

S1: PRISMA 2020 Checklist for Systematic Review and Meta-Synthesis

Section and Topic	Item #	Checklist Item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	Title page: "A Systematic Review and Meta-Synthesis"
ABSTRACT			
Abstract	2	See PRISMA 2020 for Abstracts checklist.	Abstract (structured, includes Background, Methods, Results, Conclusions)
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Introduction (paragraphs 1-4)
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Introduction (last paragraph) and Abstract (Background)
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Methods: Eligibility Criteria (SPIDER framework, inclusion/exclusion details)
Information sources	6	Specify all databases, registers, websites, organisations, reference lists, and other sources searched or consulted. Specify the date when each source was last searched or consulted.	Methods: Search Strategy (7 databases listed: MEDLINE, EMBASE, CINAHL, PsycINFO, Scopus, Web of Science, Cochrane Library; inception to April 2026)
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Methods: Search Strategy (MeSH terms, Boolean operators, three conceptual domains); supplementary S2 referenced

Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Methods: Study Selection (two independent reviewers, Rayyan platform, two-stage screening, third reviewer arbitration)
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Methods: Data Extraction (standardized form, piloted, two reviewers, cross-verification)
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g., for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Methods: Data Extraction (key findings, participant quotes, author interpretive themes, contextual descriptions)
	10b	List and define all other variables for which data were sought (e.g., participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Methods: Data Extraction (author, year, country, setting, participant characteristics, data collection method, analysis method)
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Methods: Quality Assessment (CASP Qualitative Checklist, two independent reviewers, narrative justification, sensitivity analysis)
Effect measures	12	Specify for each outcome the effect measure(s) (e.g., risk ratio, mean difference) used in the synthesis or presentation of results.	Not applicable (qualitative meta-synthesis; no quantitative effect measures)

Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g., tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Methods: Data Synthesis (thematic synthesis per Thomas and Harden 2008)
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Methods: Data Synthesis (line-by-line coding, NVivo software)
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Results: Table 1 (summary of themes, sub-themes, supporting studies); Figure 2 (conceptual model)
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Methods: Data Synthesis (three-stage thematic synthesis: line-by-line coding → descriptive themes → analytical themes)
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g., subgroup analysis, meta-regression).	Methods: Quality Assessment (sensitivity analysis); GRADE-CERQual (coherence assessment across contexts)
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Methods: Quality Assessment (sensitivity analysis for studies with methodological concerns)
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Methods: Search Strategy (supplemented by manual reference and citation tracking; no lower date restriction)
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Methods (GRADE-CERQual framework: methodological limitations, coherence,

			adequacy of data, relevance); supplementary S4 referenced
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Results: Characteristics of Included Studies (37 studies); PRISMA flow diagram referenced (Figure 1)
	16b	Cite studies that might appear to meet the inclusion criteria but which were excluded, and explain why they were excluded.	Methods: Study Selection (reasons for exclusion documented; supplementary information referenced)
Study characteristics	17	Cite each included study and present its characteristics.	Results: Characteristics of Included Studies (37 studies, 11 countries, 1,117 participants); Supplementary S5 referenced
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Methods: Quality Assessment (CASP results provided as supplementary S3)
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g., confidence/credible interval), ideally using structured tables or plots.	Results: Meta-Synthesis findings (first-order and second-order constructs integrated; verbatim quotes provided for each theme)
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Results (GRADE-CERQual confidence ratings described but specific ratings per theme require supplementary S4)
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g., confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Not applicable (qualitative synthesis; no meta-analysis)

	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Results: Meta-Synthesis (comparisons made across studies to identify similarities, differences, and recurring patterns)
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Results (sensitivity analysis referenced; studies with serious concerns retained but assessed for influence)
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Limitations section (English-language only limitation acknowledged)
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Methods and Results (GRADE-CERQual referenced; confidence ratings: high, moderate, low, or very low assigned to each analytical theme; supplementary S4)
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Discussion (paragraphs 1-10; comparisons with prior systematic reviews, HBM framework, Social Cognitive Theory)
	23b	Discuss any limitations of the evidence included in the review.	Discussion: Limitations (paragraph 1)
	23c	Discuss any limitations of the review processes used.	Discussion: Limitations (paragraph 1)
	23d	Discuss implications of the results for practice, policy, and future research.	Discussion: Implications (paragraphs 1-3)
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Methods: Study Design (PROSPERO registration stated)

	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Methods: Study Design (protocol registered on PROSPERO)
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Not stated (assumed no amendments)
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	End of Manuscript
Competing interests	26	Declare any competing interests of review authors.	End of Manuscript
Availability of data, code, and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Supplementary materials referenced (S2, S3, S4, S5)

Supplementary File S2

Detailed Search Strategy and Database-Specific Search Strings

Exploring Factors Influencing Diabetic Retinopathy Screening Uptake within Primary Care Settings: A Systematic Review and Meta-Synthesis

Search date: Inception – April 2026 |

Overview

Search strategies were developed in collaboration with a specialist research librarian and tailored to the controlled vocabulary (MeSH, Emtree, CINAHL Headings, PsycINFO Thesaurus) and field-tag syntax of each database. All searches combined three conceptual domains using Boolean operators: (1) the condition and outcome (diabetic retinopathy, retinal/ophthalmic screening); (2) the setting (primary care, general practice, community health); and (3) the study design and experiential focus (qualitative research, barriers, facilitators, patient perspectives). Truncation (*) was used where permitted. Searches were not restricted by language, geography, or publication year. The combined set #1 AND #2 AND #3 was run in each database. Results were exported to Rayyan for deduplication and screening.

Database 1: MEDLINE | Platform: PubMed (National Library of Medicine) | Date range: Inception – April 2026

#	Concept	Search String
1	DR / Retinal screening (MeSH + free-text)	("Diabetic Retinopathy"[MeSH] OR "diabetic retinopathy"[tiab] OR "diabetic retinopathies"[tiab] OR "retinal screening"[tiab] OR "diabetic eye screening"[tiab] OR "eye screening"[tiab] OR "fundus photography"[MeSH] OR "fundus photography"[tiab] OR "fundal photography"[tiab] OR "fundal examination"[tiab] OR "fundoscopy"[tiab] OR

