Author/s:
Salgado, M;Wendland, M;Rodriguez, D;Bohren, MA;Oladapo, OT;Ojelade, OA;Mugerwa, K;Fawole, B

Title:
A service concept and tools to improve maternal and newborn health in Nigeria and Uganda

Date:
2017-12-01

Citation:
Salgado, M., Wendland, M., Rodriguez, D., Bohren, M. A., Oladapo, O. T., Ojelade, O. A., Mugerwa, K. & Fawole, B. (2017). A service concept and tools to improve maternal and newborn health in Nigeria and Uganda. International Journal of Gynecology and Obstetrics, 139 (S1), pp.67-73. https://doi.org/10.1002/ijgo.12382.

CLINICAL ARTICLE

Using a service design model to develop the "Passport to Safer Birth" in Nigeria and Uganda

Mariana Salgado [1], Melanie Wendland [1,*] Damaris Rodriguez [1], Meghan A. Bohren [2], Olufemi T. Oladapo [2], Olubunmi A. Ojelade [3], Adebimpe A. Olalere [3], Ronald Luwangula [4], Kidza Mugerwa [4], Bukola Fawole [3]

[1] M4ID, Helsinki, Finland

[2] UNDP/UNFPA/UNICEF/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction, Department of Reproductive Health and Research, WHO, Geneva, Switzerland

[3] Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan, Nigeria

[4] Department of Obstetrics and Gynecology, Makerere University, Kampala, Uganda

***Corresponding author:** Melanie Wendland
M4ID, Helsinki, Finland. Email: melanie.wendland@gmail.com

Funding information: This article was developed as part of the WHO Better Outcomes in Labour Difficulty (BOLD) project, supported by the Bill and Melinda Gates Foundation and USAID.

Keywords: Co-design, Human-centered design, Maternal health, Nigeria, Passport to safer birth, Service design, Uganda

Synopsis: The service design model generates nuanced, human-centered, and innovative solutions to improve maternity care experiences and outcomes in low-resource settings.

Abstract

Objective: To demonstrate how a human-centered service design approach can generate practical tools for good-quality childbirth care in low-resource settings.

Methods: As part of the WHO "Better Outcomes in Labour Difficulty" (BOLD) project, a service design approach was used in eight Ugandan and Nigerian health facilities and communities to develop the "Passport to Safer Birth." There are three phases: Research for Design, Concept Design, and Detail Design. These generated design principles, design archetype personas, and Passport prototypes. Data collection methods included desk research, interviews, group discussions, and journey mapping to identify touchpoints where the woman interacts with the health system.

Results: A total of 90 interviews, 12 observation hours, and 15 group discussions were undertaken. The resulting design principles were: a shared and deeper understanding of pregnancy and childbirth among family and community; family readiness for decision-making and action; and the woman's sense of being in control and being cared for. Four archetype personas of women emerged: Vulnerable; Passive; Empowered; Accepter. Subsequent development of the Passport to Safer Birth tools addressed three domains: Care Mediator; Expectation Manager; and Pregnancy Assistant.

Conclusion: The service design approach can create innovative, human-centered service solutions to improve maternity care experiences and outcomes in low-resource settings.

1. Introduction

In 2014, the WHO initiated the "Better Outcomes in Labour Difficulty" (BOLD) project to address the quality of facility-based childbirth care in low-resource settings. The goal of this project is to accelerate the reduction of childbirth-related maternal, fetal, and newborn mortality and morbidity by addressing critical impediments in the process of labor and childbirth care, taking advantage of the interactions between the health system and the community [1]. The project sought to achieve this goal through a two-pronged approach: the development of a Simplified, Effective, Labour Monitoring-to-Action tool (SELMA) [2], and the creation of a Passport to Safer Birth (PSB) [3]. This paper addresses the development of the PSB.

The concept of the PSB was developed around the idea that improving demand for effective interventions and respectful care can increase the quality of services provided to women and the coverage of key interventions [3]. The PSB was conceived of as an innovative set of service prototypes and/or tools that improve or enable new interactions between communities and health facilities.

These tools were designed using an approach that applies human-centered design methods to co-design solutions together with end users. This paper reports on the development process. The PSB tools developed as a result are described in Salgado et al. [4].

1.1. Service design process as a tool to engage users and stakeholders in service innovation

The approach used to design the PSB service tools and concept is called service design, which is an emerging discipline focused on ideating, defining, and implementing services using a customer centric approach [5]. The service design process aims to innovate and improve new or existing services to make them more useful, desirable, and usable to the customer while ensuring efficiency and effectiveness to the service provider. While the consumer service sector uses the term “customer,” we refer to the term “client” or “user” when discussing services related to maternal and newborn health [6]. The holistic and multidisciplinary approach of service design enables teams to develop services that take the functional, emotional, tangible, and intangible aspects of services into account [5]. The multidisciplinary approach refers to the application of different expertise in the design process, including experts in service design, product design, research, and applied public health. Holistic means that service design looks at the client perspective, the provider perspective, and the health system perspective.

The “service” in service design refers to a series of interactions between providers and users of a service. Given that services are intangible, ephemeral [7], and dependent on the particular needs of each person using

them, the service design approach examines both conscious and unconscious needs, as well as the experiences and desire of clients. To accomplish this, service designers use a range of methods and tools to identify key moments for users accessing services, and the quality of experiences in those moments. For example, a typical customer journey through a particular service can be used to map and identify these key moments ("touchpoints"), and the kinds of experiences that are generated though interactions between customers and service providers in those moments.

