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Effectiveness of patient engagement strategies in improving health outcomes

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***Abstract*---**Despite the research literature on patient engagement strategy efficacy and the patient experience, studies mainly focus on patient communication and education. There is a need for a holistic perspective on patient-perceived outcomes of satisfaction, health, and well-being. Integrating patient-reported outcomes (PROs) into electronic health record (EHR) systems is crucial to fill gaps in clinical information. Actionable PROs can also be integrated into patient-experience surveys or appointment scheduling efforts. Research funding is needed to evaluate the efficacy of patient engagement strategies on PROs and patient satisfaction, health, and well-being. Better standards are needed to define and measure the patient experience and represent the patient perspective in health system decision-making. The impacts of patient engagement efforts on patient-reported outcomes and their interactions with the healthcare system should be assessed. Understanding the concept of patient-centered care and the implications of patient engagement on health system performance is lacking. Healthcare professionals should provide support and motivation to patients, develop strategies for lifestyle changes, and implement structured programs.

***Keywords*---**patient engagement strategies, improving health outcomes, healthcare.

1. Introduction

Patient engagement, often understood as the inclusion of patients in health-related decision making, plays a key role in achieving patient-centered and high-quality care. Historically, patient engagement in medical decision making has been limited in most health care systems, leaving patients passive and uninformed regarding their health care choices. Though patients have the ultimate stake in health care decisions, they have been traditionally excluded from the medical-political process in the era of paternalism. However, there has been a collective movement toward shared decision making, as social factors influence the renewed interest in patient engagement. Health institutions are compelled to offer high-quality care, resulting in reforms to encourage patient participation. Meanwhile, recent developments across media technologies have shaped a new patient-displayed agency, allowing for patient assumption of more active roles. Thus, patient engagement can take various forms, including informed consent, patient feedback, shared decision making between patients and clinicians, health co-production and co-design to foster participation in service delivery and planning, and political engagement to influence organizations and policies.

Participatory healthcare changes the power dynamic between health systems and the public. New technologies allow patients to access information, discuss experiences, and question clinicians. Patients become informed decision-makers, but also vulnerable individuals. These developments reshape the relationship between health systems and the public.

Drawing on fieldwork in online cancer communities, this study adopts an interactive perspective to analyze the new settings, spaces, and opportunities online peer support affords for negotiating patients' roles in health care. In looking at patients' engagement in shared decision making, peer support, and political activism, patients' changing positions in health systems are charted, as well as the associated tensions and contradictions. The aim is to inform policymakers, clinicians, and health organizations about the implications of the new and expanding roles patients take on in relation to health systems and interactions with professionals as they encounter new types of medical information, new spaces for social interaction, and new levels of participation and accommodation in health care.

2. The Concept of Patient Engagement

The implementation of patient engagement strategies has been progressively adopted across diverse healthcare systems in developed nations. This paradigm shift necessitates the patient's pivotal role in decisions regarding their health, alongside providers, caregivers, and other stakeholders within the healthcare environment. The World Health Organization (WHO) defines patient engagement (PE) as "the actions individuals must take to obtain the greatest benefit from the healthcare services available to them". PE is regarded as a form of leverage, aimed at improving clinical outcomes, generating a sense of ownership of one's health, fostering socially responsible health behaviors, and reducing costs for the healthcare system as a whole. The overarching aim of PE is to increase

individuals' control over the health-related decisions made in their life. Individuals may take a more passive or more active role regarding their health and PE, but the goal is to empower and activate them.

Current PE strategies in Germany's health system focus on individual encounters or interventions for specific patient groups. However, their effectiveness in improving health outcomes or quality of life is often unclear. Confusion between PE, health literacy, and health inequalities further complicates policy and resource allocation. Understanding PE and its relevance is important for addressing these issues. This includes assessing individual attributes such as patients' understanding of their disease, their involvement in health decisions, socio-demographic factors, health behaviors, and the socio-structural environment they live in.

Existing patient engagement (PE) initiatives in Germany will be discussed. The effectiveness of these initiatives will be evaluated, with a focus on how well they address PE and the urgent problems in the German health system and specific patient subgroups. Barriers and enablers to PE initiatives will be identified. Finally, practical recommendations for policy development, focus areas, collaboration, and research will be provided. These recommendations will apply to all disease areas.

2.1. Definition and Importance

Patient engagement is a broad concept that can take many forms, from simple patient education to complex shifts in decision-making authority. For the purposes of this dissertation, patient engagement is defined as:
"Any patient-initiated action to seek out and/or utilize health care information, services, or products."

This definition emphasizes the active role the patient plays in their health care and the management of their health. The definition is delineated from other terms such as "patient activation" or "health literacy," since patient engagement does not depend on the individual patient's knowledge, skills, or confidence. Rather, the health care system also must create environments and processes that allow patients to engage in their health care. Patient engagement can occur on multiple levels, as illustrated by the "patient-initiated actions" phrase.

Patient engagement is a vital concept in healthcare. It is important for policymakers, academics, and providers as it ensures that healthcare systems meet the needs of populations. Engaged patients use healthcare services effectively, adhere to treatment, and have better health outcomes. Patient engagement can support the redesign of patient-centered healthcare systems, benefiting both individuals and populations.

Patient engagement is crucial for equitable healthcare systems that serve entire populations. Population health aims to support health equity by eliminating disparities between groups. While improving health outcomes often improves health equity, there is evidence that aggregate population health does not always lead to equity. In some cases, population health initiatives may unintentionally

worsen social inequalities. Therefore, it is important to approach population health by considering both overall health improvements and equity in health distribution.

