

Introduction of a Medical Patient Portal to the Uninsured Patient

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Abstract

Purpose: The purpose of this evidence-based practice project was to improve participation by increasing registration on to a medical patient portal to an uninsured population. Medical patient portals have the potential to provide patients with timely, transparent access to health care information and engage them in their health care process and management. This may result in improved disease management outcomes.

Methods: This project was guided by a The Rosswurm and Larrabee Model for Change to Evidence- Based Practice and Pender's health promotion framework. IRB Approved by ASU. The instruction was implemented at an urban clinic in downtown phoenix that serves uninsured and underserved individuals. Uninsured participants were recruited (n=50). A survey pre and post registration was conducted to assess knowledge and medical portal participation in addition a random pre and post chart review was performed.

Results: Descriptive statistics was used to describe sample and outcome variables. A chi-square test of independence was calculated comparing pre and post intervention significant change was found ($\chi^2 (1) = .002, P<0.05.$), a paired sample t test was calculated to compare knowledge pre and post registration instruction the mean pre-10.187(SD = 4.422), post mean was 16.958(SD=.856). A significant increase of knowledge was found ($t (47) =-9.573, p (<.001).$

Outcomes: In this population both patients and providers have seen significant benefits such as increased communication and patient participation, from the implementation of evidence based educational tools such as instruction with teach back, and the usage of brochures. Potential Implication for sustainability includes the lack of a designated individual that is bilingual to register patients, making patients aware of the existence of a medical patient portal, patient's fear of sharing immigration status.

Keywords: Patient Education, Web Portal, Medical Portal, Patient Engagement, Portal

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Health care portals have the potential to provide patients with timely, transparent access to health care information and engage them in the care process. Evidence suggests that patient engagement improves health outcomes and reduces health care costs. Although promising there may be room for improvement in patient adaptation to this technology.

Background and Significance

Medical Portal

Medical patient portals have the potential to provide patients with timely, transparent access to health care information and engagement in the health care process and management. This may result in improved disease management outcomes. However, in this clinic located in downtown Phoenix, the lack of a strong foundation in portal registration has limited patient usage. The U.S. government introduced the Meaningful Use program as part of the 2009 Health Information Technology for Economic and Clinical Health (HITECH) Act, to encourage health care providers to show "meaningful use" of a certified Electronic Health Record (EHR).

According to Athena Health (2016), best practice of portal registration and participation is 70%. However, in this clinic 8.5 % participate in portal registration and usage. The American Recovery and Reinvestment Act (ARRA) of 2009 included the Health Information Technology for Economic and Clinical Health Act (HITECH) to provide stimulus for the provision of electronic access for consumers as a way to improve patient engagement (Arcury et al, 2017). As described by the act, MU of a tethered personal health record called a patient portal was theorized to improve patient engagement and result in improved clinical outcomes, reduced cost and increased patient satisfaction (Mook, et al., 2017). In a study conducted by Ammenwerth et

al (2012) it was found that health care provider groups around the country are all looking to engage more deeply with patients, and work together to improve health outcomes. Digital engagement is central to this ambition. Portals offer patients ready access to their health records, allow them to schedule appointments and, and allow patients to securely message their providers about health concerns, prescriptions, and care plans. It gives providers a way to stay in contact with patients between visits.

Portal Utilization

Powell (2017) mentions that although portals are being widely implemented and may be contributing to improved health outcomes, there is evidence that they are not accessed equally across groups despite uniformly high patient interest in and enthusiasm for portals. In a study by (Coughlin et al, 2017) it was found that racial/ethnic minorities are significantly less likely to use portals in integrated delivery systems as well as community-based clinic.

Patient portals have the potential to support self-management for chronic diseases and improve health outcomes. In a study performed by Coughlin et al, (2017) which involved patients with diabetes mellitus it was concluded that major perceived barriers of portal utilization included security concerns, lack of technical skills/interest, and preference for in-person communication, in addition, is also mentioned that participants with limited health literacy discussed more fundamental barriers to portal use, including challenges with reading and typing. According to Byczkowski et al (2014), caregivers expressed high interest in portal use to support their roles in interpreting health information, advocating for quality care, and managing health behaviors and medical care. Patient involvement in the medical arena is commonly referred to as patient engagement. According to AHRQ patient engagement is the involvement in their own care and others they designate to engage in their behalf, with the goal that they make competent,

well informed decisions about their health and health care management and take action to support that decision. Patient engagement has been shown as one of the benefits of using patient portals; however, patient engagement can also influence patient portal readiness and adoption. Based on a study by North et al (2011) the use of video on how to access a web portal increased the enrollment of a web portal. The implementation of patient portals caters to a mobile generation; therefore strategies such as videos, simulated with teach back using tablets and or pamphlets on how to use the portal may help the population with least technological knowledge such as the baby boomers (Kim & Lee, 2017). Two of every three older Americans have multiple chronic conditions, and treatment for this population accounts for 66 % of the country's healthcare budget. With a rising need for care, boomers are open for provider engagement. Many Boomers who do not use portals say they would be much more engaged in their care if they received access to medical information online. Boomers ages 55 to 64 accounted for the highest percentage (83 percent) of Americans who say they already do or would communicate with healthcare providers via a patient portal. If they know how to access or had knowledge of the existence of a portal (Barron, 2014).

Patient portal adoption is variable, and due to design and interface limitations and health literacy issues, many people find the portal difficult to use (Baldwin, e.al, 2017). A two-part comprehensive randomized trial reported that patients today, including the elderly and less-educated, are quite motivated to use electronic services (Johansen et al., 2012). The patient portal usage allows the patient reports to health care personnel, an institution, or a system, where the receiver processes and interprets the data and provides feedback to the patient (Mook et al., 2017). National data suggests older adults are less likely to make use of online health information, including treatment and quality comparison tools, and advice about chronic

conditions and disease prevention. Older adults are likely to be the most frequent users of healthcare, but objective portal usage data among this population group are lacking (Alpert et al, 2017). According to Ammenwerth et al (2014), a study of diabetic patients reported no relationship between self-reported health literacy and accessing a patient portal, although a larger and more comprehensive report linked low self-reported health literacy with lower levels of patient portal registration, logins, and use of patient portal functions. However, people are typically poor judges of their own abilities, and self-report literacy measures do not assess the same latent construct as objective health literacy assessments.

Problem Statement

Roughly, 69% of United States (US) adults use at least one kind of social media, with similar rates across racial and ethnic groups and rates near 90% for adults younger than 30 years. Professional organizations, public health agencies (e.g., the Centers for Disease Control and Prevention [CDC] and the World Health Organization), and hospitals routinely use social media for science and health messaging (Barron et al., 2014). All major news outlets and many local news outlets also use social media, providing additional dissemination portals and ways to combine news and events with the capabilities of smartphones (Bczkowski et al., 2014). As the adoption of the idea of patient portal rises, many patients are gaining access to their personal health information and research is showing that portal utilization may improve patient health outcomes (Arcury et al, 2017). Portal usage has been associated with patient's sociodemographic, health literacy, and education. A systematic review by Coughlin et al, (2017) explored the use of web portal for patients with chronic diseases such as diabetes mellitus, and it was proposed that access to personal health record might result in improved diabetes outcomes.

Based on requirements set out by the Centers for Medicare & Medicaid Services, providers can earn Meaningful Use (MU) Stage 2 federal incentives if they demonstrate that five percent of patients are using secure portals to view download and transmit their health information.

Purpose and Rationale

The purpose of this project is to improve patient participation in medical portal usage. The implementation of patient portals cater to a mobile generation; therefore, strategies such as videos, individually simulated tutorials using a tablet and/or pamphlets on how to use the portal may help the population with the least technological knowledge. The use of a medical portal for patients with a variety of disease processes to access their health record may result in improved disease management outcomes. However, the adoption of the medical portal by patients is slow. Evidence suggests that limitations in portal education accessibility influence patient adoption of the portal (Arcury, 2017). Clinicians and patients benefit from portal accessibility as the communication affects health outcomes. This may be caused by patient characteristics, but also by the content, layout, and promotion of the portal or lack thereof (Rhonda et al., 2014). Detailed knowledge about this could help increase patients' participation in medical portals. Healthcare portals have the potential to provide patients with timely, transparent access to health care information and engage them in the care process. There is evidence that patient engagement improves health outcomes and reduces health care cost (Coughlin, 2017).

