). Other facilitators included physicians having favorable attitudes to PCa screening (Dunn et al., 2001; Guerra et al., 2007), and initiating the conversation on testing (McFall, 2006). The health system can provide other facilitators, such as extra time (Guerra et al., 2007);

Table 2

Description of the barriers described by healthcare professionals and patients.

Healthcare professionals	Patients
 Time constraints The conversation does not always fit the patient's agenda. When can physicians use the tool and have the conversation? It is difficult to have these discussions in urgent visits. Lack of knowledge Training health personnel to lead a discussion Lack of knowledge about benefits and risks Concern about appearing less knowledgeable than patients Lack of acceptance and negative attitudes Belief that PSA testing is not an important issue Belief that the discussion does not influence whether patients opt to have the test Belief that patients seen by physicians are well informed 	 Lack of knowledge about: Prostate cancer and screening Benefits and limitations of the PSA test Adverse effects of interventions if PSA is elevated Impact of a false positive result and unnecessary tests Reluctancy to participate in medical decisions Patients with less knowledge about prostate cancer leave decisions to their physician. Patient characteristics Comorbidities Level of education/health literacy Cognitive dysfunction or mental illness
Concern about medico-legal risk	 Information from the media that men must undergo a prostate exam
 Impact on patients Concern that the discussion will discourage the patient Language barrier 	 Beliefs Fear of diagnosis and treatment Economic concerns; not wanting to appear weak Lack of trust in the health system Perceived lack of access to screening or lack of knowledge about the availability of tests

reminders in the computer system (Denberg et al., 2009); more detailed, plain language information to educate patients prior to visits (Denberg et al., 2009); sufficient information (about cancer, false positives, etc.); and individualized risk estimates (van Vugt et al., 2010). Policymakers could also promote discussions on screening as part a wider range of preventive measures (Denberg et al., 2009) (Table 3).

3.8. Facilitators for patients

Facilitators for patients included improved dissemination of information through TV monitors in waiting rooms, email or other message formats (Warlick et al., 2017); and education to improve knowledge on risks and benefits, increasing patients' interest in participating in SDM before PSA testing (O'dell et al., 1999; Ilic et al., 2018).

External influences such as knowing a friend, family member or acquaintance who has been diagnosed with PCa or hearing PCa discussed in the media (Guerra et al., 2007), can act as a facilitator, encouraging patients to request the test and to establish a SDM with the clinician. Other facilitators for patients included having their partner attend doctors' appointments with them (Allen et al., 2018; Shungu and Sterba, 2021) and beliefs regarding the risk of cancer and the benefits of early diagnosis (Shungu and Sterba, 2021) (Table 3).

4. Discussion

This review brings together the barriers to and facilitators of SDM on PSA testing for both patients and healthcare professionals. Therefore, the results can help policymakers when implementing strategies in the primary care setting.

According to our results, one of the most frequently described barriers is time constraints. In other reviews, this same barrier was identified by patients and healthcare professionals alike (Legare et al., 2008; Joseph-Williams et al., 2014). To overcome this barrier, some articles included in this review propose training healthcare professionals to lead SDM discussions within a limited time frame (Warlick et al., 2017) or providing extra time in consultations (Guerra et al., 2007).

Another common barrier identified in this and previous reviews was the lack of knowledge on the part of healthcare professionals about the benefits and risks of PSA testing, and on the part of patients about PCa and screening (Legare et al., 2008; Joseph-Williams et al., 2014). Facilitators identified in our review that could counteract this barrier include training on SDM and on PCa screening, to increase interest in

Table 3

Description of facilitators described by healthcare professionals and patients.

Healthcare professionals	Patients
 Training On SDM: focused on increasing the use of this decision-making model rather than increasing PSA testing per se On PSA screening recommendations Provide effective ways of engaging with SDM within a limited time frame Favorable attitudes towards SDM in prostate cancer screening 	 Dissemination of information: On TV monitors in the waiting room, by email or other messaging formats Training Improve patients' knowledge of risks/benefits to encourage participation in SDM External influences: Request by the patient Going with their partner to doctors' visits
 System facilitators: Extra time Reminders in the computer system Discussions on screening in the context of a wider range of preventive measures More detailed, plain language information to educate patients before visits Individualized information and risk 	

PSA: prostate-specific antigen.