The range of methods used provides a deep and textured understanding of the user experience across time, and during service touchpoints. It also encourages consideration both of the needs of the customer, and of the requirement to maintain integration of the service within the existing ecosystem of the service environment. A service designer seeks to visualize and express what other people cannot see, and to envisage solutions that do not yet exist. This is done through the observation and interpretation of needs and behaviors, and then by transforming all this information into possible future services, as well as by evaluating the quality of the resulting new design [8].

Miettinen et al. [9] compare different service processes and design phases, and conclude that models vary in the number and accuracy of their phases. The British Design Council synthesized a design process ("double diamond process"), which has four key phases: Discover, Define, Develop, and Deliver [10]. The discovery phase consists of research on user needs, markets, opportunities, and initial ideas. The define phase identifies and aligns needs and opportunities with the system or service environment and organizational goals in order to define concrete service concepts. In the develop phase, service concepts are prototyped, tested, and iterated with users and stakeholders. In the deliver phase, the service or product is finalized and made ready to launch. Service design processes apply these four key phases as a minimum, and involve users and stakeholder in as many of the phases as possible.

A human-centered service design approach has been used previously to address healthcare challenges, and has been successful in improving the creative process, the service provided, the project management, and the organizational culture [11]. For example, the cardboard hospital project in Finland used a service design approach to prototype patient-centric environments and services for hospitals, by building a 1:1 scale hospital wing with human size props and tools [12]. This model was used for prototyping and recreating real and imaginary situations in workshops with health practitioners, designers, architects, and patients [12]. The Nurse Knowledge Exchange Systems Initiative redesigned the face-to-face handover between nurses in California, USA, using a human-centered design approach to improve nursing culture and shift change practices [13]. Van Deventer et al. [14] describe the benefits of using Experience Based Co-Design (EBCD) in South Africa to engage caregivers of malnourished or HIV-positive children to enhance hospital-based quality improvement interventions. However, the approach has not been used before in the context of maternity care, nor has it been used in multiple low-resource sites and countries simultaneously. The present paper describes the successful application of this method in such contexts.

2. Materials and methods

2.1. Summary of process

The process described in this paper follows an iterative series of activities, milestones, and intermediate outputs that integrate the insights from end users of services and other stakeholders. There are three key phases: Research for Design, Concept Design, and Detail Design. The Research for Design phase represents the discovery phase described in the Double Diamond process [10], the Concept Design relates to the define phase, and Detail Design to the develop phase. As implementation of the tools into the service system was not part of the scope of this design project, the deliver phase is not discussed in this paper. Figure 1 illustrates the key phases and detail stages of data collection, analysis, exploration, synthesis, refinement, and results.

2.2. Phase 1: Research for design

The Research for Design phase is conducted with the purpose of providing background knowledge and input to designers [15]. During this phase, the team aims to understand the context the service and tools need to operate in, to explore expectations and perceptions of maternal health services, and to map user needs, behaviors, and practices within the cultural environment. Designers use this phase to gather inspiration and input for design.

While Research for Design applies similar methods as qualitative research in social sciences, it is different in that it actively includes the designer as a key informant. Bærenholdt et al. [16] argue that, in design situations, knowledge is necessary, but not sufficient. A deep interconnection between research and design is needed to avoid failures in the translation of knowledge into design requirements. Designers engage themselves as active participants during research activities, using design methods to understand and apply intuition, emotion, and aesthetic judgment [16]. The design research was summarized into an initial visualized journey of the woman through pregnancy and childbirth to highlight barriers, perceptions, behaviors, and actors along the journey.

The design team for this project consisted of four people with backgrounds in psychology, interaction design, and service design. They had no previous experience with maternal health service design.

2.2.1. Desk research

As a first step, the team conducted desk research to locate and review relevant journal articles, innovative design projects, and books as well as to conduct interviews with gynecologists and midwives. The desk research covered the topics set out in Box 1. **[Note to typesetter: Box 1 close to here]**

The design research was summarized into an initial visualized journey of the woman through pregnancy and childbirth to highlight barriers, perceptions, behaviors, and actors along the journey (Figure 2). This mapping informed the

subsequent design of field research activities to be conducted in Uganda and Nigeria.

2.2.2. Field research

Research sites were Abuja and Akure in Nigeria and Kampala, and Bududa districts in Uganda. In preparation for the field research, the design team developed interview guides, observational diaries, and visual tools to guide the discussions and facilitate communication between the research participants and interviewer.

The purpose of the initial field research was two-fold: to explore healthcare providers' interactions within the health system, considering available resources, constraints, and context; and to explore the context and journey of women through pregnancy and childbirth and their behaviors and preferences related to facility-based childbirth. The methods used in this element of the Research for Design phase were in-depth interviews and group discussions, and observations of admission, labor, childbirth, and postpartum practices in different health facilities. Interviews and group discussions were conducted by the design team in collaboration with local researchers and social scientists, in English, or in the local language where needed. Some interviews were conducted solely by local researchers, while others were conducted together with the designers.

Individuals from the following eight groups were identified as participants:

1. Pregnant women in the second and third trimester.
2. Women during labor and childbirth and immediate postpartum (when deemed acceptable by mother/family and considered feasible by health staff).
3. Women and their newborn after their return to their homes.
4. Family members of childbearing women.
5. Traditional birth attendants.
6. Community health workers.
7. Hospital reception and admission staff.
8. Facility-based nurses, midwives, and doctors.

