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Improving Women's Birthing Experience in Hospital Through Qualitative Study

Kinjal Shah | Fall 2021 Innovation Incubator Project

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Introduction

In the United States, the maternal mortality rate is 23.8 per 100,000 pregnancies representing 861 maternal deaths in 2020 (Hoyert, 2022). These deaths are influenced by various social, economic, cultural, and physiological factors. Amongst these factors, the built environment has a significant role in the well-being of an individual. It is well-known that a physical environment with good ventilation, windows, access to nature, and a safe environment helps induce the healing process positively (Ulrich et al., 2008). Most women need quality care in a safe, calm, and secure environment so that their mental and hormonal systems can function properly without any complications.

Childbirth is a significant life event for women that will be remembered throughout their lives. Today, most childbirth happens in hospitals, where the environment is more unsympathetic than a respite place. Hospitals have made this life event a medical condition rather than a physiological one. This medicalization of childbirth has made childbirth hospital spaces a function of biomedical intervention These conditions require an environment to reduce their stress levels and pain. It is a well-known fact that the built environment plays an important role in birthing women's health, well-being, and mindfulness. (M. J. Foureur et al., 2010). But there is very few research done to justify the role of built environment in improving the women's birthing experience in hospitals.

Pandemic taught us that the current healthcare system needs to keep up with upcoming challenges and surges. It made us revaluate our healthcare services and the delivery of care. Similarly, women's health is a significant service line that needs to evolve with women's current trends and needs. There is no one-size-fits-all solution, but it cannot be overlooked as just a medical sub-specialty. It needs to be seen more as a holistic health approach.

The research highlights the challenges and needs for improving the patient experience in hospital; the design checklist and goals are first step to achieve better patient experience and improve the health outcomes But women's health is major public health component, it needs tangible and intangible efforts to make it better. For future growth and trends for marketing, women's programs need to look beyond obstetrics, prioritizing gynecology, behavioral health and fertility services depending on local patient demand. Women's health program should integrate tele health to increase the access of care and provide continuum of care. Design might solve the tangible issues but it takes a community effort to create the intangible change. As healthcare designers we need to look beyond design problem. Design should not stop here to check a box and complete the checklist. It calls upon working with our clients, users, and those caring for maternal health to really understand how design should, so that design can. It is easy to agree that yes, design should do all these things however, it is up to architects and designers to creatively implement strategies based on the additional factors operational processes, social and regulatory factors.

This innovation incubator project focuses on the need for improved maternal healthcare design in hospitals. It summarizes the research from the healthcare fellowship and highlights the user needs. The project defines the design goals to improve health outcomes. These design goals inform the design strategies influencing the environmental, social and operational factors of planning. Together, these results can be used as a design checklist for any women's health project in the future.

02
Understanding the Issue

Women are the primary healthcare decision-maker in the household. The current healthcare system recognizes women's health as a medical sub-specialty but not "health" as a holistic approach. There is no one-size-fits-all solution available for women's health in healthcare delivery. There is a need for women-focused health centers to expand ob-gyn practice. This expansion should address the broad definition of women's health and well-being as primary care. Women should be part of designing healthcare as their experiences and knowledge drive more inclusive and targeted strategic planning. To improve the women's health, maternal deaths and access to quality healthcare should be tackled at the community level

Causes of Maternal Deaths

As per World Health Organization (WHO), Maternal Mortality is measured as a death that occurs while being pregnant or within 42 days of the end of pregnancy from any cause related to medical complications by the condition of pregnancy or by its management, but not from accidental or incidental causes (Declercq & Zephyrin, 2020). The recent statistics released by the CDC claimed a 14% increase in the maternal mortality rate from 861 in 2020 to 754 in 2019. This ratio is higher than the other developed countries like the UK, Canada, France, etc. (refer to figure 1). Data shows that 17 percent of the deaths occur on the day of delivery. The Report showed a significant racial disparity between black women compared to white women; it was found that the rate for black women was 55.3 deaths per 100,000 in 2020, whereas the rate for white women was 19.1 deaths per 100,000 (Declercq & Zephyrin, 2020). The data doesn't directly highlight the differences in underlying health conditions, access to quality health care, and structural health inequities. This disparity highlights the lack of community-based care and ignorance of healthy living conditions.

