Experienced-based service design in healthcare: An explorative study to improve a hospital's dialysis process

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Abstract

The aim of this research is to find improvements within the dialysis department of a hospital in terms of experiences (e.g., comfort) of both patients and nursing staff. We examine how experience-based service design can be applied in the context of a hospital. Consequently, co-creation is central as there are no better experts than the actors who come into daily contact with the dialysis service. The creative and practical way of contextualizing the project provides many insights and ideas on how to improve the waiting and the dialysis itself.

Keywords: Service design thinking, experience, hemodialysis

Introduction

People who suffer from Chronic Kidney Failure (CKF) have a gradual loss of kidney function. It is a progressive disease, which means that the function of the kidney further decreases over time. Chronic kidney disease can progress to end-stage kidney failure, which is fatal without artificial filtering (dialysis) or a kidney transplant. Due to an increase in elderly people, the number of CKF patients is increasing. This demographic change raises the importance of improving the CKF treatment (i.e. dialysis).

This case study aims to reach a better understanding of aspects that can support the dialysis center and therefore improve the satisfaction of nurses, taxi-drivers, patients, and close relatives who visit the dialysis center. By implementing service design, the hospital may receive a competitive advantage, and also improve stakeholders' outcomes (Gleason & Bohn, 2019; Stickdorn, 2011). It is an opportunity to develop and investigate the re-design of the waiting room and the dialysis center itself through the eyes of the patient and improve the communication towards the patients.

Our main research question is: ‘How to improve the experience of patients in the dialysis process of the hospital using the principles of Service Design Thinking (SDT)?’

Theory

Hospitals all over the world have embraced lean as a tool or even a philosophy to improve their operations (Graban,2016). Lean is a management approach that consists of eliminating waste to improve the flow of patients, information or goods (Brandão de Souza, 2009). By redesigning the workflow, lean can achieve benefits through reducing the number of work interruptions and work-arounds (Mazur et al., 2012; Graban, 2013). In essence, lean is an analytical problem-solving approach with a comprehensive toolbox to identify the solution for the problem at hand.

In the present paper, a fundamentally different problem-solving approach is pursued. We will apply SDT, which is a human-centered and a co-creative approach of using the knowledge and insights of all stakeholders (Stickdorn, 2011). It entails a co-operative and participative process of designing with different stakeholders (Teso et al., 2013), while applying different techniques, such as visualizing customer experiences, prototyping, interviews and patient journey mapping (Pfannstiel & Rasche, 2019). From the perspective of service design, capitalizing on the knowledge and insights of multiple actors at different points in the service provision is crucial to start understanding and improving the service experience (Zomerdijk & Voss, 2010; Pfannstiel & Rasche, 2019). In sum, while lean focuses on efficiency, removing waste, and creating value in process optimalisation, SDT places users at the heart of the solution (ref bert nieuw?)

The operational problem studied in the paper is workload of a dialysis department where work is performed in three shifts with different peaks and troughs (Hamilton & Sessoms, 2011). The high workload peaks occur in the morning, when patients are admitted, and in the evening, when they are discharged. In between, there are even higher peaks due to the arrival and departure of patients at the shift change over in the afternoon (see Figure 1).

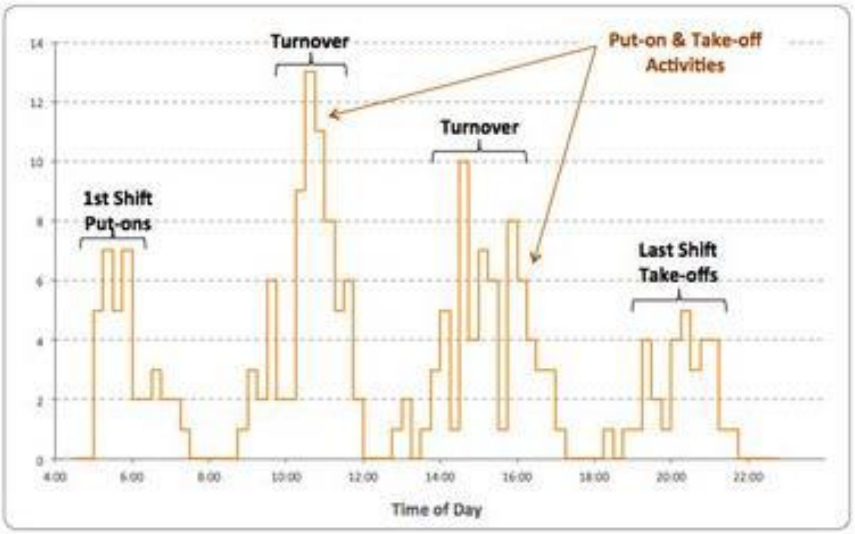

Figure 1 - A typical workload pattern on a dialysis department (Sessoms & Hamilton, 2011)