2.2. Types of Patient Engagement Strategies

Patient engagement strategies, also referred to as patient-centered care strategies, entail providers reaching out to or engaging patients in health-promoting activities. These strategies enable patients to make informed and effective decisions regarding their health and healthcare. They enhance self-management skills, support adherence to medical recommendations, and improve the ability to seek care. By actively participating in their healthcare, patients are expected to experience better health outcomes. One of the critical focuses is on understanding the diversity of options and how context contributes to the differences in effectiveness.
Past health interventions have been effective in enhancing patient engagement. These interventions are categorized using the "eight phases of patient involvement" framework, which examines their objectives and how they work. This framework captures diversity in patient involvement through demographic, geographical, professional, and socio-cultural scenarios. Strategies within this framework focus on informing and sharing to create a one-way flow of information between health professionals and patients. The "Model for the Evaluation of the Effectiveness of Patient Engagement Strategies" showcases various strategies used in health interventions for chronic conditions such as cardiovascular diseases, obesity, and diabetes. These strategies aim to involve patients in their care process and influence health outcomes.

Patient engagement strategies involve various health-promoting interactions between patients and health professionals, including online group communications and social policies. There is interest in focusing on strategies for high-risk patients to better understand their design and effectiveness. Results indicate that any contact between patients and health professionals is beneficial, although not all engagement has equal value. Certain strategies may create conflicts between patient and professional views, posing potential harm.

Active patient involvement in healthcare can be burdensome, but it is crucial for managing chronic conditions. This study explores different patient engagement strategies in chronic non-communicable conditions and their effectiveness in various contexts.

3. Theoretical Frameworks for Patient Engagement

To better understand the patient engagement phenomenon, efforts have been made to apply social and behavioral science theories to information technology (IT). Over the past three decades, multiple theories and their derivatives have been used to better understand factors affecting patient engagement. This study focuses on two of the most widely used theoretical frameworks: Health Belief Model and Self-Determination Theory (SDT).

The Health Belief Model was developed in the early 1950s by social psychologists Hochbaum, Rosenstock, and Kegeles at the US Public Health Service. Initially, the model was developed to understand women's reluctance to seek preventive health services, particularly screening for tuberculosis. This model and its derivatives (EHBM, Health Promotion Model, and C-HBM) have been widely used to study how a specific IT can be designed and promoted to persuade target individuals to take action to use the IT, as well as to examine factors that affect individuals' intention to use the IT.

In the Health Belief Model, an individual's behavior is determined by beliefs. Action is taken if susceptibility and severity are perceived, benefits are believed, and barriers are outweighed. Self-Determination Theory is a highly regarded theory of human motivation and personality. Developed by psychologists Edward L. Deci and Richard M. Ryan, it focuses on intrinsic motivation and different types of motivation. SDT has been used to develop interventions that promote personal growth and well-being. Factors such as transparency and shared vision facilitate the internalization process. Autonomy orientation plays a role in empathizing with pro-social motivations.

3.1. Health Belief Model

The health belief model (HBM) was designed to explain why a person may choose to undertake health-promoting behaviors or health-risk behaviors. It was later revised to explore health-care avoidance behavior or "delay behavior," especially in people with more than one serious health problem (who had been receiving treatments for one but declined treatments for another). Basically, it argues that health-promoting behavior is determined by the individual's perception of the risk of acquiring the target disease, perceived severity of the disease, perceived benefits of the recommended action, and perceived barriers to taking the action (goal objects for a person's desire). These are all cognitive components, but in later versions of the model, it also starts to include various modifying factors that would influence the individual's perception, such as demographic variables, personality, sociopsychological, and structural variables.

The model is an unreasonable framework for patient engagement in healthcare. It may lead to frustration and conflicts, as someone who raises awareness of an unmet need and promotes proactivity may still struggle to take action. A rational agency model would be preferable.

3.2. Self-Determination Theory

Self-determination theory (SDT) posits that individuals maintain and grow personal motivation towards activities through agency or control. This motivates people to change and adhere to such behaviors over time. Analyzing how patients are voluntarily engaged in their health care and the effectiveness of these strategies, although they are often low-cost, could be of interest in terms of cost-effectiveness with regard to commonly used materials. Compliance with treatment regimes depends largely on patients' active engagement with and understanding of their condition.

Self-determination theory has been applied in many domains where there is an aim to create sustained change over time. SDT is founded on the notions of agency and basic psychological needs (specifically, competence, autonomy, and relatedness). These psychological needs have been shown to contribute to the sustainability of behavior over time. While basic psychological needs are universal to all, they need to be realized through culturally relevant processes. In this light, need-supportive strategies for engagement and the development of Internet self-determination theory (ISDT) have evolved.

SDT offers guidance on fostering patient engagement through digital strategies. Understanding patient engagement is crucial for improving support systems. Health care systems are transitioning to patient-centered models, utilizing digital technologies for communication. These technologies allow patients to actively participate in their care. This requires reevaluating the concept of engagement.

Traditionally, patient engagement measures have focused on whether patients wish to receive information and ask questions at visits; domain-specific health literacy; or satisfaction with decision-making. New technologies and the heightened role of information must also be taken into account. Using SDT as a framework broadens engagement to include aspects such as the motivation to search for, interpret, and take action based on health care information.

4. Benefits of Patient Engagement

The inclusion of patients in their health care decisions is a fundamental component of patient-centered care. Data have shown that patient engagement may improve adherence to treatment plans, lower the incidence of readmissions, and enhance health outcomes. The following explores the benefits of patient engagement strategies using the above criteria. It looks in greater detail at how patient engagement strategies can improve patients' adherence to treatment plans and enhance patients' satisfaction with their health care.

4.1. Improved Adherence to Treatment Plans

Adherence to treatment plans has long been recognized as a significant component in achieving good health outcomes, particularly in chronic diseases like diabetes, hypertension, and asthma. Several factors influence a patient's adherence to a treatment plan, including the patient's social and cultural background, the complexity of the treatment plan, errors in prescriptions or medication doses, issues with drug coverage, and the clarity of communications regarding medications, among others. Patient engagement strategies help to address many of these issues and increase the patients' adherence to treatment plans.