Women were recruited to participate through local partners, including community leaders and community health workers. Since a woman's decisions regarding care-seeking during pregnancy and childbirth are often influenced by her significant others, other stakeholders were included in the interviews such as husbands/male partners, in-laws, heads of households, other family members, and Christian and Muslim religious leaders. These participants were recruited through the women who participated in the interviews, and the interviewer asked the women if their husbands/partners and/or other family members were available for participation in a separate interview. They participated in the interviews with the spouse present and also independently. From each of the selected health facilities, facility administrators, heads of the obstetrics and gynecology departments, midwives in charge of maternity units, or the heads of hospitals participated in in-depth interviews and workshops.

In total across Nigeria and Uganda, the design team conducted 90 interviews, 12 hours of observation in maternity wards, and 15 group discussions. Interviews and group discussions were audio recorded and transcribed for the analysis process, along with interviewer and observer field notes.

2.2.3. Ethical considerations

Ethical approval was obtained from the Ethics Research Committee of the Federal Capital Territory, Research Ethics Review Committee of Ondo State Ministry of Health and the UI/UCH Ethics Committee of the University of Ibadan in Nigeria, and Makerere University School of Health Sciences Research and Ethics Committee, Uganda. Ethical approval was also obtained from the Ethics Committee of WHO. All participants provided written informed consent prior to taking part in research activities.

2.2.4. Data analysis

Data analysis workshops

The design team conducted the first field research activities in Uganda, followed by Nigeria three months later. At the end of each initial site visit, the

design team held data analysis workshops in collaboration with the local research teams. During these workshops, the designers and researchers discussed their experiences, shared their notes, and mapped themes and ideas that emerged from the discussions. Data analysis during the Research for Design phase consisted of each designer analyzing their own notes, transcripts, and recordings of the interviews and combining them into different visualizations or presentations. This could involve drawings, diagrams, or collections of images and photographs with text (Figure 3). Additionally, the team created a shared spreadsheet document to collate insightful quotes from the interviews and group discussions, ideas, and observations. These insights were then combined in several evaluation workshops where different visualization methods, such as mind mapping [17] and affinity diagramming [18] were used. A mind map is a diagram used to organize information and was created around key concepts emerging from the data. From these key concepts, other ideas are connected directly to the central concepts, and other ideas branch out from those. Affinity diagramming is a collaborative way to cluster main insights from research using small pieces of paper. There are no pre-defined categories but the group defines them while reviewing the data gathered.

During the mapping process, the team considered the data through different lenses, such as the perspective of the stakeholders involved, as well as examining types of interactions and decision-making processes, and testing different representation techniques (Figure 4). Rapidly expressing numerous hypothetical ideas allowed them to be quickly tested. The best solutions could then be rapidly refined [19].

The analysis of the interviews, observation notes, and mapping exercises resulted in the development of a set of themes summarizing the key barriers for women to receive or demand better quality of care during facility-based childbirth. These barriers were framed as narratives, and given relevant thought-provoking titles or metaphors to enhance empathic engagement with each issue by those considering it. It was felt that this also allowed participants to and more easily discuss difficult subjects, such as mistreatment

during childbirth. The design team developed and iterated a set of 13 barriers (Table 1).

Using visuals and storytelling to describe the barriers as themes was crucial in moving toward the construction of design principles. Figure 5 illustrates this process. This picture is a visual narrative that combines quotes from the interviews with the key tag lines summarizing the insights. The team synthesized the insights into the title “Elephant in the ward” as a metaphor expressing that abuse is not being discussed in the facility.

Together with involved staff from WHO, the Nigeria and Uganda project teams and the design team discussed and evaluated the relevance of each barrier against the objectives of the design project. The workshop participants then recommended a set of prioritized barriers to explore during the design process.

User journey

Another key tool in the analysis process was the user journey, which maps the key moments or touchpoints when women and their families come in touch with the health system and where experiences, expectations, and barriers are formed and shaped [20]. The design team combined the journey of the woman with the identified barriers to understand which service ideas could address a barrier in the journey. Figure 6 shows the path from the moment the woman realizes that she is pregnant, through childbirth at a health facility, until discharge from the health facility.

Developing design principles

With the insights distilled into the barriers and mapped to the journey, the design team developed a set of goals to guide the design of solutions. These goals are called design principles, which can be compared with measurable indicators that help to evaluate whether a design solution stays true to its initial purpose and objective. In the context of the PSB, design principles or goals served as a compass to guide the solution design toward concepts that would have the desired impact. The team identified three design goals:

(1) *Shared and deeper understanding of pregnancy and childbirth:* The community shares a better understanding of pregnancy and childbirth. More attention is paid to pregnant women and their needs, and collaborative action is taken to enable women to access facility-based care. Pregnancy is openly discussed within the family and the community.

(2) *Readiness for decision-making and action:* The family has access to information and tools that prepare them for childbirth and help them make decisions or support planning.

(3) *Feeling of control and being cared for:* The woman and her partner know what to expect during childbirth, are familiar with the process in the health facility, and know their rights and what they can do to act upon their rights. The woman knows how she can ensure her well-being and can detect when it is time to go to seek care or give birth. The midwife knows how to respond to a woman's needs.

These three design goals can be imagined on a linear roadmap. While the overall objective of the PSB tools is to increase the demand for and provision of quality care, a first step was a better understanding of pregnancy and childbirth among the woman and her supporter. With a better understanding, the woman and her supporter would be ready to take action on important decisions related to care-seeking. The woman and her supporter would be able to feel more in control when in the health facility and able to express their needs and to demand high quality of care. At each step of the design process, the design ideas were evaluated against these goals to ensure that the identified insights would be translated into the design prototypes.