As described by Hamilton & Sessoms (2011), it is necessary to match supply and demand. This can be done in several ways. A first technique is by adjusting the supply: by employing more staff at peak times, so the peaks can be absorbed. At more quiet moments, breaks can be planned or staff can go home. This

technique is not easy to apply since it is bound by social legislation. On the other hand, the peaks are very split, so split working hours could be used. However, these proposed split working hours (e.g., from 7 am till 11 am and from 2 pm to 6 pm) are often not perceived as positive by nurses.

A second technique is by adjusting demand (Hingwala et al, 2015). In the current situation, many patients are already present in the waiting room before being admitted to the dialysis room as the first dialysis treatment starts between 7 and 8 a.m. As a result, these patients enter the dialysis room at the same moment in time and cannot all be helped at once. An operational (lean) solution to this problem is staggered arrival times. But patients prefer dialysis treatment patients early in the morning or early in the afternoon so as to have little "lost" time the remaining of their day. Above that, patients are often picked up by collective transport and brought back home. Since staggered arrival times are a difficult solution to implement, it is important to tailor the transport to the needs of both nurses and patients as well as taxi drivers and also that the patient experience is negatively affected.

Methodology

Design

We pursued an in-depth single case study of a dialysis department to gain a better understanding of the processes and how these processes are experienced by different stakeholders such as patients and close relatives, nurses and taxi-drivers.

Setting and data collection

Data was collected in a regional hospital in Belgium in the dialysis department. Patients must go to the dialysis center for four hours of treatment three times a week. The patients have the option to come on Monday-Wednesday-Friday or Tuesday-Thursday-Saturday. Both groups are then subdivided into morning and afternoon shifts. To manage the workload at the dialysis center, nurses work in a two-shift system. The morning shift starts at 6.30 am and ends at 3 pm. The late shift begins at 11 am and ends at 7.30 pm. Approximately 115 dialysis patients visited the department 3 times/week. The majority of these patients ranged between 75 and 89 years old. Data was collected in two waves: the data collected in 2018 was used to discover “the right problem”; the data collected in 2020 allowed us to further refine the definition of the problem and to “solve the problem right” through ideation and prototyping (Figure 2). We applied multiple types of data collection, involving a wide variety of SDT tools (Table 1). All stakeholders with influence on the dialysis experience of patients were involved.

We followed the double diamond approach (Figure 2) to set up the study in four stages.

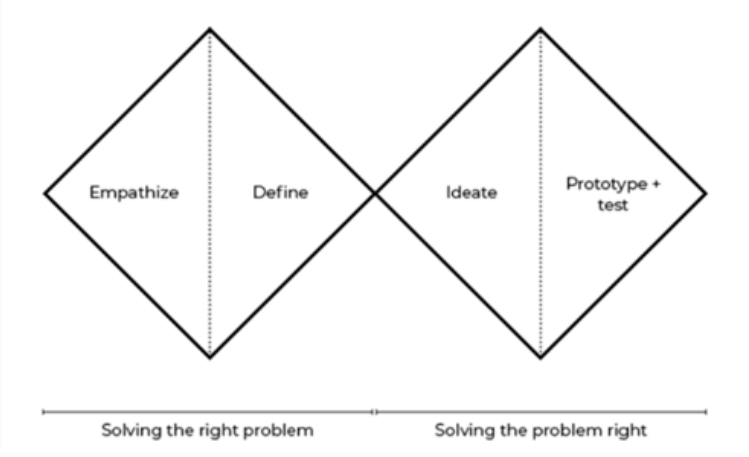

Figure 2 – The double diamond© (Design Council, 2007)

Table 1 – Data collection methods

Study method	Study participants 2018	Study participants 2020	SDT stage	SDT tool
Observation/ shadowing of the care process	All stakeholders	All stakeholders	Empathize/ define	Unstructured and non-participative observations
Semi-structured interviews	50 patients 11taxi-drivers 13 nurses and hospital staff	39 patients 5 taxi drivers 14 nurses and hospital staff	Empathize/ define	Thematic analysis
A co-design workshop		4 nurses and 1 close relative	Ideate/ prototype	Customer and provider journey personas[1], Service Blueprinting

Results

A distinction was made between the results of the observation, the interviews, and the co-creative workshop.