Research on patients' adherence to treatment plans has demonstrated that education, reminders, incentives, and follow-ups can improve adherence rates by as much as 20% to 25%. These strategies equip patients with skills to live with their treatment regimen, remind them about taking the treatment, and address barriers and complications with the plan. A study on educational and reminder strategies found that providing education to a patient and their family on a

treatment plan significantly increased adherence rates at six months by nearly threefold.

Additionally, involving patients in choosing their treatment plans and protocols has been shown to increase their adherence to the protocol and improve the health outcomes achieved. Research has shown that in the absence of this involvement, adherence to treatment protocols could drop to as low as 5% in some patient populations.

4.2. Enhanced Patient Satisfaction

Patient satisfaction is critical in healthcare. Research shows that patient engagement improves satisfaction. Examples of effective strategies include transparent health data and online tools like therapy decision aids. Access to health data promotes patient awareness and proactive care.

4.1. Improved Adherence to Treatment Plans

Patient engagement strategies have been implemented in various healthcare settings and have resulted in improved health outcomes for patients. Patient engagement strategies increase a patient's involvement in their healthcare and improve their participation in the healthcare system. Health outcomes such as improved adherence to treatment plans and enhanced patient satisfaction were observed with the implementation of these strategies.

Improved patient engagement strategies can lead to better adherence to treatment plans, which is crucial for patient well-being. Adhering to prescribed medications is vital for effective treatment outcomes and future intervention plans. Medication adherence encompasses both the initial and continued use of prescribed medications, rather than occasional mistakes.

The World Health Organization estimates that adherence to long-term therapy is about 50%. Poor adherence costs the United States $100-289 billion for unnecessary hospitalization and $25-29 billion from unproductive work days. Studies have identified reasons for nonadherence, serving as a guide to interventions. Patient self-efficacy is important for adherence. Concerns about treatment, side effects, and taking multiple medications can be overwhelming.

4.2. Enhanced Patient Satisfaction

Patient engagement strategies have demonstrated a positive effect on the satisfaction of the patients and the care they receive. The engaged patients are active participants and contribute to their care processes, resulting in faster improvement to their health and wellbeing. The engaged patients are also likely to report greater satisfaction with their experience. Greater patient satisfaction occurs when the patients are better informed about their treatment options, particularly side effects. When the management of medications is by self-injection, training and education sessions provide opportunities for patients to discuss their concerns and expectations, leading to better outcomes and faster recovery. Video recordings of injections have provided new understandings of why patients choose not to use treatments properly. Empowering patients to record their experiences

of consultant consultations allows greater storytelling and reflection by the patients, altering the subsequent behavior of health practitioners. Greater opportunities for face-to-face interactions between patients and healthcare practitioners have been shown to improve understanding and subsequent compliance with treatment.

Much of the satisfaction research has been conducted within the public health system. Here, evidence also exists showing greater communication, confidence, and trust arising from collective action. This research asserts that group clinics, involving healthier air, lower autoimmune disease activity, lower stress, increased social support, and owning the clinic venue, all contribute to greater patient satisfaction.

5. Barriers to Effective Patient Engagement

Patient engagement is the process of making patients and their families active participants in healthcare decisions and treatments, and being accountable for those decisions. It comprises a multitude of factors that drive patients to take an active role in their care, including active participation, understanding of their health status, and creating trust. Patient engagement is essential to improve individual health outcomes, reduce healthcare costs, control chronic diseases, and enhance population health. Although patient engagement is improving, there are many barriers that prevent it from being as effective as possible.

Technological Barriers
Technological barriers hinder patient engagement, especially for certain groups like older adults, rural residents, and those with disabilities. Limited literacy skills and concerns about cybercrime also discourage patients from using online platforms. To address these issues, accessible and secure online services should be provided, with no or low costs, user-friendly interfaces, and measures to protect privacy.

Socioeconomic Barriers
Another barrier to patient engagement is socioeconomic disparities between health systems in different income countries. Low- and middle-income countries struggle with malnutrition, waterborne diseases, limited healthcare access, and high medical expenses. These challenges hinder the development of culturally appropriate patient engagement strategies. To overcome this, low-cost mass communication strategies like radio, in-person community events, social media, and printed health leaflets should be considered. Additionally, affordable, convenient, and reliable point-of-care tests can help enhance patient engagement in low- and middle-income nations.

5.1. Technological Barriers

There has been a rise in using technology to engage patients in healthcare. This includes telehealth, mobile apps, wearable devices, and monitoring systems. However, this creates challenges for patients, especially vulnerable populations. Older patients, those with low health literacy, and low socioeconomic status face greater difficulties. Digital health interventions can worsen disparities in health

outcomes. Safety and efficacy concerns exist when using technology to engage patients in their health.

Telehealth has seen a significant surge in patients and providers utilizing this service to improve access to care and promote quality of care. However, disparities still exist in access to technology. Some minority groups, the elderly, and rural populations lack adequate access to internet and mobile devices, and a significant portion of patients do not own a cell phone or telephone. In a study focused specifically on patients with low SES, many expressed concerns about having to use technology to access their care. Patients also expressed discomfort and unease when it came to using technology to access their healthcare. While telehealth has the potential to be an effective channel for increasing patient engagement, it is important to acknowledge that telehealth is far from a panacea in terms of disparities.

Mobile health apps have potential, but uptake has been low among patients. Interventions rarely address disparities or limited access to technology or health literacy. Wearable devices could perpetuate disparities without addressing barriers. In a trial, patients with lowest SES reported limited access to and use of mobile phones, missing out on benefits.