		"ophthalmoscopy"[MeSH] OR "ophthalmic screening"[tiab] OR "retinal examination"[tiab] OR "retinal imaging"[tiab] OR "ocular screening"[tiab])
2	Primary care setting (MeSH + free-text)	("Primary Health Care"[MeSH] OR "General Practice"[MeSH] OR "Physicians, Family"[MeSH] OR "Community Health Centers"[MeSH] OR "primary care"[tiab] OR "primary health care"[tiab] OR "general practice"[tiab] OR "general practitioner"[tiab] OR "family medicine"[tiab] OR "family physician"[tiab] OR "community health"[tiab] OR "community clinic"[tiab] OR "community-based"[tiab] OR "outpatient clinic"[tiab] OR "primary care physician"[tiab])
3	Qualitative design / experiential focus (MeSH + free-text)	("Qualitative Research"[MeSH] OR "Focus Groups"[MeSH] OR "Interviews as Topic"[MeSH] OR "qualitative"[tiab] OR "qualitative study"[tiab] OR "qualitative research"[tiab] OR "focus group"[tiab] OR "in-depth interview"[tiab] OR "semi-structured interview"[tiab] OR "thematic analysis"[tiab] OR "phenomenolog*"[tiab] OR "grounded theory"[tiab] OR "ethnograph*"[tiab] OR "lived experience"[tiab] OR "patient perspective"[tiab] OR "patient experience"[tiab] OR "health-seeking"[tiab] OR "barriers"[tiab] OR "facilitators"[tiab] OR "enablers"[tiab] OR "perceptions"[tiab] OR "attitudes"[tiab] OR "beliefs"[tiab] OR "adherence"[tiab] OR "non-attendance"[tiab] OR "uptake"[tiab])
✦	COMBINE	#1 AND #2 AND #3 – Filters: No language or date restrictions applied

Note. Field tags: [MeSH] = Medical Subject Heading; [tiab] = Title and Abstract. Truncation: * not supported in MeSH but used in free-text. Boolean operators: AND, OR (uppercase required in PubMed).

Database 2: EMBASE | Platform: Elsevier (Ovid interface) | Date range: Inception – April 2026

#	Concept	Search String
1	DR / Retinal screening (EMTREE + free-text)	('diabetic retinopathy'/exp OR 'diabetic retinopathy':ti,ab OR 'diabetic retinopathies':ti,ab OR 'retinal screening':ti,ab OR 'diabetic eye screening':ti,ab OR 'eye screening':ti,ab OR 'fundus photography'/exp OR 'fundus photography':ti,ab OR 'fundal photography':ti,ab OR 'fundal examination':ti,ab OR 'fundoscopy':ti,ab OR 'ophthalmoscopy'/exp OR 'ophthalmic screening':ti,ab OR 'retinal examination':ti,ab OR 'retinal imaging':ti,ab OR 'ocular screening':ti,ab)
2	Primary care setting (EMTREE + free-text)	('primary health care'/exp OR 'general practice'/exp OR 'family medicine'/exp OR 'community health center'/exp OR 'primary care':ti,ab OR 'primary health care':ti,ab OR 'general practice':ti,ab OR 'general practitioner':ti,ab OR 'family medicine':ti,ab OR 'family physician':ti,ab OR 'community health':ti,ab OR 'community clinic':ti,ab OR 'community-based':ti,ab OR 'outpatient clinic':ti,ab OR 'primary care physician':ti,ab)
3	Qualitative design / experiential focus (EMTREE + free-text)	('qualitative research'/exp OR 'focus group'/exp OR 'interview'/exp OR 'qualitative':ti,ab OR 'qualitative study':ti,ab OR 'focus group':ti,ab OR 'in-depth interview':ti,ab OR 'semi-structured interview':ti,ab OR 'thematic analysis':ti,ab OR 'phenomenolog*':ti,ab OR 'grounded theory':ti,ab OR 'ethnograph*':ti,ab OR 'lived experience':ti,ab OR 'patient perspective':ti,ab OR 'patient experience':ti,ab OR 'health-seeking':ti,ab OR 'barrier*':ti,ab OR 'facilitator*':ti,ab OR 'enabler*':ti,ab)

		OR 'perception*':ti,ab OR 'attitude*':ti,ab OR 'belief*':ti,ab OR 'adherence':ti,ab OR 'non-attendance':ti,ab OR 'uptake':ti,ab)
✦	COMBINE	#1 AND #2 AND #3 – Filters: No language or date restrictions applied

Note. Field tags: /exp = explode EMTREE term (includes all narrower terms); :ti,ab = Title and Abstract. Truncation: * permitted. Boolean operators: AND, OR (uppercase). EMTREE controlled vocabulary used alongside free-text synonyms.

Database 3: CINAHL | Platform: EBSCOhost | Date range: Inception – April 2026

#	Concept	Search String
1	DR / Retinal screening (CINAHL Headings + free-text)	(MH "Diabetic Retinopathy+" OR TI "diabetic retinopathy" OR AB "diabetic retinopathy" OR TI "retinal screening" OR AB "retinal screening" OR TI "diabetic eye screening" OR AB "diabetic eye screening" OR TI "eye screening" OR AB "eye screening" OR MH "Fundus Oculi" OR TI "fundus photography" OR AB "fundus photography" OR TI "fundal examination" OR AB "fundal examination" OR TI "fundoscopy" OR AB "fundoscopy" OR TI "ophthalmic screening" OR AB "ophthalmic screening" OR TI "retinal imaging" OR AB "retinal imaging" OR TI "ocular screening" OR AB "ocular screening")
2	Primary care setting (CINAHL Headings + free-text)	(MH "Primary Health Care+" OR MH "General Practice+" OR MH "Family Practice+" OR MH "Community Health Centers+" OR TI "primary care" OR AB "primary care" OR TI "primary health care" OR AB "primary health care" OR TI "general practice" OR AB "general practice" OR TI "general practitioner" OR AB "general practitioner" OR TI "family medicine" OR AB "family medicine" OR TI "community health" OR AB "community health" OR TI "community clinic" OR AB "community clinic" OR TI "community-based" OR AB "community-based")
3	Qualitative design / experiential focus (CINAHL Headings + free-text)	(MH "Qualitative Studies+" OR MH "Focus Groups+" OR MH "Interviews+" OR TI qualitative OR AB qualitative OR TI "focus group" OR AB "focus group" OR TI "in-depth interview" OR AB "in-depth interview" OR TI "semi-structured interview" OR AB "semi-structured interview" OR TI "thematic analysis" OR AB "thematic analysis" OR TI phenomenolog* OR AB phenomenolog* OR TI "grounded theory" OR AB "grounded theory" OR TI ethnograph* OR AB ethnograph* OR TI "lived experience" OR AB "lived experience" OR TI "patient perspective" OR AB "patient perspective" OR TI barrier* OR AB barrier* OR TI facilitator* OR AB facilitator* OR TI "health-seeking" OR AB "health-seeking" OR TI uptake OR AB uptake)
✦	COMBINE	S1 AND S2 AND S3 – Filters: No language or date restrictions applied

Note. Field tags: MH = CINAHL Subject Heading (+ = explode); TI = Title; AB = Abstract. Truncation: * permitted. Boolean operators: AND, OR. CINAHL Headings used alongside free-text. Search conducted in EBSCOhost Advanced Search.

