Ecology Of Patients’ Experience In Wayfinding Situation In The Hospitals Of Bangladesh

by Dr. Nayma Khan
Presentation Guide line

- Statement of the Problem
- Research Frame work
- Development of the Instrument
- Research context, Case studies and Sample size
- Data Analysis Plan
- Research Findings
- Limitation and Future Direction
Wayfinding: What is it?

The process of using spatial and environmental information to find our way in the built environment.
Hospital Environment Is A Powerful Force In Shaping A Patient's Experience.
Problem Statement: Bangladesh Context
Patient Experience and Satisfaction

Dual meanings of the term “experience”.

Subjective and personal, referring to the person’s internal state as an experience of joy and happiness.

Objective and environmental, referring to the interaction between human and environment.
Framework to Study Patients’ Travel Experience in Wayfinding Situation
Two major factors that may affect wayfinding task (Passini et al., 1998; Carpman et al.; Dogu & Erkip, 2000; Weisman, 1981; O’Neill, 1991, 1993)

- the layout of the setting ------
  - Spatial content,
  - Form,
  - Organization,
  - Circulation.

- the quality of the environmental information ------
  - Signage system
  - Color
  - Lighting
  - Floor finish
  - Art work
  - Landmark

According to Weisman (1981), Signage system, complexity of the layout, design quality and visibility are important variables that help people to find their way.
RESEARCH OBJECTIVES

- The effect of hospital layouts, signage system, design quality and visibility of the environment on wayfinding problems,

- The effect of wayfinding behavior on patients’ travel experience and satisfaction, and

- How personal, social, and cultural aspects of the physical environment along with wayfinding difficulties help shape the patient’s travel experience in the hospitals of Bangladesh.
Understanding Patient Satisfaction in Relation to Wayfinding in LMH

A Pilot Study Conducted at Lawrence Memorial Hospital, Lawrence, Kansas, September – December, 2011.
Behavioral Observation

- Travel Time
- Travel Distance
- Number of Stops
- Number of looking around
- Number of ask for directions
Questionnaire Survey

- Part I: General Information
- Part II: User characteristic
- Part III: Information and way finding
- Part IV: Layout
- Part V: Design quality
Questionnaire Survey: Patient’s Travel Experience and Satisfaction Study

**Part I: General Information**

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Did you ask the volunteer for direction?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Gender</td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Age</td>
<td>18-35</td>
<td>36-50</td>
<td>51-65</td>
<td>65+</td>
<td></td>
</tr>
<tr>
<td>4. I am accompanying with:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. This is my:</td>
<td>1st Visit</td>
<td>2nd Visit</td>
<td>3rd Visit</td>
<td>4th Visit</td>
<td></td>
</tr>
<tr>
<td>6. How often do you visit the building?</td>
<td>Regularly</td>
<td>Sometimes</td>
<td>Rarely</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. When was the last time you visited this building?</td>
<td>Last than a week</td>
<td>Between a week</td>
<td>More than a month</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Part II: User characteristics**

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is difficult for me to understand the directions I am facing in the building</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I could keep in mind which direction of the building I enter from</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I am confident about giving directions within the building</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The presence of a map that helps me to locate my desired place</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The corridors should be well marked and organized</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I pay attention to changes in the lighting system of a building while walking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Part III: Information and way finding**

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sign showing different parts of the building are useful for me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Signs pointing out different paths and/or directions are useful for me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The size of signs is appropriate and easy to read</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. You have a map showing any location within the building with an arrow is useful for me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The floor numbering system is easy enough for me to get to a destination on a particular floor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The room numbering follows the floor number and area number enough for me to find my destination easily</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I am satisfied with the overall signage system of the building</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thank you for completing this questionnaire.