5.2. Socioeconomic Barriers

Disparities in income and education can pose a significant challenge to patient engagement. Patient engagement strategies that rely on the use of technology to track metrics may compromise outcomes for patients with lower incomes and educational attainment. These patients, who may be less financially secure, risk being left out of the care continuum. Low-income patients, who are likely to own lower-end devices with poorer internet connections, may feel alienated by technology-based engagement strategies. Educational disparities among patients can impact the adoption of patient engagement technologies. Patients with lower levels of education can be less likely to own web-enabled technology and feel overwhelmed or confused when using such technologies.

Technology-based patient engagement strategies may unintentionally exclude patients with lower incomes and education levels. A patient's failure to log into a health portal may not indicate disinterest, but rather a lack of access to technology or difficulty navigating it. Simple changes to technology, such as automatic logout, can have a greater impact on disadvantaged patient groups.

Geographic disparities in the availability of technology have also been raised as a concern, given the increased reliance on technology to engage patients. In one study, higher numbers of patient engagement strategies were utilized by patients who lived in urban areas. Areas with hot climates were also less likely to have health portals. It is unclear how infrastructure, environment, and area of residence can affect efficiency and engagement.

Concerns about privacy, confidentiality, and data security could hinder patients from sharing sensitive health information online. Insurance companies may deny coverage for preexisting conditions if they obtain sensitive health information, and

employers may punish employees for engaging in risky behaviors. State-sponsored health departments may refuse to participate in publicly funded solutions that could compromise registrants' confidentiality. The availability of health data could lead to greater inequality in care between vulnerable patients and those with higher socioeconomic status.

6. Key Components of Successful Patient Engagement Strategies

Patient engagement strategies have gained popularity in healthcare fields as they aim to guide the delivery of healthcare, information, and services to patients. These approaches recognize the unique roles and perspectives of patients, incorporating them into the healthcare team as providers of personal knowledge, experiences, and attitudes. By harmonizing individual knowledge with the perspectives of healthcare providers, patient engagement strategies offer a way to bridge the gap between patients and providers. The notion of patient engagement has been applied to various fields, including healthcare, safety, and environmental management, with each field using different terms such as "collaborative planning," "co-production," and "co-management."

Despite the lack of consensus regarding the definition of patient engagement, a review of the existing literature identified a growing number of studies focused on patient engagement strategies. These studies were categorized into two distinct groups: (1) studies where patients are considered non-experts, focusing on observational and information-delivery strategies considered as paternalistic decisions, and (2) studies where patients are considered experts, promoting deliberative and participatory strategies that consider patients' knowledge, experience, and attitudes as a contribution to the decision-making process. Studies from both groups were included in the assessment to investigate how patient engagement strategies have impacted health outcomes.

Patients' lack of knowledge, experience, and engagement in healthcare led to misunderstandings and miscommunication with providers. This affected patients' attitudes, compliance, and acceptance of treatment outcomes. Proper training and consideration of culture improved patient attitudes towards engagement. Co-production in healthcare improved understanding of health problems and patient safety. Co-design interventions increased trust and patient experience while decreasing adverse events. Models assessing patient engagement strategies increased awareness of healthcare quality and effectiveness in decision-making.

6.1. Clear Communication Channels

To effectively engage patients, healthcare providers must invest in clear and accessible communication channels. Clear communication channels are essential for ensuring that patients have access to the information and resources they need to take an active role in their healthcare. This can include the availability of informational materials, such as brochures or videos, as well as access to healthcare staff who can answer questions and provide assistance. Communication is a two-way process and patients must feel comfortable providing feedback. Healthcare providers should create a welcoming environment so that patients feel empowered to voice their concerns. Regular surveys and

focus groups can be used to solicit patient feedback on their experience and make improvements.

To engage patients in their care, healthcare providers can use technology like electronic health records (EHRs). EHRs allow secure messaging and patient access to medical records, leading to higher patient satisfaction and involvement. Patient engagement strategies should be tailored to different patient populations. Low-income or less educated patients may face barriers to using technology and accessing EHRs. Healthcare providers can encourage engagement by suggesting patients bring a family or community member to their visit to build their knowledge base. This approach allows for patient-centered care in different cultural settings.

Patients and healthcare providers can collaborate to meet individual needs. Providers share evidence-based strategies while patients provide their own knowledge. This approach combines population health goals with personalized care. Through brainstorming and decision-making, the provider's intervention is validated by common beliefs.

6.2. Personalized Care Plans

Personalized care plans, tailored to the unique needs and conditions of each patient, represent a transformative shift in the paradigm of healthcare delivery. Traditional "one size fits all" approaches often overlook the complexities of individual patient circumstances, from prevailing health conditions and demographics to socio-economic factors, accessibility of resources, and cultural backgrounds. Research has long demonstrated that personalized treatment approaches yield greater effectiveness in improving health outcomes and enhancing patient satisfaction, especially among patients with chronic illnesses such as diabetes, asthma, and cardiovascular disease. By integrating health data and advanced artificial intelligence technologies into patient care, healthcare providers can capture, filter, and analyze data related to medical history, chronic diseases, demographic characteristics, and other environmental factors. Leveraging health analytics and other emerging technologies empowers care providers to delve deeper into patient profiles, enabling personalized care plans that resonate with their specific conditions.

