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Themed Section: The Patient Journey

Enhancing Patient Centricity of Real-World Data Research: An Exploratory Analysis Using the Patient Experience Mapping Toolbox

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ABSTRACT

Objectives: There is an increasing expectation that medical product development and assessment be guided by patient input captured through patient engagement. Recently published consensus guidelines describe how qualitative patient experience data (PED) can guide the design, conduct, and translation of real-world research that reflects patients' lived experience. The objective of this exploratory analysis is to examine how researchers could leverage PED captured through the Patient Experience Mapping Toolbox (PEMT) to guide real-world data (RWD) research designs.

Methods: This exploratory analysis included a thematic analysis of interview transcripts collected while pilot testing the PEMT followed by a qualitative analysis of the emerging themes aligned with stages listed in the patient-centered real-world evidence, Real-World Research Design Framework.

Results: PED collected using the PEMT include information about symptomology, interactions with the healthcare system, information-seeking behavior, misdiagnoses, lifestyle changes, treatments, side effects, and comorbidities. This information can be leveraged at key study design decisions, including (1) identifying study cohorts and subgroups, (2) identifying exposures, (3) informing covariates and potential confounders; and (4) refining study periods. Additionally, participants described where they seek information about treatments and diseases, which should inform dissemination strategies.

Conclusions: We identified opportunities for PED collected using the PEMT to inform RWD study designs. The PED described in this exploratory analysis stem from pilot testing of the PEMT across a variety of conditions. In the next phase of development in this area, researchers should evaluate how data collected using the PEMT can be applied to RWD research for a specific disease.

Keywords: observational study, patient-centered care, patient-centered outcomes research, pharmacoepidemiology.

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Introduction

Patients and other healthcare stakeholders increasingly expect medical product development to be guided by patient experiences and products evaluated using patient-centered data (ie, outcomes and impacts import to patients).[1-5] ISPOR defines patient engagement in research as the "active, meaningful, and collaborative interaction between patients and researchers across all stages of the research process, where research decision making is guided by patients' contributions as partners, recognizing their specific experiences, values, and expertise."[6]

Over the past decade, the research community focused on developing and refining approaches to collect high-quality patient experience data (PED), an umbrella term used by the US Food and Drug Administration (FDA) to describe data that (1) "are collected by any persons (including patients, family members and caregivers of patients, patient advocacy organizations, disease research foundations, researchers and drug manufacturers)" and (2) "are intended to provide information about patients' experiences with a disease or condition, including (A) the 'impact (including physical and psychosocial impacts) of such disease or condition or a related therapy or clinical investigation and (B) patient preferences with respect to the treatment of the disease or condition'."[7] The FDA recently released guidances describing methods that can be used to collect patient input.[3] A variety of organizations and multistakeholder collaborations worldwide have established best practices for patient engagement and the hallmark characteristics of patient centricity.[8-11]

Thus, the focus of patient-centered research is shifting from establishing patient engagement methods and best practices to *applying* patient experiences to strengthen the design and impact of research, including real-world studies.[11] Examples of patient engagement guiding outcome selection, measure development, and patient preference studies are increasing.[12,13] Past studies

have demonstrated how relying on external information, for example, patient surveys (eg, Medicare Current Beneficiary Survey or patient registries) or qualitative data collected from patients, can inform and provide justification for study design decisions.[14,15]

Recently, the National Health Council's Patient-Centered Real-World Evidence (RWE) Working Group released consensus recommendations describing "how patient experience data (PED) can be incorporated into the design, conduct, and translation of real-world research that reflects patients' lived experience."[16] The recommendations are organized around a "real-world research design framework," which includes 3 phases: (1) developing a refined research question (eg, literature review, identifying knowledge gaps, and hypothesis), (2) developing a research protocol (eg, eligibility criteria, study period, and confounding), and (3) translation and dissemination.[16] To date, there are no examples illustrating how specific sources of PED could be used to implement the recommendations.

To explore how a real-world source of PED can be used to implement the recommendations, we conducted an exploratory analysis using qualitative PED collected using the National Health Council's Patient Experience Mapping Toolbox (PEMT). The PEMT is a publicly available, disease-agnostic resource for conducting in-depth interviews with individuals diagnosed with a chronic disease.[15,17,18] It includes an interview guide template, patient journey conceptual model, plain language consent form, and instructions.[19] The interview guide template includes a set of questions to engage patients in a dialogue about their experiences before receiving a diagnosis, getting a diagnosis, and living with or treating a chronic disease.[19] Given that the PEMT is designed to collect the same PED across chronic diseases, we expect it may be a valuable source of PED for real-world researchers interested in implementing the patient-centered RWE recommendations across contexts and diseases. The purpose of this article is to describe findings from the exploratory analysis and provide contextual examples of how researchers could leverage qualitative PED collected using the PEMT to guide the implementation of the consensus recommendations for developing patient-centered RWE.