Medical conditions like severe bleeding, high blood pressure, and cardiomyopathy are the most common causes of death during the first week of postpartum (Declercq & Zephyrin, 2020). About 60 percent of these deaths are preventable through decreased medical errors, effective treatments, and proper coordination by clinicians and hospitals (Slomski, 2019). On the other hand, the US has a shortage of maternity care providers for the number of births. The data showed that the US has 15 providers per 1000 live births in comparison to the other developed countries. The overall undersupply of maternity providers, lack of access to postpartum care and healthcare inequities are contributing towards rising maternal mortality.

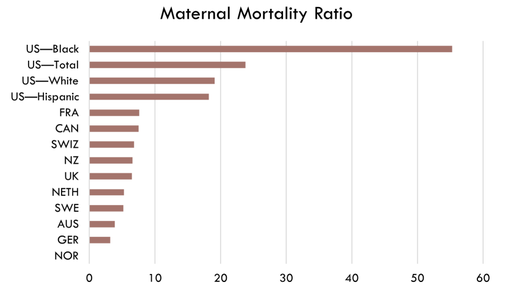


Figure 1: Chart showing the Maternal Mortality Ratio of Developed Countries. The maternal mortality ratio is defined by the World Health Organization as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. Data from Maternal Mortality Rates in the United States, 2020 (National Center for Health Statistics, Feb. 2022)

Gaps in Healthcare Delivery

The shortage of maternity providers and lack of integration of primary care and midwives in specialty care contribute to the multi-faceted high mortality rate in the US. There is a lack of knowledge and communication among patients and providers, leading to errors in diagnosis WHO recommends that midwives help in reducing the maternal mortality rate by assisting in childbirth and building a relationship with mothers to support the natural reproduction process. Although insurance plans in the US do not cover this prenatal care by midwives, access to their services is limited. As per the commonwealth study, US and Canada have lowest supply of midwives and ob-gyns i.e 12 and 15 per 1,000 live births, ob-gyns out number the midwives in maternity workforce.

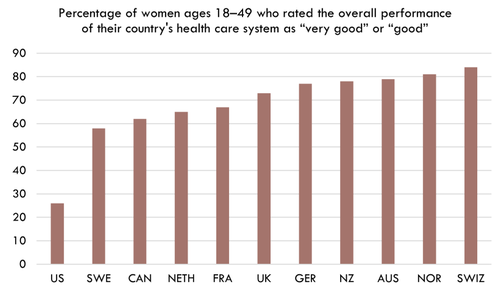


Figure 2: Chart showing that only the quarter of US women of reproductive age gave less rating to the performance of healthcare system than the other developed countries (Data from Common-Wealth Fund 2020 International Health Policy Survey)

There are also several state laws, rules and restriction on midwifery services in US which requires physician supervision of midwives (Declercq & Zephyrin, 2020). Whereas in other developed countries, there is an integration of both midwives and ob-gyn throughout the pregnancy which helps in low medical intervention rates and cost for best outcomes.

Beyond the differences in healthcare delivery in developed countries, there is also an issue of racial disparities in care delivery. The CDC report in 2020 suggested that black women are three times more likely to die of maternal complications than the white women (Hoyert, 2022). The root cause of the inequity lies in systemic, institutional, interpersonal, and individual approach. It is perceived by 40% first and second year medical students that black people have thicker than skin than white people, leading to under treatment of pain for black patients (Sullivan, 2020). There is also insufficient access to affordable and quality care for black women, hence they end up at lower quality hospital with higher morbidity rates. This can be solved by identifying the care gaps, giving community based resources and diversifying the healthcare force to incorporate inclusive impact on maternal healthcare.

3.3X

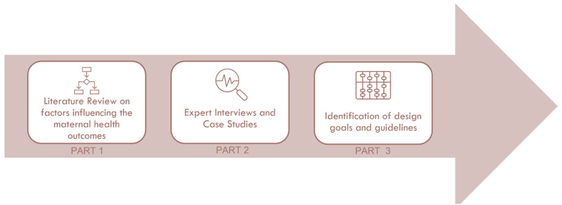
Higher pregnancy-related mortality ratio for non-Hispanic Black women compared to non-Hispanic white women, 2011-2016 (Sullivan, 2020)

55%

Higher preterm birth rate for non-Hispanic Black children compared to non-Hispanic white children, 2019 (Sullivan, 2020)

03
Research

The research for the incubator was conducted concurrent with E Todd Wheeler Health Fellowship Project. The research was three part process which included background knowledge, literature review on factors influencing the maternal health outcomes, expert interviews, case study and identification design goals. The scope of incubator was to summarize this research and develop a design toolkit with in-depth utilization.