Portals should provide a single integrated experience across the inpatient and ambulatory settings. Core functionality includes tools that facilitate communication, personalize the patient, and deliver education to advance safe, coordinated, and dignified patient-centered care. One way to build a strong foundation of patient engagement is through a user-friendly, effective online presence. Moreover, the cornerstone of that strong foundation should be a modern,

intuitive patient portal. However, in this urban clinic in downtown Phoenix, the lack of a strong foundation in portal accessibility has limited patient usage. According to Athena Health (2016), patient registration best practice is 70%. However, internal evidence demonstrated that this non-profit primary care urban clinic has 8.5 percent participation rate. Patient engagement has been shown as one of the benefits of using patient portals; and may influence patient portal usage and adoption. Based on a study by North et al. (2011) the use of video, pamphlets and coaching using tablet on how to access a web portal increased the enrollment of a web portal. This inquiry has led to this relevant question: In a primary care clinic does having a volunteer to help clients navigate the medical portal increase the rate of registration?

Search Strategy.

In order to answer the aforementioned PICOT question the following electronic data bases were searched, Cumulative Index of Nursing and Allied Health Literature (CINAHL), PubMed, and Cochrane Library. Key words used were *patient portals utilization AND patient portal education AND patient portal engagement, patient portal AND technology, patient portal AND patient participation, AND meaningful use, AND literacy*. The initial search in CINAHL produced 105 results using, the Boolean connector as follows used were *patient portal AND education AND utilization engagement*, (Appendix A). Studies published before 2012 were eliminated as part of the exclusion criteria. However, there was one study that presented important and relevant information related to the PICO question and was published in 2011. Those involving other languages other than English were excluded. The searches in PubMed yielded 101 results on the first search, *using MeSH words, patient portal AND education, Portal Utilization AND Patient participation*, (Appendix B). When Cochrane was searched using the MesH terms *patient portal AND education AND literacy AND usability* a total of 207 results

showed in the database (Appendix C) The final search included all the terms related to the PICOT question, resulting in a final yield of 206 studies in CINAHL (Appendix A); 245 studies in PubMed (Appendix B) and 207 in Cochrane (Appendix C). After appraising studies found in the aforementioned databases 10 have been chosen for inclusion in this literature review. The included studies comprise of portal usability and patient education (Appendix D). Of the 10 studies chosen, three were specific to strategies used to educate patient how to use a web portal. Using the word portal. Grey literature was searched however due to the low yield in evidence, and lack of current evidence on tools to teach portal use, data may be skewed.

Critical Appraisal Narrative and conclusions from the evidence

Ten studies were retained for this review, including two Systematic Reviews (SR) two mixed methods one exploratory review, three observational studies, and two randomized controlled trials (RCT's). The level of evidence varied and ranged from level one to level six using the hierarchy of evidence as presented in Melnyk and Fineout-Overholt (2015). The SR's retained presents a comprehensive, review of RCT's focusing on electronic communication between patient and providers to improve health quality. Papers were eligible if they presented controlled studies on the impact of patient portals. Impact could be visible in outcome-oriented parameters such as changes in mortality or morbidity or in costs of care. In addition, process parameters such as changes in therapy adherence or in patient satisfaction with the provided care were included, even when these parameters are merely surrogates for clinical outcome. With regard to study design, they included experimental (e.g. RCT) or quasi-experimental (e.g. controlled before-after trials) studies. In accordance with the definition given in the introduction for patient portals, patient portals are characterized by the following attributes, electronic applications, typically web-based, provided and maintained by health care institutions, targeted

towards providing functionality to all or a subgroup of patients, basic functionalities to access a patient's clinical data, additional functionalities such as communication modules, prescription refills, appointment scheduling, or educational guidelines. Overall the data from the reviews recommended that developing a generic model (not diagnosis specific) for electronic patient symptom reporting may benefit the patient. In addition, one of the SR's stated that there is low amount of RTC with regard to patient portal use and even when portals are available to empower patients and improve quality of care more evidence needs to support this assumption.

The studies exhibit a moderate degree of demographic information (Appendix F). Some of the demographics included, age, ethnicity, education level, and social economic status included gender and chronicity. Although the observational study (Arcury et al., 2017) included only adults age 55 and older (Appendix D). This study resulted in disparities of portal utilization due to lack of training.

Most of the studies demonstrated that patient portal usage is intended to improve their access and quality of care. In addition, most of the studies discuss facilitators and barriers that drive or inhibit patients to adopt patient portals (Appendix D).

The measurement instruments were heterogeneous and included telephone surveys, questionnaires, data searches, and bibliography searches. The aforementioned are reliable instruments used to measure patient engagement in navigating or utilizing patient portals. Some of the studies used Chi-square to measure heterogeneity; this confirms validity and reliability of instruments. Three of the studies demonstrated that utilizing strategies such as videos, simulated and mediated face to face interaction with patients how to use a portal increased the enrollment of patients accessing the portals (North, 2018). This evidence supports the PICOT question.

Theoretical Framework

Nora Pender's Health Promotion Model. (Appendix G) is a revised model and is based on social learning theory. Consequently it provides some theoretical propositions: Prior behavior and inherited and acquired characteristics influence beliefs, affect, and enactment of health-promoting behavior. Therefore if patient is unaware that a medical portal is available and engagement may positively affect their health. Behavior change can be achieved. Furthermore A major underpinning of the HPM is the assumption that individuals value growth and seek improvement in their health status. Self-efficacy, a belief in the ability to succeed, is an important part of the model. Patient utilizing portals will be motivated to follow up on their care management making decision with their provider thereby creating a significant change in behavior about their health management. Furthermore providing the proper tools and education how to access the portal affect the enrollment to the portal thereby enhancing involvement in their care. (Ahlers, Nguyen, 2013).

Evidence Based Practice Model

The Model for Evidence Based Practice Change by Rosswurn and Larabee (1999) was chosen for this project. The model is based on theoretical and research literature related to evidence-based practice, research utilization, standardized language, and change theory (Appendix J). In this model, practitioners are guided through the entire process of developing and integrating an evidence-based practice change. The model integrates principles of quality improvement, use of team work tools, and evidence based translation strategies to promote adoptions of a new practice. The model has six components 1) assess need for change in practice; 2) Locate the best evidence; 3) Critically analyze the evidence; 4) Design practice change; 5) Implement and evaluate change in practice; and 6) Integrate and maintain change in

practice. Internal and external evidence suggests that knowledge of health portal accessibility is a problem. Lack of education about portal accessibility and inquiring about their state of health may have an impact on health outcomes. This model provides a great infrastructure for practice change. Each step described in the model fits perfectly to provide a framework for implementation of an educational infrastructure for the staff and patients for ease of use of health portal. This will affect the patient's portal registration and accessibility. Interventions used was educational tool for staff and patients on accessing the portal, verbal teaching for patients. The expected outcome will be increase in patient portal registration and participation. The intervention was assessed for feasibility, risks and benefits. Benefits included, patients using the portal will have the opportunity to communicate with their provider thereby engaging in their own health management this could potentially can improve their health. Staff was educated on what to give patient as resource as patients may ask how to access portal by the change and evaluation of the results will be assessed sustainability of the practice change.

Methods

Ethics

This project was approved by the Arizona State University Institutional Review Board (IRB). A letter of agreement was also obtained from the clinic medical director. A recruitment flyer describing the project, risk and voluntary participation and a consent that was translated into Spanish was read and provided to potential participants, by the assigned investigator. Declining participation would not affect their registration on to portal if they wanted to do in the future. If patients voluntarily agreed, an informed consent would be obtained at time of portal registration, they would also provide their phone number. They were informed that at two months a survey will be conducted to assess knowledge of medical portal and participation. All

the survey and pertinent documents would be de-identified. Participants were also informed that the results of project may be disseminated and shared with the clinic. Furthermore a random chart review was conducted before initiation of intervention, then a random chart review was also performed two months after intervention. The data was collected by the clinic assistant director. In addition data was also collected from Athena Health software with graphics before and after intervention.

Setting

This project was implemented in a free, nonprofit, community healthcare clinic that provides medical and dental care for only the uninsured. Located in an urban area of a large metropolitan city in Arizona. This clinic is the only one of its kind as it provides care for all spans of life and most all specialties. Furthermore a large segment of their patients are diabetics, moreover this is the only clinic in the city that provides highly complicated wound care for free. Patients are selected based on whether they have applied to a Medicare or Medicaid program and have been declined healthcare.

The office and medical staff includes a medical director, two medical assistants an office manager technology needs is provided by the nonprofit organization, which oversees the dental and medical clinic. The nonprofit organization provides a variety of programs for the underserved. .relies mainly on donations and volunteers. In 2018, 675,000 volunteer's hours were logged including hours from the dental and medical clinic, some of the other program ran by this organization include 83 volunteer run pantry that delivered 150,00 boxes of food, served 2,4 million free meals.