Methods

This project included a thematic analysis of interview transcripts collected while developing and pilot testing the PEMT and a qualitative analysis of the emerging themes aligned with stages listed in the patient-centered Real-World Research Design Framework (RWE Framework), which include (1) developing and refining a research question, (2) developing a research protocol, and (3) translating/disseminating the findings.[14,16] The PEMT interviews were reviewed and deemed exempt from continuing review by Advarra's institutional review board.

Source of PED: Transcripts From PEMT Pilot Testing

Eligible participants were at least 18 years of age, with a self-reported diagnosis of a chronic or potentially disabling condition as defined by the Chronic Conditions Data Warehouse condition categories.[20] Participants were recruited in the United States by a market research firm and compensated in alignment with the Patient Engagement Fair-Market Value Calculator for their participation.[21-24] The recruitment firm emailed invitations, screened participants, and scheduled interviews over the phone. To help participants prepare for the interview, a pre-interview letter was sent providing general information about the interview including the purpose of the study, expected duration, information to have readily available, and tips for participating in the virtual interview.

The purpose of the interviews was to ensure the interview guide template applies to a wide variety of chronic conditions and diverse backgrounds. The interview guide and accompanying visual aid are available online.[19] Although the interview guide questions are disease agnostic, patients respond about their unique experiences living with a specific disease or interactions among comorbid diseases. Interviews lasted approximately 60 minutes and were conducted virtually between January and March 2021. Researchers with qualitative interview experience conducted the interviews (E.O., PhD, female; L.G., PhD, female; K.M., PharmD, female; S.S., BA, female; and R.C., PharmD, male). All interviews were recorded and transcribed.

Qualitative Analysis of the Emerging Themes With the Stages of Real-World Research Design

A thematic analysis was conducted based on stages of the patient journey (experiences before getting a diagnosis, while getting a diagnosis, and living with and treating a chronic disease).[25] The coders (L.G., E.O.) met to discuss, adapt, and confirm themes and illustrative quotes. After a thematic analysis of the PEMT transcripts, researchers experienced in conducting real-world analyses (E.O., M.B., L.G.) discussed how the insights could be incorporated into the design, conduct, and translation of real-world research that reflects patients' lived experience, as outlined by the RWE Framework.[26,27] For this study, we adopted the FDA's definition of real-world data (RWD) and RWE.[28] Results are reported in alignment with the Consolidated Criteria for Reporting Qualitative Studies Checklist for qualitative research.[29]

Results

This analysis relied on transcripts from 30 interviews with patients diagnosed of a variety of chronic conditions and who were diverse in terms of demographic characteristics, geographic location, and insurance type (see Appendix 1 in Supplemental Materials found at https://doi.org/10.1016/j.jval.2022.10.002). The PEMT interview guide template includes questions on more than 30 topics and is available online.[19] For this exploratory analysis, we focused on themes emerging across stages of diagnosis and living with a chronic disease, as well as 3 topics particularly relevant to developing and disseminating patient-centered RWE: life factors (ie, social determinants of health), personal goals and aspirations, and sources of information patients look to. An overview of the topics, emerging themes, and illustrative quotes from the PEMT interviews is presented in Table 1. Separately, we interpreted these topics and themes and identified opportunities to apply them to inform RWD-based research design. Example questions from the PEMT interview guide, additional illustrative quotes, and potential implications for RWD research designs are summarized in Table 2.

The first section of the PEMT interview guide asks patients to describe their experiences first noticing signs or symptoms, how they attempted to manage symptoms, and how symptoms affected their daily routine, work, and family life. Given that patients were diagnosed with different chronic diseases, symptoms varied significantly (eg, seizures among individuals ultimately diagnosed of epilepsy, skin sensitivity described as "it literally felt like nails coming at me" among patients with fibromyalgia, and vision and light sensitivity among patients with multiple sclerosis [MS]).

Participants also described delays, sometimes for years, before seeking a diagnosis, even after noticing symptoms. During this period, many participants attempted to self-manage their symptoms. Importantly, many of the strategies used by patients to cope

Table 1. Emerging themes and illustrative quotes.