2.2.5. Design archetypes

A final deliverable in this phase was a set of design archetypes. Design archetypes are persona-type descriptions of user insights summarized to highlight the most relevant behavioral dimensions among a group of users that should be accounted for in the selected design context. Design

archetypes are used as a type of compass for the design team to stir thinking and empathy around certain identified behaviors and inspire idea generation. The archetypes were developed based on behavioral dimensions identified during research activities with women. They were used in the design process to guide solutions to incorporate different needs and behaviors. The design team created four design archetypes (Figure 7): (1) Vulnerable; (2) Passive; (3) Empowered; and (4) Accepter.

In this phase, facility administrators in Uganda and Nigeria particularly welcomed the comprehensive presentation of the research results and considered the format valuable and useful for a discussion around quality improvement.

2.3. Phase 2: Concept design

Using the design principles and the design archetypes, the team moved on to a concept design phase to explore a range of ideas and solutions. During the first "ideation" stage of this phase, a long list of ideas and potential solutions was developed, without considering or assessing feasibility, viability, or usability. This open approach allowed the group to table creative and innovative solutions. These ideas were explored, developed, and evaluated via a co-design process with the target user groups. Co-design refers to the creative activity of both designers, and of people not trained in design, working together in the design development process [21]. Sixteen ideation workshops with a total of 92 participants were facilitated by the design team in Nigeria and Uganda during 2014 and 2015. Where possible, the design team involved the same participants who had participated in the in-depth interviews and group discussions, to build ownership and continuity, and to ensure a responsive design process.

The ideation workshops focused on topics such as understanding both clinical and emotional needs during pregnancy and childbirth, and creating an ideal journey throughout the process of childbirth. In these workshops, participants engaged in creative exercises to build simple paper-based prototypes or role play service situations (Figure 8). With the help of these prototypes, ideas

were made tangible and the participants were able to discuss, critique, and evolve their preliminary concepts. Bringing together midwives and women in workshop exercises resulted in enlightening discussions, highlighting their different perspectives. This allowed for the development of tools to assist healthcare providers in providing women-centered childbirth care, and elucidated common themes to leverage for design.

2.3.1. Synthesis and exploration

After the workshops were conducted and the results evaluated, the design team distilled three key areas that were amenable to solutions for better quality of care. These areas are framed as solution domains. The solution domain allows the designer to set a specific parameter, such as the issue that the solution should address. The three distilled solution domains defined for the PSB were: the *Care Mediator,* which aims to improve the relationship between the woman and the healthcare provider to assist with medical information and emotional support during childbirth; the *Expectation Manager,* which aims to increase the role of the woman's companion and create better expectations toward care to generate more autonomy during childbirth; and the *Pregnancy Assistant,* which aims to improve the understanding of pregnancy and childbirth among the couple and creates better communication between the pregnant woman, her partner, or family members to prepare for childbirth.

After defining the solution domains, the design team began working on designs within these domains. Over a week, the design team and the research teams from Uganda and Nigeria met in Helsinki, Finland. This also included an experienced midwife and a prototyping and sketch expert. Participants developed ideas within the different solution domains so that the design proposals addressed different barriers and challenges. In addition, the team prioritized ideas and discussed which ideas were most feasible for implementation. Role playing was used as a technique to identify innovative solutions from the point of view of different stakeholders.

2.4. Phase 3: Detail design

2.4.1. Refinement and results

A design proposal defines the physical, visual, and functional aspects of a solution and the context in which it could be used. In the case of service design, a proposal can include guidelines and recommendations on activities, interactions between people and the service (touchpoints), and the specifications of the actors that are involved in the service. Design proposals are expected to be modified in the process of implementing real products or services according to contextual and manufactural needs. The design team developed prototypes of the tools, and tested these prototypes in the health facilities and communities in Nigeria and Uganda.

The designer conducted usability, functionality, and desirability testing by distributing the tools to users (healthcare providers, women, and partners). Designers observed their usage of the tools, how well or not the content was understood, and how clear the purpose of the tool was to them. Workshops were also conducted to explore the most effective tone of voice, visual language, form, and functionality. User feedback was iteratively integrated into refined tools in between workshop sessions and field work in Nigeria and Uganda. The tools were tested during two field visits to Uganda and one to Nigeria. An information designer specializing in information visualization translated the collected feedback from users into the final designs, paying attention to color, placement of information, size of font, and functionality of the tools. The content and language were also finalized with maternal health experts to ensure technical accuracy.

3. Issues arising in the process

Human-centered design processes are complex and require many iterations with users. The model outlines three key phases with six stages (data collection, analysis, exploration, synthesis, refinement, and results), which support the design of services that are responsive to specific contexts. This presents a clear process, which enables users and providers of services and stakeholders to take an active role in the design (research for design, concept design, and detail design) and analysis phases (user journey, design archetypes, barriers, design principles, and solution domain). In the case of

the BOLD PSB, the service design model supported the intertwining of intuition-based design with analytical thinking, as creative thinking was an integral component of the process.

This design process was conducted in two countries: Nigeria and Uganda. While the process was conducted with standard phases and activities, local variances were taken into account. Owing to strikes in the health sector in Nigeria, the process had larger time gaps between initial research and the co-design activities. The testing of prototypes in Nigeria consequently happened later in the design process than desired. Owing to security concerns in Nigeria, the design team did not have as open access to community-based design work as was possible in Uganda. However, engagement with health facility administrators and providers was stronger in Nigeria than in Uganda. In both countries, participants in the design process were eager and interested, but owing to gaps between the design activities and change of staff, continuity of the process was not always ideal. Active participation and ownership of the participating facilities and access to community-based design work are crucial for the success of a new service development project.