Part 1: Literature Review on Factors influencing Maternal Health outcomes

A narrative literature was conducted to understand the role of the built environment in improving patient health outcomes. The review included 25 plus sources from different search databases like PubMed, Google Scholar, Research Gate, and peer-reviewed journals. The keywords searched were women's health, birthing unit design, childbirth, maternal healthcare design, empathy, and midwifery.

The framework for research was based on co-relation of three factors- Environment, Care Deliver and social Support. Each of these factors are co-related between each other to bridge the influences of design and health outcomes. This framework guides the design checklist with evidence to justify the design goals for strategies to be considered in future.

Environment

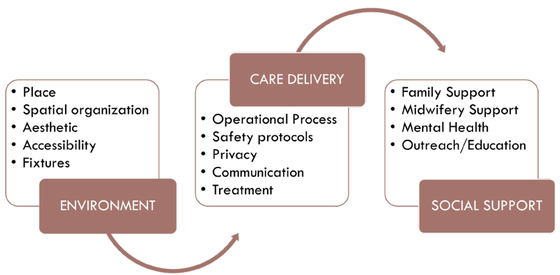
The design of the built environment influences the care process for patients & staf. The spatial organization of places influences the clinical process and aesthetics can help in creating the social and emotional support

Care Delivery

Many operational methods are evolved around the clinical process and some of these process affect the social factors like presence of family support. These clinical processes are based on the feedback of social perceptions of an individual.

Social Support

Community knowledge and understanding the perceptions of social culture drives the change in long term policies and intangible outcomes. Integration of family and midwifery support helps in mental and emotional support.



Journal Article	Design interventions	Health outcomes /impact
The Influence of Nature Stimulus in Enhancing the Birth Experience(Aburas et al., 2017)	Visual nature images	Improves clinical and behavioral outcomes, higher satisfaction, and low anxiety/stress rate
Re-conceptualizing the hospital labor room: the PLACE (pregnant and laboring in an ambient clinical environment) pilot trial (Hodnett et al., 2009)	Concept of Ambient room with flexible bed positions, concealed medical equipment, comfortable chair, dim lights, audio and visual distractions	Women in the ambient room were less likely to have artificial oxytocin and a shorter labor period.
Feathering the nest: what women want from the birth environment (Singh & Newburn, 2006)	Physical elements like privacy, ability to work around, sense of control, acoustics, and comfortable homelike furniture	Women were less likely to have any medical interventions like a cesarean delivery
Assessing the Feasibility of Measuring Variation in Facility Design Among American Childbirth Facilities (Plough et al., 2019)	Maximum distance between LDRs, the average distance from support spaces, bed capacity, unit circulation	Optimal unit planning based on capacity, workload, motivation, and contextual factors can help in reducing cesarean rates
Healing architecture and Snoezelen in delivery room design: a qualitative study of women's birth experiences and patient-centeredness of care (Nielsen & Overgaard, 2020)	Snoezelen room to enhance women's experience during labor	Provided positive distraction, relaxation, comfort, and choice of therapy
Developing the Birth Unit Design Spatial Evaluation Tool (BUDSET) in Australia: A Qualitative Study(M. J. Foureur et al., 2010)	Birthing room layout with earthy colors, adjustable lighting, soft surfaces, daylight, storage space	Provides positive emotional, psychological, physiological responses and facilitates active labor
Women's Experiences of Physical Features in a Specially Designed Birthing Room: A Mixed-Methods Study in Sweden (Skogström et al., 2022)	Room4birth is designed with a bathtub, window, dimmable lighting, sound absorber, media installation, companion space, storage, birthing equipment, and rounded corners on furniture	A welcoming and familiar environment gave integrity and social support by privacy and space for a companion, a positive emotional state.

Table 1: Summary of Literature review highlighting design interventions and health outcomes

Part 2 : Expert Interview & Case Study Analysis

Seven industry experts who could share their experience as architects, nurses, planners, and mothers were interviewed. These interviews were based on lessons learned from the projects, user group meetings experience, operational needs, and future trends.