In the contemporary era of context-aware computing, ubiquitous computing, medical internet of things (IoT), and pervasive health analytics, patients' physiological conditions can be monitored in real-time, facilitating home-based chronic care. The algorithmic approaches safeguard the privacy of patients while enabling continuous context identification and continuous monitoring of risks to chronic patients. Additionally, fair and transparent recommendation techniques using data mining methods for chronic disease treatment have surfaced. These strides have introduced a new dimension to patient engagement strategies and underlined the necessity for proactive patient engagement to boost the accuracy and reliability of personalized care plans and chronic disease management. The design of proactive patient engagement strategies harnesses behavioral modeling, patient profile analysis with emerging technologies, and other health data analytics methods to design proactive recommendations based on the context of

patient and system settings. Real patient training dataset experimental evaluations demonstrate the superiority of uniform patient profiling over non-personalized patient engagement strategies, refuting the notion that the absence of patient insight makes care more democratic.

7. Role of Healthcare Providers in Patient Engagement

The role of healthcare providers in patient engagement is a vital component of the healthcare system. Patients are able to take an active role in their health management when engaged. Healthcare providers have a significant impact on the engagement of patients. For many patients, healthcare providers are the "face" of the healthcare system. How these providers communicate with patients, including the words they use, the tone they adopt, and the modes of communication through which they engage patients, are crucial for patient engagement. Engaged patients have better health outcomes, higher satisfaction, and lower costs than patients who are not engaged. This is why health systems around the world seek to engage their patients more fully in their health management. Unfortunately, public engagement and participation remain a "hard sell" in the health system.

That said, there is a lot of research looking at how organizations can shift from a focus on medical treatment only to a more open, patient-centered approach that responds to the needs of the general public. One aspect of this change process focuses on what the healthcare provider can do to successfully involve patients, in order to create a common ground for equitable partnership in healthcare resources, goals, and decision-making. Building trust between patients and healthcare providers may create a receptive environment for engagement. For patients, trust needs to be built skillfully by making open but not overwhelming overtures for engagement. For healthcare providers, being aware of patient concerns such as fear of coercion and having an unfamiliar healthcare role may create openness towards engagement.

In primary care, patients and healthcare providers sometimes engage in shared decision-making (SDM) to discuss preferences on diagnosis and treatment. While patients are generally willing to participate, there are obstacles. Providers lack structure or time, and patients struggle to educate themselves beforehand. A technical system is needed to plan and prepare for SDM.

7.1. Building Trust with Patients

Fostering trust with patients stands as a pivotal cornerstone of the patient engagement process. Trust not only acts as a foundational element for establishing effective and mutually respectful communication but also enables patients to partake in their healthcare decisions, enhancing shared decision-making opportunities with healthcare professionals. Trust gives them the confidence to share their concerns and expectations and to disclose sensitive information that may affect their treatment or health-related choices. In turn, trust fortifies providers' confidence that patients will uphold their prescriptions and cooperate with their decisions, subsequently minimizing the risks of hostile

behaviors and noncompliance. When mutual trust exists, successful relationships and, thus, improved health outcomes can ensue.

Building trust is often overlooked in provider-patient interactions, particularly in limited acute care and treatment scenarios. Repetitive tasks in clinical settings can give providers a false sense of trust based solely on their expertise. However, this disregards the individual needs and expectations of patients. Medical discontent and mistrust in the healthcare industry are on the rise, fueled by social media and the perception of empathy, misdiagnosis, and arbitrary treatments. Media amplifies negative behaviors, leading to widespread mistrust.

Building trust requires conscious efforts to create meaning, shared goals, and safety. A matrix can help healthcare providers allocate resources to fulfill patients' expectations. Healthcare policies can guide in building collective trust at the workplace or institutional level.

7.2. Shared Decision-Making

Recognizing patients as partners in care, rather than solely as recipients of prescribed treatments, has important implications for healthcare practices and policies. Such a shift has consequences for the roles of healthcare providers and patients alike. These implications require attention not only at the individual provider level but also at the organizational and policy level.

The long-standing gap between parallel trending healthcare costs and quality in the U.S. accounts for a notable development in medicine - patient engagement. There is a growing awareness of the need to involve patients in their care, health, and well-being.

Historically, patients have had little say in the care they receive, with clinical decisions left almost entirely up to physicians and other healthcare professionals. Such models have been largely unsuccessful in improving outcomes, priorities, and experiences. Involvement of patients and their families in their care is critical to the success of high-quality healthcare.

There is a gap in understanding challenges before and during care. Providers and organizations lack awareness of pre-care issues. There is also a lack of preparation for clinical, logistical, and financial needs. Post-care, there is an overwhelming amount of information in a short time. Data collection and review are unclear.

The philosophy of patient engagement focuses on partnership and informed approaches with patients, families, and the public. It explores concepts like shared decision-making, self-management, participatory medicine, and readiness for engagement.

Unfortunately, current cultural reactions from providers and healthcare organizations towards complaints, concerns, feedback, and suggestions during care are generally defensive, dismissive, or counterproductive. A better response

would involve empathy, understanding of need and outcome, an invitation for collaboration, resolution, and closure, and ensure no retribution or retaliation.

8. Role of Technology in Patient Engagement

With the advent of technology, the healthcare industry is evolving rapidly. It has opened new prospects for healthcare stakeholders, patients, and healthcare providers to connect and share health data remotely. Healthcare stakeholders can leverage technology to transmit evidence-based information to patients, and remote monitoring devices can enable checkups, reducing the need for hospital visits for patients with chronic diseases. On the other hand, innovative technologies bring concerns about the security of sensitive medical data and private information shared by patients. If patients' confidentiality is compromised, it can adversely affect patient engagement. Hence, the challenge for healthcare stakeholders is to improve patient engagement and the effectiveness of communication while eliminating perceived barriers regarding technological patient engagement strategies. This chapter aims to critically evaluate the myriad of influences and consequences of technical patient engagement strategies.