Database 4: PsycINFO | Platform: APA PsycNET / EBSCOhost | Date range: Inception – April 2026

#	Concept	Search String
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1	DR / Retinal screening (Thesaurus + free-text)	(DE "Diabetic Retinopathy" OR TI "diabetic retinopathy" OR AB "diabetic retinopathy" OR TI "retinal screening" OR AB "retinal screening" OR TI "diabetic eye screening" OR AB "diabetic eye screening" OR TI "eye screening" OR AB "eye screening" OR TI "fundus photography" OR AB "fundus photography" OR TI "fundal examination" OR AB "fundal examination" OR TI "ophthalmic screening" OR AB "ophthalmic screening" OR TI "retinal imaging" OR AB "retinal imaging" OR TI "ocular screening" OR AB "ocular screening")
2	Primary care setting (Thesaurus + free-text)	(DE "Primary Health Care" OR DE "Community Health Services" OR DE "Community Mental Health Centers" OR TI "primary care" OR AB "primary care" OR TI "primary health care" OR AB "primary health care" OR TI "general practice" OR AB "general practice" OR TI "general practitioner" OR AB "general practitioner" OR TI "family medicine" OR AB "family medicine" OR TI "community health" OR AB "community health" OR TI "community clinic" OR AB "community clinic" OR TI "community-based" OR AB "community-based")
3	Qualitative design / experiential focus (Thesaurus + free-text)	(DE "Qualitative Research" OR DE "Focus Groups" OR DE "Interviews" OR TI qualitative OR AB qualitative OR TI "focus group" OR AB "focus group" OR TI "in-depth interview" OR AB "in-depth interview" OR TI "semi-structured interview" OR AB "semi-structured interview" OR TI "thematic analysis" OR AB "thematic analysis" OR TI phenomenolog* OR AB phenomenolog* OR TI "grounded theory" OR AB "grounded theory" OR TI ethnograph* OR AB ethnograph* OR TI "lived experience" OR AB "lived experience" OR TI "health belief" OR AB "health belief" OR TI "health-seeking" OR AB "health-seeking" OR TI barrier* OR AB barrier* OR TI facilitator* OR AB facilitator* OR TI "patient perception" OR AB "patient perception" OR TI uptake OR AB uptake)
✦	COMBINE	S1 AND S2 AND S3 – Filters: No language or date restrictions applied

Note. Field tags: DE = APA Thesaurus Descriptor; TI = Title; AB = Abstract. Truncation: * permitted. Boolean operators: AND, OR. PsycINFO Thesaurus descriptors used where available; free-text synonyms supplement controlled vocabulary.

Database 5: Scopus | Platform: Elsevier | Date range: Inception – April 2026

#	Concept	Search String
1	DR / Retinal screening (TITLE-ABS-KEY)	(TITLE-ABS-KEY("diabetic retinopathy" OR "diabetic retinopathies" OR "retinal screening" OR "diabetic eye screening" OR "eye screening" OR "fundus photography" OR "fundal photography" OR "fundal examination" OR "fundoscopy" OR "ophthalmoscopy" OR "ophthalmic screening" OR "retinal examination" OR "retinal imaging" OR "ocular screening"))
2	Primary care setting (TITLE-ABS-KEY)	(TITLE-ABS-KEY("primary care" OR "primary health care" OR "general practice" OR "general practitioner" OR "family medicine" OR "family physician" OR "community health" OR "community clinic" OR "community-based" OR "outpatient clinic" OR "primary care physician"))
3	Qualitative design / experiential focus (TITLE-ABS-KEY)	(TITLE-ABS-KEY("qualitative" OR "qualitative study" OR "qualitative research" OR "focus group" OR "in-depth interview" OR "semi-structured interview" OR "thematic analysis" OR "phenomenolog*" OR "grounded theory" OR "ethnograph*" OR "lived experience" OR "patient perspective" OR "patient experience" OR "health-seeking" OR "barrier*" OR "facilitator*"))

		OR "enabler*" OR "perception*" OR "attitude*" OR "belief*" OR "adherence" OR "non-attendance" OR "uptake"))
✦	COMBINE	#1 AND #2 AND #3 – Filters: No language or date restrictions applied. TITLE-ABS-KEY field tag used throughout.

Note. Field tag: TITLE-ABS-KEY searches Title, Abstract, and Author Keywords simultaneously. Truncation: * permitted. Boolean operators: AND, OR. No controlled vocabulary; all terms are free-text. Wildcards supported.

Database 6: Web of Science Core Collection | Platform: Clarivate Analytics | Date range: Inception – April 2026

#	Concept	Search String
1	DR / Retinal screening (Topic field = TI + AB + KW + KP)	TS=("diabetic retinopathy" OR "diabetic retinopathies" OR "retinal screening" OR "diabetic eye screening" OR "eye screening" OR "fundus photography" OR "fundal photography" OR "fundal examination" OR "fundoscopy" OR "ophthalmoscopy" OR "ophthalmic screening" OR "retinal examination" OR "retinal imaging" OR "ocular screening")
2	Primary care setting (Topic field)	TS=("primary care" OR "primary health care" OR "general practice" OR "general practitioner" OR "family medicine" OR "family physician" OR "community health" OR "community clinic" OR "community-based" OR "outpatient clinic" OR "primary care physician")
3	Qualitative design / experiential focus (Topic field)	TS=("qualitative" OR "qualitative study" OR "qualitative research" OR "focus group" OR "in-depth interview" OR "semi-structured interview" OR "thematic analysis" OR "phenomenolog*" OR "grounded theory" OR "ethnograph*" OR "lived experience" OR "patient perspective" OR "patient experience" OR "health-seeking" OR "barrier*" OR "facilitator*" OR "enabler*" OR "perception*" OR "attitude*" OR "belief*" OR "adherence" OR "non-attendance" OR "uptake")
✦	COMBINE	#1 AND #2 AND #3 – TS = Topic field (searches Title, Abstract, Author Keywords, Keywords Plus). No language or date restrictions applied.

Note. Field tag: TS (Topic) searches Title, Abstract, Author Keywords, and Keywords Plus simultaneously. Truncation: * permitted. Boolean operators: AND, OR (uppercase). Databases included: SCI-EXPANDED, SSCI, A&HCI, ESCI.