If you have any questions about your rights as a research participant, you may call 785-505-5442 or e-mail IRB Chair at jeff.pierce@ihr.org.
Space Syntax Analysis

Integration - Publicly accessible route

Integration - whole System

Connectivity - Publicly accessible route

Connectivity - whole System
Findings Summary

- The signage system, overall layout and interior design feature is important for patient satisfaction.
- Female patients are less satisfied than Male patients with signage system, overall layout and overall design of hospital.
- Patients of middle age group (36-65), are less satisfied with signage system, overall layout and overall design of the hospital than the younger (18-35) and above + 65 group.
- Patients who ask for direction are less satisfied with signage system, overall layout and overall design of hospital than patients who did not ask for direction.
- For Male patients, higher integration and connectivity value of publicly accessible route will decrease travel distance, number of stop, at the same time it will increase male patient satisfaction about overall design.
- For female patients, increase in the integration & connectivity value of female patient route in the publicly accessible system will decrease female patient’s travel time, travel distance, number of stops, etc., though they are not satisfied with the overall layout and design. Moreover increase in the mean integration value of travel route in the whole system will dissatisfy female patients.
Legibility of the environment can affect patients’ satisfaction in wayfinding situation;

Patients’ satisfaction can vary according to gender in wayfinding situation;

Patient’s wayfinding behavior can predict patients’ satisfaction in wayfinding situation.
RESEARCH CONTEXT, CASE STUDY AND SAMPLE SIZE
Demographic Characteristics of Bangladesh

**Geographic coordinates:**
24 00 N, 90 00 E

**Area:**
total: 143,998 sq km
land: 130,168 sq km
water: 13,830 sq km

**Land use:**
arable land: 55.39%
permanent crops: 3.08%
other: 41.53% (2005)

**The division of Bangladesh:**
64 districts, or zila 493 sub-districts or towns, or Upazila

**Climate:**
Tropical monsoon-type climate, with a hot and rainy summer and a dry winter.

**Population:**
161,083,804 (2011 est.)

**Female (% of total):**
49.35 (2010 est.)

**Religion:**
90% Muslim (2011 est.)

**Literacy rate:**
57.53% (2010 est.)

**Literacy rate of population by age group (2010 est.):**
- Can write a letter
  - (5-9) 16.43%
  - (10-14) 67.38%
  - (15-19) 82.17%
  - (20-24) 75.09%

**Location:** Southern Asia, bordering the Bay of Bengal, between Burma and India
Case studies Selection

Selection process of the case studies is based on---

- The size of the hospital-
  - 250-500 bed hospital

- The location of the hospital-
  - District Town

- Typology of the hospital form-
  - Linked compact block type
  - Courtyard type
  - Hybrid linked type layout
Type of Public Hospital Layout in Bangladesh

- Courtyard type Layout
  - The compartmentalization of hospital functions
  - All programmatic functional spaces connected with each other through corridors and arranged around a courtyard
  - Provides certain degree of hierarchy, security and privacy.

- Compact Linked Block Type
  - Three to four blocks constitute the plan
  - All the blocks are connected with short corridors and separated by open spaces.
  - Ensures privacy and security

- Hybrid Linked Block Type
  - All clinical functions are arranged around multiple courtyards in this hospital layout type
  - Blocks are connected with long corridors.
  - This type of layout increases the walking distance between outpatient department
Method for understanding Patient Experience

Systematic Observation
- Searching behavior
- Stopping behavior
- Help-seeking behavior
- Travel time

Patient Survey
- General Information
- User characteristic
- Information and way finding
- Spatial Layout
- Design quality

Floor plan Analysis
- Integration
- Integration -3
- Connectivity
- Intelligibility
- Intelligibility-3
Behavioral Observation

Registration Area

Circulation Space (Corridor)

Waiting Area

Comilla 250-bed District Hospital
Wayfinding Behavior

Searching Behavior

Stopping Behavior

Help Seeking Behavior
Behavioral observation (Data collection sheet)

