BMJ Health & Care Informatics

Patient perceptions and interactions with their web portal-based laboratory results

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To cite: Robinson S, Reed M, Quevillon T, *et al*. Patient perceptions and interactions with their web portal-based laboratory results. *BMJ Health Care Inform* 2019;**26**. doi:10.1136/bmjhci-2019-000012

Received 31 October 2018
Revised 24 December 2018
Accepted 25 December 2018

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ABSTRACT

Background The movement to improve patient-centred care, combined with the development of user-friendly technology has led to the spread of electronic patient portals (EPP). Little research has examined the effects of providing patients with access to their laboratory results on their healthcare and health behaviours.

Objective The purpose of this study was to gain insight into the use of EPPs, understand why patients use EPPs to access their laboratory results and explore its impact on their health.

Method Semistructured interviews were conducted with 21 patients who used the laboratory results section of an EPP. Interviews were analysed using a grounded theory approach.

Results Participant interactions with their laboratory results varied based on their level of understanding of their results. Benefits of EPP-based access to test results included convenience, fewer appointments and decreased anxiety. Some participants described increased engagement in their healthcare and positive health changes. However, some were concerned about receiving alarming test results.

Conclusion Healthcare providers using EPPs to provide patients with their test results should try to ensure their patients understand their test results. Patient comprehension of test results may be improved by having providers comment on the meaning of test results and by encouraging patients to use specific websites and search options within EPPs.

Summary

What is already known?

- EPP-based test results may help make patients better prepared for appointments, more aware of their health and increase their motivation to engage in positive health-related behaviours.
- Concerns about EPP-based test results include patients having difficulty understanding their test results and experiencing increased anxiety.

What does this paper add?

- Physician comments on test results may help to relieve patients' anxiety and improve their understanding.
- Participants varied in their understanding of their test results, with some seeking additional information about their test results.
- Some participants were concerned about receiving alarming test results without context and felt concerning test results may be better provided in person.

INTRODUCTION

Electronic patient portals (EPP) are websites allowing patients to view their laboratory results, schedule appointments, message their providers and refill prescriptions.[1–3] These tools have the potential to increase administrative efficiency, and productivity,[1] as well as patient engagement,[4 5] empowerment[4] and motivation.[6] This may lead to more productive office visits,[6] improved self-care[5] and greater satisfaction with care.[5 7] While EPPs have the potential to improve quality and access to care, few studies have examined the effects of providing patients access to their laboratory results on EPPs from the patient's perspective.

Providing patients with their laboratory results via an EPP enables them to monitor their results[6 8] and gauge the status of their health.[6] In this way, EPPs may promote earlier interventions when there is a problem or deviation from normal health. Likewise, providing patients with their laboratory results enables them to educate themselves on their condition[6] and prepare questions for their provider.[8] An additional benefit is that patients report improved retention of their test results via EPPs compared with receiving test results over the phone or in person[6 9] and quicker access to their results.[10] This has the potential to improve health outcomes due to quicker intervention.

Despite the benefits of EPP laboratory results, physician concerns include increased patient anxiety[8 11] and being uncertain if patients understand their results.[6] Additionally, concerns may be raised about where patients are getting information about their test results when they do not understand

them. In order to justify the acceptance of the laboratory result feature of many EPPs, their effects and patient use need to be better understood.

Many patients have difficulty understanding their test results.[6 10 12] A significant negative correlation has been found between anxiety and comprehension of results,[10] leading to concerns about test results causing anxiety. However, other studies have reported mixed findings about patient access to test results via EPPs and anxiety.[2 8 10 11] Thus, more research is needed to understand the effects of patient access to test results on anxiety. This would enable EPPs to be designed and implemented in a way that will avoid causing patients anxiety. Some physicians believe that quick interpretations of the results eliminate patient anxiety,[8] as patients may better understand their results. Nevertheless, to our knowledge, no research has examined if physician comments on test results have improved patient understanding and reduced anxiety.

Despite the identified benefits of providing patients with access to their laboratory results via EPPs, its effects on their health and health behaviours remain unclear. This study seeks to gain insight into the use of the myCARE patient portal at the Group Health Centre (GHC), understand why patients use myCARE to access their laboratory results, how they interact with their EPP-based test results and determine its impact on their health and healthcare.