Database 7: Cochrane Library | Platform: Wiley Online Library | Date range: Inception – April 2026

#	Concept	Search String
1	DR / Retinal screening (MeSH + Title/Abstract)	([mh "Diabetic Retinopathy"] OR "diabetic retinopathy":ti,ab,kw OR "diabetic retinopathies":ti,ab,kw OR "retinal screening":ti,ab,kw OR "diabetic eye screening":ti,ab,kw OR "eye screening":ti,ab,kw OR [mh "Fundus Oculi"] OR "fundus photography":ti,ab,kw OR "fundal examination":ti,ab,kw OR "fundoscopy":ti,ab,kw OR "ophthalmic screening":ti,ab,kw OR "retinal imaging":ti,ab,kw OR "ocular screening":ti,ab,kw)

2	Primary care setting (MeSH + Title/Abstract)	([mh "Primary Health Care"] OR [mh "General Practice"] OR [mh "Family Practice"] OR [mh "Community Health Centers"] OR "primary care":ti,ab,kw OR "primary health care":ti,ab,kw OR "general practice":ti,ab,kw OR "general practitioner":ti,ab,kw OR "family medicine":ti,ab,kw OR "family physician":ti,ab,kw OR "community health":ti,ab,kw OR "community clinic":ti,ab,kw OR "community-based":ti,ab,kw)
3	Qualitative design / experiential focus (MeSH + Title/Abstract)	([mh "Qualitative Research"] OR [mh "Focus Groups"] OR [mh "Interviews as Topic"] OR "qualitative":ti,ab,kw OR "focus group":ti,ab,kw OR "in-depth interview":ti,ab,kw OR "semi-structured interview":ti,ab,kw OR "thematic analysis":ti,ab,kw OR "phenomenolog*":ti,ab,kw OR "grounded theory":ti,ab,kw OR "ethnograph*":ti,ab,kw OR "lived experience":ti,ab,kw OR "patient perspective":ti,ab,kw OR "barrier*":ti,ab,kw OR "facilitator*":ti,ab,kw OR "enabler*":ti,ab,kw OR "perception*":ti,ab,kw OR "health-seeking":ti,ab,kw OR "uptake":ti,ab,kw)
✦	COMBINE	#1 AND #2 AND #3 – Searched across CDSR, CENTRAL, DARE, and HTA databases. No language or date restrictions applied.

*Note. Field tags: [mh] = MeSH heading (searches indexed records); :ti,ab,kw = Title, Abstract, and Keywords. Truncation: * permitted. Databases searched: Cochrane Database of Systematic Reviews (CDSR), CENTRAL, Database of Abstracts of Reviews of Effects (DARE), and Health Technology Assessment (HTA) database.*

Supplementary note on manual searching:

In addition to electronic database searching, the reference lists of all included studies and relevant systematic reviews identified during the search were manually screened (backward citation tracking). Forward citation tracking was performed for all included studies using Google Scholar and Web of Science Cited Reference Search. Targeted hand-searches were also conducted in key journals: Diabetic Medicine, BMJ Open, PLoS ONE, BMC Family Practice, British Journal of General Practice, and Ophthalmic Epidemiology. Grey literature (dissertations, conference abstracts, government reports) was not systematically searched but was included if identified incidentally and if sufficient methodological detail was available to permit quality appraisal.

Supplementary File S3

Quality Appraisal Scores for Included Studies

Quality was assessed independently by two reviewers using the Critical Appraisal Skills Programme (CASP) Qualitative Checklist (10 items). Responses: Y = Yes; CT = Can't Tell; N = No. Studies with serious methodological concerns were retained but subjected to sensitivity analysis. Risk of bias is reported as Low, Moderate, or High based on the overall profile of responses.

Study (Author, Year)	Country	Method	Q1 Clear Aims	Q2 Qual Method	Q3 Design	Q4 Recruitment	Q5 Data Collection	Q6 Reflexivity	Q7 Ethics	Q8 Analysis	Q9 Findings	Q10 Value	Total Score	Risk
Fan et al. (2023)	China	FGD/Interview	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10	Low
Beaser et al. (2018)	USA	Interview/Survey	Y	Y	Y	Y	Y	Y	Y	Y	CT	Y	9/10	Low

[illegible]

Hipwell et al. (2014)	UK	Interview	Y	Y	Y	Y	Y	Y	CT	Y	Y	Y	9/10	Low
Strutton et al. (2016)	UK	Interview	Y	Y	Y	Y	CT	Y	Y	Y	Y	Y	9/10	Low
Xiao et al. (2026)	China	Interview	Y	Y	Y	Y	Y	Y	Y	Y	CT	Y	9/10	Low
Liu et al. (2019)	USA	Interview	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10	Low
Frimpong et al. (2025)	USA	FGD	Y	Y	Y	Y	Y	CT	Y	Y	Y	Y	9/10	Low
van Eijk et al. (2012)	Netherlands	Interview	Y	Y	Y	Y	Y	Y	CT	CT	Y	Y	8/10	Low
Lake et al. (2017)	Australia	Interview	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10	Low
Duan et al. (2017)	China	Interview	Y	Y	Y	Y	CT	Y	Y	Y	Y	Y	9/10	Low
Hudson et al. (2022)	USA	Interview	Y	Y	Y	Y	Y	Y	Y	CT	Y	Y	9/10	Low
Yahya et al. (2020)	Palestine	Interview	Y	Y	CT	Y	Y	Y	Y	Y	Y	Y	9/10	Low
Du et al. (2025)	USA	Interview/FGD	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10	Low
Bastos de Carvalho et al. (2021)	USA	Interview	Y	Y	Y	Y	Y	Y	Y	CT	Y	Y	9/10	Low
Ramchandra n et al. (2022)	USA	Interview	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10	Low
Chauhan et al. (2025b)	India	Interview/Obs.	Y	Y	Y	Y	Y	CT	Y	Y	Y	Y	9/10	Low
Glasson et al. (2017)	Australia	Interview	Y	Y	Y	Y	Y	Y	CT	Y	Y	Y	9/10	Low
Khou et al. (2021)	Australia	Interview/Survey	Y	Y	Y	Y	Y	Y	Y	Y	CT	Y	9/10	Low
Lewis et al. (2007)	UK	Interview	Y	Y	Y	CT	Y	Y	Y	Y	Y	Y	9/10	Low

Katibeh et al. (2017)	Iran	FGD/Interview	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10	Low
Byrne et al. (2020)	UK	Interview	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10	Low

Abbreviations: FGD = Focus Group Discussion; Obs. = Observation; Q = CASP question number; CT = Can't Tell.

