

Pictures in patient decision aids

What should designers be aware of when adding pictures?

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ABSTRACT

In a shared decision-making process, patients can be directed to online decision aids to read about their treatment options. These tools often consist of different media formats such as text, pictures and videos. This article investigates, through a literature review, how pictures in patient decision aids can affect patients emotionally. It is important for designers to be aware of how people are affected by different pictures, in order to add pictures that are beneficial. The findings in this review show that adding pictures can help make information more comprehensible. This can especially benefit low-literate patients. However, it is important that pictures underline the information it is coupled with. The review also shows the importance of designing with the target group and include pictures from real life situations.

KEYWORDS: pictures, photographs, shared decision making, decision aids

1. INTRODUCTION

Shared decision making is the process when healthcare professionals and patients together take clinical decisions on behalf of the patient (Charles et al., 1997). According to Norwegian law, Norwegian patients have the right to be presented with information regarding their health, and to participate in decisions related to their health (Pasient- og brukerrettighetsloven, 2001). To take part, patients must possess correct and valuable information about treatment options to make an informed choice. One way to obtain this information is through patient decision aids.

Patient decision aids are tools to help the patient become involved in shared decision making. They provide information about possible options, and positive and negative outcomes of different options. Decision aids are intended to support the patients in taking their personal values into consideration and complement, not replace,

counselling from a healthcare professional. This way they can take the best informed choice for the patient together (O'Connor et al., 2015).

Traditionally, patients have relied on medical professionals to provide them with health information. In a process of shared decision making, patients who have been provided with a decision aid are by themselves in a learning situation when they are asked to find the best treatment option. In a situation where patients are anxious, in pain or sick, it can be difficult to concentrate (Osborne, 2006), and finding the best treatment option can be stressful (Harwood & Clark, 2013). Care should be put into designing decision aids that offer emotional and practical support, as a patient's emotional state will influence how well the patient learn.

Because there is a power and educational imbalance between the patient and the healthcare professional (Houts et al., 2006), the

patient might be afraid to admit that they do not understand the information presented to them. It is important to be aware of this when developing online decision aids.

In his book, *Design for Care*, Peter H. Jones explains: "Although information seeking may seem like a rationally guided task to a designer or professional, the felt experience of the person living with a health concern is not experienced" (Jones, 2013, p. 58). The emotions and experience of patients might differ greatly. Moreover, an information seeking process, like using an online decision aid, can be stressful (Harwood & Clark, 2013). Hence, there is a need to learn more about how online decision aids make patients feel and how the patients can be stimulated and motivated to use them.

Photographs have been used in marketing and advertising to trigger emotions and impulse buying (Adelaar et al., 2003; Schmidt & Stock, 2009). Current studies on shared decision making and decision aids found in the search for literature do not say much about pictures in decision aids. There is a need to know more about how pictures (photographs or illustrations) in online decision aids affect patients.

The aim of this article is to get an overview of studies on the use of pictures in different academic fields, including studies on pictures related to health information. Moreover, it can be important for designers to know how pictures affect patients and how pictures can be used most efficiently. Thus, the questions to be answered in this article are:

- 1) What can be the benefits of including pictures in an online decision aid?
- 2) What should designers be aware of when including pictures in online decision aids?

Both questions will be answered in Conclusion. The latter will also be summarised as key points that designers should be aware of in the section Implications.

2. METHOD

This article is based on a literature review on articles from different academic fields, where the most dominant ones are medicine, educational psychology and information visualisation. In the search for relevant studies, keywords like 'decision aid', 'patient information', 'healthcare', 'medical information', 'emotion' and 'shared decision making' were used alone or in combination with 'picture', 'photograph', 'illustration', 'visual', and 'image'.

Searches including the keywords 'pictures' or 'visuals' yielded the most relevant results. The literature was found mostly through Google Scholar and accessed through the portal Oria, provided by the University library at The Norwegian University of Science and Technology.