METHODS

Study location

This qualitative, cross-sectional examination of interview data was conducted at the GHC in Sault Ste Marie, Ontario, Canada. The GHC uses an EpicCare Electronic Health Records System, with an associated EPP called myCARE.

Participants and recruitment

Adult patients of one primary care physician were recruited to participate in the study from July to October 2017. Aggregate data from the GHC database were used to identify patients active in myCARE. An electronic message was sent to these patients (n=618) from a third-party myCARE administrator inviting them to participate in the study. Patients who responded (n=37) were asked for consent to access their charts to determine if they met the inclusion criteria of having actively used the myResults feature of the myCARE patient portal. Those who met the criteria and consented to participate (n=26) were sent further information on the study and were invited to be interviewed. Patients (n=21) were scheduled interviews at their convenience (table 1).

Table 1 Participant demographics

Age (years)	Female (%)	Male (%)	Total (%)
18–49	1 (4.8)	0 (0)	1 (4.8)
50–59	3 (14.3)	1 (4.8)	4 (19.0)
60–69	4 (19.0)	4 (19.0)	8 (38.1)
70–79	0 (0)	5 (23.8)	5 (23.8)
≥80	1 (4.8)	2 (9.5)	3 (14.3)
Total	9 (42.9)	12 (57.1)	21 (100.0)

Data collection and analysis

Informed written consent was obtained to participate and be audio recorded. Semistructured interviews were conducted in person between September and October 2017, which included questions about use of the portal, reception of test results and changes in their healthcare experience as a result of the EPP.

Grounded theory analysis was used as its inductive nature makes it well suited for understanding healthcare experiences. Integration of concepts developed from patient interviews with the researchers' interpretation creates a theoretical framework that is grounded in patients' experiences.[13] This ultimately captures the subjective reality of EPP-based test result users.

Grounded theory analysis was completed concurrently with data collection. Two members of the research team independently conducted open line-by-line coding of each transcript, where data were broken down into keywords and phrases. Axial coding was then used, grouping similar codes together. Finally, selective coding was used, creating higher level themes/categories.[14] Data collection occurred until saturation, when no new themes emerged.

RESULTS

Category 1: uses of myCARE

Theme 1: reasons for signing up

Participants signed up because they could view their information, thought it was convenient, progressive and would lead to improved communication, were engaged in their care and their physician encouraged them to sign up. One participant stated, 'it seemed like an opportunity to have a better communication with [the doctor]' (A116). A second stated, 'um, number one, um, [my physician] encouraged it. Um, number two… to be able to access it online, um, just seemed like a convenience to me' (A113). A third participant stated, 'I want to be the steward of my own health, basically. And I like having uh information accessible, I like being able to go back and look at it' (A120). Another participant added, 'I thought this was the way we need to move forward… I'm doing all sorts of stuff online' (A126).

Theme 2: types of test results viewed

Participants varied from viewing many results to viewing few results. Participants viewed results for all tests ordered, imaging, blood work and screening results. One participant stated, 'whatever the doctor orders, I look at them all' (A101). Another participant added that they view 'anything from a blood test to… the last thing I looked at

was breast screening' (A105). Others added that they view 'blood, um, x-rays, MRIs…' (A113).

However, participants varied in terms of their health status, from those who were healthy with minor problems, to those requiring screening and those managing chronic illness. One participant stated, 'I've had really good health. I got a couple little issues that are, you know just sort of typical as you get older but they're not major' (A115). Another participant stated, 'I'm… borderline everything' (A117).

Category 2: interaction with the myCARE system

Theme 1: user-friendliness

Participants felt it was user-friendly and secure; however, there may be a learning curve. Users in our study ranged from being computer literate to computer illiterate. However, participants suggested those who are computer illiterate may have issues using myCARE. One participant stated, 'it's like any new application, when you first signed in it was all new, so you're kinda, you know looking at the header and seeing ok where are the links and what do I need to click on… Now that I've used it extensively I have no issues at all, I find it quite user-friendly' (A115). Another participant added, 'if a person is not computer savvy, it would probably be a good idea that maybe have a quick little tutorial on it to show people how to use it… I think that probably would help uh the users that are not really computer savvy' (A101).