4. Discussion

Service design is a relatively new approach in the field of maternal health, therefore it is important to clearly communicate each step in the process and engage stakeholders and users throughout the process. In this study, barriers for women to receive or demand better quality of care during facility-based childbirth were formulated as a visual narrative incorporating quotes from the research participants. This visual narrative made the insights more tangible and approachable to the project collaborators. Participants in workshops and co-design sessions grasped the barriers quickly and prioritization activities were useful to ensure ideas and solutions were relevant and important in a certain context. In addition, the narrative style helped to discuss sensitive topics with healthcare providers, such as the mistreatment of women during childbirth, because participants did not feel that they were being evaluated or judged.

A key finding from the co-design activities was the need to improve the continuity of the relationship with design research participants. For many participants in BOLD research activities, such an active participation in a design process was new. Discussion, critique, and imaginative thinking are required to come up with ideas and design suggestions. To establish trust, a mutual understanding of the process and the dynamics of the team is necessary. Enough time should be invested, over a short time span, to ensure the continual workflow and maintain synergy between participants, designers, and experts.

In reviewing the process, the design team concluded that the model could be executed at a faster pace—namely over a period of two years. To keep the synergy and flow in the design process it is crucial to spend enough time doing participatory design work and use this as inspiration for the next phase in the process. Long times within stages may separate the team too much from fresh and meaningful insights that enrich the design process. Another challenge faced in the co-design process was that healthcare providers in facilities rotate, which can create a discontinuity of ownership to the process that the design process tries to achieve among the project participants.

Despite these difficulties, the design and research activities (interviews, ideation and evaluation workshops, prototypes) were perceived as well-selected and efficient in terms of quantity and quality of data gathered. The model supported the selection of design activities and an organized documentation of the process. In addition, it helped to communicate with others in the team. This was important as the design research methods used were new in the healthcare setting.

4.1. Strengths and limitations

Scalability was a challenge owing to the qualitative characteristics of this work, and because participatory design methods are attached to designers and their enactment of the methods [22], their backgrounds, and preferences. Despite this, we believe that the insights, solutions, and model developed for the PSB will be relevant and transferable to other populations within Nigeria

and Uganda or even beyond owing to the involvement of many different stakeholders throughout the process. The solutions have been designed to take local manufacturing and supply possibilities and constraints into consideration. An important strength of this project is the demonstration that innovative user-engagement methods to improve quality of maternity care are feasible in two low-resource settings. This project demonstrates that service-design methods can be used to design services that generate demand for quality improvement, are human-centered, and provide positive experiences for both users and providers.

We recommend that service designers use this model. Researchers could consider adopting service design methods when developing interventions to improve maternal health in low-resource settings.

5. Conclusion

The present paper describes how a service design process can be applied to develop innovative tools or services in the realm of maternal health in low-resource settings. The service design model presented here promotes the inclusion of key actors (healthcare providers and experts, women, companions, community members, and facility managers) in the different stages of the design process and provides a strategic framework to ensure insights collected from all actors are taken through into the design proposals. The model highlights the importance of using visual communication tools to guide complex decision-making and design processes, such as the design of a series of tools to support families and healthcare providers for facility-based birth. The model gives the design team the possibility to move between micro (nuances of design functionalities) and macro (barriers, design domain) views of the process. The model could be adapted, replicated, and used for other contexts and design challenges. The engagement and commitment in the whole design and research process of all the actors that form the ecosystem around the design proposals is fundamental and can only be achieved through constant and effective communication. A service design model, if used consistently, could ensure the transparency in the quality improvement process by keeping all stakeholders updated and committed.

Contribution to authorship

This commentary was conceived by MS, DR, MW, and MAB. All authors contributed to the content and development of the article. All authors reviewed and agreed the final version of this manuscript.

Acknowledgments

We would like to acknowledge the contribution of all participants in our co-design sessions as well as our colleagues at M4ID who contributed to this project. We appreciate the technical advice from the members of the WHO BOLD Technical Advisory Group. The authors alone are responsible for the views expressed in this publication and they do not necessarily represent the views, decisions, or policies of the institutions with which they are affiliated.

Conflicts of Interest

The authors have no conflicts of interest to declare.

References

[1] Oladapo OT, Souza JP, Bohren MA, Tuncalp O, Vogel JP, Fawole B, et al. WHO Better Outcomes in Labour Difficulty (BOLD) project: Innovating to improve quality of care around the time of childbirth. *Reproductive Health*. 2015;12:48.

[2] Souza JP, Oladapo OT, Bohren MA, Mugerwa K, Fawole B, Moscovici L, et al. The development of a Simplified, Effective, Labour Monitoring-to-Action (SELMA) tool for Better Outcomes in Labour Difficulty (BOLD): study protocol. *Reproductive Health*. 2015;12:49.

[3] Bohren M.A, Oladapo OT, Tunçalp Ö, Wendland M, Vogel JP, Tikkanen M, Gülmezoglu AM. Formative research and development of innovative tools for “Better Outcomes in Labour Difficulty” (BOLD): study protocol. *Reproductive Health* 2015;12:50.

[4] Salgado M, Wendland M, Rodriguez D, Bohren MA, Oladapo OT, Ojelade OA, Mugerwa K, Fawole B. A service concept and tools to improve maternal and newborn health in Uganda and Nigeria. Int J Gynecol Obstet 2018 **[THIS SUPPLEMENT]**

[5] Mager B. Service Design. In: Erlhoff M, Marshall T, Eds. *Design Dictionary: Perspectives on Design Terminology*. Basel: Birkhäuser; 2007.