The aim of conducting this literature review is to get a thorough introduction to, and an overview of, the studies on pictures in different academic fields. This article can provide an important theoretical background to further studies on how to use pictures in decision aids.

Various studies on pictures related to learning were found, but studies on the use of pictures in healthcare communication or in decision aids were limited.

The findings from the literature are sorted into topics based on where the most relevant studies were found. Studies on attention, comprehension, emotions and personalisation were found and these became relevant groups to structure the article around.

3. RESULTS

Studies on decision aids and health information have shown that people appreciate pictures in decision aids (Coulter et al., 1999), that photographs are a useful part of decision aids (Waljee et al., 2007) and that illustrated material are preferred over non-illustrated materials

(Mansoor & Dowse, 2003). Pictures in decision aids might also have other effects on patients. In this section, the results of pictures effect on attention, comprehension, emotions and personalisation are presented.

3.1 Attention

Delp and Jones (1996) evaluated the effect of cartoon illustrations in wound care instructions. They studied 234 patients who received printed instructions on wound care, either illustrated instructions, as can be seen in figure 1, or text instructions. The results showed that patients who were given the illustrated instructions were significantly more likely to read them. This suggested that the cartoons enhanced attention and interest. The patients who got the illustrated instructions were also more likely to say that they were 'very satisfied' with the instructions and found them 'very easy to read'.



Figure 1: Patients given illustrated instructions on wound care were more likely to read them. (Reprinted from Delp and Jones (1996, pp. 266-267))

Two studies on online advertising show that photographs may attract more attention than text alone (Hsieh & Chen, 2011; Riegelsberger et al., 2003). Still, these studies do not report on why this could be the case. Other studies on why photographs may attract more attention were not found.

3.2 Comprehension

Information is easier to remember if people can visualise it. Therefore, pictorial information is easier to recall later compared to text-only information (Ratner & Riis, 2014). This phenomenon is called the picture superiority effect (Krum, 2013).

Pictures have been shown to have a positive effect on comprehension of health information compared to text alone (Houts et al., 2006). A study by Frisch et al. (2013) showed that students exposed to a multimedia (text and pictures) presentation of health information recognized more information than the ones presented with text only presentation.

The study by Delp and Jones (1996) also showed that among the patients who read the instructions, those who received the illustrated versions were more likely to have understood and followed the instructions, compared to the control group. A more recent study by Mansoor and Dowse (2003) further substantiates this. They showed that pictograms had a positive effect on how well the participants understood the drug information in a patient information leaflet. The participants answered two questions assessing their comprehension, and those who received illustrated information leaflets scored significantly better than patients who received text only information leaflets.

An important finding from studies on education is that comprehension is better when pictures are related to the information in the text (Harp & Mayer, 1998). Still, pictures are sometimes added to create visual interest to a page as text-only information can be regarded as boring (Harp & Mayer, 1997).

In education, adding pictures that are topically related to learning materials, but not adding meaning to the text, does not have a positive effect on learning. It can even interfere with it and

make learning more difficult (Harp & Mayer, 1998; Levie & Lentz, 1982). An example of this is illustrated in figure 2.

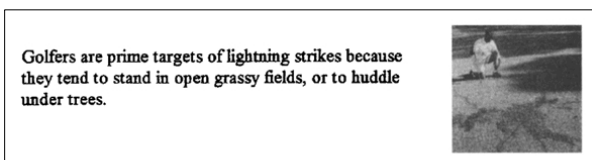


Figure 2: The golfer in the picture is only topically related and does not add meaning to the text. (Reprinted from Harp and Mayer (1998, p. 416))

Morony et al. (2017) showed that pictures that do not add meaning to the text are sometimes added to health information. They studied 26 information materials aimed at people with chronic kidney disease. They found that the materials in general performed poorly when assessing the pictures and graphics in them. Most of the materials contained visuals that were mainly decorative and distracting from the content, rather than being informative. Some of the materials contained pictures adding no meaning and some even contradicted the text it was coupled with. Morony et al. (2017) suggested that those producing health materials often focus on aesthetics, rather than function, when choosing what pictures to include.