Theme 2: improvements to myCARE features

Participants ranged from thinking no features need improvement, to wanting more physicians and healthcare institutions to use myCARE, to experiencing glitches. For example, one participant explained that they faced 'no [issues], I've used every [feature]… I can't see any improvement really' (A102). Another participant added, 'I would like to have my other doctors included in the system as well. I have my family doctor now, and I have two other regular doctors I see… if they could be on the system as well because I have more tests through them' (A129). Other participants stated that they would like access to their X-ray images, and to receive confirmation that their physician viewed their test results and messages.

While most participants were willing to pay to use myCARE, some were not willing to pay. One participant stated, 'I'd even be willing to pay a monthly fee to keep it going. I just think it's great' (A102), while another stated, 'I think you'll see a lot of people drop off if [people have to pay]' (A131).

Theme 3: understanding test results

Participants ranged from having no difficulty understanding their results to having difficulty understanding the medical terminology. When they did not understand their results, they found that the reference ranges helped. One participant stated, 'it's very self-explanatory. They give you a range to what's, so you know if you're on the continuum, if you're a little bit higher or lower than the, what you should be. It's very user-friendly' (A105). Another countered, "there's some medical terminology that I may not, like, a lot of the terms I don't understand… And, and when I'm in to see [the doctor] next I say 'well what is this, what does this actually refer to, what does this mean?'" (A125).

They relied on the internet, their family, physician, or physician's comments to understand the results. One participant explained, 'if I wasn't sure about something I'd Google it… They also have another feature where you can go and read about it, but, I, I, I've been doing it for a little while so I have a sense of where things are' (A120). Another participant stated that they 'check with the [spouse], especially my blood results. [They will] go through them and if there's something I don't understand then I can either send [the doctor] an email or… have a follow up with him' (A102).

Category 3: benefits of myCARE

Theme 1: benefits of lab results

Participants perceived many benefits in being able to access their laboratory results. Participants liked being able to view their test results online, as they could easily review them. One participant stated, 'if you and I were just talking, when I left, you've got nothing. You just have a few little memories. But when you see it, or you're recording it, you can go back and look at it and put more thought into it' (A114).

Participants liked being able to share their laboratory results with allied health professionals. One participant explained, 'it really helps me that way because… I can uh print off a report. For instance, my… MRI, and take it to the chiropractor… She showed me the spine, she showed me what was happening, and then she adjusted me accordingly' (A113).

Theme 2: improved access to information

Participants liked having improved access to their health information. For example, one participant stated, 'I want to be the steward of my own health, basically. And I like having uh information accessible, I like being able to go back and look at it' (A120).

Participants also felt that having access to their lab results made them better prepared for appointments, leading to improved discussion. For example, 'I think it better prepares you for when you come in to talk to the doctor, because, like I said, I don't fully understand all of the results, so you go on and research it and then so… I start thinking 'okay I want to ask him this'… so I think that it better prepares me for when I come in for a visit, because then I'm already wondering questions, right, instead of him going over the results and then me thinking about it after I get home. So I just think it prepares you better' (A121).

Theme 3: communication

Participants also appreciated the communication that accompanies myCARE. One participant stated, 'it's a

tremendous improvement on communication. I think it just sets patients, certainly me as a patient at ease. Because I know I can go in and see it, even if I don't want to. I know I can go and look at [the test results] immediately or tomorrow or the next day, whatever it is. I'm not waiting for the doctor's office to call' (A115). Participants also liked that they and their healthcare team could use myCARE on their own time. For example, one participant stated, 'when you can go on your computer and get that information [lab results], you know, come back to you… from your own doctor… on his time' (A114).

Category 4: impact on health and healthcare

Theme 1: comments

Most appreciated their physician's comments accompanying their test results, while some said the comments made no difference. Some were not aware that their physician commented on their results. For example, one participant said, 'I appreciate [the comments] because then I know that he's seen it, and I don't even have to go see him' (A114). Another participant added, 'if they are posting everything, and I looked at it, and it was really bad then I could probably panic or be upset about something. So for him to interpret the results I think is important, it's an important key step in it' (A101). In contrast, another participant stated that their physician's comments made 'no [difference], none whatsoever' (A131).

Participants stated that comments provided clarification, alleviating their concerns and anxiety. For example, one participant stated, 'I absolutely rely on his annotations and his interpretation [for] understanding' (A115). Likewise, another participant stated, 'I know he's looked at them and then it just gives me more confidence that I guess he's looked at them, reviewed them… he's okay'd them' (A121). Participants were confident that their physician would contact them if they needed an appointment. For example, one participant stated, 'I'm sure if there was something of concern that [the doctor] would contact me right away' (A127).