[6] Moritz S. Service Design. Practical Access to an Evolving Field. Cologne, Germany: *Köln International School of Design*; 2005.

[7] Lovelock C, Gummeson E. Whither Services Marketing? In Search of a New Paradigm and Fresh Perspectives. *Journal of Service Research 2004;*7:1.

[8] Holmlid S. Interaction Design and Service Design. Expanding a Comparison of Design Disciplines. *Nordes* 2007;2.

[9] Miettinen S, Rontti S, Kuure E, Lindström A. Realizing Design Thinking through a Service Design Process and an Innovative Prototyping Laboratory – Introducing Service Innovation Corner (SINCO). Paper presented at DRS 2012 Bangkok, Chulalongkorn University Bangkok, Thailand, 1–4 July 2012.

[10] Design Council. A study of the design process. http://www.designcouncil.org.uk/sites/default/files/asset/document/ElevenLessons_Design_Council%20(2).pdf. Accessed March 30, 2017.

[11] Bate P, Robert G. Experience-based design: from redesigning the system around the patient to co-designing services with the patient. *Quality & Safety in Health Care 2006*;15:307–310.

[12] Kronqvist J, Erving H, Leinonen T. Cardboard hospital: Prototyping patient-centric environments and services. *Nordes 2013*;1:5.

[13] Lin M, Hughes B, Katica M, Zuber C, Plsek P. Service Design and Change of Systems: Human-Centered Approaches to Implementing and Spreading Service Design. *International Journal of Design* 2011;5:2.

[14] Van Deventer C, Robert G, Wright A. Improving childhood nutrition and wellness in South Africa: involving mothers/caregivers of malnourished or HIV positive children and health care workers as co-designers to enhance a local quality improvement intervention. *BMC Health Services Research.* 2016;16:358.

[15] Simonsen J, Bærenholdt JO, Büscher M, Scheuer JD, Eds. *Design Research. Synergies from Interdisciplinary Perspectives.* London: Routledge; 2012.

[16] Bærenholdt J, Büscher M, Scheuer JD, Simonsen J, Eds. *Design Research: Perspectives on design research*. London: Routledge; 2012.

[17] Moggridge B. Designing Interactions. 1st edition. Cambridge, Mass: *The MIT Press*; 2007.

[18] Beyer H, Holtzblatt K. Contextual Design*. Interactions 1999*;6:32–42.

[19] Faste T, Faste H. Demystifying "Design Research". Design is not Research, Research is Design. *IDSA Education Symposium*. August 15, 2012, Boston, USA.

[20] Kumar V. 101 Design Methods: A Structured Approach for Driving Innovation in Your Organization. 1st edition. Hoboken, NJ: Wiley; 2012.

[21] Sanders EBN, Stappers PJ. Co-creation and the new landscapes of design. *CoDesign 2008*;4:5–18

[22] Light A, Akama Y. The human touch: participatory practice and the role of facilitation in designing with communities. Proceedings of the 12th Participatory Design Conference: Research, August 12–16, 2012, Roskilde, Denmark. New York: Association for Computing Machinery; 2012:61–70.

Box 1. Desk research topics.

- Maternal and perinatal mortality and morbidity in low-resource settings (12 articles).
- Quality of care during childbirth in low-resource settings (5 articles).
- Barriers and facilitators to quality care during childbirth in low-resource settings (3 articles).
- Facilitators, barriers, and interventions to improve respectful maternal care (3 articles).
- User and provider experiences with mistreatment during childbirth (13 articles).
- User experiences of the facility referral processes—the journey from home to primary facility to referral facility (6 articles).
- Community perceptions of pregnancy, labor, and delivery in Sub-Saharan Africa (4 articles).
- Health behavior change in Sub-Saharan Africa (3 articles).
- Experiences with supportive attendance during childbirth (4 articles).
- Mobile and technology-driven maternal health initiatives in Sub-Saharan Africa (10 articles).

Table 1.

Barriers to women receiving or demanding better quality of care during facility-based childbirth.

	Narrative theme	Description of theme
1.	Pregnancy and childbirth have no narrative	Lack of a compelling and holistic service story result in a weak macro view and a lack of better understanding of pregnancy and childbirth
2.	Endless acceptance of poor or lack of services	Communities tend to express a low demand for quality of care and demonstrate high acceptance of poor or lack of services
3.	Information format error	Health talks, information brochures, and other health message formats do not meet the diverse needs of women and therefore lead to poor health information retention
4.	Waiting and hoping	Waiting and hoping is often the main activity in the facility when processes and outcomes are not clearly communicated

		to women
5.	Men are just the providers	Men are perceived and accepted in the mere role as the financial provider and therefore are left as outsiders in the process of childbirth
6.	Shortcuts are part of the uniform	Lack of right tools, processes, and collaboration models within hard work environments have made shortcuts in care a norm
7.	The elephant in the ward	Abuse is a topic that is spoken openly and commonly in the community but not addressed and discussed in the facility
8.	In God we trust	Religion plays a big role in the decision-making around pregnancy and childbirth and is often a neglected factor in service planning
9.	Tools capture only samples	Lack of tools to monitor, track, and document labor efficiently and reliably often results in fragmented and incomplete data for decision-making.
10.	Pregnancy needs no attention	Not enough attention is paid to pregnancy within communities and pain or signs of danger are often accepted and ignored as part of the norm
11.	Money buys better care	Money is perceived the key to good quality of care
12.	There is always tomorrow	Delaying decisions related to health is common in low-resource settings.
13.	Lonesome in the crowd	Women are lonely with lack of peer support and forums to discuss issues

FIGURE LEGENDS

Figure 1. Process model.

