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Service Design Approach to Elevate the Patient Experience during Home X-Rays

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Abstract

Healthcare services have evolved with advances in science, technology and societal needs. Despite being around for two decades, 'X-ray at Home' has seen limited adoption. Understanding its enablers and disablers can lead to insights to develop an accessible healthcare service ecosystem. Healthcare organisations have adopted design thinking to develop new products but healthcare service design is still in its introductory phase. This qualitative study describes the current state of home X-ray services in Mumbai and proposes touchpoints for raising awareness, acceptance and patient experience.

Keywords: service design, design thinking, healthcare design, patient experience, x-ray

1. Introduction

Healthcare organisations are built for a complicated, not a complex world. The silo structure of healthcare organisations efficiently divides the problems into manageable pieces but is incapable of dealing with high degrees of complexity. The modern way of life, combined with an ageing population, has increased the prevalence of chronic diseases. Chronic diseases lead to difficulties for the user and are complex system-level problems requiring holistic solutions. People who suffer from chronic diseases require greater attention and better experiences at every micro-step of the service process (Freire and Sangiorgi, 2010). Healthcare organisations are welcoming patient-centric solutions to improve the customer experience and boost satisfaction using human-centred design approach. The company which delivers the best experience and creates the most patient satisfaction, gets the most clients (Bae et al., 2014). However, healthcare innovation primarily occurs in the equipment and techniques; overhauling systems and practises is unusual due to the difficulty of quantifying and visualising the advantages of intangible variables. Therefore, to achieve the highest degree of care, it is critical to move beyond the traditional understanding of value and adapt service processes that are more human-centred and accessible.

Diagnostic services are essential at different stages of healthcare. Access to basic diagnostic imaging and other health services in low resource areas (such as rural areas) is one of the most complex challenges faced by healthcare. Services such as teleradiology and home diagnostic services can partially solve this problem, as observed in the mobile diagnostics in Kenya (Dhoot et al., 2018). However, accessibility is a more complex issue that extends beyond the delivery or access to equipment and is also affected by an individual's ability. Specially-abled, immobile, and frail individuals find it incredibly difficult to travel to a clinic or hospital or even get diagnosed within these spaces. Patients in circumstances where the attendant is pressed for time (for example in nursing homes, old age homes or small families), may find it difficult to use the diagnostic service, even if it is nearby (Toppenberg et al., 2020). Since the pace of diagnostics and getting onto the diagnostic table becomes a major challenge, home diagnostics become a great source of comfort. (Story et al., 2008). Healthcare institutions are improving primary care accessibility to

diagnostics and imaging services to enhance patient experience and improve clinical management. This is enabled through use of radical service design approach (Birchall, 2010).

Service Design is application of design thinking - a human-centred approach to problem solving, for designing intangible products, called as services. Birgit Mager, a professor at Köln International School of Design (KISD), defines Service Design as "the activity of choreographing people, infrastructure, communication, and material components of a service in order to create value for the multiple stakeholders involved". Lara Penin (2018) mentions that service design is a holistic, systemic, and strategic process that involves a high degree of research and discovery as well as ideation, prototyping, and proposal generation.

Using an example of service design in healthcare, this study aims to uncover the potential of service design methodology to solve complex primary healthcare issues and create patient-centric solutions. The study describes the application of service design approach in diagnostic services by emphasising on home X-ray services. The paper reviews significant literature and documents various examples of service design in healthcare. It further includes research methodology, findings in the form of potential opportunity areas, discussion, and conclusion.

2. Service design in healthcare

Over the past decade, many examples of application of service design to redesign existing healthcare services or create new ones are documented, however, the application universe is vast and service innovation is still not considered critical. This can be attributed to an underlying belief that everything else will follow if the technology is in place. This misconception has stifled interest in service innovation and moved the emphasis to research and innovation for novel diagnostics or treatments, as well as product innovation and development (Lovlie et al., 2009). A new drug or piece of equipment is subjected to several clinical studies, but new methods of service design and delivery are hardly exposed to clinical testing. Commercial and political imperatives drive these service changes, with little regard for the patient's experience. The human context, need, and fallibility are rarely considered while developing novel interventions and processes in healthcare, leading to the need for continual innovation and underutilised solutions (Altman et al., 2018).