Topic	Theme	Illustrative quote
Information seeking	Google	"I do a lot of Googling. I do a lot of looking it up on my own. But if I don't have the answer, I do have an app where I can message my neurologist, personally, and I get her nurse and they come right back to me with an answer."
	Patient groups	"I was on the web, on all those different websites reading as much as I can just trying to learn as much as much as I can. I reached out to the local MS Society looked for what type of groups, types of support and volunteering there was. One of the things that probably helped me the most is, I started doing some of the volunteer work."
	Scientific literature	"I had to go look at medical journals."
	Healthcare providers	"I got booklets and pamphlets and of course I saw my doctor every three months, which I still do. They had to educate me on how to make sure to take care of myself, to stay healthy, to do my treatments every day, and to take my medicine every day."
Goals and aspirations	Playing the role in the familial unit	"Moms are supposed to be a supermom and make it all better for them and now it's kind of turned the other way. When I'm down. They come for me and stay with me."
	Ability to remain a caregiver	"That's my biggest thing is that I just, I have to be able to be the mom and that's my biggest worry is that I can't be the mom and now it's time to take care of my dad."
		"I live with my mother who's 81 and my father is in assisted living so I take care of and manage his finances and business."
	Independence	"My hopes and aspirations are that I can live pain free at least. […] just to see my grandkids grow up […] I don't want to go to a nursing home that scares me. I don't want to go."
		"Even though I still hope for a full-time job I've accepted the fact that I might have to settle for a part time job for a little bit until I can get myself mentally and physically more stable. But for the most part they've stayed the same, my goal has always been to live independently and hopefully that's still a possibility."
	Live to an old age	"They keep coming out with medications to make me live longer [..] So that's my goal in life to live to be old hopefully."
Life factors	Family and support system	"Having family support at home, whether it's parents kids, the husband or wife, I think that's, that's a very, very important thing."
	Work and Student life	"My depression gets really bad and my anxiety gets really bad. Now I don't go. Now I can't even think about going to work because it makes me anxious to think about doing that."
	Housing and transportation	"I think the hardest part was[…] not having transportation. At that point, I lost my car. I couldn't drive because I was terrified of driving for a while."
	Healthcare—relationships	"The hardest part was actually find a doctor that actually cares and that was really going to try to like pictures of problem and not just for the money and stuff like that."
		"Navigating the healthcare system – it's very hard to navigate the healthcare system."
	Insurance and access to care	"I can never get my insurance back because I couldn't maintain [my work as an] electrician because of the pain[…]I didn't have insurance to go see a doctor and it took me a while."
	Mental health	"I developed medical PTSD so my mental health is not great. I am struggling very hard with my mental health when it comes to my chronic illnesses."
		"A lot of the times [the psychologists] are dealing with maybe people that had a traumatic experience but that traumatic experiences over. So now, they can go work through it, but how do you work through something that's constantly going to be with you for the rest of your life and you literally can't change it? […] What I have learned is it is very hard for mental health professionals to grasp and treat."
	Finances and other conditions	"I really don't have the finances to pay, but I'm trying, because I know it's something that I need. And I feel like when you don't have insurance, it is not discrimination, but medical people want you to have insurance because they know the cost of medication."

MS indicates multiple sclerosis; PTSD, post-traumatic stress disorder.

Table 2. Patient insights and implications for RWD study design.