Administrative staff includes a Medical Director, two Medical assistants and an office receptionist and manager. Providers are volunteers that dedicate at least one day a week in the

clinic. As previously mentioned the clinic relies on the use of volunteers that include, MD's, DO's other volunteers include nurses, Spanish medical interpreters, and office staff. In 2018, the dental and medical clinic had 15,800 visits for uninsured patients. All the services were rendered free of charge. As it relies on private grants, donations.

In this area of town, patient demographic include persons from different backgrounds largest is Hispanic/Latino 62% according to census bureau. Unable to find stats on how many are Spanish speaking. However the project participants 86% were Spanish speaking only, 100% percent were uninsured and unable to qualify for any federal care assistance. Expenses incurred during the project was provided by a private donor.

Intervention

Clinic staff and volunteers were informed on overview, and power presentation was presented to the medical director, of the proposed project. Posters were strategically placed throughout the clinic to advertise the portal availability and quick recognition code was created and placed on poster for ease of access with mobile device. Providers were instructed on informing patients about the availability of the medical portal and discussing the benefits of registering to the medical portal. Front office was instructed to ask patients that met the inclusion criteria if they wanted to participate. Inclusion criteria included patient 18 years or older able to speak and understand English and/or Spanish with access to internet, phone. Exclusion criteria for participation in the intervention, included not Speaking English or Spanish, not having internet access and being under 18 years old. The intervention to encourage participation in portal registration included reading material at a 5th grade reading level. It also included a real time coaching on how to register and access the medical portal; there will be a reminder on a brochure how to access the medical portal.

Process: Step 1. 5-10 minutes- Initial introduction of the project with patient, providing patient script and consent if they agree to be part of project. A pre-intervention survey was filled out by recruiter based on participant's answers. Step 2. 10-15 minutes while the patient waits to be seen by provider or at discharge, the recruiter will use a computer tablet, at which point the recruiter coached the participant step by step how to create an account and access the medical portal. Then the participant demonstrated, how to access the medical portal. Step 1. Open the tabled to 5919.portal.athenahealth.com. Step 2. →Participant clicks on outpatient login. Step 3 → Participant clicks on outpatient login. Step 4 → Participant chooses sign up today. Step 5 → Participant enters information required by the software-name, birthdate, gender, phone number participant continues to verify information. Step 6 → Participant creates a password. Then recruiter showed how to navigate within the portal, participant does a teach back. A brochure was provided to participant, as reminder of the steps on how to access the medical portal in English and Spanish. Recruitment lasted for 8 weeks, (8, clinic days). 50 patients were interested, in participating in the project, 48 of this patients met the inclusion criteria. The two reminder patients had no phone access therefore the project team was unable to contact them after intervention. (See Appendix L for Instruments)

Measurements and Outcome Variables

To measure the baseline of patient portal knowledge, a brief survey was constructed in Spanish and English. The survey contained demographic questions: age, gender, ethnicity, language, education it also contained two item that determine inclusivity for intervention: 1. Do you have internet access? Answer yes or no if no they will not participate in the intervention. If yes then 2. Have you ever used a medical portal? It also contained Questions were answered using a Likert scale (Likert, 1932). The response options were: Strongly agree, agree, neutral,

disagree, and strongly disagree. Post-intervention will included a follow-up phone survey that contained a one item question 1. In the past two months, I used the medical portal if no continue with the surveys questions, if yes write in what did you use it for. Then continue with the rest of survey. Questions were answered using a Likert scale (Likert, 1932). Strongly agree, agree, neutral, disagree, strongly disagree. 1. I know how to access the patient portal. 2. I know how to find information about my health using the portal. 3. I'm confident using the medical portal. 4. I think that the medical portal will help manage my healthcare.

A chart review was used to collect data on, variable portal login and use. Chart review is an essential research tool in social and health science research. Evidence has shown that using a questionnaire for studies have high validity and reliability (Giuffre, 1995).

The goal if this intervention is to have patient engagement, accessibility participation of at least 50% of the current participation. In the same way increase their knowledge about the medical portal. Patients using the portal will have the opportunity to communicate with their provider thereby engaging in their own health management this could potentially can improve their health.

Analysis

SPSSTM Version 25.0 (<https://www.ibm.com/analytics/spss-statistics-software>) was used for data entry analysis. Descriptive statistics was used, to describe the sample and outcome variable, and inferential statistics was used to analyze the data. Using Pearson Chi- square demonstrated statistically differences in patient login was found data. Paired sample *t*-test were used to compare pre/post means of knowledge scores. Two -tailed test were ran and the critical value was set at $p < .05$. Random reports were obtained Athena Health access the rate of patient logins.

Results

Participants

Forty eight participants (n=48) completed the intervention (attrition 4%). The average age participant was 42 (SD=14.1), ranging from 18 to 72 years. Twenty seven females (56%) and twenty one (43%) males completed the intervention. Forty six participants were Hispanic (96%) and two were Caucasian (4%). Thirty eight (79%) participant's spoke and wrote Spanish, nine participants (19%) primary language was English, one participant (2%) spoke other language, and approximately 96% fix, of participants had primary school education. During recruitment, the majority of the participants had no knowledge of a medical patient portal or had logged into one.

Fifty random participants were pulled from the clinic data base for chart review. Pre (n=50), mean age 45.2 (SD=11.8) There were thirteen male (39%), twenty females (61%), thirty three spoke (66%) Spanish, seventeen (34%) did not, no other language specified, thirty nine (78%) had not logged on to the portal, eleven (22%) had logged in the portal. Post intervention random chart review (n=50), mean age 45.4(SD=12.6), there were twenty three male (46%), twenty seven females (54%), thirty spoke Spanish (60%), twenty (40%) did not, no specified language, twenty four (48%) had not logged in to portal after intervention, twenty six (60%) had logged in the portal after intervention. Random reports were obtained from Athena health showed an increase in patient logins, demonstrated by an increased registration rate 8.5% to 18% this result validates impact of individualized education on improved portal registration and engagement.

Outcome Results

A chi-square test of independence was calculated comparing pre and post intervention significant change was found ($\chi^2 (1) = .002, P < 0.05$), a paired sample *t* test was calculated to compare knowledge pre and post registration instruction the mean pre-10.187(SD = 4.422), post mean was 16.958(SD=.856). A significant increase of knowledge was found ($t (47) = -9.573, p (<.001)$). (Appendix K for results graphics and table)

Discussion

The principal findings of the project demonstrate that insured and uninsured patients want wish to be engage in their own care management. All of the participants were encouraged by the opportunity to see participate in their health management. However according to the participants however, the participants states they would not have been interested if there had not been a designated person, coaching them how to register then and navigate. Furthermore office staff and providers played a large part in the success of this intervention, as they encouraged patients to become enrolled in the medical portal to increase communicate. Based on literature evidence, patients are hesitant in using the medical portal due to possible breach in confidentiality. Also lack of awareness of portal existence. Although tools are available to help increase patient registration and participation, they are not as effective as having someone dedicated to do this task. All group participants engaged in some form of technology, making it portal access simpler to use. Sustainability will depend on whether the clinic has a bilingual volunteer available to register patients 95% of participants were Spanish speaking. As patient centered care and engagement has become the center of a high functioning health care system, it is crucial that patients are involved in usage a medical portal, we get patients on board and improve the efforts on value of the medical portal usage. It is important to note that although this clinic does not

receive government compensation, the expectation of HITECH increase interoperability, which is the third step of the HITEHC enactment (CMS.gov, 2019).

Limitations

Limitations of implementation include: Lack of patient awareness, lack of marketing and lack of having a designated person registering patients. Since this particular clinic serves uninsured patients, in addition many of the patients are undocumented many of the individuals may not want to participate due to fear of sharing their immigration status.

Conclusion

In this ever-growing healthcare field, technology is becoming an essential part of managing and caring for patients. Furthermore, patients have the desire to be involved in their own healthcare management. In order increase to open communication and access information, it is patients is important that providers inform and encourage patients to register and use their medical portal. Medical portals are a great tool for patient engagement and empowerment, even if a patient is uninsured thus providing equitable health care. To increase portal registration and adoption, patient incentives and a simpler registration process with materials in their preferred language. Offering an easy way to register at the office may increase patient registration and logging. According to the evidence provided from this project an effective way to get patients engaged, is having a designated person to coach the patient and using a brochure in their preferred language. Sustainability of this project may lead to better health outcomes due to increase patient involvement in their plan of care.

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Appendix A

Figure 1A.