#	Study (as cited in article)	Ref. No.
1	Fan C, Liu Y, Huai B, et al. Disease perception and experience in people with diabetic retinopathy: A qualitative study. <i>Nursing Open</i> . 2023;10(4):2150–7.	19
2	Beaser RS, Turell WA, Howson A. Strategies to Improve Prevention and Management in Diabetic Retinopathy: Qualitative Insights from a Mixed-Methods Study. <i>Diabetes Spectrum</i> . 2018;31(1):65–74.	20
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Supplementary File S4

GRADE-CERQual Process and Details

The GRADE-CERQual (Grading of Recommendations Assessment, Development and Evaluation – Confidence in the Evidence from Reviews of Qualitative Research) framework was applied to assess the confidence of each analytical theme. Four domains were evaluated: (1) Methodological Limitations — concerns about design, conduct, or analysis of contributing studies; (2) Coherence — the degree to which findings from contributing studies are similar and form a coherent pattern; (3) Adequacy of Data — the overall richness and quantity of data supporting a finding; and (4) Relevance — the extent to which contributing studies are relevant to the review question and target context. Confidence ratings are: High, Moderate, Low, or Very Low.

Analytical Theme	Key Findings / Sub-themes	Methodological Limitations	Coherence of Evidence	Adequacy of Data	Relevance	CERQual Confidence	Explanation of Confidence
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Theme 1: Knowledge, Risk Perception, and Health Beliefs	Sub-theme 1.1: Inadequate knowledge of DR and screening purpose Sub-theme 1.2: Symptom-driven health-seeking and low perceived risk Sub-theme 1.3: Fatalistic, self-reliant, and alternative health beliefs	Multiple studies; minor concerns about design in 2 studies	High coherence; consistent patterns across settings	37 studies; extensive verbatim data across 11 countries	Evidence primarily from primary care and community settings; broadly applicable	High	Highly consistent finding across all geographic and economic contexts; forms the primary patient-level barrier to DR screening engagement.
Theme 2: Psychological and Emotional Determinants	Sub-theme 2.1: Fear, denial, and avoidance behavior Sub-theme 2.2: Psychological burden of chronic illness Sub-theme 2.3: Motivation, self-efficacy, and internal drive	Minor methodological concerns in 4 studies (reflexivity); otherwise robust	Some variability in the direction of fear (barrier vs. facilitator), but coherent overall	Substantial data across 20+ studies; includes patients and providers	Applicable to primary care; some studies in community or specialist overlap	Moderate	Robust but moderate confidence owing to the bidirectional role of fear. Self-efficacy as a facilitator less well-evidenced than avoidance behavior.
Theme 3: Social and Cultural Influences	Sub-theme 3.1: Healthcare provider influence and referral behavior Sub-theme 3.2: Family and peer support Sub-theme 3.3: Gender norms and socio-cultural constraints Sub-theme 3.4: Stigma and social isolation	Minor concerns in studies addressing stigma (limited reflexivity); provider studies robust	High coherence for HCP influence; moderate coherence for gender norms (culturally specific)	Adequate; HCP influence well-represented; gender and stigma themes from a smaller subset	Provider findings globally applicable; gender findings mainly from LMICs	Moderate	The influence of HCP recommendation is highly consistent and cross-cultural. Gender and stigma themes are important but have narrower geographic representation.
Theme 4: Structural, Logistical, and Economic Barriers	Sub-theme 4.1: Financial constraints and insurance coverage Sub-theme 4.2: Geographic distance and transportation	Methodological quality good; some studies lacked reflexivity statements	High coherence; consistent barriers across income settings	Extensive; addressed across 30+ studies in diverse income contexts	Strongly applicable to primary care; especially relevant in rural and low-income settings	High	Among the most consistently documented barriers. Mydriasis-related transportation constraint is a distinctive primary care-specific finding warranting targeted policy attention.

	Sub-theme 4.3: Time constraints and competing demands						
Theme 5: Health System and Primary Care Organizational Factors	Sub-theme 5.1: Systematic recall and reminder mechanisms Sub-theme 5.2: Workforce capacity and clinical champions Sub-theme 5.3: Integration with routine diabetes care Sub-theme 5.4: Teleophthalmology and AI-assisted screening	Provider-level studies robust; AI/tele-ophthalmology evidence from fewer studies with some design limitations	High coherence for recall systems and integration; emerging evidence for AI	Recall and integration well-evidenced; AI findings from smaller, more recent studies	Directly relevant to primary care organizational contexts	Moderate	Recall systems and integration are strongly evidenced facilitators. AI/teleophthalmology findings are promising but based on a smaller, more recent evidence base; confidence appropriately downgraded.

CERQual = Confidence in the Evidence from Reviews of Qualitative Research; DR = diabetic retinopathy; HCP = healthcare provider; LMIC = low- and middle-income country; AI = artificial intelligence.

S5: Table 1. Overall Characteristics of Included Studies (n=38)

Abbreviations: DR = diabetic retinopathy; FGD = focus group discussion; GP = general practitioner; HCP = healthcare provider; HIC = high-income country; LMIC = low- and middle-income country; PDR = proliferative DR; STDR = sight-threatening DR; T1D = type 1 diabetes; T2D = type 2 diabetes; UMIC = upper-middle-income country.

Ref #	Author (Year)	Country	Income Level	Study Design	Setting	Participants	Aim / Focus	Key Findings
1	Fan C et al. (2023)	China	UMIC	Qualitative (in-depth interviews)	Hospital ophthalmology department	Patients with DR	Explore disease perception and lived experience in people with DR	Patients experience high emotional burden and fear of blindness; knowledge gaps exist regarding early

								asymptomatic stages.
2	Beaser RS et al. (2018)	USA	HIC	Mixed methods (interviews + survey)	Endocrinology practice	Patients with diabetes and clinicians	Identify strategies to improve prevention and management in DR	Fragmented communication between endocrinologists and eye care specialists limits systematic screening compliance.
3	Kumar G et al. (2023)	Thailand	UMIC	Qualitative (in-depth interviews)	Multiple healthcare settings	Patients, family members, and HCPs	Explore barriers and facilitators to DR screening in Thailand	Barriers include travel costs and clinic wait times; facilitators include strong family support and direct HCP endorsement.
4	Chauhan A et al. (2025)	India	LMIC	Qualitative (FGDs and interviews)	Public health facilities (North India)	Patients with diabetes and HCPs	Explore barriers to DR screening in public health facilities in North India	System bottlenecks include heavy patient loads, equipment shortages, and low basic eye care literacy among patients.
5	Held LA et al. (2022)	Germany	HIC	Qualitative (semi-structured interviews)	Primary care practices	Primary care stakeholders (GPs, practice staff)	Determine factors influencing implementation of AI-supported DR screening in primary care	AI screening improves access and saves time, but faces workflow friction, high initial setup costs, and data