Symptoms: Could you please tell me more about your symptoms? What did they feel like? How did you try to manage your symptoms? How did your symptoms affect your daily routine, work, family, or hobbies?	
Illustrative quote from Patient Interviews	"My vision got real bad. I never wore glasses but then I was having vision problems for a couple months and then it would go away. I would have pain and numbness to my legs for about a month or two and then it would go away. Because I work the shift work, I just thought maybe I'm just tired, maybe I'm just overdoing it at work."
Implications for RWE researchers	• Study cohort identification • Exposure • Covariates and confounders
First interaction with healthcare system: Once you decided to seek care, could you tell me about where you went first (eg, clinic, hospital) and how you ended up there (eg, did you have an appointment with a provider for a wellness visit or a visit for an unrelated condition, were you taken to the emergency department)?	
Illustrative quote	"I took a nap and my wife panicked because she's like he never takes a nap so she called and made an appointment right then and there to go see my primary care doctor. And so I went and I explained all my symptoms. I said, Hey, you know, for the last year, I keep losing weight, I'm not sleeping, I have night sweats, and a lot of body aches. So my doctor said, Well, I'm not alarmed by everything because you're still in the normal range, you have the energy to go to work and go to the gym still. Let's order blood work. Let's not panic until we need to. So he ordered bloodwork I had it done and the lab lost my blood work." "I'm going to say like about five years I was having symptoms before I tried going to a doctor and they didn't do anything. A lot of doctors are very, very overworked and you get five minutes of actual talk time. You got five minutes with the doctor, and some doctors listen. Most do not, in fact some are slightly on the arrogant side and they will take in and basically brush off, whatever your concerns are and you know minimalize, whatever your symptoms are and explain it away with something that you know quite often is very, very unsatisfactory and not a good answer. So you know I just got to the point where I stopped going to the doctor because he didn't diagnose me."
Implications for RWE researchers	• Target population • Study period • Hypothesis generating
Understanding and information gathering: Did you feel like you left the office/emergency department/hospital with an understanding of [condition] or what the next steps were for [add from list below]? Why or why not? • Confirming the diagnosis • Getting treated • Seeing a specialist • Where to look for information	
Illustrative quote	"The doctor didn't tell me anything, which was very frustrating, but the diarrhea continued and I ended up going to a gastrointestinal doctor."
Implications for RWE researchers	• Preliminary research questions • Gaps in knowledge • Dissemination
Misdiagnoses: Did any of the providers you saw give you a diagnosis that was later changed—in other words, did you find out you had a different condition than you were first told? What made the provider change your diagnosis? Please tell me about how that impacted your experiences.	
Illustrative quote	"I first was diagnosed with rheumatoid arthritis, but I was already having some other issues. So my rheumatologist, when I was sent to him, he kind of evaluated everything and so he mentioned in the beginning when I first got diagnosed with rheumatoid arthritis, that some of the things that I was describing sounded more like fibromyalgia. He was going to just kind of wait to see how we would proceed depending upon you know my symptoms and how I was doing."
Implications for RWE researchers	• Gaps in knowledge • Inclusion and exclusion • Study period
Lifestyle changes: During the time when you were still trying to get a diagnosis, did you try any treatments prescribed by a healthcare provider? What, if any, lifestyle changes did you try? Could you please describe them for me? For example, exercise or diet changes.	
Illustrative quote	"Looking after my original the diagnosis right in the beginning, I did start eating better. I do smoke, and I did quit one time for probably about two years, but then started back up again."
Implications for RWE researchers	• Exposure • Covariates/confounders
Treatments and side effects: Could you please tell me about any treatments you tried for your [condition], but have stopped? What made you decide to stop the treatment?	
Illustrative quote	"It was a daily shot that I had to for a little less than a year[..] after adding the medicine for that time and it was still showing new and active lesions, so we switched that. They were going to put me on infusions but we had to wait for insurance to approve it. So they put me on just a daily pill. It wasn't didn't work out good at all. I had some bad side effects from that one. I was on that for roughly three months. There was a lot of flushing and like a lot of like burning after I would take it and pins and needles and the numbness feeling. It was it was extremely painful and for how active my MS was, it wasn't going to be strong enough, I think." "I mean the finances, tremendously, because for every hospital stay the medical bills went up a lot. That was more stress. […] The finances affect your mental health." "It's very hard for me to tell you what the side effects are because I take so many medications they all kind of have side effects. They all kind of make me a little tired, make me not that hungry, and sometimes they do unfortunately make me a little nauseous."

Table 2. Continued

Implications for RWE researchers	• Exposure • Potential outcomes • Covariates/confounders
Multiple chronic conditions: If you have more than one chronic condition, how do you coordinate your care for these conditions? How has having multiple chronic conditions affected your treatments? Do your providers communicate with each other and coordinate your care when exploring treatment options?	
Illustrative quote	"That was why I switched to Kaiser and I got tired of my doctors not talking other, having to transfer records all the time or having to bring my records with me so I converted there where everybody has access to everything." "It's to the point now that I've had MS so long, I don't know what is being caused by the MS or because of my old age, what has been caused by the diabetes, or what is being caused by the high blood pressure. Because I've got numbness in my legs and pain is that from the sugar or is it because I have MS. The joint pain is that arthritis or is it the MS or is it me working so hard that I need things replaced. You know when I was younger, that's the part it's very confusing as to what your MS is doing versus what might be symptoms that are the other problems that I have like a diabetes.[..] Like some people have arthritis so they treat the arthritis. Some people have got high blood pressure, so they treat the blood pressure, or some people have diabetes and treat the diabetes, or some people have MS and treat the MS. But when you combine them all together, you don't know what you're treating." "I was officially diagnosed then because I started to have a lot more problems due to my other medical conditions, I guess, they just kind of glazed over it and just kind of chalked up the symptoms to my other issues. But my symptoms got worse within the past several years, so I decided to seek a specific professional and he was the one that officially gave me a diagnosis and is treating me."
Implications for RWE researchers	• Hypothesis generation • Covariates • Subgroups

RWE indicates real-world evidence.

with symptoms are traditionally unmeasured in administrative data. For example, patients used over-the-counter treatments (eg, ibuprofen) or alternative medicine (eg, acupuncture, chiropractor) and lifestyle changes, such as diet and exercise (eg, water aerobics and yoga). Other patients delayed seeking care for symptoms because they wanted to "wait and see" if symptoms improved.