Figure 3 shows an example of informative visual information adding meaning to the text. This is done by illustrating the highest recommended amount of alcohol with a picture consisting of photos of wine glasses, and illustrations indicating gender. The glass next to the icon for 'women' is half full of wine, indicating that women should not drink more than 1 unit (half a glass of wine) a day, hence the illustration is underlining the text.

Even though photographs may be good at capturing attention, they are often full of detail. These details may interfere with comprehension (Houts et al., 2006). Adults seem to react faster to simpler, more familiar illustrations and visual representations (Skogen, 2006). Additionally, certain simplified views of objects can be easier to perceive than others. Therefore, diagrams and

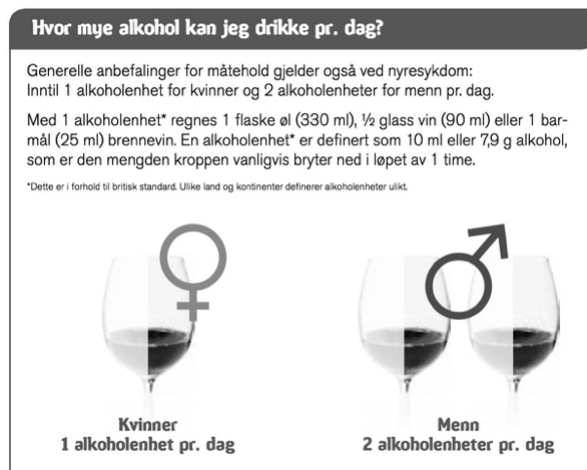


Figure 3: Informative visual picture that adds meaning to the text. (Reprinted from 'Kostråd ved nyresykdom' (p. 17) by Oslo University Hospital, St. Olav's University Hospital and LNT)

simpler illustrations can be more suitable and perceivable than photographs with more complexity (Ryan & Schwartz, 1956). An example of such illustrations can be seen in figure 4 .

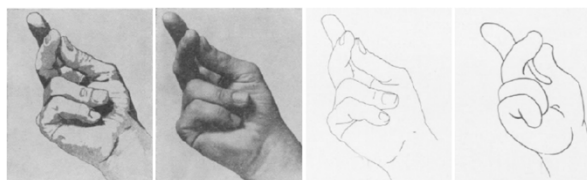


Figure 4: Simplified line drawings, like the drawing on the right, can be perceived quicker than the pictures to the left (Reprinted from Ryan and Schwartz (1956, p. 66))

Some studies report on how the use of pictures or pictograms in health information benefit patients with low literacy skills when it comes to comprehension (Dowse & Ehlers, 2001; Mansoor & Dowse, 2003; Osborne, 2006). The study by Mansoor and Dowse (2003) was conducted with low-literate patients and adding pictograms improved the patients comprehension of a patient information leaflet.

Literacy and health literacy skills are important when it comes to learning. According to Osborne (2006), health literacy is "the degree to which individuals have the capacity to obtain, process

and understand basic health information and services needed to make appropriate decision". If high health literacy skills are required by information materials, some users will have difficulty understanding it. In this case, information materials cannot be regarded as useful for these users (Osborne, 2006). A study by Sarkar et al. (2010) showed that diabetes patients with self-reported low literacy skills in fewer cases signed in to a patient portal to look for information. Additionally, Smith et al. (2009) found that lower literacy participants had greater problems with the concept of informed choice.

3.3 Emotions

Schmidt and Stock (2009) showed that different photographs can trigger different emotions. They tested 30 photographs manually selected from Flickr after searching for 'emotions'. One example of such a photograph can be seen in figure 5. The result of the study was that users had clear emotional favourites. Still, Schmidt and Stock could not conclude that all participants felt the same when they labelled an image with 'disgust' or 'fear' as the participants may have different definitions of the same word.