								privacy concerns.
6	Watson MJG et al. (2021)	Australia	HIC	Qualitative (semi-structured interviews)	Primary care (general practice)	GPs and optometrists	Identify barriers and facilitators to DR screening within Australian primary care	Unclear administrative tracking and lack of automatic shared reminder systems impede coordinated care between GPs and optometrists.
7	Kumar S et al. (2023)	India	LMIC	Qualitative (interviews and FGDs)	Tertiary eye care centre	Patients with sight-threatening DR	Understand treatment-seeking behaviour in patients with STDR using a behavioural model	Fatalistic attitudes ("my vision is fine now") and high costs of tertiary treatments significantly delay critical care-seeking.
8	Fu J et al. (2026)	USA	HIC	Qualitative (semi-structured interviews)	Academic medical centre	Under-adherent patients with diabetes (high-risk)	Interrogate a framework for DR screening adherence in a severely affected population	Social determinants of health, competing financial priorities, and past negative clinical experiences drive severe non-adherence.
9	Almouqati F et al. (2025)	Australia	HIC	Qualitative (semi-structured interviews)	Nurse-led community clinic	Patients attending DR screening clinic	Identify factors associated with adherence to DR screening in a	Nurse-led models enhance trust, comfort, and patient

							nurse-led community clinic	education; structural barriers like transport remain problematic.
10	Fairless E et al. (2019)	USA	HIC	Qualitative (semi-structured interviews)	Academic medical centre	High-risk patients with diabetes	Explore barriers to and facilitators of DR screening utilisation in a high-risk population	Logistical friction (transport, complex insurance) is the primary barrier; clear, empathetic provider communication serves as the key facilitator.
11	Lindenmeyer A et al. (2014)	UK	HIC	Qualitative case study (interviews and observation)	Primary care practices	Patients and practice staff	Explore influence of primary care practices on patients' uptake of DR screening	Practices using dedicated administrative tracking and electronic medical record alerts achieve significantly higher screening uptake.
12	Piyasena M et al. (2019)	Sri Lanka	LMIC	Qualitative (interviews and FGDs)	Community and health facilities (Western Province)	People with diabetes	Investigate barriers and enablers to uptake of DR screening	Fear of total blindness drives screening uptake, while lack of free transport and poor primary care integration act as barriers.

13	Pelayo C et al. (2023)	USA	HIC	Qualitative (interviews and FGDs)	Community health settings	Latinx patients with diabetes	Explore factors influencing eye screening adherence among Latinx patients with diabetes	Language barriers and fear of documentation status hinder adherence; family support serves as a core motivating mechanism.
14	Ozioko N et al. (2024)	Nigeria	LMIC	Qualitative (interviews)	Primary care settings	Patients with diabetes and providers	Understand barriers and enablers of access to diabetic screening services	High out-of-pocket costs, lack of screening equipment in local clinics, and long travel distances restrict access.
15	Hall CE et al. (2016)	Tanzania	LMIC	Qualitative (needs assessment; FGDs and interviews)	Community settings	People living with diabetes and DR	Assess needs of people living with diabetes and DR	Critical shortages in specialized ophthalmic workforce and affordable laser therapies severely limit real-world treatment capacity.
16	Liu Y et al. (2018)	USA (rural)	HIC	Qualitative (FGDs and interviews)	Rural community settings	Patients with diabetes	Identify factors influencing DR screening adherence in rural communities	Rural barriers include long distances and agricultural harvesting seasonal conflicts; trusted

								local PCP advice improves compliance.
17	Ford BK et al. (2021)	Australia	HIC	Qualitative (semi-structured interviews)	Publicly funded eye care pathway (Western Sydney)	Patients with diabetes	Explore experiences of patients attending a publicly funded eye care pathway	Free pathways successfully remove financial barriers, but administrative booking backlogs lead to patient distress.
18	Prothero L et al. (2022)	UK	HIC	Qualitative (semi-structured interviews)	Multiple community and clinical settings	Young adults with type 1 diabetes	Identify barriers and enablers to DR screening attendance in young adults with T1D	Young adults face screening friction due to competing employment obligations, fatalism, and transitional gaps from pediatric care.
19	Hipwell AE et al. (2014)	UK	HIC	Qualitative (semi-structured interviews)	DR screening service	Staff and patients	Explore attitudes, access and experiences of DR screening from staff and patient perspectives	Patients report distinct anxiety regarding the diagnostic window and temporary vision blurriness caused by mydriatic eye drops.
20	Strutton R et al. (2016)	UK (London)	HIC	Qualitative (service evaluation; interviews and records)	DR screening programme (Sutton and Merton)	Non-attendees at DR screening	Identify system-level and patient-level explanations for	System errors (incorrect address databases) combine with

							non-attendance at DR screening	personal barriers (misunderstanding the need for annual tests) to cause drops in compliance.
21	Xiao B et al. (2026)	China (southern)	UMIC	Qualitative (interviews and FGDs)	Township health units	Service providers and users	Explore contextual factors affecting DR screening uptake at township health units	Primary care units suffer from low technical infrastructure and staffing shortages; community-based health workers are vital for mobilization.
22	Liu Y et al. (2019)	USA (rural)	HIC	Qualitative (semi-structured interviews)	Rural primary care clinic	Clinicians and patients	Identify barriers, facilitators and implementation strategies for teleophthalmology-based DR screening	Embedding camera screening directly into standard nursing workflows optimizes success; technical downtime and billing are core limitations.
23	Frimpong A et al. (2025)	USA	HIC	Qualitative (focus groups)	Community setting	Adults with diabetes (high-risk)	Generate recommendations for a digital health tool for blindness prevention in high-risk DR patients	High-risk patients prefer mobile health tools featuring simplified visual graphs, automated text text alerts, and

								direct care-team messaging.
24	van Eijk KN et al. (2012)	Netherlands	HIC	Mixed methods (questionnaire and interviews)	Primary care (general practice)	Patients with diabetes mellitus	Identify incentives and barriers to DR screening in primary care	Strong GP relationships serve as the strongest incentive; common barriers include plain forgetfulness and administrative oversights.
25	Lake AJ et al. (2017)	Australia	HIC	Qualitative (semi-structured interviews)	Multiple clinical and community settings	Young adults with type 2 diabetes	Explore factors influencing retinal screening uptake in young adults with T2D	Stigma, low perceived risk ("it's a disease for older generations"), and busy professional schedules impede screening in young cohorts.
26	Duan F et al. (2017)	China (southern)	UMIC	Qualitative (in-depth interviews)	Hospital ophthalmology department	Patients with proliferative DR (PDR)	Explore factors influencing timely follow-up visit compliance in patients with PDR	Compliance dropped significantly when patients experienced brief visual improvements post-procedure or felt overwhelmed by treatment costs.