Finally, participants described experiences that led them to seek a formal diagnosis. This was often the result of pressure from concerned family members or worsening symptoms. For example, one patient who was diagnosed with postural orthostatic tachycardia syndrome described how the increasing severity of symptoms pushed them to seek a diagnosis, "So I get really dizzy and lightheaded and my vision blurs sometimes and I feel like I'm going to pass out. Over the years, I kind of got used to the lightheadedness and I chalked it up to my other issues [comorbidities]. But when I started throwing up, that really like did me in. That's when I decided to really push for the diagnosis and push for the treatment because I just couldn't handle the vomiting anymore."

The second section of the PEMT interview guide queries patients about their experiences after entering the health system, either because they experienced symptoms and sought care or as part of a routine healthcare visit that identified "something wasn't right" (eg, laboratory test or clinical sign). For some patients, seeking a diagnosis was very fast or occurred in childhood (eg, sickle cell disease). Other patients described how it can take many years to receive a diagnosis even after actively seeking care. Several participants stated that healthcare providers that they spoke to did not recognize the symptoms as being a chronic disease. Others experienced a lengthy journey to diagnosis because they required numerous tests or procedures to confirm a diagnosis. During this stage of the interview, patients often stated that they left their provider with a limited understanding of the condition. They highlighted fears related to the treatment and progression of the condition and the effects these would have on their mobility, functionality, and lifespan.

Another challenge identified by patients was misdiagnosis. For example, one participant described experiencing a headache for more than 6 months in high school and receiving a diagnosis of anxiety. Upon relocating to a city with better access to specialists, they were diagnosed of a migraine disorder and received effective treatment. Understanding the context around the onset of symptoms, misdiagnoses, and what ultimately led to patients to seek a diagnosis may assist researchers in refining the study period, including washout periods, and the appropriate target population.

Insights about patient experiences related to symptom onset and early experiences seeking a diagnosis can be leveraged by real-world researchers to (1) identify study cohorts and subgroups, (2) identify exposures, (3) inform covariates and potential confounders, and (4) refine study periods.

The third section of the interview guide relates to patient experiences after receiving a diagnosis, including how symptoms change over time, experiences trying different treatments, and outcomes they experienced. Across diseases, patients highlighted the important and often confusing effect of aging and comorbidities on treatment decision making. This can complicate treatment decision-making because of contraindicated treatments. It can also delay the diagnosis of newly presenting conditions and increase the treatment burden. For example, one patient who was ultimately diagnosed of MS stated that his primary care physician was "not concerned" with treating his MS, instead focusing on treating his comorbid hypertension and diabetes given that these were considered more likely to cause a serious adverse event.

Patients also reported how stigma can be a barrier to seeking care for a disease. For example, being accused of "drug-seeking behavior" when attempting to treat pain. These experiences highlight outcomes for researchers to evaluate and provide insights into potential covariates or confounders. This information may also inform interpretation of studies about utilization, especially factors affecting treatment initiation and adherence.

Throughout each section of the interview guide, participants are queried about how "life factors" affected their experiences across stages of disease and diagnosis. In the PEMT, "life factors" refer to family and support system, work or student life, geography, housing, and transportation, insurance and access to care, mental health and other health conditions, finances and costs, ethnicity, age, or gender. Given that these are often unmeasured in traditional data sets, questions about life factors are particularly relevant for real-world researchers.

Patients described how the health system, including insurance, affects mental health and adherence to care plans. For example, one participant stated that finding healthcare providers who accept their health insurance is a barrier, "Sometimes you just get to the point where you're just like so stressed out that you don't even want to look for the diagnosis and deal with the treatment and stuff because you just get so stressed out by the healthcare system."

Additionally, participants described how living with a chronic disease negatively affects their career or ability to work, which in turn can affect insurance access (ie, employer-based health plans). Participants with disease onset earlier in life also described negative impacts on their education. Others described how a lack of transportation or insurance complicated their experiences. Participants with particularly severe diseases explained how their lives primarily revolve around their treatment. For example, one participant with cystic fibrosis and other comorbid conditions described having undergone 36 surgeries to date. Participants with children often stated that their primary goal with treatment was "being there" for their children. Others emphasized maintaining their ability to work or living to old age.