Figure 2. Example of the desk research highlighting barriers and bottlenecks related to quality of care during pregnancy.

Figure 3. A designer visualizing insights collected from the field into a visualized diagram.

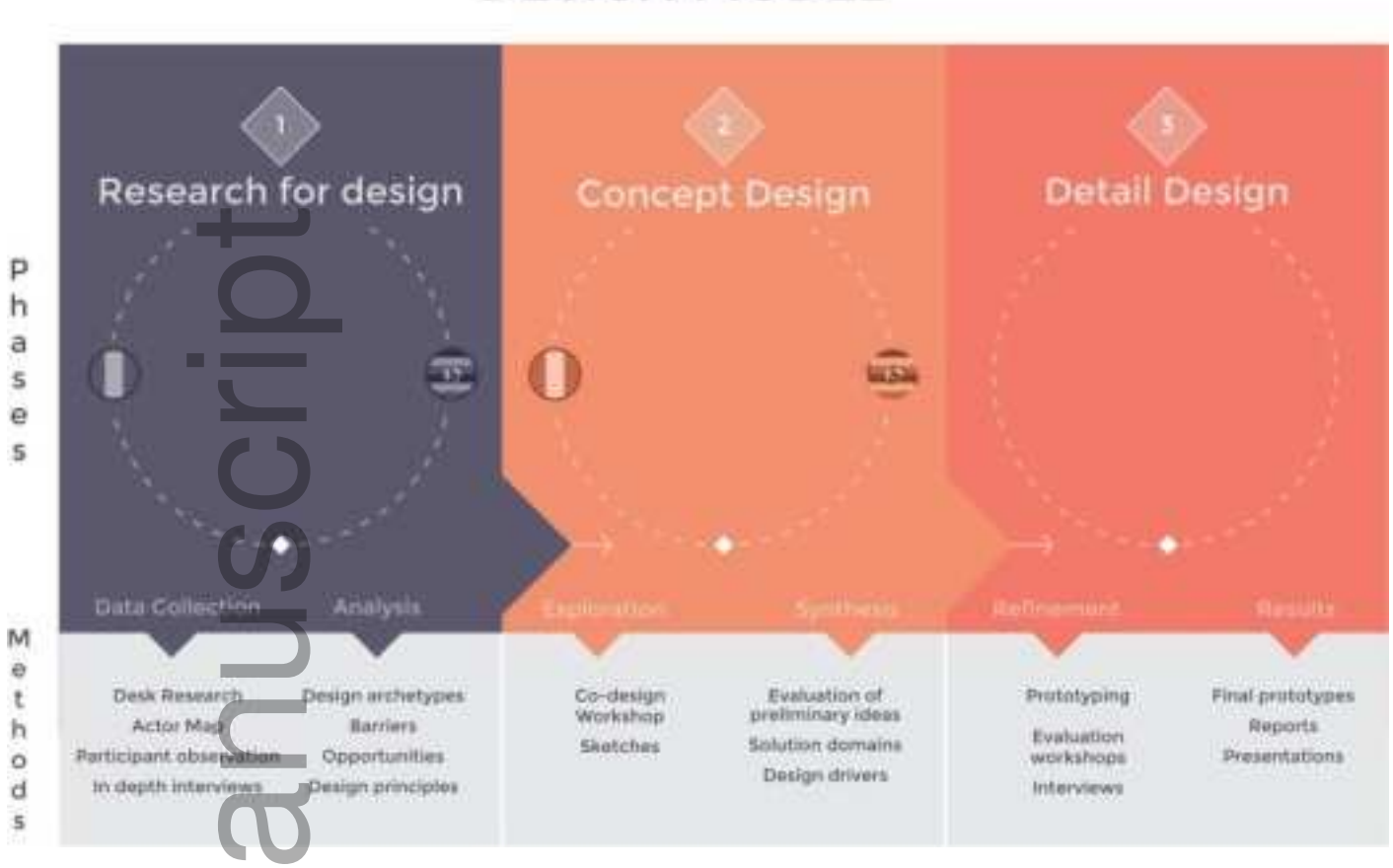
Figure 4. Design team jointly analyzing findings and mapping insights into an affinity diagram.

Figure 5. Using visuals and story-telling to develop meaningful metaphors: “the elephant in the ward.”

Figure 6. Touchpoints on the user journey.

Figure 7. Design archetypes.

Figure 8. Example of one of the co-design workshop exercises conducted with the participants.