- Lessons Learned from the projects: The ratio of LDR, post-partum rooms and C-section needs to suffice the volume projections for future growth. The adjacency of women's department and pediatric care spaces helps in continuum of care.
- User group Meeting meetings:. The need for social/ space for companion was prioritize. Staff suggested spaces for respite like on call rooms on the LDR patient floor, separate nourishment space from the patient families. The aesthetics of inpatient room was always suggested to be homelike and calming.

Figure 3: Women in Labor and delivery room needs flexibility to move around and feel at comfortable to manage the pain

03
Research

- Operational: There has always been a need for excess storage spaces for staff and patients. The distance from nurse station to patient rooms shouldn't be long especially on LDR. The use of LDRP rooms in the program is not advisable as that causes nursing issues and also unpleasant environment for mother to room in after birth.
- Future Trends: Most experts shared the idea of having flexibility in layout to accommodate the boutique needs of clients and birthing mothers. Though there isn't code in FGI for windows in LDRs, but it is a best practice to provide LDRs with exterior windows and daylight.

Beyond the interviews, Advisory Board resources were used to get a broader perspective on the industry needs. The resources like customer surveys, market analysis and future trends were referred to get data. One such data was the nationwide customer survey on pregnancy needs from different demographic groups.

Figure 4: Summary of Literature review highlighting design interventions and health outcomes

The insights from the literature and expert interviews prescribe the framework for existing facility studies. The goal of case studies is to identify the design strategies to achieve the design goals The collection of this data is used to understand how these unique strategies were used in social, operational, or environmental factors. Five case studies were selected based on different clients, facility age, design strategies, and capacity. Understanding that it would be inaccurate to prescribe design solutions according to any type of clinical diagnosis, rather a framework was developed to capture high level characteristics common for this patient populations and use supporting insight from the literature to suggest goals that environment should aim to address.

Each case study informed about the design strategies like family lounge, attached storage room to inpatient rooms, boutique features like bathtub and ample daylight. The size of the LDR were also integrated with provision of family space and equipment spaces. The soft color palette and clean environment helps giving the patient home-like environment and satisfaction. These departments were planned with respite spaces for staff and families. Provision of quiet/bereavement room away from the central space helps giving families space to grief and gives the privacy they need. The self served nourishment space in the family lounges are equipped with coffee machines and dry pantry helps in companions of patient to be self dependent for basic food and not disturb the staff with their needs. The dedicated elevator or entry for women's unit also helps in reducing the travel distances for patients. This also helps in case of emergency to take the laboring mothers to delivery units. These units are connected with postpartum rooms on the same floor which helps in easy patient transport. The VIP partpartum rooms in Medical City Dallas, has an attached family room with small kitchenette and sleeper lounge, this feature improves family satisfaction.

Virginia Mason Birth Center

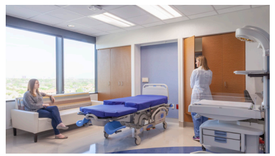
Program: Triage, 5 LDR, 6 Postpartum, 4 NICLET rooms, 2 C-Section ORs

Description: The distinct feature of this project is the provision of bathtub in the labor and delivery rooms. This calming and relaxing color palette with daylight provides a cozy environment. The NICLET care rooms provide recovery space for mother and infants. The project integrated lean process to collaborate the staff operations. The design process incorporated room mock-ups for clinicians and staff to validate the planning strategies. There is a dedicated family space with self served nourishment counter.

MUSC Shawn Jenkins Children's Hospital & Pearl Tourville Women's Pavilion

Program:12 LDR, 41 Ante Partum Post Partum beds including 7 Couplet Care rooms, 2 C-Section ORs

Description: The project focuses on the specialized care for pediatric & women's healthcare services. The program integrated with women's program for high-risk births under one roof. There is a dedicated stork elevator to the women's pavilion. The family lounge and private terrace for adults is used to spend time & relax. The lounge & play area provides space for their family to rewind and wait during the labor. There is also a quiet/ bereavement space at the end of the unit to grief.



HCA Medical City Dallas

Program: 5 LDR, 6 Postpartum, 4 NICLET rooms, 2 C-Section OR

Description: The women's expansion services for existing hospital included LDR, and VIP postpartum rooms. The highlight of the program are the VIP postpartum rooms with attached family room to the inpatient room, gives family their own private space to recover and spend time. This also helps mother to not get worried about the space for their companion and get continuous family support. The labor and delivery rooms have attached storage rooms helps staff to grab equipment whenever needed.