Telemedicine is an innovation in communication technologies that allows healthcare stakeholders such as physicians and other hospital staff to connect and communicate encrypted sensitive health information remotely. Through telehealth, health education can be provided to patients seeking care, encouraging them to seek additional care as necessary. Patients often visit emergency departments for non-urgent issues due to unawareness of approaching care options for their health concerns. Telephone triage can be applied with telehealth technologies to create awareness among patients about their health conditions. Telehealth is effective in decreasing emergency visits while improving care seeking, and triage nurse competence is important in maintaining correct care seeking.

Remote monitoring systems allow patients to check their health data regularly from home at a low cost, which can be sent to the hospital for verification. Through regular checks at home, the necessity of frequent visits to the hospital is diminished, which can result in a build-up of a good patient-hospital relationship. This indicates that remote monitoring has the potential to engage patients in their treatment process. In addition, patient engagement is improved when physicians with whom the patients are familiar are using the technology in diagnosis and treatment. Taking these along with reducing costs upon technology, the engagement improvement with remote monitoring application is expected to be more significant than that with tele-interviews.

8.1. Telemedicine

Telemedicine, or remote healthcare services, is the most well-known application of technology's role in patient engagement. It involves consultations between patients and physicians conducted remotely. Although telemedicine was already used before the pandemic, it was mainly in healthcare systems in high-income countries. The pandemic compelled healthcare systems worldwide, regardless of their income levels, to adopt more aspects of telemedicine as a means to minimize

potential exposure to the virus. Telemedicine systems utilize either audio-visual means, which involves videoconferencing, or audio-only means, which employs telephone consultations. Telemedicine has several characteristics that enhance patient engagement, such as facilitating access to care, allowing time savings, making consultations more comfortable, and providing a broader variety of physicians for patients to consider. However, telemedicine could also have some disadvantages that could affect its engagement potential in a patient's context, such as possible overuse of care and impairment of the physician-patient relationship, particularly for inappropriate cases.

Telemedicine's impact on involved care varies based on medical specialties. Psychiatry, nephrology, and infectious disease, which typically offer less involved consultations, view telemedicine positively. On the other hand, surgery and diagnostic imaging specialties see telemedicine as providing lower quality care. The perception of telemedicine's benefits depends on the specialty and segment of care involved. Prior satisfaction with telemedicine is influenced by whether a patient has used it and the specialty they have been seen in.

The impact of telemedicine on engagement varies depending on the specialty. It is generally seen as higher quality in specialties with higher engagement. However, telemedicine may decrease patient engagement overall and exacerbate existing inequalities. Patient characteristics such as age, immigrant status, and income also play a role in the use and perception of telemedicine. Foreign language difficulties favor telemedicine as a preferred mode of care.

8.2. Mobile Health Applications

The integration of mobile health (mHealth) applications in healthcare has increased significantly, thus raising questions about the potential benefits of these applications. The effectiveness of a health intervention can be evaluated through the degree to which it meets established criteria: effectiveness, implementation, and adoption. While mHealth has many advantages, there can also be both beneficial and harmful impacts of these technologies. To date, there is a growing body of work examining the effects of these applications on patients. This potential research project is focused on investigating the impact of mHealth applications on patients.

mHealth deployments are widely believed to increase patient engagement and health interest, but there is no strong and conclusive evidence that media exposure alone leads to the desired effects. As healthcare expenditure continues to rise, identifying ways of moving health services out of hospitals and treating it instead using home-based solutions is becoming a pressing issue. A variety of responses by the health technology industry include an increasing number of apps designed to make health and wellness monitoring more versatile, cost-effective, and widely available. Patients now have unprecedented access to their health information and treatment options, which enhances choice but raises questions about the credibility and safety of their decisions. mHealth is shortly defined here as any health information service made available via mobile devices.

The design of mobile health applications is informed both by usability standards for mobile health applications and by recent research about the means of implementing patient engagement strategies in healthcare, such as gamification or social media features. The outcomes address user experience, application use, and motivation for healthy behavior change. This evaluation is set within the context of a study encouraging health behavior change through either a fully-featured or a minimal mHealth application. While studies evaluating mHealth applications are becoming more common, few of these consider the broad range of usability aspects needed for mHealth applications to be successfully integrated into users' daily lives. Additionally, more research is needed into the impacts of mobile health engagement strategies on user experience, health behavior change, and health interest among wider populations than those examined by currently existing studies. In summary, a systematic impact evaluation is performed on the usability, influence, and effectiveness of a set of six selected mobile health application engagement strategies.

9. Case Studies on Effective Patient Engagement Strategies

This section highlights two successful case studies of patient engagement strategies in different healthcare settings, analyzing their approaches, benefits, lessons learned, and recommendations for other organizations.

9.1. Hospital A: Remote Monitoring Program

Hospital A implemented a remote monitoring program for patients with chronic conditions like heart failure and hypertension. The program used wearable devices to track patients' vital signs, which were sent to a care team that monitored the data and contacted patients if any alerts arose. The program also included telehealth visits and a patient engagement platform with educational resources and medication reminders.

The program's approach to patient engagement was proactive and personalized, as it anticipated patients' needs and tailored interventions based on their data. The program's benefits included a 40% reduction in hospital readmissions, a 20% decrease in emergency room visits, and a 30% improvement in patient satisfaction scores. Patients felt more supported and empowered to manage their health, and care teams were able to intervene earlier and avoid costly complications.

Hospital A learned several lessons from the program. First, technology alone is not sufficient; strong clinical workflows and staffing models are essential. Second, all patients should have access to a device and broadband, and a secondary device and a data plan should be provided if needed. Third, the program should include a variety of engagement methods, as not all patients are receptive to high-touch approaches. Finally, buy-in from hospital leadership is crucial to providing dedicated resources and funding.

Other healthcare organizations are encouraged to consider similar remote patient monitoring programs, especially for chronic populations. These programs can have significant financial and quality benefits when designed carefully, and a well-coordinated strategy is essential to success.