Because the interviews took place during the COVID-19 pandemic, patients described their experiences with telemedicine. In general, their experiences with telemedicine were positive, but several participants stated that they looked forward to going back to see their healthcare providers in person as soon as it was safe to do so.

When researching symptoms or their chronic disease, participants described looking to the internet, patient advocacy groups, the scientific literature, and directly from their healthcare providers. In some cases, participants described finding other patients with the same diagnoses online and learning from their experiences. Understanding where patients access information is useful in crafting a dissemination strategy. It highlights the need to publish studies open access and, ideally, alongside a patient-friendly summary.

Discussion

This exploratory analysis demonstrates how qualitative information collected using the PEMT can inform real-world study designs and dissemination strategies. We found that the PEMT is a particularly useful resource for understanding symptomology, sequence of events surrounding disease onset and experiences within the health system, and, finally, experiences living with and treating chronic disease. Qualitative PED collected using the PEMT provide context that is not available in traditional real-world databases but is relevant when defining study exposures, covariates, confounders, and other key study design elements. The PED described in this exploratory analysis stem from pilot testing of the PEMT across a variety of conditions. Nevertheless, it is also important to note that the PEMT can be adapted to specific chronic conditions and inform condition-specific factors needed to enhance RWD research.

Data collected using the PEMT can help researchers understand context around healthcare utilization not captured in administrative medical and pharmacy insurance claims and electronic medical/health records, which are commonly used for health outcomes and other RWE research. For example, patients report the use of various treatment strategies for symptom management before and after the receipt of a diagnosis, including the use of holistic treatments (eg, massage treatment, dietary changes), can identify study cohorts, exposures, and inform covariates and aid in hypothesis generation. These treatments are not captured within commonly used healthcare databases yet should be considered in RWE studies.

Similarly, data collected through the PEMT can aid in identifying important potential unmeasured confounders and help understand unmeasured confounder distributions between treatment groups in comparative effectiveness research. In the absence of randomization, health outcomes studies using large administrative healthcare databases are prone to confounding especially related to important risk factors not captured in these databases.[30] These may include, depending on the research question, smoking status, alcohol use, over-the-counter medication use, and educational and financial status. There are existing frameworks on methods to conduct adjustment of suspected unmeasured confounders of using external information (eg, information external to the main study data source).[15,31] Although using the PEMT to engage a small sample of individuals with a specific chronic disease can identify early insights about potential confounders, engaging a larger population more representative of the target patient population would be necessary to provide reliable information about confounder distributions. This may be more easily achieved by advancing other efforts to gather patient-reported data. For example, there are a growing number of creative mechanisms to collect patient-reported data as part of routine care, especially in countries with nationalized health systems and robust patient registries.[32] In the United States, the Agency for Healthcare Research and Quality recently funded a multiyear effort to explore clinical decision support tools, including advancing trust, interoperability, measurement/value, and partnership with patients.[33] This initiative could be an opportunity to more systematically collect PED while driving patient-centered care delivery transformation. In parallel, there is a significant effort among RWD asset managers and data stewards who are responsible for the access and transformation of their respective RWD to apply emerging artificial intelligence technologies. These artificial intelligence technologies can include text mining that uses natural language processing techniques, to harness and transform unstructured data, such as free-text narratives written by clinicians.[34] Likewise, electronic health record and medical records could be enhanced by creating entry fields to capture patient narratives about a subset of patient experience mapping questions. This may be an approach to overcome another challenge of applying the PEMT, which is that it requires significant time and effort to first conduct the interviews and then analyze the transcripts.

One area where PED, such as those collected using the PEMT, can be particularly useful for real-world researchers is in understanding life factors that can affect outcomes and utilization. Because they have an excellent capture of dispensed prescription drug use, large, automated healthcare databases are frequently used to assess medication adherence patterns, for example, duration of use, and time to treatment discontinuation. Nonetheless, claims databases usually have limited data on reasons for treatment discontinuation, including medical and nonmedical

reasons.[18] Cost-related medication nonadherence is a common nonmedical reason for delaying initiation of or discontinuing. Finances were also cited as an important reason for delayed diagnosis. Depending on the study question and disease area/indication, other variables such as occupation, number of jobs, number of hours of work per week, time between diagnosis and treatment initiation, time between symptom recognition and diagnosis, and distance to provider can act as proxies for uncaptured patient experience that can affect utilization and outcomes.