The risk of managing and internal network costs of healthcare services creates a roadblock for dramatic innovation but supports incremental, long-term innovation. Incremental innovations can be achieved by building onto existing strategies and practises rather than attempting to replace what already exists (Lovlie et al., 2009). A service design methodology can lead to incremental innovation since it can create value by making minor adjustments at each micro-step and testing them using quick and dirty prototyping, thus eliminating the need for significant sums of money. Design-led process innovation eliminates the creation of unused solutions, prioritises building empathy for users, enables working in collaborative interdisciplinary teams, and employs action-oriented fast prototyping of solutions. (Altman et al., 2018). Unlike products, which are static in nature and usually enter the market near-perfect, services are built by mapping emotions, to keep attracting customers (Zomerdijk and Voss, 2010). Service design may thus consist of continuous incremental improvements that organisations use to fine-tune their services on a regular basis.

2.1. Design of user experience in Service Design

Customers tend to remember the overall pattern of pain, pleasure, and the end rather than each individual instance or encounter. The user's relationship with value has shifted from being a destroyer of value to a co-creator of value (Freire and Sangiorgi 2010). Service firms acknowledge this and therefore place customer experience at the heart of their offering. Experience-centric services are those in which organisations shape the desired experiences to customers through unique service and product offerings (Zomerdijk and Voss, 2010). Everyone recognises that patient acquisition is futile if the first personal encounter is not ideal (Huber and Hadschieff, 2009). The value of non- medical aspects of service which may be critical in delivering patient experiences is significantly lower than the medical aspects. Design is usually disregarded in the healthcare industry since it is assumed to deliver a quality component over an efficient, effective, and value for money element. However, design has the potential to go beyond the perceived value of quality and luxury to innovate processes and reshape perceptions of healthcare by

empathising with stakeholders and providing patients with the type of experience they desire while ensuring safety, efficiency, effectiveness, and value for money (Lovlie et al., 2009). Patient satisfaction is described as the degree to which patients believe their needs and expectations are being satisfied by the service provider, and the degree of congruence between a patient's expectations of ideal treatment and their perception of the actual care they receive. Patients suffering from chronic diseases require greater care and attention for improved experience. Many patients opting for home X-rays are aged, often suffering from chronic diseases such as osteoporosis, arthritis and lung cancer. According to a study, patient experience is associated with greater health effectiveness, treatment adherence, and reduced resource use, making their experience of care crucial in the treatment process (Kapoor et al., 2019). The evidence- based framework of service design evaluates the effectiveness of care of a service offering before implementing it, ensuring a positive experience (Lovlie et al., 2009).

Successful examples, such as General Electric's Adventure Series, Ascensia Diabetes Care and Breast Cancer Diagnosis in a hospital at Oslo, exhibit the power of service design in medical and non-medical healthcare processes that have empowered patients and improved effectiveness and acceptance of treatment.

General Electric's adventure series- Doug Dietz's example from General Electric clearly displays the power of process innovation through design in transforming patient experience and care. Dietz's design for an MRI machine garnered great acclaim and was also submitted for the International Design Excellence award. However, when introduced, the machine traumatised children and failed to deliver the desired experience. Dietz went on to redesign the experience of the MRI scans for paediatric patients after learning the principles of design thinking and collaborating with a range of people. He applied human-centred design, empathised with the children, and came up with his first prototype - the "Adventure Series". The children enjoyed the new MRI experience wished to do it again (Kelley and Kelley, 2013). An experience or engagement can be physical, emotional, mental, and spiritual (Zomerdijk and Voss, 2010). Design can identify, curate and deliver relevant engagement by creating journeys according to the experience required, as seen in Dietz's design for the paediatric patients.

Ascensia Diabetes Care- The importance of process innovation for health effectiveness can be further iterated through the example of Ideo's diabetes management system for Ascensia Diabetes Care. The design of the monitoring system was holistic and went beyond simple glucose measurements to encompass all elements that affect a person's health. The solution included training of the service provider, packaging design, visual design, digital application design and content generation. The solution was customised to the individual and included topics like cooking and mental health. The continuous feedback, progress monitoring, and refining, not only helped with diabetes, but also with mental health. The solution enabled a 70- year-old widowed woman overcome depression, resume swimming, and regularly monitor blood sugar readings (A Holistic, Human-Centred Approach to Managing Diabetes Care, 2017).