Observations

During the observation, a first impression of the dialysis center and the waiting room is formed. It allowed the researcher to construct a generalized patient journey and also the service blueprint was mapped.

Interviews patients

Patients reported that in their transport to and from the hospital they encountered a large number of different taxi drivers. It appears that only 33 percent have the same driver each time. The remaining 67 percent tend to have frequently different drivers. According to the following comment, the patients would prefer consistency:

> *"I never know when they [taxi drivers] are coming and who is coming. These drivers are different all the time. That should change, so we have the same driver that always arrives at the same time." Patient respondent 16*

Also, the number of patients that ride along in a single taxi influences the experience of the respondents. Depending on whether the patients are picked up first or last, it will affect the pick-up time at home. One patient mentioned the bad organization when several patients have to be picked up by a single taxi.

> *"I can't understand how they organize the taxi service. I wonder how they make their schedules to pick people up. I live in Drongen [region around Ghent city]and there are another 3 or 4 patients in that region. The taxi drives at least 30 km too much." Patient respondent 13*

Above that, for the people arriving at the hospital by taxi, there is a step prior to the current customer journey that has an impact on the experience, namely waiting at home to be picked up by the taxi driver. When asking about the punctuality of drivers, several answers are given. Two respondents have mentioned being forgotten several times by the driver.

[1] Due to Covid-19 restrictions patients could not attend the workshops, therefore personas where created.

"It is already happened that I had to call the dialysis centre to say the driver did not show up. It brings uncertainty." Patient respondent 5

The second part of the interview relates to the patients' waiting time at the hospital. A distinction is made between the experience of the waiting time of patients before and after the dialysis. Not only comfort is considered but also the perceived duration and the patients' perspective.

Opinions regarding the comfort of the waiting room are divided according to three points of view. The first view is a rather grateful view, in which patients are glad that they can come to the dialysis. Others have pointed out that the comfort of the waiting room is certainly not the most important aspect of the dialysis and that they are not very bothered by it. A third view entails that there is some room for improvement. For example, a patient mentioned that he goes to the main entrance hall to rest after the treatment because of his back problems.

"Once I am through with dialysis and back in the waiting room, I go to the main entrance hall. Because my back hurts a bit, and I can rest there. My back is gradually starting to wear out" Patient respondent 6

One patient even communicated all three different points of view simultaneously.

"They are ordinary chairs of course, but it's only 10 minutes, fifteen minutes at the most. Sure, if you're a little early, you may sit here for half an hour. But I think it's all okay. We don't need luxury in that waiting room. In the dialysis department itself, there is more comfort, but yes, we have to wait for the nurse to call us in." Patient respondent 24

There is a lot of patience before the treatment, both in the morning and afternoon.

"Sometimes I am a bit early, but it does not matter. Because then I have the time to go to the toilet and to get my blanket. That waiting time goes by quickly." Patient respondent 28

The patients' opinions of the taxi service after the dialysis are mixed. Several respondents are satisfied with how it is currently going. Several patients even see an improvement compared to the past. But other patients are dissatisfied and find it annoying to have to wait so long for the taxi driver. The waiting times for patients who make use of collective transport are inevitably higher since they cannot go straight home after the treatment has finished. This unavoidably has an impact on their experience.

"I have to say I'm usually disconnected [from the dialysis device] at half past six in the evening. Afterwards, I always have to wait in the waiting room. Sometimes until 6:15, 6:30 p.m.. I only live 4 km away from here and have to wait so long. I'm very disappointed by that. Four km is not that far. I thought I was going to be home soon but that's definitely not the case" Patient respondent 29

Not a single complaint about dialysis treatment itself has been mentioned by the patients. Many activities during the dialysis are listed by the respondents, of which most patients use a tablet to watch movies or series while waiting during the treatment. Regarding their general experience with dialysis, many patients mention the good atmosphere and the proper organization. Two of the questioned patients even asked if they could stay in this dialysis center instead of having to go back to their previous dialysis center.

"To be honest, I used to go to Gentbrugge [another facility of the hospital located in the region of Ghent] on Mondays, Wednesdays and Fridays. But I went here once and I was so satisfied that I asked the doctor if I could stay here." Patient respondent 18

"I have never been reluctant to go to dialysis. It's really good over here. You'll get the perfect care. You should do a comparison with other clinics." Patient respondent 13

Interviews nurses

To avoid waiting time the nurses mentioned that they make an exception to let in patients earlier in the dialysis room if the patient is not physically well.