Methodist Richardson Medical Center

Program:10LDR,16Postpartum beds, 2 C-Section ORs

Description: : The Women's Center of Excellence included space for central postpartum units and labor and delivery units adjacent to NICU thus giving continuous clinical flow for mother and baby on one floor. This helps in reducing patient transfer distance and reduces any medical errors. The labor and delivery suite has storage rooms helps staff to grab equipment whenever needed. There are on call rooms for staff to relax during long shift hours. The ample daylight and welcoming aesthetics gives calming environment.

04
User Needs

Women's expectations and needs should be supported to improve the physical environment. Women's satisfaction is strongly related to a sense of being in control and, in particular, being able to control panic. The physical environment is one crucial factor that has tended to be neglected. Other crucial factors that play a significant part in women's labor experience, such as staff attitudes, midwifery care, and continuity of support, have been more extensively researched.

According to the British survey, The research showed that access to clean room and space to move around freely mattered to women. It was also vital that they were not seen and heard everywhere; they wanted their privacy to be respected without being overlooked by the staff. Some women also insisted on accessing the birth pool if needed while being in labor pain. The evidence showed that immersion in warm water such as a bathtub helps in giving comfort and produces significant pain relief through redistribution of blood volume, which stimulates the release of oxytocin and vasopressin, a hormone that regulates pain. Providing an ensuite toilet is also a need that most women highlighted in their surveys; during labor, women yield to the power of contraction and relax their pelvic muscles and hence need to open their bowels frequently. Heating and lighting were also considered necessary as they needed to adjust heating during labor, and more than half of women claimed that dim lighting helped in relaxing (Singh & Newburn, 2006).

Labor goes on for hours, and sometimes the need for any snack or water is urgent. Some women suggested that mini-kitchenette with fridge, tea / coffee maker would help them pass tiem pleasureably. This also helps their companion to be self -dependant and not ask for the help from staff. Also access to labor aids was addressed, women tend to adopt upright positions and they need birthing ball or any wall support helps in leaning over (Singh & Newburn, 2006).

The evidence from the studies shows that family support helps give mothers comfort and relaxation. Women labor in pain for hours and need nourishment support to maintain their hydration and access to food to avoid exhaustion. Hence, accommodation for companions and birth attendants helps provide basic needs like support during pain, walking around the unit, and motivation to push. It also gives a sense of control to mothers that their family is part of the life event. (Harte et al., 2016).

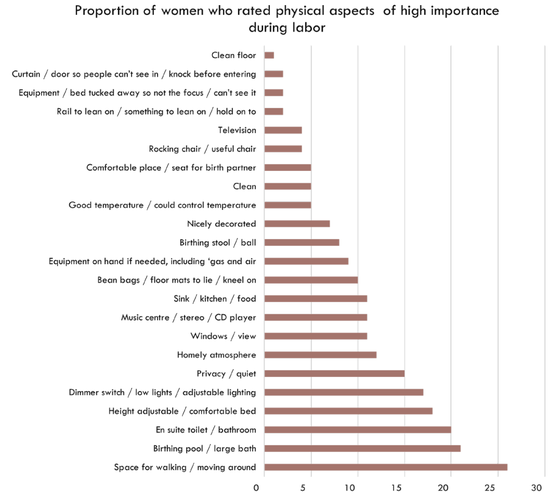


Figure 3 : Chart showing the data from the 1436 women listing up to three physical aspects of the labor room that they felt helped them have the type of birth they wanted and rated them of high importance (Singh & Newburn, 2006).

Family-oriented care supports parental satisfaction and facilitates shorter labors, control pain better, and needs less medical intervention. Social support is also provided through doulas and midwives who help harmonize the courses of birth and help in providing information regarding the birthing process. Their presence helps reduce the anxiety caused by miscommunication or lack of control in the care process. Communication helps enhance self-awareness and confidence among the mothers (Lunda et al., 2018). The loving touch of a partner or reassurance of a companion can help women feel secure. As women go deep inside themselves to focus on the overwhelming waves of contractions they need privacy and quiet, and may not want to be touched (Singh & Newburn, 2006).

Furnishing and aesthetics in the maternity units is also an important feature that many a times is overlooked in the clinical environment. Women liked their environment to be homelike, which helped reduce their anxiety. Fewer than half of the women who wanted floor mats, extra pillows, or a bean bag to help them relax or change positions said that these aids were readily available.The comfort of pillows, mats and bean bags helped them relax and change positions. The soft protective floor mats are used occasionally whenever women would feel stuck to their labor bed.