Jamalpur 250 Bed District Hospital
Hospital C: Cox’s Bazar 250-bed hospital

Floor Plan Analysis

Axial Map Analysis

Integration
Integration-3
Connectivity
Intelligibility
Inteligibility-3

Space Syntax Analysis

First floor plan
Second floor plan
Descriptive Analysis

### Gender

<table>
<thead>
<tr>
<th>Education</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>No education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>class 1-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>class 5-8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>class 8-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>class 11-12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bachelor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>masters</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Age

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-35</td>
<td></td>
</tr>
<tr>
<td>36-50</td>
<td></td>
</tr>
<tr>
<td>51-65</td>
<td></td>
</tr>
<tr>
<td>66+</td>
<td></td>
</tr>
</tbody>
</table>

### Layout type

<table>
<thead>
<tr>
<th>Layout Type</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>compact linked</td>
<td></td>
</tr>
<tr>
<td>courtyard type</td>
<td></td>
</tr>
<tr>
<td>Modified compact linked type</td>
<td></td>
</tr>
</tbody>
</table>

### Education

<table>
<thead>
<tr>
<th>Year of Study</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st visit</td>
<td></td>
</tr>
<tr>
<td>2nd visit</td>
<td></td>
</tr>
<tr>
<td>3rd visit</td>
<td></td>
</tr>
<tr>
<td>4th visit</td>
<td></td>
</tr>
<tr>
<td>more than 4</td>
<td></td>
</tr>
</tbody>
</table>

### Frequency of Visit

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regularly</td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td></td>
</tr>
<tr>
<td>Rarely</td>
<td></td>
</tr>
<tr>
<td>No response</td>
<td></td>
</tr>
</tbody>
</table>

### Accompanying with

<table>
<thead>
<tr>
<th>Accompanier</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Family Member</td>
<td></td>
</tr>
<tr>
<td>Friend</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

### Time from Last visit

<table>
<thead>
<tr>
<th>Time from Last visit</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st visit</td>
<td></td>
</tr>
<tr>
<td>2nd visit</td>
<td></td>
</tr>
<tr>
<td>3rd visit</td>
<td></td>
</tr>
<tr>
<td>4th visit</td>
<td></td>
</tr>
<tr>
<td>more than 4</td>
<td></td>
</tr>
</tbody>
</table>
• Identification signage, directional signage and size of signage have greater impact on patients’ satisfaction.

• Patients’ travel experience depends on proximity of necessary functions, waiting room and stair/elevator, on the size of corridor, and on how much time patients spend on walking to their destination.

• The design quality of the hospital environment have an impact on patient experience.

• Patients’ searching behavior is a useful measure to predict patients’ satisfaction with overall signage, perceived travel time, and with overall layout in wayfinding situation.

• Proper orientation signage and signs of appropriate size may reduce patients’ searching behavior, and may improve their travel experience in wayfinding situation.

• The higher integration and connectivity value of the layout increase searching behavior, patients’ travel time in wayfinding situation and decrease patients’ travel experience in wayfinding situations.
Gender based findings

- Identification, directional, and size of signage is important for male patient satisfaction in relation to signage. In contrast, the orientation signage is important for female patients’ satisfaction but not for men patients’ satisfaction. (Lawton, Charleston & Zieles, 1996).

- Male patients are more satisfied with the layout than female patients are when corridors are wide enough. (Betchtel, 1997; Sommer, 1969; Hall, 1966)

- In wayfinding situations, male patients’ satisfaction with layout complexity depends on the intelligibility properties of the layout. In more intelligible layouts, male patients show less stopping behavior and it helps to increase their satisfaction. Proper use of directional signage and size of signage help to reduce male patient stopping and searching and help seeking behavior and may increase their satisfaction.

- In contrast, female patients’ satisfaction depends on the global and local syntactic properties of the layout. When female patients are in more integrated route, increase their searching behavior and make them dissatisfied. Proper orientation signage may reduce female patient searching behavior.
Layout based findings

Findings

- The signage is not important for improving patients’ travel experience in wayfinding situation.