Furthermore, it was indicated by half of the respondents that they tried to notify the drivers as soon as possible about a delay. However, due to unforeseen circumstances it is sometimes not possible to inform the taxi drivers immediately, or it is impossible to know in advance how long the delay will take.

"If nothing is planned, we can call immediately to inform them [taxi drivers] of what time it will be. But often it concerns patients who are not well, who still have to wait for the doctor and need to have a further examination and wait for the lab results. Then it all delays." Nurse respondent 6

The nurses listed many factors concerning the punctuality of the drivers, such as the traffic, the obligation to take on extra orders in between, and the schedule made by the dispatch[2] (e.g. when they patients are dropped off too early in the dialysis room). In addition, three nurses mentioned that several patients had already been forgotten, or that the driver was too late because he overslept. If that occurs, the nurses call the driver or internal dispatch.

"The taxi drivers have many patients they have to drop-off and pick up. We have problems with some of the drivers. It is not just communication, it is also their laxity. They forget to pick up the patients, they sometimes get out of bed too late and then they do not understand in return when we say that our patient will be a bit later." Nurse respondent 12

Interviews taxi drivers

The main themes identified where: the communication of the driver with all actors in the care process; the punctuality and the medical complications.

Seventy-five % of the drivers stated to have to wait less than 5 minutes when they go and pick up patients at their home or at the reception desk of their residence. The other 25% of the drivers claims having to wait between 5 and 10 minutes. Many drivers state that always the same patients are on time and the same are running late.

At pick up at the hospital after the dialysis treatment 63% of the drivers has to wait less than 10 minutes while 37% claims to have to wait between 20 and 30 minutes. Not only the patients can run late, but also the drivers.

"Sometimes there is a lot of traffic causing delays. The same trajectory I normally do in 15 minutes can take up to 1 hour in that case." Driver respondent 7

Multiple drivers quote that the punctuality of the patients after the treatment depends on the day, on the nurse and on the shift. One driver states to experience the biggest tardiness problems when picking up the

[2]Taxi drivers dispatch which coordinates the patient transports (not only for dialysis patients)

patients from the morning session at noon. In this matter the drivers of large taxi companies claim to have an advantage compared to the small firms.

> *"When a patient isn't ready on time we communicate this to the dispatch. They check with the other drivers who will also drive to the hospital and can go and pick up that patient later. In this way the patients are moved last minute to another schedule. Also when we dropped off a patient too late this is communicated to the dispatch. In this way they can take into account that this patient will probably finish later as well." Driver respondent 4*

Co-creative workshop

The co-creative workshop started with a warm-up sensitizing exercise with the intention of creating an open environment in which discussions can be created. At the introduction and beginning of the warm-up exercise, it soon became clear that participants were comfortable in speaking up. They had no problem clarifying how they thought about certain things. The facilitator wrote down the most important aspects as key words.

The next exercise was intended to share their thoughts of the current dialysis process. Gradually the participants became more talkative and addressed the various challenges, problems of the current situation, as was also mentioned in the interviews. Often comments were made of the service-level attributes regarding the doctors, taxi drivers and head nurses. Other comments were made regarding the privacy and comfort in the waiting room.

The first proposal concerned a screen that can be placed in the waiting room where the taxi drivers would be able to see when the patient is disconnected from the dialysis device. As a result, the drivers would no longer intrude into the dialysis room as they would have an understanding of how long they have to wait. The participants referred to the drivers' disturbance during the nurses' peak hour. It does not only bother the nurses, but also the patients start to hurry themselves when they see their driver entering the dialysis area.

The final perspective of participants regarding the taxi drivers is that they do not mind the driver asking questions, it is the way that they ask the information.

> *"Personally, I do not mind if they ask any question, but it is the way how they ask it. I do not think they should bark at us but they should stay friendly. I will let any driver ask me, "Mrs. Can you check for me when patient X is finished? But not in the way of "How long is this going to take here! Then I am like, "Go ask it yourself!" Participant nurse workshop respondent 1*

After multiple perspectives of participants were clarified, a first sketch of the screen was drawn. The following remarks were made concerning the representation of the screen. First participants proposed to display both the initials and the date of birth to avoid overlap. In case if the patients had a atrio-venous (AV) fistula[3] it should be taken into account that the patients need a quarter of an hour for disconnection. Only the first eight patients who are allowed to be disconnected should be listed on the screen so that the screen does not give a crowded impression. In order to finalize this idea generation, a prototype was drawn up by the workshop participants (see figure 3).