CINAHL Search Strategy

The screenshot displays a search interface with a 'Search History/Alerts' section at the top. Below this, there are navigation links: 'Print Search History', 'Retrieve Searches', 'Retrieve Alerts', and 'Save Searches / Alerts'. A control bar includes a 'Select / deselect all' checkbox, buttons for 'Search with AND', 'Search with OR', and 'Delete Searches', and a 'Refresh Search Results' button.

Search ID#	Search Terms	Search Options	Actions
<input type="checkbox"/> S7	"patient portals" AND "engagement"	Search modes - Boolean/Phrase	View Results (38) View Details Edit
<input type="checkbox"/> S6	"patient Portal" AND "utilization"	Search modes - Boolean/Phrase	View Results (63) View Details Edit
<input type="checkbox"/> S5	"patient Portal" AND "usefulness"	Search modes - Boolean/Phrase	View Results (0) View Details Edit
<input type="checkbox"/> S4	patient portal AND education	Search modes - Boolean/Phrase	View Results (105) View Details Edit
<input type="checkbox"/> S3	"Patient Portal" AND meaningful use	Search modes - Boolean/Phrase	View Results (0) View Details Edit
<input type="checkbox"/> S2	meningful use AND patient AND portal	Search modes - Boolean/Phrase	View Results (0) View Details Edit
<input type="checkbox"/> S1	"meaningful use" AND "patient Portal"	Search modes - Boolean/Phrase	View Results (0) View Details Edit

Below the table, the 'Refine Results' section shows 'Current Search' as 'Boolean/Phrase'. The main results area displays 'Search Results: 1 - 38 of 38' with a 'Relevance' dropdown, 'Page Options', and a 'Share' button. The first result is '1. eHealth Literacy: Patient Engagement in Identifying Strategies to Encourage Use of Patient Portals Among Older Adults.' A right-hand sidebar indicates 'Folder has Items' with sub-items: 'Measuring Health Literacy...' and 'The patient portal:'.

Appendix B

Figure B1

PubMed Search Strategy

History		Download history Clear history		
Search	Add to builder	Query	Items found	Time
#30	Add	Search Personal[Title] AND health[Title] AND records[Title] AND Meaningful[Title] AND whom[Title]	1	20:21:06
#29	Add	Search Personal health records: Meaningful use, but for whom? Filters: Clinical Trial; Review; Free full text; Full text; published in the last 5 years	0	20:20:47
#26	Add	Search (patient Portals) AND "Literacy" and "usability" Filters: Clinical Trial; Review; Free full text; Full text; published in the last 5 years	1	17:35:38
#25	Add	Search (patient Portals) AND "Technology" Filters: Clinical Trial; Review; Free full text; Full text; published in the last 5 years	15	16:59:37
#24	Add	Search (patient Portals) AND "patient participation" Filters: Clinical Trial; Review; Free full text; Full text; published in the last 5 years	6	16:29:17
#23	Add	Search (patient Portals) AND patient participation Filters: Clinical Trial; Review; Free full text; Full text; published in the last 5 years	7	16:25:17
#22	Add	Search (patient Portals) AND patient participation Filters: Clinical Trial; Review; Free full text; published in the last 5 years	7	16:23:40
#21	Add	Search (patient Portals) AND patient participation Filters: Clinical Trial; Free full text; published in the last 5 years	3	16:21:53
#20	Add	Search (patient Portals) AND patient participation Filters: Free full text; published in the last 5 years	26	16:21:46
#19	Add	Search (patient Portals) AND patient participation Filters: published in the last 5 years	74	16:21:29
#18	Add	Search (patient Portals) AND patient participation	101	16:21:08
#17	Add	Search (("Medical Portal" and "Education"	2	16:19:55
#16	Add	Search (("Medical Portal" and "Patient")) AND "education" Schema: all	0	16:19:36
#15	Add	Search (("Medical Portal" and "Patient")) AND "education"	0	16:19:35
#14	Add	Search (("Medical portal" and "meaningful use")) AND "education" Schema: all	0	16:17:48
#13	Add	Search (("Medical portal" and "meaningful use")) AND "education"	0	16:17:18

Appendix C

Figure C1.

Cochrane Search Strategy

The screenshot shows the Cochrane Library Search Manager interface. At the top, it says "Wiley Online Library" and "Cochrane Library" with the tagline "Trusted evidence. Informed decisions. Better health." There are links for "Log in / Register". The interface has tabs for "Search", "Search Manager", "Medical Terms (MeSH)", and "Browse". Below the tabs, there is a search instruction: "To search an exact word(s) use quotation marks, e.g. 'hospital' finds hospital, hospital (no quotation marks) finds hospital and hospitals, pay finds paid, pays, paying, payed)".

The main area is titled "Add to log" and contains a table of search items:

Item ID	Search Term	Count
#1	patient portals	162
#2	Portals usability	12
#3	"patient portal" and "education"	25
#4	"patient portal" and "literacy"	8
#5		N/A

At the bottom, there are buttons for "Clear Strategy" and "Search Help", a checkbox for "Highlight orphan lines", and a "Save strategy" section with a "Strategy Name" input field and a "Save Strategy" button.

Appendix D

Table 1

Evaluation Table

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied and Their Definitions	Measure ment/ Instrume ntation	Data Analysis	Findings/ Results	Level of evidence/ Decision for Use/Application to Practice
<p>Ahlers, Nguyen, (2013). Country: USA</p> <p>Funding: None disclosed</p> <p>Bias-</p>	<p>Health promotion model</p>	<p>Design: Qualitative</p> <p>Purpose: To demonstrate if a facilitated simulation would encourage parents to use kiosks to access their children records via a portal.</p>	<p>N – 300 IG – CG-</p> <p>Demographics: White, Hispanic, Asian, African American, other mixed race</p> <p>Setting: Department of pediatrics, University of Kansas.</p> <p>Inclusion: Parents over 18 years old.</p> <p>Exclusion:</p> <p>Attrition 54%</p>	<p>IV: Parents DV1: Demonstration of use of patient portal</p> <p>Time frame of the intervention – Unknown</p>	<p>Demonstration on how to access portal on site kiosks.</p>	<p>Study data was managed using, Research Electronic Data Capture (REDCap), Analysis was completed using Predictive Analytics Software (PASW) version 20.0(SPSS, Inc., Chicago, IL).</p>	<p>. Of those approached, 171 (54%) parents participated in the demonstration; 64 (37%) completed surveys. Average age was 28 years (standard deviation 7), and most were white (26, 40%) or Hispanic (14, 22%). Most (46, 72%) did not know about the patient portal prior to demonstration; of those who did, only five (28%) had used it. Following demonstration, the majority (59, 92%) thought the patient portal was easy to use. Parents planned to view medical records and laboratory results but disliked having separate accounts for each child and the lack of a "symptom checker." Many (44, 69%) planned for future use. The majority (62, 97%) found the navigator helpful, and (37, 58%) wanted access to the patient portal via on-site kiosks.</p>	<p>.Level 4</p> <p>Strengths- With portals becoming more widely implemented by medical practices, it is necessary that they are designed to function as valuable health communication tools appropriate for all patients and providing the education on how to use them is equally important.</p> <p>Weaknesses- limited time to demonstrate portal, low response rate, lack of follow up on empirical observation, after demonstration and self-report of data.</p> <p>Conclusion-Although most parents had no prior experience with the patient portal, they were satisfied overall with ease of use and offered features.</p> <p>Clinical significance: The use of kiosks and Demonstration on how to use patient portal may increase the utilization for patients.</p>

DV1 – Dependent variable 1, DV2 – Dependent variable 2, DV3 – Dependent variable 3, DV4 - Dependent variable 4, IG - Intervention group, RCT-Randomized Controlled Trial, EHR-Electronic Health Record, eHealth-electronic health, eHEALS-eHealth Literacy Scale, IT-information technology, NVS-Newest Vital Sign, OR-odds ratio, PASW-Predictive Analytics Software,- TAM-technology acceptance model, BHLS-brief health literacy screen, GED-general education development, PAM-13- Patient Activation Measure, REDCap-Electronic Data Capture REALM-SF-Rapid Estimate of Adult in Medicine short form, S-TOFHLA-Short Test of Functional Health Literacy in Adults,