Finally, although this exploratory analysis focused on the potential uses of PED captured using the PEMT to guide analyses of RWD, there are a myriad of potential other uses for these data within a regulatory or health technology assessment context. For example, questions in the PEMT could assist researchers in developing new outcome measures, inform patient preference studies, and support premarket and postmarket regulatory decision-making tools.

Limitations

This study is an exploratory analysis that relied on transcripts from interviews with 30 patients with chronic disease. The data are not generalizable to all patients, for example, individuals with severe hearing loss or who are uncomfortable with one-on-one interviews. The interviews were conducted during pilot testing of the PEMT, and the purpose was not to gather representative data about a single chronic disease. Therefore, many of the themes discussed in this analysis relate to general experiences with treatment and the health system rather than patient experiences with specific treatments or procedures. Nonetheless, the findings provide a starting point to illustrate how PED collected using the PEMT can augment and enhance existing traditional RWD sources for patient-centered research.

Conclusion

Patients and other healthcare stakeholders increasingly expect patient-centered research and healthcare delivery. Therefore, there is significant interest in gathering high-quality data on patients' experiences, priorities, and desired outcomes and to apply those insights to research designs. In this exploratory analysis, we identified a number of opportunities to leverage PED collected using the PEMT to inform real-world study designs. In the next phase, researchers should evaluate how data collected using the PEMT can be applied to RWD research for a specific disease.

Supplemental Material

Supplementary data associated with this article can be found in the online version at https://doi.org/10.1016/j.jval.2022.10.002.

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REFERENCES

1. Lowe MM, Blaser DA, Cone L, et al. Increasing patient involvement in drug development. *Value Health*. 2016;19(6):869–878.
2. Elvsaas IKØ, Ettinger S, Willemsen A. Patient involvement in relative effectiveness assessments in the European Network for Health Technology Assessment. *Int J Technol Assess Health Care*. 2021;37:e24.
3. FDA patient-focused drug development guidance series for enhancing the incorporation of the patient's voice in medical product development and regulatory decision making. Food and Drug Administration. https://www.fda.gov/drugs/development-approval-process-drugs/fda-patient-focused-drug-development-guidance-series-enhancing-incorporation-patients-voice-medical. Accessed April 29, 2019.
4. Summary of stakeholder engagement to support the development of ICH (E6)R3. International Council for Harmonisation. https://admin.ich.org/sites/default/files/2020-05/E6-R3_PublicEngagemenSummary_2020_0421.pdf. Accessed September 15, 2020.