Theme 2: emotional effects

Participants stated that viewing their lab results had no negative effects on their healthcare or on themselves emotionally. Some participants stated that it had positive effects. For example, one participant stated, 'no [negative effects], rather, it's been positive. If anything it alleviates anxiety… That you know your results uh quickly, that the doctor's uh looked at them, uh, it's in laymen's terms so I understand it and if I don't, I can easily just go online and look something up so I better understand it' (A105).

Some participants were not worried about receiving concerning results, while others were concerned. For example, 'even if the results weren't good, I'd much rather know. I mean, you can't have your head in the sand. And I think with as much information as you can, you make better lifestyle decisions' (A120). Another participant added, 'there was one thing scared… me, well it didn't scare me I was just reading it and I goes 'holy crap this looks like trouble'" (A102).

Participants felt that receiving their test results brought peace of mind. They found it beneficial to be able to receive their test results without having to call, and were comforted knowing they would receive their test results quickly. One participant stated, 'in the past, like, the 'negative lab result' or whatever [it] was, you know, they never called you. But in the back of your mind, you're kind of asking yourself, what if they missed it? And this way it's fantastic because you don't have that anxiety at all… if they've forgotten you're gonna ask about it… I think it just sets patients, certainly me as a patient, at ease because I know I can go in and see it… I'm not waiting for the doctor's office to call' (A115). However, some participants were unsure when their test results were released.

Theme 3: relationship with family physician

Participants varied from finding that having access to their laboratory results had a positive effect to no effect on their relationship with their physician. Some believed it caused improved communication. For example, one participant stated, 'it's probably improved [the relationship with their physician] in the sense that, you know, I have more knowledge when I come in uh or I don't feel I need to come in because the results banged it right there' (A105). However, some were concerned that communications would lose their personal touch, which may lead to misunderstandings. For example, one participant stated, 'I would think that there's an element of reporting that he misses and I kind of lose that part too… This in-person presentation always enriches the sharing… With me probably that's dynamic of sharing which you miss on computer if it's just written stuff… it can lead to misunderstanding of things' (A116).

Participants stated that being able to access their laboratory results increased their engagement in their care. For example, one participant stated, '…I see the results, I can participate in the results in effect… it makes me feel as if I'm participating more in the overall care of my health if you like' (A111).

Theme 4: changes in healthcare due to lab results

Participants varied from having positive changes in their healthcare to having no changes. Many participants stated that they felt they had improved comfort with their healthcare. For example, 'I generally am much more comfortable, because I see the results, I can participate in the results in effect, and it makes me more comfortable' (A111).

Participants felt that they had less need for appointments and had shorter wait times for their appointments. They felt that being able to access their laboratory results on myCARE freed up appointments for others, allowed them to avoid making appointments for minor things and that they could message their doctor about things they would usually ignore. One participant stated, 'I really like… that I can make contact with him and not have to

make a doctor's appointment which… it may be minor, I wouldn't book a doctor's appointment for, I wouldn't take up that space that other people need' (A114). Another participant stated, 'I don't have to go and see the doctor again unless it requires some further action. Because quite often [the doctor] is able to say well these results seem to be fine to me so then it saves his time and it gives me peace of mind' (A128).

Participants were able to monitor their test results on myCARE, which increased their awareness and allowed them to change their behaviour to improve their health. This led to quicker resolution of health conditions. For example, one participant stated, "I've made some health uh changes, so yeah, based on that because I don't want to see the numbers go out of, out of whack or if I have a concern I think 'maybe I need to, to address my own behaviour'" (A120).

DISCUSSION

The participants in this study used myCARE for a variety of reasons, including to access their medical record, communicate with their healthcare team and view their test results. Previous studies have found that access to test results is one of the main reasons patients use EPPs.[2] While all participants used the test results feature, they varied in how frequently they used it and in the types of test results they viewed. Patient use of the test result feature may be related to their level of health, with people managing chronic medical conditions using it more frequently.

We found that participants varied in their understanding of their test results. This is consistent with previous findings of patients experiencing difficulty understanding their test results.[6 10 12] Nevertheless, participants stated that reference ranges and their physician's comments on their test results aided their understanding. Patient understanding of test results can be improved by using reference ranges on EPPs and encouraging physicians to comment on test results.