Table 2

Evaluation Table

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied and Their Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of evidence/ Decision for Use/Application to Practice
<p>Ammenwerth, E., Schnell-Inderst, P., & Hoerbst, A. (2012). Country: USA Funding: COMET Center Oncotyrol which is funded by Austrian Federal Ministries of BMVIT/BMWF J(via FFG) and the Tiroler Zukunftsstiftung/Standortagentur Tirol(SAT)</p>	<p>Health promotion model</p>	<p>Design: This review included RCT, quasi experimental studies. Purpose: To Systematically review the impact of electronic patient portals on patient care by analyzing controlled studies on the use of patient portals.</p>	<p>N – 9 IG – 5 CG-4 Demographics: 4 different patient portals Setting: Inpatients and outpatients areas. Inclusion: Included studies independent of the patient subgroup or disease (e.g. general portal, but also portals for diabetes patients), included papers in English, German, and French. Exclusion: All papers where the intervention consisted of a paper based copy if the medical record.</p>	<p>IV: Patient portal DV1: Impact of patient Portals on Outcomes DV2: Impact on clinical Outcome. DV3: Impact on Health Recourses Consumption DV4: Impact on Patient Adherence DV5: Impact on Patient-Physician Communication DV6: Impact on Patient Empowerment. DV7: Impact on Patient Satisfaction. Time frame of the intervention – Use literature from 1990, until 2012, which is when the research was performed.</p>	<p>Systematic search to identify RCT, and quasi- experimental studies.</p>	<p>A systematic search was conducted using PubMed and other sources to identify controlled experimental or quasi-experimental studies on the impact of patient portals that were published between 1990 and 2011.</p>	<p>It was identified 5 papers presenting 4 distinct studies. There were no statistically significant changes between intervention and control group in the 2 randomized controlled trials investigating the effect of patient portals on health outcomes.</p>	<p>.Level 1 Strengths- All electronic patient portals included in this review, offered functionality in addition to sole access clinical data. Weaknesses-Small Sample of studies was reviewed. Conclusion- Even if electronic patient portals are often seen as a way to empower patients and improve patient care, the available evidence does not support this assumption. Clinical significance: Further studies of larger sample size and with harmonized outcome indicators are needed to investigate the portal usability.</p>

DV1 – Dependent variable 1, DV2 – Dependent variable 2, DV3 – Dependent variable 3, DV4 - Dependent variable 4, IG - Intervention group, RCT-Randomized Controlled Trial, EHR-Electronic Health Record, eHealth-electronic health, eHEALS-eHealth Literacy Scale, IT-information technology, NVS-Newest Vital Sign, OR-odds ratio, TAM-technology acceptance model, BHLS-brief health literacy screen, GED-general education development, PAM-13- Patient Activation Measure, REALM-SF-Rapid Estimate of Adult in Medicine short form, S-TOFHLA-Short Test of Functional Health Literacy in Adults,

Table 3

Evaluation Table

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied and Their Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of evidence/ Decision for Use/Application to Practice
<p>Ancker et al.,(2015) Country: USA</p> <p>Funding: Weill Cornell Physician Organization</p> <p>Bias</p>	Self-Efficacy	<p>Design: Observational Study</p> <p>Purpose: To assess the relationship between patient activation and outpatient use of patient portal.</p>	<p>N = 180 113 responded</p> <p>Demographics: Adult patients of the Weill Cornell Physician Organization.</p> <p>Setting: 12 primary care practices, USA</p> <p>Inclusion: Pts accessing medical portals</p> <p>Exclusion Attrition-37%</p>	<p>IV: Patient portal</p> <p>DV1:Demographics DV2: Health issues DV3:Technology DV4: Attitudes</p> <p>Time frame of the intervention – 12 months</p>	Patient Activation Measure (PAM), Demographics and behaviors.	Univariable logistic regression spearman correlations. Data were summarized with proportions for categorical variables and medians for continuous variables. In compliance with PAM scoring guidelines.	Of the 180 respondents who had been given access codes to allow them to establish patient portal accounts, 113 (63%) established account to the expected proportion of 60%). Among users, the account was accessed a median of 6 times (interquartile range: 2.75–13.5).	<p>.Level-5</p> <p>Strengths- Patients were generally happy with the portal, suggesting that using it might be associated with other important benefits such as satisfaction with care that were not measured in the current survey</p> <p>Weaknesses: it was a single-center study with a largely insured population, limiting the ability to generalize to other settings and populations.</p> <p>Conclusion. Findings provide no evidence that patients who established and used their portal accounts were more highly activated than those who did not establish accounts. Instead, the current findings (like those of others) confirm that use of electronic patient portal was more likely among patients with higher education as well as those who used the Internet more frequently.</p>

DV1 – Dependent variable 1, DV2 – Dependent variable 2, DV3 – Dependent variable 3, DV4 - Dependent variable 4, IG - Intervention group, RCT-Randomized Controlled Trial, EHR-Electronic Health Record, eHealth-electronic health, eHEALS-eHealth Literacy Scale, IT-information technology, NVS-Newest Vital Sign, OR-odds ratio, TAM-technology acceptance model, BHLS-brief health literacy screen, GED-general education development, PAM-13- Patient Activation Measure, .REALM-SF-Rapid Estimate of Adult in Medicine short form, S-TOFHLA-Short Test of Functional Health Literacy in Adults,

Table 4

Evaluation Table

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied and Their Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of evidence/ Decision for Use/Application to Practice
<p>Arcury et al, (2017) Country: USA</p> <p>Funding: Grant from The agency fo Healthcare Research and Quality. Bias- Only urban and rural clinics were included.</p>	<p>Davis’ Technology Acceptance Model (TAM). Theory of Reasoned Action, Theory of Planned Behavior.</p>	<p>Design: Observational Study</p> <p>Purpose: To determine modifiable factors affecting portal utilization.</p>	<p>N – 200</p> <p>Demographics: Patients from one urban clinic and two rural clinic, low income, age 55 or older, male and female, African America, White, Latino.</p> <p>Setting: Urban and Rural Areas in north Caroline.</p> <p>Inclusion: Community Dwelling adults aged 55 or older, treated for chronic disease.</p> <p>Exclusion: Patients under 55 years old.</p> <p>Attrition: 80%</p>	<p>IV: Utilization or Patient Portal DV- perceived usefulness and usability. DV1: Portal Utilization DV2-Marital Status DV3-Health Insurance DV4-House hold composition</p> <p>Time frame of the intervention – 24 months</p>	<p>Questionnaire</p>	<p>Charlson Comorbidity Index, chi-square</p>	<p>This study found differences in portal utilization by ethnicity, education, poverty level, and rurality; those who are minority, have lower income and education, and are rural utilize patient portals less</p>	<p>. Level-3</p> <p>Strengths-It was demonstrated that, familiarity and use of technology were associated with greater patient portal utilization</p> <p>Weaknesses-Small sampling , this survey did recruit a large, multi-ethnic, low income sample that included rural and urban patients</p> <p>Conclusion- This analysis found that variation in patient portal utilization reflects disparities, even in low income patient populations Clinical significance: The utilization of patient portal can be beneficial for this populations.</p>

DV1 – Dependent variable 1, DV2 – Dependent variable 2, DV3 – Dependent variable 3, DV4 - Dependent variable 4, IG - Intervention group, RCT-Randomized Controlled Trial, EHR-Electronic Health Record, eHealth-electronic health, eHEALS-eHealth Literacy Scale, IT-information technology, NVS-Newest Vital Sign, OR-odds ratio, TAM-technology acceptance model, BHLS-brief health literacy screen, GED-general education development, PAM-I3- Patient Activation Measure, ,REALM-SF-Rapid Estimate of Adult in Medicine short form, S-TOFHLA-Short Test of Functional Health Literacy in Adults,

Table 5

Evaluation Table

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied and Their Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of evidence/ Decision for Use/Application to Practice
Barron et al, (2014) Country: USA Funding: Not mentioned Bias- IT publishing company,	Cognitive Theory	Design: Mix study Purpose: To identify if older adults and caregivers were interested in patient portal utilization.	n-33 Demographics: Olders adults age >65with chronic disease Setting: Geriatrics medical practice in Baltimore, USA, with Dx of COPD or CHF and their caregiver. Inclusion: patients older than 65 with COPD or CHF, with their caregivers Exclusion: Younger than 65 with no COPD, or CHF. Attrition 0%	IV: Performance on patient portal DV1:Patients DV2:caregivers Time frame of the intervention – Unclear	Semi structured interview	Access to the portal is offered to patients at the discretion of their providers. Providers typically discuss the patient portal with their patients and enter an electronic order for interested patients. Patients then receive instructions for enrolling in the portal, which they need to complete at home.	Too small of sample	. Level-4 Strengths- Web portal usage Weaknesses-too small of sample Conclusion- Older adult will use patient portal with education. Clinical significance: Portal access can be included discharge plan of care.