Figure 5: Most people in the study by Schmidt and Stock (2009) labelled this photograph with the emotion 'happiness'. (Reprinted from Schmidt and Stock (2009, p. 868))

Moreover, the content of a picture can be of importance. People seem to engage more with photographs of faces. This was supported by a

study by Bakhshi et al. (2014) showing that if a photograph on Instagram contained one or more faces, the photo was more likely to receive likes and comments.

Cyr et al. (2009) showed that photographs of people with facial features could be added to a web page for it to be perceived as warm and having more social presence. Other effects are that photographs of employees on e-commerce websites has been shown to increase users' perceived trust (Steinbrück et al., 2002), and that they can make users less critical to the content (Riegelsberger et al., 2003).

How people perceive decision aids was briefly studied by Coulter et al. (1999). They used questionnaires, focus groups and reviews of existing decision aids to find guidelines for creating decision aids. Among other aspects, they studied the effect of language, tone and presentation. They found that patients appreciated the use of pictures and diagrams in decision aids. The users did not, however, like pictures they categorised as 'gory' or 'scary'. An example of such a picture could be like the one in figure 6 that most of the participants in the study by Schmidt and Stock (2009) labelled as 'disgusting'.



Figure 6: Most people in the study by Schmidt and Stock (2009) labelled this photograph with the label 'disgust'. (Reprinted from Schmidt and Stock (2009, p. 869))

3.4 Personalisation and real representations

Sillence et al. (2007) investigated how people evaluate what medical websites to trust or not. Among other factors, the participants were looking for websites where the content was aimed at 'people like them', written by 'people like them'. Coulter et al. (1999) also found that the patients in their study preferred decision aids that related to them personally. Familiar sounding language and relevant content were the only factors mentioned in this study contributing to the patients feeling like the content was aimed at them.

Related to this, Mansoor and Dowse (2003) found that patients prefer pictures that include representations that are similar to themselves, and sensitive to their culture. Dowse and Ehlers (2001) evaluated pharmaceutical pictograms in a cultural group in South Africa with low literacy skills and found that the pictograms that used representations from the specific culture were preferred compared to pictograms using representations from western countries.

According to the '113 Design Guidelines for Homepage Usability' by Nielsen (2001), web designers should use photos to show real content that has an obvious connection to the text instead of stock photos. Additionally, graphics should not just be added to decorate a web page. Eyetracking studies have shown that users ignore stock photos of generic people as opposed to portrait photos of actual people working in a company (Nielsen, 2010).

4. DISCUSSION

Including pictures in decision aids could benefit patients in different ways. Studies on learning have shown that pictures and illustrations can make information easier to comprehend (Harp & Mayer, 1998; Levie & Lentz, 1982) and remember (Ratner & Riis, 2014), this also seems to be the case for health information (Frisch et al., 2013; Morony et al., 2017). Thus, adding pictures can

benefit a patient who is in a shared decision-making process, as it can be difficult to concentrate and comprehend health information when feeling scared or sick (Osborne, 2006).

Still, designers need to be aware that one should not just add pictures and expect them to make decision aids motivating and easier to understand. According to Nielsen (2010) people are able to tell stock photos from 'real life' photos, and ignore purely decorative photographs. Adding unrelated pictures might even interfere with comprehension (Harp & Mayer, 1998). The pictures should be informative and support the text. When it comes to health information it is especially important that pictures do not contradict the text, but rather underlines the information presented to assure the patient that they have understood correctly.

Patients with low literacy skills and low health literacy skills can really benefit from pictures in health information paired with text information (Dowse & Ehlers, 2001; Mansoor & Dowse, 2003). It is important to be aware that investing time in a medical decision aid might require more effort for low-literate patients. In some cases, they might not even look for information at all (Sarkar et al., 2010), as it can be very time-consuming and difficult for them. Therefore, it is especially important for this group of people that the decision aid is perceived as approachable and easy to read. Adding pictures to text information could be one way of lowering the threshold for this group to invest time in a decision aid. This way, pictures could, to some extent, have some 'motivating' effect on low-literacy patients in addition to making the information easier to comprehend.