Breast cancer diagnoses- When the whole service path was examined in a hospital in Oslo, time required to diagnose breast cancer patients was reduced by 90%. Although the waiting period could be reduced further, patients stated that they were not mentally prepared to be diagnosed sooner. This underlines the value of patient experience and the importance of user needs in innovation efforts.

Diagnostic services such as radiology are an integral part of healthcare but they still lack service innovation. This is evident in a case study by Hawassa University in Southern Ethiopia. Following World War II, radiology services saw considerable advances in technology and techniques, including use of chemicals like Barium Sulphate for stomach and intestinal imaging. As patient experience is impacted by a variety of factors, entire service and its process must be seen holistically (Laal, 2013). According to a study, patients typically react to things that cause issues in the radiology department, such as delay, neglect, harsh remarks directed at them, unneeded repeats, and preferential treatment. Patients that arrive at the radiology department are frequently worried or appear to be aggressive (Mulisa et al., 2017). Hence, the focus of radiology services should not be limited to the radiology room but to the complete journey of the patient from entry to exit.

Mobile diagnostics like home X-ray solve clinical challenges including safe and convenient patient mobility and low resources and time constraints, but their implementation leads to new challenges. Challenges related to machine size and space available in the house, limit the accessibility of a home X-ray service and affect the service experience for the patients. An organisation must address these

difficulties to enhance patient experience and satisfaction. Since factors affecting accessibility are varied, utilising the multidimensional approach of service design can greatly benefit the service.

2.2. Delivery of user experience in Service Design

Service design can help healthcare organisations move past their own biases of quality and help them focus on the needs of the patients and their perception of the given treatment, delivering a positive experience. Service Design addresses numerous elements at the same time, including the demands of patient, physician, and the larger organisational setting. (Griffioen et al., 2017). Service design is not limited only to the design of service features, rather it is a more dynamic and ongoing collaborative process between clients and service organisations. Through a human-centred approach, service design puts the patient at the centre and empathetically understand their needs, leading to great patient satisfaction. However, key stakeholders that include patient's caregiver or guardian, can have an impact on patient satisfaction. Caregivers or patient attendants are silent stakeholders whose experience is overlooked while developing a service, despite being essential in providing physical, emotional, and mental support to the patient throughout the journey (Ericson, 2009). Service design goes beyond the silos of healthcare organisations and tackles problems holistically by studying the front end, back end, and interrelationships between stakeholders.

Elements in healthcare are frequently constructed as single interventions, based on static relations to intervene at the right time to navigate the complexity of healthcare systems caused by the large number of people, interactions and multilevel structure (Patricio et al., 2020). Building trust between the patient and professional takes time and is influenced by elements that appear to be unrelated. It is vital to pay attention to these 'unrelated' factors to create a differentiated experience and be valued by patients. Service design can discover these unrelated elements by understanding the interrelation of each touchpoint rather than viewing them as static relations. Lara Penin (2018) defines touchpoints as "the material face of services and comprise the artefacts that support the service's interactions. They not only physically enable the interactions but also are key to make them better, more efficient, more meaningful, and more desirable."

Samsung Hospital- Samsung Hospital revamp explains the benefits of understanding needs of key stakeholders in the service system. Samsung Hospital revamped its entire service model to include lodging for parents of hospitalised children, an inhouse school for children hospitalised for a longer duration, reduced queues, automatic payments, renovated space, TV and videos for kids, art exhibition for guardians and use of organic cotton for the patient uniforms and linen. Similarly, service design also considered the needs of the practitioners and staff by providing them with various benefits including childcare services. This service revamping resulted in a good reputation in patient satisfaction (Bae et al., 2014).

