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Development Process for Type 2 Diabetes Patient Applications: Findings from a Literature Review

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Background (1/2)

- Type 2 Diabetes (T2D) occurs when the human body does not use insulin properly, which leads to an increase in blood sugar levels [1]
- For T2D, diabetes self-management education and support programs are the groundwork to help patients handle this illness [2]
- Patient portals and personal health records (PHRs) are powerful applications for self-managing T2D [3,4]

Background (2/2)

- The use of these portals in diabetes care has shown improvements in health outcomes, including glycemic control, a decrease in emergency visits, and improved quality of care [4]
- Behavioural Intervention Technology (BIT) Model, "provides a framework for the translation of treatment and intervention aims into an implementable treatment model."[5]
- A BIT intervention facilitates the transition of the user from the current state (the state at the moment of use) using one or more interventions to achieve a determined aim (desired future state) [5]

Problem

- Studies have shown some barriers to the usage of patient portals, e.g., enrollment of patients, lack of capacity to use the patient portal, or lack of desire to use the patient portal [6]
- With the variety of features in patient portals and PHRs, it is hard to discover which features can support type 2 diabetes patients in the management of the disease
- Learning/Knowing features related to health outcomes will provide support for developers in creating patient portals and PHRs for T2D patients

Research questions

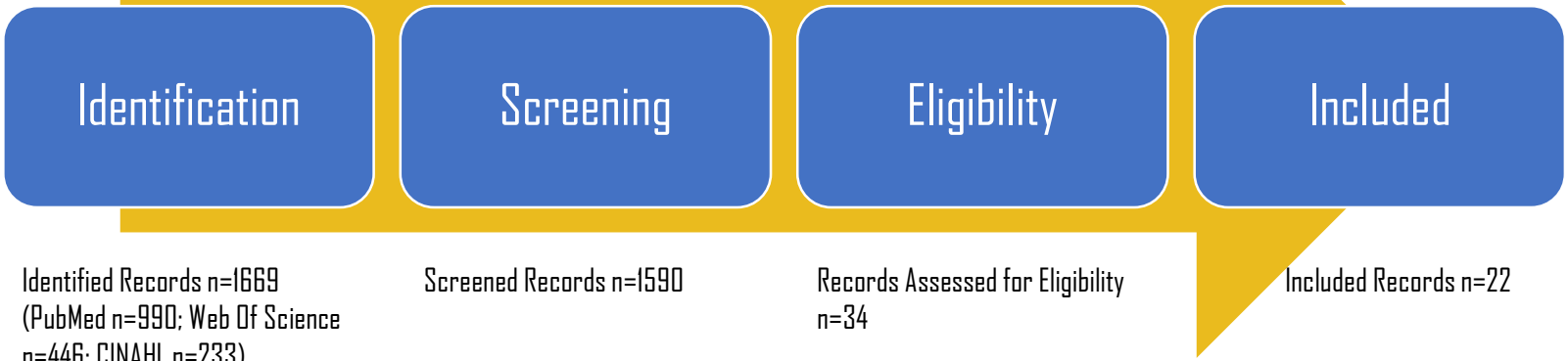
1. Which features can be used to enable engagement in self-management of type 2 diabetes patients?

2. Which recommendations can be provided for development of patient portals and Personal Health Record systems?

Methods

- An exploratory scoping literature review was chosen as the research approach, applying Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [7] workflow
- Elicited features were categorized according to Taxonomy of Patient Portals Based on Characteristics of Patient Engagement (TOPCOP) portals created to classify and compare patient portals based on characteristics that promote patient engagement [8]

Methods – PRISMA Flowchart of Literature Search



Results – Studies Included in the Analysis

#	PubMed ID	#	PubMed ID
1	31335206	12	31775734
2	29929483	13	27369696
3	23171659	14	34339500
4	25424228	15	33905458
5	25614996	16	26237200
6	29588269	17	33038473
7	20455776	18	18779465
8	31363538	19	21406018
9	32706679	20	27769953
10	26086272	21	27437062
11	23195925	22	24485208

Results - Identified Features

#	Feature	Studies including the feature
1	Secure messaging (*)	#1-#4, #6, #8-#10, #13-#19, #21, #22
2	Viewing laboratory results (*)	#1, #2, #4, #5, #8-#12, #14-#18, #20, #22
3	Accessing medication history (*)	#1-#4, #6, #7, #9-#11, #14, #16, #17
4	Self-tracking, mainly of blood glucose and weight (*)	#2-#5, #7, #10-#12, #15, #19, #21
5	Accessing diabetes education	#2-#4, #7, #10-#12, #15, #19, #22
6	Managing appointments	#1, #2, #4, #9, #10, #14, #16, #17, #20
7	Setting treatment goals (*)	#2-#4, #7, #8, #10, #12, #18
8	Renewing prescriptions (*)	#1, #9, #13, #14, #16-#18
9	Accessing to clinical notes, and medical summaries (*)	#1, #3, #6, #7, #17, #19
10	Receiving reminders, alerts, and notifications	#6, #9, #19

(*) feature associated with "improved" health outcomes.

Results - Identified Recommendations

#	Recommendation	N	Examples
R1	Health care provider **encourage patients** to engage in Patient portal/PHR	9	#8, #9, #12
R2	Patient portal /PHR developed using **user-centered design** approach	8	#4, #6, #7
R3	Patient portal /PHR provide **secure access control** by secure authentication	6	#4,#5,#22
R4	Patient portal /PHR present **educational content** in different media formats	5	#6, #12,#15
R5	Patient portal /PHR should be **interoperable with other healthcare applications**	5	#5,#9, #12
R6	Patients should be **trained to use patient portals** or PHRs	5	#6, #10,#11
R7	Patient portal /PHR should **give the patient control** of who can have access to their healthcare data		
	Patient portal /PHR should be a **system integrated in the clinical workflow**	4	#4, #19
R8	Patient portal /PHR should **use evidence-based information,** provide information also in lay language	3	#2, #12
R9		3	#4, #12

Discussion

- Features such as secure messaging, access to lab results, and access to medication history were the most common ones
- However, more research is needed for assessing which features are most important for the users
- Proposed recommendations can support developers in designing these features for T2D patient portals or PHRs

Conclusions

- We found 22 studies that describe the association between patient portals and PHRs for T2D patients and health outcomes from different perspectives and methods
- Future work includes improvement of literature searches and the quality assessment of included studies

Thank you for the attention

Questions?

Comments?

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