- In this type of layout patients satisfaction depends on crowding around the information desk.

- When patients use less travel time and produce less searching behavior, their satisfaction with perceived travel time improves.

- Easy to locate waiting room and proximity to necessary functions help reduce patients’ searching behavior, stopping behavior and travel time in the courtyard type hospitals in Bangladesh.
In compact linked type layout, patients’ travel experience and satisfaction depend on directional signage, identification signage, orientation signage and the size of signage.

When patient easily find the information booth, waiting room and necessary functions in the layout and when corridors are wide, they become more satisfied with the layout in wayfinding situations.

When patient move through the more integrated route it decreases their satisfaction with signage.
Findings

• Patients’ satisfaction depends on directional signage, identification signage, and the size of signage of the outpatient department of Bangladesh.
• Easily locate information desk and waiting room their satisfaction improves.
• Design quality plays a greater role to improve patients’ satisfaction in wayfinding situation.
• Patients travel time, stopping behavior, help-seeking behavior negatively affect patients’ satisfaction with perceived travel time.
Most Important Findings:

Signage system, spatial layout, and design quality have a greater effect on patient experience in wayfinding situation.

By reducing searching behavior and travel time, it is possible to improve patient travel experience in wayfinding situation. (McNeil, 1992; Alibali, 2005)
In wayfinding situation when patients follow more integrated local route, which have higher visibility and accessibility it decrease their satisfaction level due to crowding. (Haq & Zimring, 2003; Kim & Penn, 2004; Haq, 2003).
Patient Travel Experience in Wayfinding Situation

Patient Satisfaction

Personal Factor
- Age
- Education
- Gender
- Wayfinding Behavior

Perceived control
- Personal space
- Territoriality and privacy

Social Factor

Environmental Factor
- Signage
- Spatial layout
- Design quality
- Visibility
- Layout type

Summery Finding
Research Contributions

- In relation to design
- In relation to theory
Principles of Patient Centered Design in Wayfinding Situation

Easily understandable, welcoming environment that demonstrates a willingness to help patients in wayfinding situation, show respect to patient and valued as a unique individual in that environment.

Understanding and feeling understood the non-verbal language demonstrate a clear nonverbal communication with patients to process information and execute the task of wayfinding.

Feeling valued and safe help to incite healthy wayfinding behavior to process information in wayfinding.

Feeling patients’ private moments are protected and patients’ are treated with due respect and considerations by the environment.

Findings
Endley (1988) defines situation awareness as “the perception of the elements in the environment within a volume of space and time, their comprehension of their meaning and the projection of their status in the near future (p.5).”
Patients’ experience as the product of patients’ cognitive & emotional reaction, attitude, and perception that are influenced by patients’ personal interpretation of a situation based on the cultural demographic condition, wayfinding behavior and social and physical condition of the environment.
Limitations & Future Directions

For the selection of case study hospitals, convenience sampling method based the availability of the floor plans at the time of data collection was used. Future studies should use equal and larger number of hospitals for improved generalizability.

There may be some degree of researcher biasness as the researcher needed to read and fill out the questionnaire on behalf of these patients. A qualitative research using patient interview may be a better way to overcome the limitation in future studies.

In this research, data analysis had focused on patients’ satisfaction based on gender and layout type only. Further analysis focusing on individual information such as age, level of education, individual differences in cognitive abilities, visiting with others or not, and the number of visits to hospitals may provide additional interpretation of patients travel experience in wayfinding situation.

In this exploratory research, Pearson correlation analysis was used to reveal the degree of association between environmental, personal and social factor and patients’ travel experience in wayfinding situations. Future studies should consider regression analysis to learn more about the relationships between predictor variables and patients’ satisfaction in wayfinding situations.

For floor plan analysis, the study used the axial map analysis of space syntax. Further analysis based on isovist and visibility techniques may help explain better the relationships among spatial variables, behaviors, and patient experience in wayfinding situations.
Thank you

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