Patients undergoing home X-rays are typically fragile, specially-abled or bedridden (Toppenberg et al., 2020). The service must actively participate in radiological and non-radiological advances to meet the demands of patients. Non-radiological benefits include system-wide collaboration, cultural nuances, and understanding the implications of other stakeholders (Rubin and Abramson, 2018). While these can significantly improve the service experience, healthcare delivery is difficult, and any endeavour to enhance or innovate service delivery necessitates balancing numerous different views (Lovlie et al., 2009). Thus, it is critical to integrate the co-creative aspect of service design to ensure that the solution matches the context and that the service is easily accepted by all stakeholders (Altman et al., 2018). The holistic approach of service design thus caters to the needs of all the actors of the system.

2.3. Service Design Process

The Double Diamond model, developed by the UK Design Council, is globally adopted to drive design projects (Design Council, 2019). This process is also applied for design of new services or to improve existing ones. The first phase - 'Discover' is an exploratory step that helps understand contexts, users, and their needs. This step involves discovering information from secondary and primary sources. In the second phase 'Define', information collected in the previous step is analysed to identify the right problems to solve and new opportunities to pursue. The 'Develop' phase is the concept development phase involving generation of new ideas based on the previously defined brief. These ideas are iteratively prototyped and tested with users before the final solution is arrived at. Launch and effective implementation of the final solution is achieved in the 'Deliver' phase.

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Like any design process, service design is also user-centric and iterative. However, service design approach also has some unique characteristics as described by Griffioen et al., (2017). The process is holistic and sequential as it is built around the user experiences and interactions that are mapped on a timeline. Service design is co-creative, it enhances experience by soliciting active participation from all stakeholders who may influence the quality of experience. Prototypes serve as tangible evidence of the solution and enable stakeholder feedback during co-creation. Oliver King, co-founder of the UK's leading service design company, Engine quotes "Service Design is a collaborative process of researching, envisaging, and then orchestrating experiences that happen over time" (King and Mager, 2009).

3. Methodology

The objective of this study is to demonstrate the advantages of using service design approach for healthcare services, using home X-ray as an example. This explorative study explains the current situation of home X-ray services and ways to improve it using service design. The study is qualitative and undertaken in Mumbai, India. Design thinking tools were used in the process. Interviews, contextual inquiry and bodystorming were deployed in the data collection phase and user persona, user journey maps and affinity mapping in the analysis phase.

Key interview sources were identified using stakeholder maps, they included patients, patient attendant, radiographer, radiologist and doctors. A questionnaire was floated to 80 respondents to recruit the patients for interviews based on their age, gender, prior experience with home X-rays and reasons requiring X-rays. Four at-home X-ray patients, seven at-clinic X-ray patients and six patient attendants were interviewed. The home X-ray patients were all aged over 30 years while the attendant's age ranged from 16 to 60 years. Similarly, four radiographers, four radiologists and two orthopaedic doctors with varying degrees of experiences were interviewed. A radiology safety officer from the Atomic Energy Regulatory Body (AERB) was interviewed to understand the legal and safety requirements while using X-rays. Thus, 28 interviews were conducted in total and the average duration of the interviews was thirty minutes.

Design-led process encourages contextual inquiry which is necessary to understand the functioning of the service in the real world. Thus, an observational study was conducted at six diagnostic centres, one clinic and one hospital, and four nursing homes. The unpopularity of the home X-ray service became a limitation to study the end-to-end user journey. Therefore, bodystorming- an immersive technique requiring the researcher to physically experience the situation, was used. This session simulated an extreme usage scenario with difficult to find patient location, lack of parking, narrow roads, buildings with no elevators and poor lighting. This was necessary to unbundle all the elements of the entire service from pre-booking to post service. The elements for observation included medical aspects, such as the examination and quality of X-ray and non-medical aspects of the service including punctuality, communication, mode of transport and set-up.
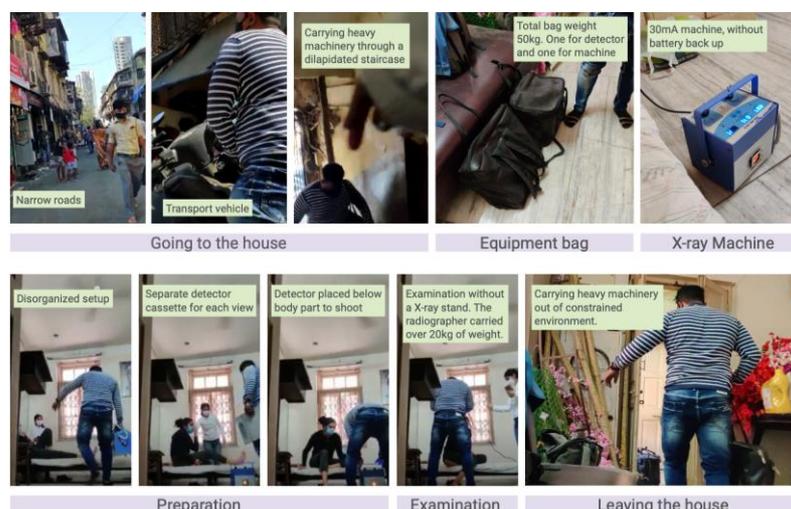