Another survey by Advisory Board Survey, a lot of women had differentpreferences for care. The survey was conducted on 1,752 women aged between 18 to 40 from across the country who are interested in having or have had a baby. Based on their responses, we identified five pregnancy personas to consider in your growth and experience strategies. Some women wanted a private room with specialized care on site and a partner to be present during the delivery.

64% Current Mothers
- A private postpartum room
- Their baby sleeping in their postpartum room, not a nursery
- Delivering within 15 min. of home
- Friendly nurses & staff

13% Gen X moms- to- be
- Staying in one room for delivery and postpartum recovery
- Checkups offered after business hours
- Weekend checkups
- Alternative pain relief

14% Millennial moms-to-be
- Staying in one room for delivery and postpartum recovery
- Cutting-edge technology
- Wraparound support

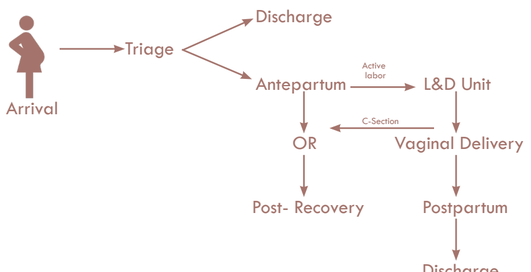
11% Midwifery-Minded
- Their baby sleeping in their postpartum room, not a nursery
- Provider-offered postpartum counseling and behavioral health support
- Water birth tubs

Source : Pregnancy Care Consumer Choice Survey from Advisory Board

05
Design Checklist

The primary goal of the environment is to influence the pattern and progress of labor, affecting both the number of vaginal births without major interventions and the rate of emergency caesarean sections. During labor, women's bodies need to soften and open to let the baby be born. They need to feel safe and secure, be protected from disturbances and adverse stimulation, and be able to relax in order to let their body work most effectively. Hence their sequence of patient journey informs the strategies needed for planning strategies.

A typical patient journey for pregnant women starts at triage, where they are evaluated for dilation and active labor. Depending upon the clinical condition, they are either discharged or moved to an antepartum room. After the observation, women with active labor are transferred to the labor and delivery unit for vaginal delivery and where vaginal delivery cannot be instrumented. They are taken to C-section for delivery. Mothers are then transferred to postpartum to recover for a few days and then discharged.



Typical Patient Journey

As per FGI guidelines, LDR rooms should have a minimum 325 sq. ft clear floor with a minimum wall head of 13 ft. The clear floor area includes infant stabilization and resuscitation space of 40 sq.ft. Each patient room should have direct access to private toilet room with shower or tub. A typical patient journey for pregnant women starts at triage, where they are evaluated for dilation and active labor. Depending upon the clinical condition, they are either discharged or moved to an antepartum room. After the observation, women with active labor are transferred to the labor and delivery unit for vaginal delivery and where vaginal delivery cannot be instrumented. They are taken to C-section for delivery. Mothers are then transferred to postpartum to recover for a few days and then discharged

These design goals are not intended to be applied in isolation. Many work with each other and strategies can complement each other. Implementing design strategies that reduce stress and anxity can aid in reducing pain , thus supporting patient experience.

The aim is to understand that design should do these things and there are many different strategies and ways to achieve them. What was initially examined were specific strategies more directly influencing or achieving these design goals. What was found and how we move orward is understanding the multiple causes and influences in achieving these goals. It is easy to agree that yes, design should do all of these things however, it is up to architects and esigners to creatively implement strategies based on the additional factors of patient population, operational processes, social and regulatory factors. Design should not stop here in an effort to check box. It calls upon working with our clients, users, and those caring for this patient population to really understand how design should, so that design can.

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The design checklist is a tool that can be used in pre-design space to evaluate the programming and planning of any new or renovation of women's project. The checklist has three categories- environmental, social and operational factors. Each of the design strategy complies with one or more design goal.