PSA: prostate-specific antigen; SDM: shared decision-making.

participation in SDM (O'dell et al., 1999, Warlick et al., 2017, Ilic D et al., 2018).

Decision aids used in primary care are effective for reducing decisional conflict and improving knowledge about disease and treatment options, risk awareness, and satisfaction with decisions taken (Coronado-Vázquez et al., 2020). These decision aids are potentially more useful if they include more detailed, plain language information to educate patients before visits, as health literacy plays an important role in how patients interpret, understand and act on the information they receive (Guiliani et al., 2020). In addition, there are other resources useful for patients and health professionals in addressing barriers and facilitators in SDM before PSA testing. For instance, 'Talk to Nathan' is a human simulation developed by the Centers for Disease Control to support patients in their decision whether to get screened (https://www. cdc.gov/cancer/prostate/talk-to-nathan/index.htm). This tool also supports health professionals in the resource 'Explore Talking to Patients about Prostate Cancer' in which, the professional can practice helping patients make decisions about PCa screening and treatment. In addition, the health professionals can learn simple rules for SDM and receive feedback on the approach they have taken.

Some barriers, such as certain patient characteristics (comorbidities or cognitive dysfunction) are hardly modifiable. But others, such as patient beliefs (fear of diagnosis and treatment, lack of knowledge of testing availability, perceived lack of access) could be resolved by facilitators such as dissemination of information through email or other message formats, provision of individualized risk estimates (van Vugt et al., 2010), or external influences such as attending appointments with a partner (Allen et al., 2018). Offering patients decision aids before appointments helps them to develop preferences based on their understanding of the accessible information; this leads to more realistic expectations, less decisional conflict and greater satisfaction (Elwyn et al., 2016). Recent evidence also suggests that SDM can improve adherence and increase trust in the system (Bukstein et al., 2020).

The main strength of this review is our inclusion of both barriers and limitations from the perspective of patients as well as healthcare professionals. In addition, by not restricting our search by study design, we were able to include more studies. The European Association of Urology recently published recommendations on the use of PSA testing as part of a risk-adapted strategy based on the characteristics of each patient (Van Poppel et al., 2021b), and the results of this review could help clinicians to implement such a strategy. Therefore, these results can be applied to the primary care setting to improve SPM when ordering PSA, in line with available recommendations.

This review has some limitations. Firstly, the filters applied in the search may have excluded relevant studies published in another language. Secondly, although the compliance of the interventional and qualitative with each checklist was higher, the quantitative studies complied with only 14 of 21 STOBE checklist criteria on average. The items with lower fulfilment in the STROBE checklist were the description of the data sources and the statistical methods used. Another relevant aspect that was not included was the description of the generalizability of the results.

5. Conclusions

Many of the barriers – such as lack of time, lack of knowledge among health professionals and patients, and some patient beliefs – are modifiable, so researchers, managers, and physicians can use the results of this review to design solutions to improve SDM on PCa screening. Similarly, we have identified actions that could facilitate SMD implementation in primary care, such as training healthcare professionals to lead SMD discussions within an established time frame, providing education for patients and healthcare professionals, and disseminating information. Further research should be conducted on the implementation of these measures and their impact on facilitating discussions on disease risk management.

CRediT authorship contribution statement

María Estevan-Vilar: Conceptualization, Data curation, Formal analysis, Investigation, Writing – original draft. Lucy Anne Parker: Data curation, Formal analysis, Investigation, Writing – review & editing. Juan Pablo Caballero-Romeu: Data curation, Formal analysis, Investigation, Writing – review & editing. Elena Ronda: Data curation, Formal analysis, Investigation, Writing – review & editing. Ildefonso Hernández-Aguado: Data curation, Formal analysis, Investigation, Writing – review & editing. Blanca Lumbreras: .

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

Acknowledgements

We thank Julia Turner in the preparing of the English version of the manuscript.

Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Ethics approval

No ethics approval was required for this systematic review of literature.

Funding

Article funded by the Instituto de Salud Carlos III, Ministry of Science and Innovation of the Government of Spain, code PI20/01334, Principal Investigator Dr. Blanca Lumbreras, co-financed with FEDER funds from the European Union "A way of doing Europe". The research is independent, however, and the views expressed in this article are solely those of the authors.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pmedr.2023.102539.

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