Figure 1. Bodystorming for home X-rays

All the information gathered from interviews and observational study was categorised into various themes using affinity maps. Affinity maps help identify patterns and organise ideas into categories or themes based on their underlying similarity. Themes were identified basis recurring problem areas, positive experiences and potential needs of the patients and service providers.

4. Findings and opportunities

Service design approach to improve the home X-ray service scenario in Mumbai yielded interesting opportunity areas. Healthcare organisations and diagnostic centres in Mumbai are diversifying their service portfolio through the addition of home X-ray services. However, low awareness, limited accessibility and poor user experience are the major factors for its unpopularity with the users. The service providers lack focus and have execution issues with home X-rays. These gaps identified in the frontend and backend actions provide a unique opportunity to improve patient journey by improving existing touchpoints and creating new ones. The service design touchpoint opportunities discovered in process include brand visibility, internal and external communication, safety practises and physical accessibility of the service.

4.1. Branding

Mobile X-rays were not popular and had trust issues when compared to clinical X-rays. Over 70 percent of the survey respondents were unaware of the existence of home X-rays. The lack of awareness was also prevalent in medical professionals. A good awareness strategy and timely delivery of relevant information can mitigate this problem and reduce stress and anxiety. However, service promotion needs to be conducted in a trustworthy manner to be most effective. Most patients collected and valued medical references solely from their relatives, close associates and known medical professionals and considered advertisements untrustworthy or a last resort. Introducing home X-rays through partnerships with medical professionals and organisations may generate higher credibility of the service. In cases where the service suggestion was not made through word of mouth, patients and the patient attendants chose a known brand, implying that good branding is essential.

Presently, there are three types of mobile X-ray services in Mumbai, India. A clinic or hospital providing the service strictly on a need basis, diagnostic centres offering it as a regular service and third-party radiographers offering their services to smaller diagnostic centres that are unable to afford branching out into home X-ray services. These variations in service offering have resulted in lack of standardisation, leading to an unorganised service model with poor service practises, such as casual or semi-formal attire rather than a uniform as seen in the bodystorming session and interviews (Figure 1.). This appearance makes it difficult for the patients to identify the radiographer and raises suspicions about the service. Large healthcare organisations have demonstrated that a uniform is one of the critical faces of the service and an asset throughout the patient journey. It is also vital to ensure that the uniform is appropriate for the service. Some organisations that impose uniforms, solely address the clinic or hospital context, resulting in smell, stains, and a dishevelled look. Branding colours, logos, uniforms, and guidelines for service communication, staff etiquettes and service delivery can make a significant difference. Branding thus distinguishes a company from its competitors, instils trust, promotes professionalism, and fosters brand loyalty (Zomerdijk and Voss, 2010).

4.2. Smart communication

The preferred method of scheduling appointments was seen to be largely dependant on age, comfort with technology, frequency of availing the service and platform used for booking. It was observed that older respondents preferred calling the centre over booking online. They sought help from their younger neighbours or children to overcome the technological barriers while booking online appointments. However, their anxiety levels remained higher in case of an online booking. Another person regularly availing service for a parent suffering from Parkinson's, preferred calling whereas the younger generation requiring the service occasionally preferred booking online or through SMS. The availability of booking options also affects the choice of the service provider. Technology provides various

communication channels but accessibility and ease of use are critical success criteria for its wider adoption.