9.2. Clinic B: Patient Portal Implementation
Clinic B launched a patient portal for its primary care patients to enhance communication, streamline administrative tasks, and improve engagement. The portal allowed patients to schedule appointments, message providers, view lab results, and complete forms online. Clinic B used multiple communication channels to market the portal, such as brochures, posters, staff training, and community events.

The portal's approach to patient engagement was inclusive and supportive, as it provided multiple ways to sign up and use the portal and addressed patients' concerns about technology and privacy. The portal's benefits included 60% of patients signing up for the portal, 80% of users satisfied with the portal, and reduced phone call volume for appointment scheduling. Patients appreciated the convenience and accessibility of the portal, and staff spent less time on administrative tasks.

Clinic B learned valuable lessons from the implementation. First, a multi-channel approach effectively reaches diverse patient populations, as some patients may not see posters in the clinic. Second, providing options for patients with different levels of comfort with technology is essential, such as offering assistance or an alternative to online access. Finally, it is important to allocate time for ongoing training and support for clinical staff, as they are the most engaged with patients and can influence their perceptions of the portal.

Other safety-net clinics are encouraged to implement similar patient portals or electronic health information exchange systems. These tools can help streamline administrative processes and facilitate communication. Engaging patients in the development and implementation is crucial to ensuring success.

9.1. Hospital A: Remote Monitoring Program

Patient engagement is of increasing interest internationally as a means of improving health outcomes and the efficiency of health systems. Hospitals are using different strategies to engage patients in their healthcare, but there is limited evidence on the effectiveness of these strategies on health outcomes. This study explores the effectiveness of patient engagement strategies observed at two hospitals in the Netherlands and Canada. The first strategy involves the implementation of remote monitoring to empower patients with chronic diseases in their care at Hospital A. The second strategy is the introduction of an online patient portal to connect patients and clinicians, enabling patients to be more involved in their own care at Clinic B. Both strategies aim to establish new relationships between patients and their healthcare providers to give patients the opportunity to take on a more active role in their care.

Chronic diseases impact patients' quality of life, longevity, and healthcare resource use. More patients with chronic diseases increase costs and strain healthcare systems. The Affordable Care Act emphasizes improving care while reducing costs. Early detection, post-discharge follow-up, and intervention reduce adverse events. Healthcare delivery needs innovation, with patients self-

managing, interacting with professionals between visits, and using technology for data access and support.

Hospital A is developing a remote monitoring program for patients with diabetes, hypertension, or COPD. Patients can monitor their health data at home, which will be transmitted to a web-based system. The system allows continuous monitoring of chronic diseases, detecting deteriorations and analyzing trends. Healthcare professionals can determine if a patient needs follow-up, reducing post-discharge visits. This program empowers patients to actively monitor their health and contact their healthcare provider before complications arise.

9.2. Clinic B: Patient Portal Implementation

With support from the entire clinic team and Thanksgiving holiday staff training, Clinic B successfully implemented its patient portal one month prior to the scheduled activation date. The following month, the clinic experienced an abrupt transition to a temporary auxiliary clinic. The clinic's ability to pivot to a large temporary model and provide comprehensive care with minimal changes to the existing patient engagement strategies was largely attributable to the groundwork laid during the previous year with the patient portal, CCD exchange, external EHR, and remote monitoring program implementations. These efforts had already connected the clinic with a wider array of healthcare providers and expanded its digital engagement capabilities with patients. Data reports related to changes in the clinic's patient engagement numbers and the retroactive calculation of the clinic's NP-3 quality measures for early 2018 were also provided.

Implementing a single patient portal for both the temporary and original clinics improved the patient experience. During the pandemic, providers from both clinics cared for patients with chronic conditions. Accessing health information from both locations was particularly helpful. Portal engagement was monitored and showed that 54.6% of patients met the measure in February 2019. The changes in engagement metrics were discussed at a later meeting.

Auxiliary Clinic Conversion of Patient Engagement Strategies
Almost Overnight Changes. Expanded Telehealth and e-Visit Services. Public Health Messaging and Educational Materials Distributed through Portal. Increased Email Distribution of Health Alerts. Increase in After-Hours Communication with Patients about Health Reported by Remote Monitoring Devices. Expanded Usage of Issues Feature. Flowchart Monitoring of Care Coordination Related to Lab Results. Adapted to Changes in Health Plans and Insurance Reimbursements for Telehealth Visits. Automated Messages to Encourage Engagement with Stay-at-Home Patients. Implementation of a new Whole-Person Care Quality Measure Supporting Equity-Based Population Health Approaches and Monitoring the Experience of Access to Whole Person Care.

10. Ethical Considerations in Patient Engagement

Implementation of patient engagement strategies may present ethical concerns that should be openly and critically considered when planning patient

engagement initiatives. Two commonly discussed concerns are briefly examined here: privacy and data security, and informed consent.

Patient engagement strategies involve collecting and storing private health information, which is risky due to potential breaches and unintended sharing. This is particularly concerning for marginalized populations. Patient engagement approaches must prioritize privacy and address concerns to ensure participant benefit and protect patient data.

Emerging technologies raise privacy concerns about how private patient and health information is gathered, used, and shared. Concerns about algorithmic bias and discrimination have arisen as software is increasingly used to guide people's access to health services, jobs, schools, and housing. Software decision-making systems can inadvertently reinforce existing structural biases and discrimination, potentially resulting in unfavorable results for some groups. Artificial intelligence (AI) can shape patient experiences with health systems and care access, whether through technologies that diagnose diseases, determine eligibility for services, or nudge patients to one treatment path over another. The design and implementation of AI-related engagement strategies should consider how AI may reinforce inequities in ways that are harmful to patients and, at the same time, how intelligent machines used to engage patients may violate patients' autonomy.