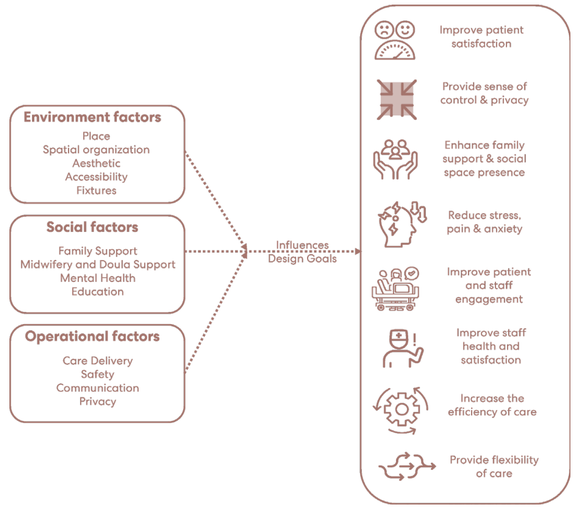

Illustration showing the design goals are influenced by environmental, social and cultural factors

Design Checklist

Environment Factors:

- [ ] Provide visual distractions by adding windows with controlled shade for daylight in staff and patient areas
- [ ] Provide ample space in the room to move or flex around to walk or change positions during labor
- [ ] Providing privacy from the public corridor or areas by adding alcove /curtains at room entrance
- [ ] Private bathroom with sufficient space and ergonomic design for labor and delivery (e.g. fixture height, hand rail supports, drainage not blocked by use of birth ball if included)
- [ ] Providing the patient with control of adjustable temperature, varied/dimmable lighting and shades, and entertainment within reach of patient bed and chair
- [ ] Patient control of visibility and room entrance (e.g. privacy curtains controlled by patient, sign requesting privacy)
- [ ] Provide the option of rooming-in for newborn and mother together in room by giving space for bassinet on the side of mother's bed.
- [ ] Provide multimedia access for distraction and engagement
- [ ] Provide acoustical sound absorption measures (e.g. acoustic ceiling tile) to minimize sound transmission between patient rooms, and between patient rooms and corridors
- [ ] Providing excess storages spaces in the unit as well as in the department
- [ ] Provide high quality durable finishes and linen for patient so they feel more comfortable and home-like.
- [ ] Providing spaces or furniture/fixture that support massaging (e.g. roller, table, chair, bed)
- [ ] Provide lighting variation (i.e. bright light during daytime and reduced light during nighttime) for the purpose of maintaining patients' circadian rhythm
- [ ] Considering the option of providing more comfortable bed rather than hospital bed for patients to make them feel more at home
- [ ] Provide appealing artwork/graphics that educates as well as motivates during the labor.
- [ ] Considering fresh air and options of soothing smells through aromatherapy in the patient room and eliminating unpleasant odors

Social Factors:

- [ ] Family space in the patient room so they can be included in the care coordination conversation
- [ ] Place for physician/nurse to sit around patient to converse and support
- [ ] Providing an option of flexible accommodation for family connected to patient zone like attached family room with kitchenette
- [ ] Access to family areas outside of patient room, but in close proximity for family breaks (such as lounge, meditation room)
- [ ] Furniture (desk/chair/sleeper chair) that does not encroach into the patient/caregiver zone.
- [ ] Providing sensitive adjacencies like bereavement /quiet room away from the newborn nursery or LDR
- [ ] Providing dedicated nourishment space for patient's family seperate from staff
- [ ] Provision of education cues in the department for awareness of care.
- [ ] Considering the option of having dedicated midwifery and doula service for mothers for integrated support

Operational Factors:

- [ ] Providing close adjacencies to different care and support spaces to minimize staff walking and travel distances
- [ ] Providing an attached equipment storage room with inpatient unit gives staff an easy access
- [ ] Provide sufficient space for storage of bedside electronic medical records (in-room EMR devices including computers, barcode scanners, etc.)
- [ ] Locations of equipment, connections, outlets for both mother and newborn(s) during various birthing stages (e.g. labor aids, oxygen, suction, nitrous oxide outlets for both mother and newborn, newborn warmer, charting) verified with various caregivers for ease of access and use when needed.
- [ ] Providing ample daylight and aesthetical design in staff work zone and other areas (overall aesthetics, non-institutional materials and colors, pleasant things to look at such as artwork) to facilitate staff communication and coordination
- [ ] Provide flexible room layout that can be used as overflow bed (for example ante partum room can be larger in size so it can used as LDR in case of emergency and unavailability of existing room)
- [ ] Provision of blood bank near the C-section in case emergency need of blood during surgery
- [ ] Provision of on-call rooms in the department for staff

06
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