5. Regulation (EU) no. 536/2014 of the European Parliament and of The Council of 16 April 2014 on clinical trials on medicinal products for human use, and repealing directive 2001/20/EC. European Parliament and The Council of the European Union. https://ec.europa.eu/health/sites/default/files/files/eudralex/vol-1/reg_2014_536/reg_2014_536_en.pdf. Accessed September 9, 2021.
6. Harrington RL, Hanna ML, Oehrlein EM, et al. Defining patient engagement in research: results of a systematic review and analysis: report of the ISPOR patient-centered special interest group. *Value Health*. 2020;23(6):677–688.
7. Patient-focused drug development: collecting comprehensive and representative input. U.S. Food and Drug Administration. http://www.fda.gov/regulatory-information/search-fda-guidance-documents/patient-focused-drug-development-collecting-comprehensive-and-representative-input. Accessed May 29, 2019.
8. The patient engagement quality guidance. Patient-Focused Medicines Development. https://patientfocusedmedicine.org/the-patient-engagement-quality-guidance/. Accessed June 20, 2019.
9. Perfetto EM, Oehrlein EM, Schoch S, Love TR. The National Health Council rubric to capture the patient voice: a guide to incorporating the patient voice into the health ecosystem. National Health Council. https://www.nationalhealthcouncil.org/Patient-Engagement-Rubric. Accessed August 13, 2019.
10. Sheridan S, Schrandt S, Forsythe L, Hilliard TS, Paez KA. Advisory Panel on Patient Engagement (2013 inaugural panel). The PCORI engagement rubric: promising practices for partnering in research. *Ann Fam Med*. 2017;15(2):165–170.
11. Patient involvement in the development, regulation and safe use of medicines. Council for International Organizations of Medical Sciences. https://cioms.ch/working-groups/working-group-xi-patient-involvement/. Accessed March 25, 2022.
12. Forsythe LP, Ellis LE, Edmundson L, et al. Patient and stakeholder engagement in the PCORI pilot projects: description and lessons learned. *J Gen Intern Med*. 2016;31(1):13–21.
13. Patient-focused medical product case examples. National Health Council. https://nationalhealthcouncil.org/additional-resources/patient-focused-medical-product-case-examples/. Accessed September 2, 2021.
14. Oehrlein EM, Perfetto EM, Schoch S. Patient-centered real-world evidence: methods recommendations from an evidence-based consensus process. National Health Council. https://nationalhealthcouncil.org/patient-centeredrwe. Accessed October 6, 2021.
15. Stürmer T, Glynn RJ, Rothman KJ, Avorn J, Schneeweiss S. Adjustments for unmeasured confounders in pharmacoepidemiologic database studies using external information. *Med Care*. 2007;45(10 suppl 2):S158–S165.
16. Oehrlein EM, Schoch S, Burcu M, et al. Developing patient-centered real-world evidence: emerging methods recommendations from a consensus process [published online July 18, 2022]. Value Health. https://doi.org/10.1016/j.jval.2022.04.1738.
17. Bourke A, Dixon WG, Roddam A, et al. Incorporating patient generated health data into pharmacoepidemiological research. *Pharmacoepidemiol Drug Saf*. 2020;29(12):1540–1549.
18. Okun S. The missing reality of real life in real-world evidence. *Clin Pharmacol Ther*. 2019;106(1):136–138.
19. Oehrlein EM, Schoch S, Majercak K, Gressler LE, Perfetto EM. National health council patient experience mapping toolbox. National Health Council. https://nationalhealthcouncil.org/resources/patient-experience-map. Accessed March 14, 2022.
20. Condition categories. Chronic Conditions Data Warehouse. https://www.ccwdata.org/web/guest/condition-categories. Accessed April 24, 2019.
21. Miles MB, Huberman AM. *Qualitative Data Analysis: An Expanded Sourcebook*. Thousand Oaks, CA: SAGE Publications; 1994.
22. van Rijnsoever FJ. (I Can't Get No) Saturation: a simulation and guidelines for sample sizes in qualitative research. *PloS One*. 2017;12(7):e0181689.
23. Dworkin SL. Sample size policy for qualitative studies using in-depth interviews. *Arch Sex Behav*. 2012;41(6):1319–1320.
24. Fair-market value calculator. National Health Council. https://nationalhealthcouncil.org/fair-market-value-calculator/. Accessed March 14, 2022.
25. Saldaña J. *The Coding Manual for Qualitative Researchers*. Thousand Oaks, CA: SAGE Publications; 2016.
26. Oehrlein EM. RWD research design framework. National Health Council. https://nationalhealthcouncil.org/wp-content/uploads/2021/07/NHC_RWD-Research-Design-Framework-Final.pdf. Accessed March 24, 2022.
27. Oehrlein EM, Burcu M, Hendricks-Sturrup R. Patient-centered real-world evidence: consensus recommendations & use cases. National Health Council. https://nationalhealthcouncil.org/events/patient-centered-real-world-evidence-consensus-recommendations-use-cases/. Accessed August 26, 2021.
28. Real-world data (RWD) and real-world evidence (RWE) are playing an increasing role in health care decisions. Food and Drug Administration. https://www.fda.gov/science-research/science-and-research-special-topics/real-world-evidence. Accessed March 24, 2022.
29. COREQ (Consolidated criteria for reporting qualitative studies) – guidelines for reporting health research: a user's manual. Wiley Online Library. https://onlinelibrary.wiley.com/doi/10.1002/9781118715598.ch21. Accessed December 17, 2021.
30. Asche CV, Seal B, Kahler KH, Oehrlein EM, Baumgartner MG. Evaluation of healthcare interventions and big data: review of associated data issues. *Pharmacoeconomics*. 2017;35(8):759–765.
31. Schneeweiss S. Sensitivity analysis and external adjustment for unmeasured confounders in epidemiologic database studies of therapeutics. *Pharmacoepidemiol Drug Saf*. 2006;15(5):291–303.
32. Nelson EC, Dixon-Woods M, Batalden PB, et al. Patient focused registries can improve health, care, and science. *BMJ*. 2016;354:i3319.
33. AHRQ funds clinical decision support innovation collaborative. Healthcare Innovation. https://www.hcinnovationgroup.com/clinical-it/clinical-decision-support/news/21252876/ahrq-funds-clinical-decision-support-innovation-collaborative. Accessed March 25, 2022.
34. Koleck TA, Dreisbach C, Bourne PE, Bakken S. Natural language processing of symptoms documented in free-text narratives of electronic health records: a systematic review. *J Am Med Inform Assoc*. 2019;26(4):364–379.