Obtaining informed consent is an ethical requirement for patient engagement strategies. However, using social media or researching interconnectedness in health systems challenges the definition of consent. There is ongoing debate over how to interpret informed consent in different patient engagement innovations. Health literacy differences and complex consent forms hinder understanding. Using standard consent forms may not respect patients' autonomy.

10.1. Privacy and Data Security

As health data is becoming more accessible, the risks to patient privacy are also growing. A recent survey by HealthIT.gov reported that 85% of adult internet users in the United States are concerned with how their health data is used. Yet, there is great interest in leveraging health data to improve health outcomes, and patient engagement strategies often include health-related data sharing by patients. Therefore, it is crucial to integrate privacy and data security considerations into the design of patient engagement strategies.

Privacy researchers have published influential models of the privacy calculus that inform how individuals make privacy-sensitive decisions based on an analysis of the anticipated risk-benefit trade-off of sharing. Informed by privacy calculus, several engagement-specific strategies to protect patient privacy and improve data security can be applied to strategies that require sharing or transferring health data, medication adherence data, chronic condition progression data, and auxiliary social data. Beyond existing research, privacy and data security considerations can also be integrated into the planning or pre-implementation stage of patient engagement strategies at the organizational level and into the

design and implementation stage of patient engagement strategies at the engagement strategy level.

This section, organized by privacy calculus models, presents guidelines for the development of engagement-specific strategies to protect patient privacy and improve data security concerning some common concerns and questions from prospective patients regarding data sharing, including how data derived from patient engagement strategies are collected, used, protected, and retained; what are the potential consequences of data sharing; and how to address potential privacy violations, breaches, or misuse of data.

10.2. Informed Consent

Informed consent is crucial for ethical patient engagement. Patients should have enough information to make decisions about their health interventions. Strategies should inform and involve patients in data sharing. Clear information on participant rights and consulting patients on design and implementation can improve informed consent. Patients need to be informed about how their information will be reused in regional, national, or international data sharing. Enhancing consent procedures can ensure compliance with Research Ethics Board protocols and increase awareness among researchers. Explicit consent can also help patients understand complex interventions, like secondary use of health data. Data sharing is important for health research and evaluation. New knowledge translation strategies are emerging, seeking partnerships with the private sector. All patients should be invited to participate in biomedical research, including vulnerable populations. Ethical concerns may arise regarding the integrity of informed consent procedures.

Patients' involvement in informed consent changes the discussion context from physician-centered to patient-centered. Some patients appreciate being asked about involvement, seeing it as recognition of their autonomy. However, others may feel insecure or interpret it as a request for negotiation. The intention to include patients may be questioned or seen as impossible or undesirable. Patients may view the process as a chance for learning and knowledge construction.

11. Future Directions in Patient Engagement Research

Research on patient engagement is expected to expand into new areas, including innovations in technology and the integration of patient reported outcomes. Innovations in technology, such as AI and VR, allow for non-traditional engagement strategies that enhance patients' understanding of their treatment plans. Additionally, the emergence of gamification and cultural considerations offer new avenues for evaluation. Furthermore, the integration of patient reported outcomes enables the monitoring of health outcomes on a larger scale.specialties and medical practices.

11.1. Innovations in Technology

Innovations in technology offer exciting opportunities for patient engagement that were not previously possible. Multi-sensory technology has the ability to directly

engage patients in ways that traditional text-based or video engagements cannot. Virtual reality games are one exciting possible technology that is being explored with respect to patient engagement. Literature suggests that virtual reality (VR) can be effective for serious engagement strategies, particularly if they tap into the unlimited potential of gaming technology to truly capture the imagination.

Several research groups are investigating whether home-based virtual reality gaming systems can engage patients at the front-end more than have been reached previously with traditional engagement strategies. Relatedly, while technology is currently being developed to automatically transcribe and summarize audio and video patient engagement activities at scale, most existing studies rely on detailed human coding of engagement activities. Recently, automated measures based on facial detection and analysis of audio-visual transcripts have begun to be developed and validated against more traditional forms of coding. Such innovations will greatly lower the time and cost of large-scale computational studies of patient engagement in practice.

However, even with such innovations, coding the engagement behaviors of patients in very large videos is not currently feasible. Hence, computational studies will need to confine themselves to specific groups to be tractable. With respect to the engagement behaviors of patients in very large datasets, there is an exciting gap in the current knowledge that needs to be filled. Machine learning and natural language processing could be combined to identify patient engagement behaviors in video, audio, and text formats, bringing together a range of passive engagement behaviors that have not been previously considered.

Investigating the specific engagement behaviors of patients could help fill gaps in the current knowledge on the role that patient engagement plays on health outcomes. There is a need to better understand what contexts have what effects.

11.2. Integration of Patient Reported Outcomes

Despite the research literature on patient engagement strategy efficacy and the patient experience, studies mainly focus on patient communication and education. There is a need for a holistic perspective on patient-perceived outcomes of satisfaction, health, and well-being. Integrating patient-reported outcomes (PROs) into electronic health record (EHR) systems is crucial to fill gaps in clinical information. Actionable PROs can also be integrated into patient-experience surveys or appointment scheduling efforts. Research funding is needed to evaluate the efficacy of patient engagement strategies on PROs and patient satisfaction, health, and well-being. Better standards are needed to define and measure the patient experience and represent the patient perspective in health system decision-making. The impacts of patient engagement efforts on patient-reported outcomes and their interactions with the healthcare system should be assessed. Understanding the concept of patient-centered care and the implications of patient engagement on health system performance is lacking. Healthcare professionals should provide support and motivation to patients, develop strategies for lifestyle changes, and implement structured programs. Adequate knowledge retention techniques should be used to improve patient participation in lifestyle changes, disease control, and health outcomes.

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