DV1 – Dependent variable 1, DV2 – Dependent variable 2, DV3 – Dependent variable 3, DV4 - Dependent variable 4, IG - Intervention group, RCT-Randomized Controlled Trial, EHR-Electronic Health Record, eHealth-electronic health, eHEALS-eHealth Literacy Scale, IT-information technology, NVS-Newest Vital Sign, OR-odds ratio, TAM-technology acceptance model, BHLS-brief health literacy screen, GED-general education development, PAM-13- Patient Activation Measure, REALM-SF-Rapid Estimate of Adult in Medicine short form, S-TOFHLA-Short Test of Functional Health Literacy in Adults,

Table 6

Evaluation Table

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied and Their Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of evidence/ Decision for Use/Application to Practice
Coughland et al (2017). Country: USA Funding: None Reported Bias	Health promotion model	Design: Systematic Review Purpose: Review evidence on patient web portal use for disease management, disease-specific portals, and disease prevention and to examine the disparities in portal use.	N – 35 IG –14 CG-21 Total of 620 articles citations were identified. Kept 35 studies. Demographics: studies involving patients with DM, HTN, CAD and mental disorders. Setting: Inclusion: articles published in English from 1993-2016 Exclusion: Attrition	IV: Portal usability DV1: Web portals for specific disease and patient population. DV2: Web portals and Disease prevention. DV3: Web Portals and health disparities. DV4: Community web Portals Time frame of the intervention –1993-2016	Review of web portal utilization	Bibliographic searches in PubMed, reviews important developments in web portals for primary and secondary disease prevention, including patient web portals tethered to electronic medical records, disease-specific portals, health disparities, and health-related community web portals.	An evidence base is accumulating from rigorous studies with historical cohorts (observational) or randomized controlled trial design on the effectiveness of patient web portals for improving health outcomes	.Level-2 Strengths- The studies analysis included important areas that affect portal utilization. Weaknesses-Additional studies are needed of the utility and effectiveness of web portals for other patient groups (e.g., patients with chronic respiratory, gastrointestinal, musculoskeletal, or dermatologic illnesses; women seen for obstetrical or gynecologic care; cancer patients Conclusion- The majority of studies on the effectiveness of patient web portals have focused on portal use by patients with specific medical disorders such as diabetes, hypertension, and coronary heart disease and mental disorders. Clinical significance: Patient web portals have also shown promising results in increasing adherence with screening recommendations

DV1 – Dependent variable 1, DV2 – Dependent variable 2, DV3 – Dependent variable 3, DV4 - Dependent variable 4, IG - Intervention group, RCT-Randomized Controlled Trial, EHR-Electronic Health Record, eHealth-electronic health, eHEALS-eHealth Literacy Scale, IT-information technology, NVS-Newest Vital Sign, OR-odds ratio, TAM-technology acceptance model, BHLS-brief health literacy screen, GED-general education development, PAM-13- Patient Activation Measure, REALM-SF-Rapid Estimate of Adult in Medicine short form, S-TOFHLA-Short Test of Functional Health Literacy in Adults,

Table 7

Evaluation Table

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied and Their Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of evidence/ Decision for Use/Application to Practice
Irizarry et al, (2017) Country: USA Funding: Grant by Aging institute of University of Pittsburg Medical Center. Bias	Self-efficacy	Design: Mixed Methods Purpose: To identify perceptions and beliefs of older adults about the usage of patient portals.	N – 100 IG – CG Demographics: Older community at least 65 years of age. Dwelling adults. Living in an independent residence. Setting: Pittsburg Inclusion: At least 65 years of age cognitively equipped to answer a full battery if questions. Exclusion: Attrition	IV: Portal Use DV1:Health status and disease burden DV2:Health Literacy DV3:level of engagement DV4: technologies attitudes Time frame of the intervention – 3 months	Phone survey Analysis	Chi-square, Kuskal-Wallis H Dunn Procedure with Bonferroni correction. Using SPSS	Differences in health literacy, comfort navigating health information on the Web, and previous portal experience explained some but not all differences related to the 7 themes that emerged in the focus groups analysis	.Level-5 Strengths- Survey methods, including sampling, use of validated measures, the collection of data using standard formatting by trained phone interviewers, and standard analysis techniques ensured reliability and validity of quantitative analysis. Weaknesses This study has low evidence instruments such as phone calls. Conclusion- Most of the older adults are interested in using a patient portal regardless of health literacy level, previous patient portal adoption, or experience navigating health information on the Web. Clinical significance: This may not be a good design for practice change due to the validity of instruments.

DV1 – Dependent variable 1, DV2 – Dependent variable 2, DV3 – Dependent variable 3, DV4 - Dependent variable 4, IG - Intervention group, RCT-Randomized Controlled Trial, EHR-Electronic Health Record, eHealth-electronic health, eHEALS-eHealth Literacy Scale, IT-information technology, NVS-Newest Vital Sign, OR-odds ratio, TAM-technology acceptance model, BHLS-brief health literacy screen, GED-general education development, PAM-13- Patient Activation Measure, REALM-SF-Rapid Estimate of Adult in Medicine short form, S-TOFHLA-Short Test of Functional Health Literacy in Adults,

Table 8

Evaluation Table

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied and Their Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of evidence/ Decision for Use/Application to Practice
<p>Mook et al, 2018 Country: USA</p> <p>Funding: None declared</p> <p>Bias-The demographics may not be reflective of other regions in the nation.</p>	<p>Grounded Theory Model</p>	<p>Design: Explorative review, Observational, retrospective design</p> <p>Purpose: To Demonstrate the importance of understanding the population using a patient portal and provides insight.</p>	<p>N – 461700 IG – CG-</p> <p>Demographics: Primarily English speaking, with an established primary care.</p> <p>Setting: non-profit integrated healthcare system in Northern Virginia</p> <p>Inclusion: Pts accessing medical portals</p> <p>Exclusion: Attrition</p>	<p>IV: portal activation IV2-predictive factors</p> <p>DV1: portal user DV2:non portal user DV3:Ethnicities DV4: computer literacy D5-income D6-education D7-insurance D8-attitudes.</p> <p>Time frame of the intervention – 12months</p>	<p>Patients' user data were obtained from the Epic Care database and included age, date of birth, gender, ethnicity, race, and zip code. Federal poverty levels (FPLs) by area (defined by US Postal Service zip code) were captured from the 2013 US census 5-year estimates</p>	<p>Univariate analysis and multivariable logistic regression indicated associations between patient portal activation and predictive factors</p>	<p>A total of 387 198 patients met the study inclusion criteria; of those, 80 435 (20.8%) activated their portal account. Portal activation was highest among English-speaking patients (23.4%) and lowest among Spanish-speaking patients (4.1%). In addition, Hispanic ethnicity had a low activation percentage (10%) compared with non-Hispanic (22%). White patients had the highest activation (25% of white patients activated), followed by Asian (21%), African American (16%), Middle Eastern (13%), and other (15%).</p>	<p>Level-4</p> <p>Strengths- demonstrates the importance of understanding the population using a patient portal and provides insight for future development on how to engage patients to interact with their providers through the portals</p> <p>Weaknesses. The research was conducted in one healthcare system, and the demographics of this population may not be reflective of other regions in the nation.</p> <p>Conclusion- This study has contributed to the current knowledge on patient portals by identifying predictors of portal activation from the perspective of an integrated healthcare delivery system and examining portal activation among a large diverse urban population.</p> <p>Clinical significance: Solutions were developed to translate messages from healthcare providers into Spanish</p>

DV1 – Dependent variable 1, DV2 – Dependent variable 2, DV3 – Dependent variable 3, DV4 - Dependent variable 4, IG - Intervention group, RCT-Randomized Controlled Trial, EHR-Electronic Health Record, eHealth-electronic health, eHEALS-eHealth Literacy Scale, IT-information technology, NVS-Newest Vital Sign, OR-odds ratio, TAM-technology acceptance model, BHLS-brief health literacy screen, GED-general education development, PAM-13- Patient Activation Measure, REALM-SF-Rapid Estimate of Adult in Medicine short form, S-TOFHLA-Short Test of Functional Health Literacy in Adults,

Table 9

Evaluation Table

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied and Their Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of evidence/ Decision for Use/Application to Practice
North et al (2011) Country: USA Funding: Mayo Foundation Bias-	Health Education and promotion	Design: Qualitative Purpose is to examine the use of the face-to-face office appointment as a teachable moment to educate patients about the Mayo Clinic patient portal and to promote portal registration	There was an analysis of pre and post after watching a video how to use portal. Demographics: Adult patients Setting: Primary care clinic. Inclusion: Patients with apt within specific time. Exclusion: patient needing translation Attrition-	IV: Portal usage DV1:Video DV2:pamphlet Time frame of the intervention – 45 days	Five-point Likert scale: strongly agree, agree, neutral, disagree, and strongly disagree.	Categorical data were compared using the χ^2 test, and ANOVA was used for continuous variables. They used multivariate logistic regression analysis to determine adjusted ORs. JMP 8.01 (SAS) was the software used for analysis.	There were 1038 launches of the video from a total of 1270 face-to-face eligible appointments (82%). They collected 647 patient surveys concerning the 1038 video launches (62%).	. Level-2 Strengths- 3 cohorts Weaknesses. They did not correct their analysis for racial differences which are known to influence registrations. Conclusion. Within 6 months following the interventions, 3.5% in the video cohort, 1.2% in the paper, and 0.75% of the control patients demonstrated portal use by initiating portal messages to their providers (p<0.0001). Clinical significance- This demonstrates that the use of video how to use portal can increase the portal accessibility.