[3] An AV fistula is a surgical connection between an artery and a veinat the level of the wrist, forearm or elbow. This vein is punctured each dialysis with two needles. One needle to allow the blood to be purified to flow to the artificial kidney and one needle to return the purified blood simultaneously.

Figure 3: Prototype of the screen jointly developed by the stakeholders

Generally, the participants also indicated that the waiting room area is too small, especially because of the storing of the wheelchairs and new lockers for the blankets. The participants generated many different ideas to make the waiting room more comfortable and enjoyable (see table 2).

One less favorable remark of the current waiting room was given by the participants regarding the tree of life.

"Now there are only obituaries in the tree of life. It's sad to see! Yes, the people are sitting there waiting and watching the people who have died." Participant, family member, respondent 5

Instead of a tree of life, a calendar was proposed in which the birthdays of the patients are shown.

Waiting room redesign
Decorate by themes
Artificial plants, flowers
Paintings, framed poems of creative dialysis patients of AZMM
Fragrance
Substitution of the tree of life: calendar with faces of patients who have their birthday
More comfortable seats (cf many older people)
Repainting of wall
Two in one system: TV remote control and call system

Table 2 - Overview idea generation for the waiting room

Discussion

This study provides qualitative insights into the patients' perspectives of the dialysis and investigated how service design tools can contribute to the dialysis experience; and more particularly the problem of synchronizing the transport of patients to the hospital and back to home with the activity on the dialysis department. The prototype dashboard is a nice example of how the double diamond approach can lead to an innovative solution (Design Council, 2007). Furthermore, participants came up with several ideas that can be placed within the context of servicescape to enhance the waiting experience (Bitner, 1992).

An important point is that we can measure and try to optimize certain aspects of the care process by using for example a lean approach, but some bottlenecks in the care process cannot be solved completely

(e.g., arrival time of patients). As such, there will always be waiting times and peak moments in this case. But by implementing SDT we can make these moments more pleasant/bearable, this with small adjustments, launched from the target audience. Those small adjustments can make a difference for the patients and staff.

References

Brandão de Souza, L. (2009). Trends and approaches in lean healthcare. *Leadership in Health Services*, 22(2), 121–139. https://doi.org/10.1108/17511870910953788

Bitner, M. J. (1992). Servicescapes: The impact of physical surroundings on customers and employees. Journal of Marketing, 56 (2), 57-71.

Design Council. (2007). Eleven lessons: managing design in eleven global brands, a study of the design process. Retrieved from https://www.designcouncil.org.uk/

Gleason, B., & Bohn, J. (2019). Using small step service design thinking to create and implement services that improve patient care. In M. A. Pfannstiel, & C. Rasche, Service design and service thinking in healthcare and hospital management (pp. 39-54). Switzerland: Springer Nature Switzerland.

Graban, M. (2016). Lean hospitals: Improving quality, patient safety, and employee engagement (3rd ed.). Boca Raton, FL: CRC Press.

Hamilton, G., & Sessoms, M. (2011). Improving workflow in het dialysis clinic (Part 1). *Nephrology News & Issues*, 25(11), 32-36.

Hingwala, J., Tangri, N., Rigatto, C. & Komenda, P. (2015). Improving the Quality and Efficiency of Conventional In-Center *Hemodialysis. Seminars in Dialysis*, 28(2), 169-175.

Mazur, L., McCreery, J., Rothenberg, L. (2012) Facilitating Lean Learning and Behaviors in Hospitals During the Early Stages of Lean Implementation. *Engineering Management Journal*, 24(1)1,11-22.

Pfannstiel, M., Rasche, C.(2019). *Service Design and Service Thinking in Healthcare and Hospital Management*. Switzerland: Springer Nature Switzerland.

Segelström, F.(2013). *Stakeholder Engagement for Service Design: How service designers identify and communicate insights* (Doctoral dissertation, Linköping University Electronic Press).

Stickdorn, M. (2011). What is Service Design? In K. Andrews, B. Belmonte, R. Beuker, F. Bisset, K. Blackmon, J. Blomkvist, . . . v. Ooster, This is Service Design Thinking. Amsterdam, The Netherlands: BIS Publishers.

Teso, G., Ceppi, G., Furlanetto, A., Dario, C., Scannapieco, G.(2013). Defining the role of service design in healthcare. *Design Management Review*,*24*(3),40-47.

Zomerdijk, L.G., Voss, C.A.(2010). Service design for experience-centric services. *Journal of service research*,*13*(1),67-82.