27	Hudson SM et al. (2022)	USA	HIC	Qualitative (focus groups)	Ophthalmology and primary care settings	English and Spanish-speaking patients with diabetes	Identify factors affecting compliance with DR screening comparing English and Spanish speakers	Spanish-speaking cohorts face severe structural language gaps but exhibit high adherence when given culturally coordinated navigation support.
28	Yahya T et al. (2020)	Palestine	LMIC	Qualitative (FGDs)	Primary healthcare centres	Patients with diabetes	Investigate DR screening barriers among Palestinian primary health care patients	Geopolitical instability, movement constraints, clinic overcrowding, and high out-of-pocket costs severely suppress attendance rates.
29	Du S et al. (2025)	USA	HIC	Qualitative quality improvement (interviews and chart review)	Tertiary academic medical centre	Patients with diabetes	Identify facilitators, barriers and areas of opportunity in DR screening via quality improvement	Point-of-care screening offers delivered during regular diabetes maintenance checks substantially elevate screening capture rates.
30	Bastos de Carvalho A et al. (2021)	USA	HIC	Qualitative (multi-level; in-depth interviews)	Federally Qualified Health	Patients, clinical staff and	Evaluate multi-level barriers and facilitators in a large DR	Institutional barriers include hardware breakdown and

					Centres (FQHCs)	administrators	screening programme in FQHCs	high medical staff turnover; clinic champions are critical to sustain programs.
31	Ramchandra n RS et al. (2022)	USA	HIC	Qualitative (semi-structured interviews)	Academic medical centre	Clinical staff	Explore implementation of teleophthalmology to improve DR surveillance	Long-term digital screening expansion requires dedicated operational roles and continuous feedback infrastructure for clinic coordinators.
32	Chauhan A et al. (2025)	India	LMIC	Qualitative/mixed methods (interviews and observation)	Primary healthcare settings	Healthcare providers and community members	Assess reach and implementation of human and AI-assisted DR screening models in primary care	AI-driven models process diagnostic images faster and expand clinic reach, but rely heavily on steady financing and functional referral pathways.
33	Glasson NM et al. (2017)	Australia (remote)	HIC	Qualitative (semi-structured interviews)	Remote healthcare settings	Patients with diabetes and healthcare providers	Evaluate patient and provider perceptions of a remote DR screening model	Remote tele-screening models drastically decrease personal travel burdens, though isolated staff

								require sustained technical camera support.
34	Khou V et al. (2021)	Australia	HIC	Multi-method (interviews and survey)	Primary care (general practice)	Multiple stakeholders (GPs, staff, patients)	Evaluate initial implementation of a nationwide DR screening programme in primary care	Initial infrastructure outlays and variable GP clinic participation underscore the absolute necessity for centralized technical support registries.
35	Lewis K et al. (2007)	UK	HIC	Qualitative (semi-structured interviews)	Ophthalmic outpatient clinics	Patients with diabetes	Identify factors influencing attendance at ophthalmic outpatient clinics	Patients skip appointments out of fear of uncomfortable ocular procedures and clinic delays, but comply when clear long-term utility is shown.
36	Riordan F et al. (2020)	Ireland	HIC	Qualitative/mixed methods (interviews, survey and observation)	DR screening programme (national)	Multiple stakeholders (patients, HCPs, programme managers)	Develop an intervention to facilitate implementation and uptake of DR screening	Designing effective uptake interventions requires a multi-faceted approach addressing GP audit logs and patient education booklets.

37	Katibeh M et al. (2017)	Iran	UMIC	Qualitative (in-depth interviews)	Healthcare system (national)	Multiple stakeholders (patients, providers, policymakers)	Explore stakeholder perspectives on diabetes and DR care in Iran	Macro bottlenecks include disjointed health insurance guidelines, lack of national tracking databases, and isolated specialist workflows.
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Supplementary S6: Thematic Synthesis Audit Trail

This audit trail provides representative examples of the progression from first-order data (participant quotations) and second-order constructs (author interpretations) through initial codes, descriptive themes, and final analytical themes. The full coding was conducted across all 37 included studies using NVivo 14. **A total of 128 initial codes were generated, which were organized into 14 descriptive themes, and subsequently abstracted into five analytical themes.**

Analytical Theme 1: Knowledge, Risk Perception, and Health Beliefs

First-Order Data (Participant Quote)	Second-Order Construct (Author Interpretation)	Initial Code	Descriptive Theme	Analytical Theme
"I did not know at all that diabetes can have ocular complications. I did not know that eye problems were linked to diabetes." (Ref 21; Patient)	Patients demonstrated a fundamental lack of awareness that diabetes can affect the eyes, hindering preventive eye care behavior.	Lack of basic DR awareness	Inadequate knowledge of DR and screening purpose	Knowledge, Risk Perception, and Health Beliefs
"I did not pay so much attention to that because I have 20/20 vision...I was not rushed or worried to go back to the treatment, because like I said, I did not understand how bad my eye was." (Ref 24; Patient)	Patients relied on subjective visual acuity as an indicator of ocular health, leading to low perceived risk and deferred screening.	Symptom-driven health-seeking	Symptom-driven health-seeking and low perceived risk	Knowledge, Risk Perception, and Health Beliefs
"I said, 'No, I don't want to go [to the doctor], I already struggled... God is giving me what I have.'" (Ref 27; Patient)	Fatalistic attributions, where illness outcomes were perceived as divinely ordained, reduced the perceived utility of preventive action.	Religious fatalism	Fatalism, alternative beliefs, and vicarious learning	Knowledge, Risk Perception, and Health Beliefs

"The truth of the matter... It all boils down to what you put in your mouth. But... [diabetes] is going to deteriorate things in your body no matter how well you stick to the rules." (Ref 28; Patient)	Patients expressed a deterministic view of diabetes progression, undermining motivation for preventive behaviors like screening.	Deterministic health beliefs	Fatalism, alternative beliefs, and vicarious learning	Knowledge, Risk Perception, and Health Beliefs
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Analytical Theme 2: Psychological and Emotional Determinants