Studies have shown that line drawings and simpler illustrations are quicker and more accurately perceived (Ryan & Schwartz, 1956; Skogen, 2006). This can make illustrations more suited than photographs for instructions as illustrations do not normally carry as much detail as photographs can do. Too much detail might interfere with comprehension (Houts et al., 2006).

On the other hand, a benefit of including photographs of faces, is that they can provide social presence and warmth to a web page (Cyr et al., 2009). This could be desirable as some patients might experience being directed to a website for health information as impersonal compared to receiving the information from a healthcare professional in person.

Studies on decision aids have shown that it is important for the users to feel like the medical information provided was made for them (Coulter et al., 1999; Dowse & Ehlers, 2001; Sillence et al., 2007). Hence, it is important for designers to be aware that a pitfall when including photographs of people can be that some patients might feel more distanced from the material providing the photograph. This could happen if the person in the photograph does not represent them in terms of culture, age, gender or appearance. An example of a photograph that represent women of a certain age and might make men feel distanced from a decision aid can be seen in figure 7.



Figure 7: A photo that might make some people feel like a decision aid was aimed at them, while others might feel more distanced from it (Reprinted from Unsplash, uploaded by Brooke Cagle)

As stated before, people seem to ignore stock photography (Nielsen, 2010), hence, adding a stock photo of a person might not have the intended effect of representing the patient group.

If, however, the photograph represents the patient group, it might give the feeling that the web page was aimed at them. When it comes to

decision aids, the users are expected to take their personal values into consideration. Aiming the decision aid at the patient might make this easier for the patient.

Another important thing to be aware of is that people might react differently to the same photograph. They can make associations one cannot predict, based on previous experiences. Therefore, a photograph that triggers one emotional response with some users might trigger a completely different emotional response with others (Schmidt & Stock, 2009). Finding photos that trigger the same emotional response in most of the target group might be challenging.

To create the best possible solutions, producers of decision aids should co-create with the target group. They should also conduct interviews and tests that are focused on how the decision aid is *perceived* and not only its usability. Co-creating with patients empowers them and changes the role of the patients from passive recipients to co-producers of their own health (Bartl, 2009). Additionally, aiming the decision aid at the target group through co-creation can make the users feel like the decision aid was made for them.

There are indications that decision aids should use pictures, and not only text, to convey information. The studies in this literature are conducted in different countries around the world which can imply that these indications can be applied to different audiences. Still, the studies reviewed in this article are conducted on different groups of people using different illustrations and photographs. Therefore, more research is needed to examine what kind of pictures benefit different target groups the most.

5. IMPLICATIONS

Based on the literature review in this article there are some key findings that designers should take into consideration when including pictures in patient decision aids.

- Designers should make sure that the pictures added are informative and supports the content, rather than just being aesthetically pleasing
- Consider what the aim of adding a picture is. For instructions, illustrations may be better suited than photographs
- Strive to include photographs taken in real life situations as opposed to generic stock photography, as people can tell them apart and seem to ignore visuals they label as stock photos
- Include the target group in both developing decision aids and when choosing what pictures to include
- Do interviews and tests that focus on the experience of using a decision aid, not just the usability of it as the felt experience of using a product cannot be properly communicated through a usability test

5. CONCLUSION

This literature review shows that adding pictures to decision aids can help convey information and make content more comprehensible. This can especially benefit low-literate patients. However, to obtain this effect it is important that the pictures underline the information it is coupled with rather than to contribute no meaning or contradict the content.

Another benefit of including photographs of people in a patient decision aid is that it can add presence and warmth. On the other hand, it can be more difficult to adjust the decision aid to the target group.

It is important for designers to be aware that pictures should be informative and support the information presented, as opposed to only being added for aesthetic reasons. Additionally, photographs should optimally be taken in real life situations. Designers should also make sure to include the target group when developing decision aids and deciding on what pictures to include, as different target groups can react emotionally different to the same pictures.

Further research is needed to examine what kind of pictures benefit different target groups the most.

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