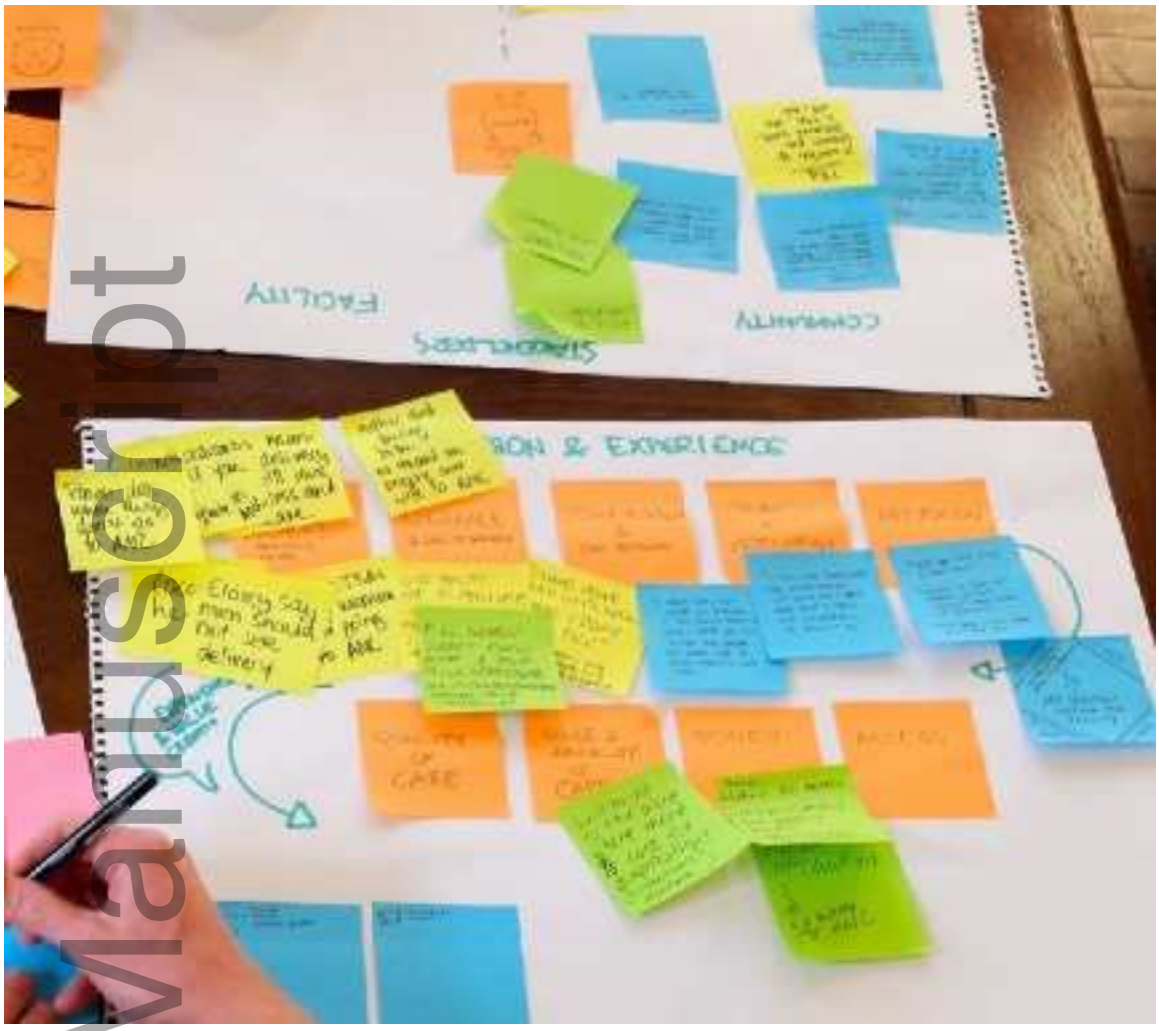


ijgo_12381_fig1.jpg

BOTTLENECKS DURING PREGNANCY

ijgo_12381_fig2.jpg

ijgo_12381_fig3.jpg



ijgo_12381_fig4.jpg

7

THE ELEPHANT IN THE WARD

Abuse is a topic only in the community but not in the facility

People accept and do not raise concerns when they experience or observe abuse

"Some women prefer TBAs because nurses use such abusive and insulting language"

Man

"Nurses shout because women behave like children. They need to be harsh so women would do the right things."

Doctor

"Rude behavior of nurses is also caused by patient behavior"

Doctor

We are pregnant

Antenatal care

1 2 3 ...

I attend ANC but I never go before the 7th month. Once I went early and later my baby died, so going early is not good."

"They gave me the mother's book but is it for them and not for me"

Labor starts

"I thought I had Malaria and just went to rest, and then suddenly the baby came, so I gave birth here at home"

Admission

"Sometimes the mothers come without anything at all. They should have the information and mama-kits ready."

Discharge

"If you want someone to care for you very well, you will need to touch in the pockets"

Postpartum

"No comments about the baby's condition are shared or no questions asked during an hour observation period"

Delivery

"You are supposed to be happy with what you are told or given"

Labor

"Nurses shout because women behave like children. They need to be harsh so women would do the right things."

VULNERABLE

She worries about pregnancy and needs emotional support. She wants the best for the baby but avoids busy hospitals and turns away because of the fear of bad care, discrimination or lack of privacy. She values soft approach and traditional care.

EMPOWERED

She values medical care and emotional support. She actively selects the best option accessible and has a holistic view about pregnancy and delivery. She knows partly about risks. She prepares and plans for the delivery and has a positive attitude toward family planning. She wants to be in control and demands.

PASSIVE

Pregnancy and childbirth need no special attention. Only God has the power to give life. Facility has no meaningful role, and other stakeholders make decisions on her behalf. Facility/ANC visits only in case of an emergency.

ACCEPTER

She believes in the need for medical care but doesn't know much. She wants the best outcome for her delivery but she can be passive and postpones critical decisions. She shows weak demand for quality, and other stakeholders have a strong effect on her decisions.

WORKSHOP C Board, information at the facility

ACTIVITIES

BRIEF "Let's design a digital board that will help women, their companions and midwives to feel more in control, empowered and receive better quality care. The point is not to redesign patient file folders – but instead to create one board with simple and useful information that is most relevant to midwives and women."

1. Introduce the empty board to the participants. Ask for their spontaneous input for 5 empty "areas".
2. Introduce all the prepared material to the participants. First version midwife board and a second version from the woman's perspective. Participants should look through all the material and select the information that is most relevant.
3. Create an example where midwife and mother could use the board at hospital. Recreate in pairs the situation where one person is the midwife and the other person is the woman.
4. Final presentation