While patients reported that their physician's comments and reference ranges helped them understand their test results, it did not always provide sufficient information. Many reported searching online, asking their family, or their physician for additional information about their results. Interestingly, none of the participants reported accessing the myCARE reference library for additional information on their test results, although one participant acknowledged that they saw it. This is consistent with previous findings,[2] suggesting patients may not know where to search for this information. This also raises concerns that patients may be accessing inaccurate medical information online. Patients should be encouraged to use specific websites and search options provided within the portal to access accurate medical information.

Benefits of online access to test results included convenience, fewer appointments and decreased anxiety. Some participants found that they had less need for appointments as they received their results online and did not need to make an appointment to receive them. This has the potential to decrease physician workload and healthcare expenditures. Participants liked being able to view their test results as they could review the information provided to them without having to worry about forgetting it. They also reported that being able to view their test results on myCARE decreased their anxiety because they knew they would receive all of their test results instead of only being informed about clinically significant results. Finally, they experienced decreased wait time for their results, easing their nerves. This is consistent with previous findings.[9 10]

We did not find that patients in our sample had increased anxiety from receiving their test results via myCARE. This suggests that physician comments on test results may provide enough context for patients to understand their results, thereby reducing anxiety. However, anxiety about receiving test results may be a rare occurrence and may not have been captured within our sample. Nevertheless, there were some concerns about the arrival of alarming results without context. Physician comments that accompany the results help to relieve anxiety and increase understanding, but some patients worried about the loss of the nuance that comes with in-person communication. Some patients may need additional personalised information, such as reassurance and compassion, which cannot be sufficiently provided via EPPs. While providing patients with guidance for next steps, such as whether a follow-up appointment is needed, may be helpful, concerning test results may be better provided in person. Thus, physicians must be cognisant of the effects of EPPs on the therapeutic alliance with their patients.

Our study also identified the impacts of providing patients with access to their test results on their healthcare and health. Consistent with previous findings,[6 8] we found that participants felt that having access to their lab results made them better prepared for appointments. This led to improved discussion with their physician. Some participants cited increased awareness, ownership of their healthcare, and made positive changes because they wanted to keep their test results within normal range. This suggests that providing patients with access to their test results may have positive effects on health by increasing motivation and health-related behaviours.

This study has several limitations. First, it was limited to a single centre with a single EPP, and patients of only one primary care physician. This may have resulted in a selection bias. This also limits the ability to generalise to a larger population, as the results of the portal may be dependent on the EPP, the centre and physician using the portal. For example, not all physicians comment on test results at the time of their release. Future studies should build on our findings by interviewing patients of several practices while incorporating interview information on the primary care physicians' habits of EPP use (such as commenting on test results), and their perceptions of its impact on their patients. Second, we had a relatively small sample size. Despite reaching saturation, our findings may not

be representative of the experiences of all patients. For example, anxiety about receiving test results via an EPP may be a rare occurrence that was not captured within our sample, so our findings need to be interpreted with caution. Future research using quantitative methodology is needed to further examine the experiences of patients and to identify factors that predict poor understanding of test results. Third, we were not able to control for factors such as health literacy, education or health, which may have an impact on patient perception, understanding and use of test results. By examining factors such as these in future studies, a better understanding of patient perceptions of EPP-based test result use may be obtained.

CONCLUSIONS

The results of this study add to the body of research surrounding the test result features of EPPs. While we identified many positive outcomes of EPP-based test results on health and healthcare, such as improved health outcomes and healthcare, EPP-based test results remain limited. Some patients believe that miscommunication may be more likely to occur through EPPs and were worried about receiving troubling test results on EPPs. More research needs to be done to better understand these concerns and identify ways to address them. We also found that some patients experienced difficulty understanding their test results. There may be opportunities to increase comprehension of test results by having providers comment on the meaning of test results and encouraging patients to use specific websites and search options within EPPs. Including these factors in guidelines for providers using EPPs in their practices may be a feasible step to improve patient understanding of test results across providers and institutions.

Acknowledgements We thank the participants who shared their insights with the research team. We also thank Dr Nicola Shaw, Melissa Kargiannakis and John Hogenbirk for their guidance, as well as the staff at the Group Health Centre for their support in implementing this study.

Competing interests None declared.

Patient consent for publication Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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