DV1 – Dependent variable 1, DV2 – Dependent variable 2, DV3 – Dependent variable 3, DV4 - Dependent variable 4, IG - Intervention group, RCT-Randomized Controlled Trial, EHR-Electronic Health Record, eHealth-electronic health, eHEALS-eHealth Literacy Scale, IT-information technology, NVS-Newest Vital Sign, OR-odds ratio, TAM-technology acceptance model, BHLS-brief health literacy screen, GED-general education development, PAM-13- Patient Activation Measure, REALM-SF-Rapid Estimate of Adult in Medicine short form, S-TOFHLA-Short Test of Functional Health Literacy in Adults,

Table 10

Evaluation Table

Citation	Theory/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Major Variables Studied and Their Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Level of evidence/ Decision for Use/Application to Practice
<p>Ronda et al, (2014) Country: Netherlands</p> <p>Funding: This study was supported by The Diabetes Fund, The Netherlands Organization for Scientific Research in Diabetes (grant 2010.13.1369). Bias</p>	Health promotion model	<p>Design: RCT Purpose The aim was to study the opinions of patients with diabetes and identify perceived barriers to using a Web portal to Optimize its use.</p>	<p>N – 4500 IG – 1500 CG-3000 Research of</p> <p>Demographics: patients with diabetes by randomly selecting patients aged 18 to 85 years Setting: 62 primary care practices and 1 outpatient hospital clinic in the central area of the Netherlands Inclusion: all used the same electronic health record with a Web portal. Exclusion: Attrition-</p>	<p>IV- diabetes-related variables Time frame of the intervention – Unknown</p>	2 separate questionnaires: 1 for patients with a Login and 1 for patients without a login.-If they knew how to use portal, and how they found out-Pamphlet Dr. notification...	Multivariable regression analysis.	<p>From the 4500 questionnaires, 101 were not answered because 33 patients died and 68 had incorrect contact information. From the remaining patients, 2931 (66.63%) responded; 1541 of these 2931 patients (52.59%) declared that they did not wish to Participate. In total, 1390 (31.60%) patients were eligible for analysis (“participants”) because they returned a completed Questionnaire and signed a consent form.</p>	<p>.Level-2 Strengths- The use of users and nonusers was a strength. Weaknesses-No comparison were made for other methods of dissemination of the existence of a portal. Conclusion- this study showed that unawareness of the patient portal is the Main barrier of enrollment. All patients who were aware of the Existence of the Web portal were made aware by their health care provided using a pamphlet. Clinical significance- Patients can be made aware and educated of patient portal by use of pamphlet and or verbal information by their provider/</p>

DV1 – Dependent variable 1, DV2 – Dependent variable 2, DV3 – Dependent variable 3, DV4 - Dependent variable 4, IG - Intervention group, RCT-Randomized Controlled Trial, EHR-Electronic Health Record, eHealth-electronic health, eHEALS-eHealth Literacy Scale, IT-information technology, NVS-Newest Vital Sign, OR-odds ratio, TAM-technology acceptance model, BHLS-brief health literacy screen, GED-general education development, PAM-13- Patient Activation Measure, REALM-SF-Rapid Estimate of Adult in Medicine short form, S-TOFHLA-Short Test of Functional Health Literacy in Adults,

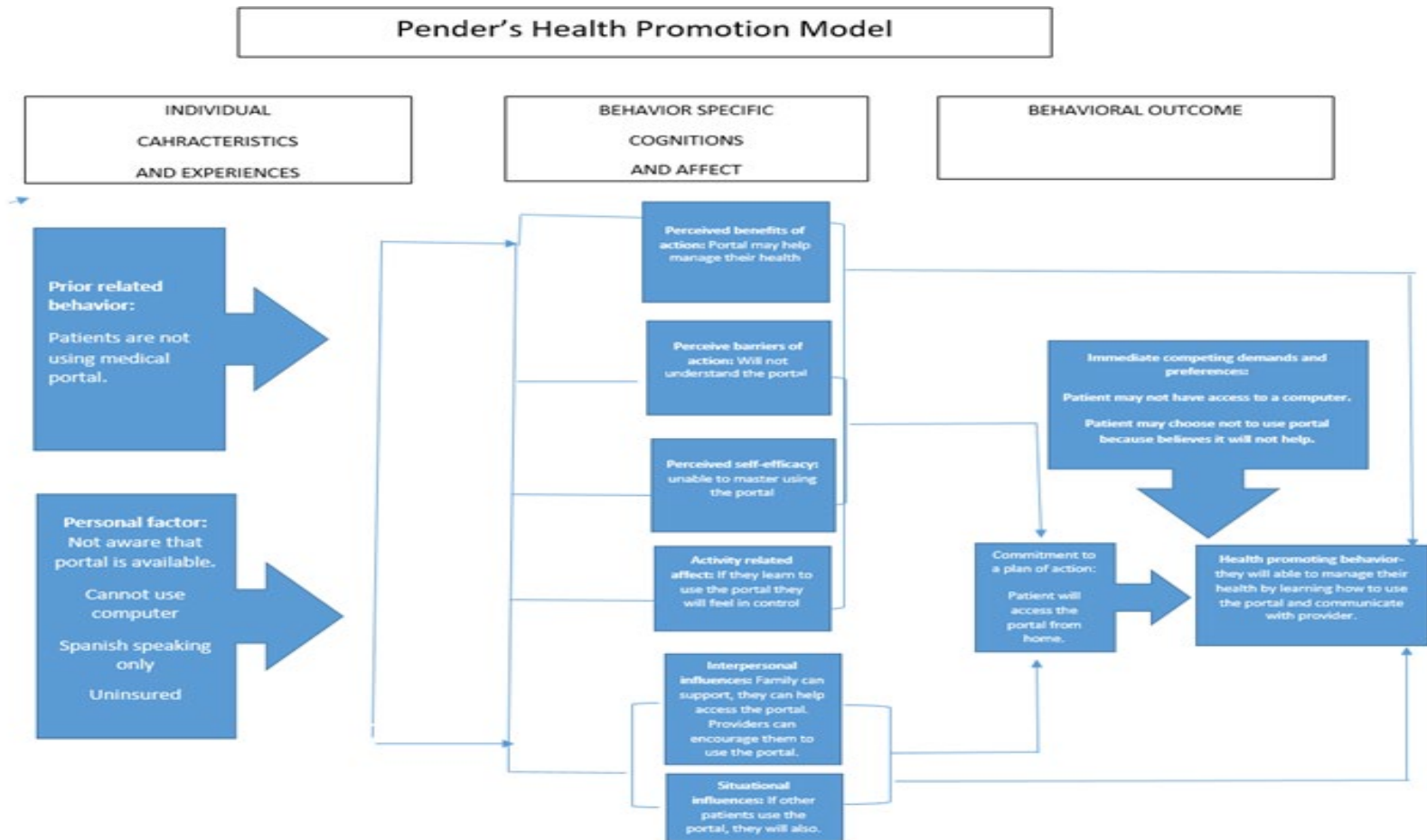
Appendix F

Synthesis Table

Study Details										
Author	Ahlers, Nguyen,	Ammenwerth :Schnell-Inderst;Hoerbst	Anker et al	Arcury et al	Barron et al	North et al	Coughl and	Irizarry et al	Ronda et al,	Mook
Year	2013	2012	2015	2017	2014	2011	2017	2015	2014	2012
Design	RCT	Systematic Review of controlled trials	RCT	Observational Study	Exploratory Study	Qualitative Study	RCT	Systematic Review	RCT	Systematic Review
Level of Evidence	IV	I	V	III	IV	II	II	V	II	IV
Sample	171	13 papers	180	200	33		35	100	29	461700
Independent Variables										
Handout	x	x				x			x	
email	x	x	x	X	x	x	x	x	x	x
Facilitated demonstration/Coach/Simulation	x	x	x	x						x
Tablet				x						
Power point										
Podcast										
Video	x				x	x				
Dependent Variables										
Portal utilization	-	-	↑	↑	↑	↑	↑	↑	↑	↑
Findings	Parents found using the demonstration on portal use made it easier to use access portal	Even when patients portals are often discussed as a way to empower patients and improve quality of care , there is insufficient	Patients who chose electronic patient portal were highly activa	Disparities in training in portal utilization and making technology access will increase	Older adults with chronic illness and their caregivers were interes	Videos have the potential to be a great tool how to access a	Additional studies are needed of the utility and effectiveness of differen	Most of the adults are interested in using a patient portal regard	Recommendation for the developing of a patient portal generic model	Identifying factors that affect portal utilization