First-Order Data (Participant Quote)	Second-Order Construct (Author Interpretation)	Initial Code	Descriptive Theme	Analytical Theme
"I hadn't been to the eye doctor in over like seven years or more. I was just scared to go, I don't know. I don't know why. I guess I didn't want to know what was going on with my eye." (Ref 24; Patient)	Fear of receiving adverse diagnostic news led to avoidance behavior, described by both patients and providers as a significant contributor to non-attendance.	Fear of diagnosis	Fear, denial, and procedural avoidance	Psychological and Emotional Determinants
"I can't see when I walk, or when I take things. The world is dark, and I feel like I want to die." (Ref 21; Patient)	The psychological burden of vision loss associated with advanced DR included profound existential distress, loss of autonomy, and deterioration of self-worth.	Existential distress from vision loss	Psychological burden of chronic disease	Psychological and Emotional Determinants
"I have a family. I have kids. I want to see them grow up, get married, and maybe have grandchildren. Therefore, I want to see that that	The prospect of blindness and its consequences for family roles served as a powerful internal motivator for health-seeking behavior.	Family-oriented motivation	Internal motivation and self-efficacy	Psychological and Emotional Determinants

future becomes a reality. I think the only thing I can do is to be healthy." (Ref 35; Patient)				
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Analytical Theme 3: Social and Cultural Influences

First-Order Data (Participant Quote)	Second-Order Construct (Author Interpretation)	Initial Code	Descriptive Theme	Analytical Theme
"I do just [about] everything [my doctor] asks of me. He just hasn't asked me to go get an eye exam, so I haven't done it...If he does ask, I will do it." (Ref 27; Patient)	The authority of the healthcare provider recommendation was a dominant cue to action; its absence led to perceived lack of clinical urgency.	HCP recommendation as cue to action	Healthcare provider influence and referral behavior	Social and Cultural Influences
"I cannot go by myself, I cannot communicate well. My kids look after me." (Ref 25; Patient)	Family members provided crucial instrumental support, including arranging transport, accompanying patients to appointments, and providing reminders.	Instrumental family support	Family and social network support	Social and Cultural Influences
"Though I have an appointment date [to check eyes], I was not able to go due to some reason, mainly problems at home. ... suddenly children get ill ... or children say there is a parents' meeting at school." (Ref 37; Patient)	Female participants often prioritized family responsibilities over their own health appointments, constrained by gendered role expectations.	Gendered role constraints	Gender norms and socio-cultural role constraints	Social and Cultural Influences
"I am afraid of wearing glasses, even though I need them to read, because my kids would make fun of them." (Ref 41; Patient)	Stigma associated with visual impairment and the use of assistive	Stigma of visual aids	Stigma and social isolation	Social and Cultural Influences

	devices deterred health-seeking behavior.			
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Analytical Theme 4: Structural, Logistical, and Economic Barriers

First-Order Data (Participant Quote)	Second-Order Construct (Author Interpretation)	Initial Code	Descriptive Theme	Analytical Theme
"It's very expensive to go to the doctor. [For diabetic eye screening, it was] around \$120... and I had no insurance. I'm looking for another way [to get it done]." (Ref 27; Patient)	The direct and indirect costs of screening, including consultation fees, imaging, and transport, created substantial financial disincentives for uninsured patients.	Out-of-pocket costs	Financial constraints and insurance coverage	Structural, Logistical, and Economic Barriers
"Long travel distances to obtain health services... Between 65 and 70 miles." (Ref 34; Patient)	Geographical distance to specialist eye care facilities was a fundamental impediment, particularly in rural and remote settings.	Distance to services	Geographical distance and transportation	Structural, Logistical, and Economic Barriers
"I'm a stay-home mom, so my main job is my kids. I have a 10-year-old and a 4-year-old, and I have to work with their schedule." (Ref 32; Patient)	Competing demands from childcare, employment, and caregiving responsibilities directly displaced planned screening attendance.	Competing life demands	Time constraints, appointment flexibility, competing demands	Structural, Logistical, and Economic Barriers

Analytical Theme 5: Health System and Primary Care Organizational Factors

First-Order Data (Participant Quote)	Second-Order Construct (Author Interpretation)	Initial Code	Descriptive Theme	Analytical Theme
"[The message is] there reminding me, you really have to get this done. This is not something you can let slide and go ok I'll forget about it." (Ref 45; Patient)	Systematic recall and reminder mechanisms were valued by patients as an effective prompt for action and a safeguard against forgetting annual reviews.	Automated reminders	Recall systems and reminder mechanisms	Health System and Primary Care Organizational Factors
"She's the one that makes sure that they're done to the best of their abilities and that people are doing [the TDRS exams] right. [...] She made it her mission and went above and beyond for it." (Ref 48; Healthcare Professional)	The presence of a dedicated clinical 'champion' within the practice was associated with markedly higher screening rates and implementation success.	Clinical champion	Workforce capacity, training, and champions	Health System and Primary Care Organizational Factors
"They have to have eye drops put into their eyes and so they usually have a nurse available so that they can have the flu injection and their eye drops put in at the same time, it's like a conveyor belt really." (Ref 40; Healthcare Professional)	Integration of DR screening with other routine diabetes care (e.g., flu vaccination) was described as a highly effective approach to streamline attendance.	Integrated care pathways	Integration with routine diabetes care	Health System and Primary Care Organizational Factors
"How you make a referral is the more challenging part...don't have resources to be tracking every referral." (Ref 47; Healthcare Professional)	Deficiencies in inter-professional communication and referral pathway integrity created coordination challenges and opportunities for patients to be lost to follow-up.	Fragmented referral pathways	Referral pathways, communication, and care coordination	Health System and Primary Care Organizational Factors

"If an algorithm [AI] could tell me whether there is diabetic retinopathy or not, I could refer them straight to an ophthalmologist." (Ref 51; Healthcare Professional)	The potential of AI-assisted image analysis was viewed as a mechanism to alleviate workforce bottlenecks and streamline referral decisions.	AI as decision support	Technology, AI, and teleophthalmology	Health System and Primary Care Organizational Factors
"Time limitation is GP's greatest enemy along with the cost of technology." (Ref 39; Healthcare Professional)	Inadequate reimbursement and high capital costs were identified as major disincentives to the adoption and maintenance of DR screening capacity within general practice.	Reimbursement barriers	Financial sustainability and reimbursement	Health System and Primary Care Organizational Factors

Summary of Analytical Progression

Stage	Number	Description
Initial codes	128	Generated from line-by-line coding of all first-order and second-order data
Descriptive themes	14	Formed by grouping related initial codes based on similarities
Analytical themes	5	Generated through iterative interpretation and abstraction of descriptive themes