Technology advancements also enable effective internal communication for the service provider, breaking down the silo structure that frequently results in negative experiences. A few noteworthy cases were discovered in which a lack of internal communication resulted in a negative patient experience. One of the respondents mentioned about an elderly woman who visited a clinic for an X-ray. She waited for her examination results for a long time after it was done, only to be informed that she needed to take another set of tests. The radiologist attributed re-examination to the poor image quality in the first attempt. Some cases require a unique positioning of the patient or intake of a chemical for better image quality. Demands for such cases in home X-ray services may only be met by establishing a strong communication between the radiographer and radiologist. Similarly, instances requiring re-examination require an efficient backend communication enabled through digital platforms for good patient experience.

4.3. Safety

Safety in home X-ray has three components - equipment safety, occupational safety and safety of people. Adherence to all the safety protocols is necessary to mitigate health risks involved with X-rays. Safety regulations are defined for equipment and practised only by equipment manufacturers, but in the absence of a regulated and standardised usage guidelines, some X-ray firms do not follow safety precautions. Despite high awareness about radiation hazards, radiographers are often negligent of their personal safety owing to the weight of the equipment. The on-duty radiographers carried the heavy equipment to difficult to access places with no elevators and far away parking places. They thus avoided carrying any extra payload, such as the radiation safety vest and ignored their own occupational safety. Majority of radiographers in Mumbai that perform home X-rays were men. This was primarily due to the heavy weight of the equipment and lower availability of certified female radiographers. This became a challenge with female patients who were more comfortable being diagnosed by female radiographers. Thus, ergonomic design of the equipment and training of radiographers can be looked at. Safety of radiographer emerged as a major area of concern during bodystorming. Radiographers travelling in two-wheeled motorised scooters are forced to place the equipment on the footboard of the scooter, restricting the movement of their legs and increasing the chances of accidents that could physically harm them as well as the machine and X-ray plate damage. The dimensions of the equipment disallow the radiographer to place it inside the boot (storage) space or secure it on the backseat, which coerces the radiographer to place it near the footboard (leg space) of the vehicle. A well-designed service kit has the potential to mitigate problems related to radiographer and equipment safety comprising of physical safety, emotional comfort, transport and financial security.

Along with radiation, patients are often more concerned about the "mess" generated in their house and the amount of time that the radiographers (a stranger) would be in their homes. A well-designed service kit may improve the X-ray process, reduce the amount of mess created and lower the weight of the equipment and accessories encountered. The kit must be designed to maximise process efficiency, reduce the payload on the radiographer and facilitate easier transport (vehicle, elevator and stairs). A right service kit is an opportunity for new product development to increase service efficiency, experience, and safety of home X-ray significantly.

4.4. Transportation

The narrow and closely packed streets in the interiors of Mumbai make it difficult for large vehicles to manoeuvre and find parking places. When Google Maps is unable to offer accurate instructions, the radiographer carrying the portable X-ray equipment may end up going in the wrong directions or damaged roads. In such situations, vehicle, equipment and equipment packaging selection is critical. Bad roads can disturb the calibration of some portable machines which can give incorrect results, thus the adversities of the environment and machine selection need critical evaluation. Many organisations rendering this service were seen to opt for a two-wheeled scooter as a mode of transport to the service location. However, organisations that provided this service only on a need basis opted for public

transport which required them to allocate a large team of radiographers to handle the equipment. A two-wheeled motorised scooter that can be customised for home X-ray services can thus be chosen.