Appendix G

Figure G

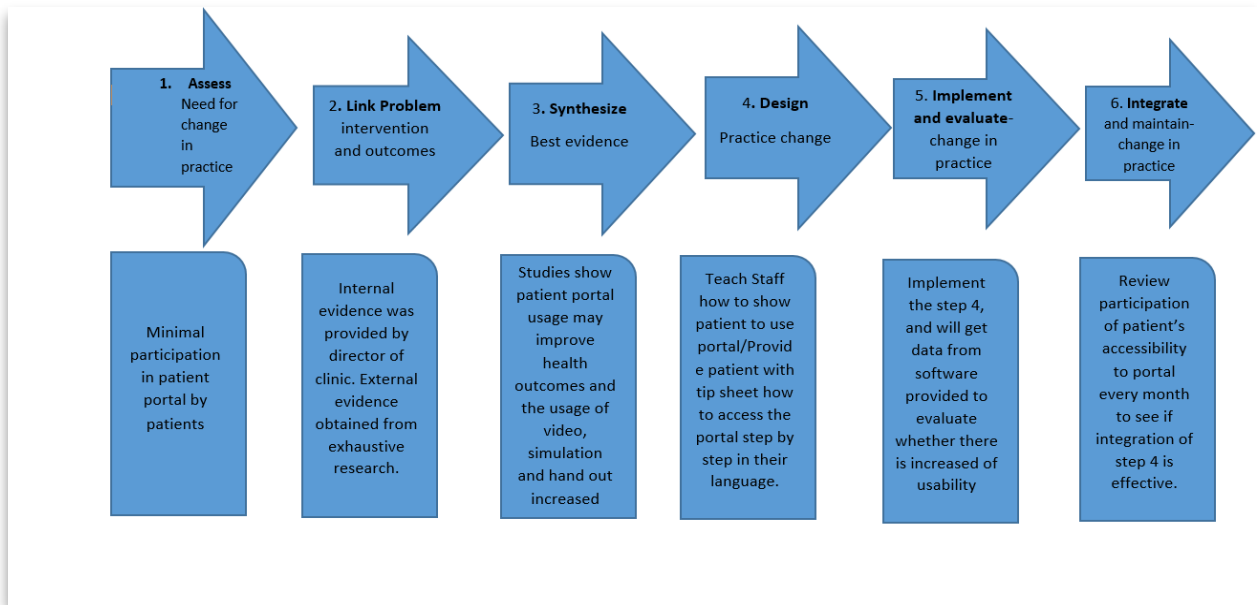


Appendix J

Figure J

A MODEL FOR EVIDENCE –BASED PRACTICE

ROSSWURM & LARRABEE



From Rosswurm & Larrabee (1999). By Permission of Sigma Theta Tau International Honor Society of Nursing

Appendix K

Results table K

Chi-Square Tests					
	Value	df	Asymptotic Significance (2- sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	9.653 ^a	1	.002		

A Pearson Chi-Square test of independence was calculated, $df=1$, $p<0.05$, with significant level at .000, Significant increase on login was found after intervention as shown on table.

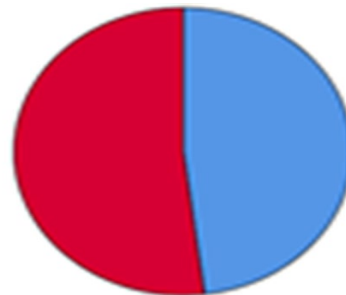
Figure K

Chart review

Pre intervention chart review



Post intervention chart review

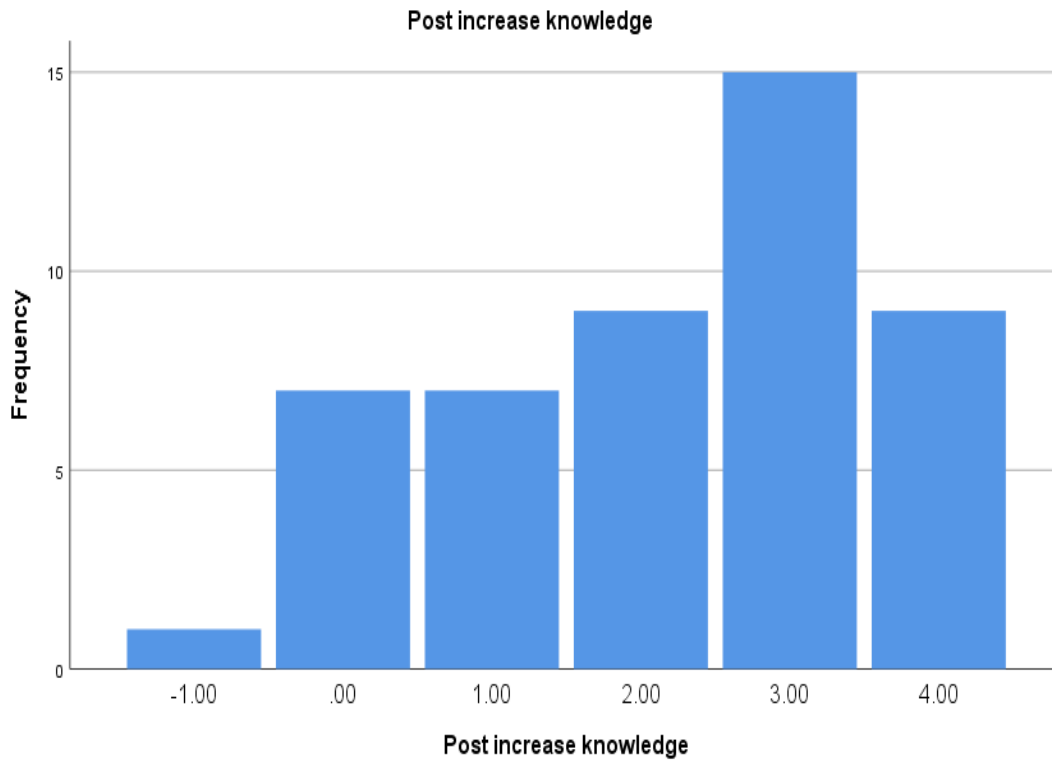


Login
0 ■ (blue)
1 ■ (red)
0=No
1= yes

Results Table L

Paired Sample ttest					
Post increase knowledge					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.00	1	2.1	2.1	2.1
	.00	7	14.6	14.6	16.7
	1.00	7	14.6	14.6	31.3
	2.00	9	18.8	18.8	50.0
	3.00	15	31.3	31.3	81.3
	4.00	9	18.8	18.8	100.0
	Total		48	100.0	100.0

Figure L



A significant change was calculated using frequency paired sample test.

Footnotes

¹Add footnotes, if any, on their own page following references. The body of a footnote, such as this example, uses the Normal text style. *(Note: If you delete this sample footnote, don't forget to delete its in-text reference as well. That's at the end of the sample Heading 2 paragraph on the first page of body content in this template.)*

Tables

Table 1

Table Title

Column Head	Column Head	Column Head	Column Head	Column Head
Row Head	123	123	123	123
Row Head	456	456	456	456
Row Head	789	789	789	789
Row Head	123	123	123	123
Row Head	456	456	456	456
Row Head	789	789	789	789

Note: Place all tables for your paper in a tables section, following references (and, if applicable, footnotes). Start a new page for each table, include a table number and table title for each, as shown on this page. All explanatory text appears in a table note that follows the table, such as this one. Use the Table/Figure style, available on the Home tab, in the Styles gallery, to get the spacing between table and note. Tables in APA format can use single or 1.5-line spacing. Include a heading for every row and column, even if the content seems obvious. A table style has been setup for this template that fits APA guidelines. To insert a table, on the Insert tab, click Table.

Figures



Figure 1. Include all figures in their own section, following references (and footnotes and tables, if applicable). Include a numbered caption for each figure. Use the Table/Figure style for easy spacing between figure and caption.

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