5. The Future State Journey Map

According to Ideo, companies cannot afford to deliver an exceptional emotional experience throughout, and individuals cannot absorb such feelings continuously. A user journey map identifies the touchpoints at which emotional experiences must peak to have the greatest impact (Zomerdijk and Voss, 2010). This is achieved by visualising a user's step-by-step interaction with the service or product. What the user sees, feels, and experiences is described in the map. It may be used as a research tool, to map out current services, or as an ideation tool, assisting in the generation of new service sequences and features (Penin, 2018). The journey map as shown in Figure 2. depicts a simplified version of the touchpoints presented to make the home X-ray service experiential and patient centric. The map has been divided into three primary segments for easy interpretation: before examination, during examination, and after examination. These phases are further broken into smaller pieces for a better understanding of the process. Below each step, the service touchpoints discovered in this study are mapped.
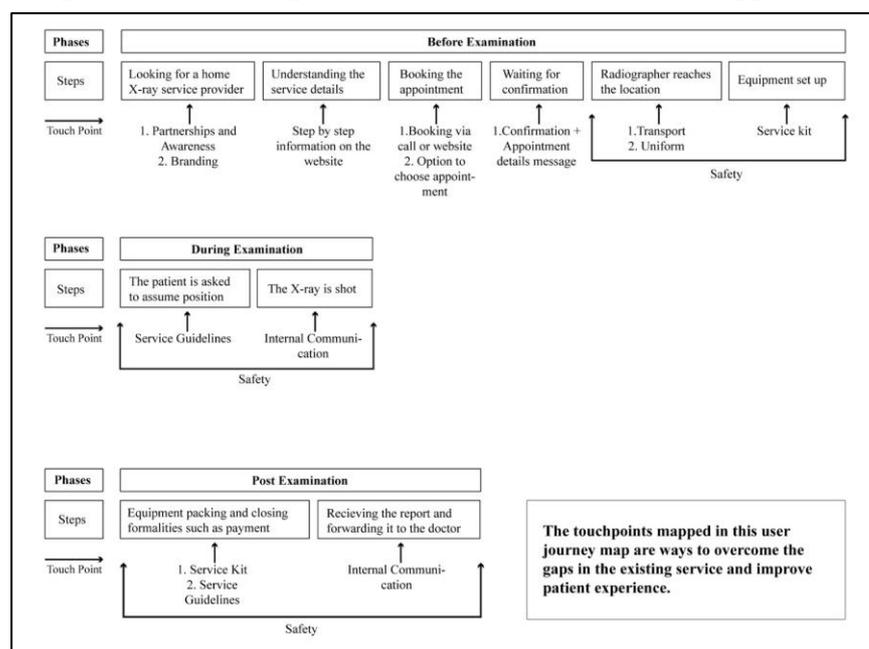

Figure 2. Proposed journey map

6. Discussion

The study demonstrates the application of service design approach in the primary healthcare sector. The findings of this study help visualise the innovation potential for patient-centric solutions and are in line with other studies (Patricio et al., 2020; Bae et al., 2014; Kelley and Kelley, 2013). Service design approach enables a holistic investigation of the system, maps the interdependence between various entities and helps arrive at impactful solutions. The layered use of research tools including observations, user journey maps and bodystorming, uncovered previously unknown challenges affecting the delivery of existing home X-ray services and patient experience. The interdisciplinary nature of service design is visible in the proposed touchpoints that belong to the domains of Branding, Information and Communication Technology, and Product Design. These opportunities are improvement of existing touchpoints that can drive incremental yet impactful innovation.

The study only focuses on design opportunities and not on the real-world delivery of the proposed touchpoints. Therefore, co-creation of touchpoints involving key stakeholders of service is not under the scope of this study. This was a user-centred, qualitative study with a limited sample and conducted only in one geography. Implementation in other contexts require detailed design, prototyping and user testing of the touchpoints. Though the focus of this work is on home X-rays, it indicates that service

design approach can positively enhance other healthcare and home diagnostic services, thereby making them more user- centred. As the awareness and usage of home diagnostic services has grown amid the fear of Covid-19 pandemic, higher adoption rates can be expected in the future. Service design is thus essential to cater to the scale and quality of at-home healthcare services.

7. Conclusion

Healthcare sector provides multiple opportunities for innovation using service design. Service design makes the patient journey experiential and streamlines the delivery processes of the organisation. Patient experience has become an integral and non-negotiable component of the healing process. A superior patient experience can also be a significant differentiator for one service provider over the other. Service design helps to strategize and develop new touchpoints or improve existing ones that create hassle-free experiences for the patients. Mobile X-ray and diagnostic services are essential to increase the accessibility of primary healthcare to the patients of chronic illness. Healthcare organisations that launch services like home X-ray are driven by the purpose of wider reach of quality healthcare. However, these services did not appear as the primary agenda for hospitals, diagnostic centres and clinics in Mumbai. Major efforts are required towards spreading awareness, last mile delivery and enforcing safety practises of the mobile healthcare services.

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