Flexibility and the Inpatient Room:

How positive distraction, social support and perceived control reduce stress
The project

“Hospital Rooms and Patients’ Well-being: Exploring Modeling Variables”

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Cláudia Andrade (ISCTE-IUL)
Luísa Lima (ISCTE-IUL)
Outline of presentation

• Background
• Research design and sites
• Results
• Discussion and future work
• Practical implications

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Learning Objectives

- Explain the concepts in Ulrich’s theory of supportive design
- Identify positive and negative qualities of inpatient rooms identified in the research
- List cross-cultural differences in patients’ perceptions of these qualities
- Explain concept of linking (mediating) variable and its relevance to health care design
Background

• Inpatient rooms as stressors (e.g., Tanja-Dijkstra, 2011)
  - inundated by technology
  - loss of privacy
  - loss of control
  - lack of social support
Approaches to dealing with stressors

• Patient-centered care
  - active involvement of families/caregivers
  - patients as partners in their care
  - patients’ values, preferences considered

• Planetree model as practical example
  (Martin, Hunt, Hughes-Stone, & Conrad, 1990; Stone, 2008)
• The physical environment contributes to well-being and stress
• We don’t know how or why
• Most research has concentrated on specific room elements (e.g., art; view to nature)
We propose a different approach

- Concentrates on psychological processes
- What people think about links elements in room
  - e.g., control of TV;
  - seating for friends;
  - something attractive to look at

to satisfaction and reduction in stress
For intervention

• If we better understand what patients need, it may be easier to decide what elements should be provided in the room
Ulrich’s theory of supportive design provides a model for us to test.

Adaption of Ulrich’s theory of supportive design (1991)
Perceived control

• Perceptions of control (perceived control; PC)
• Opportunities to modify, alter aspects of environment (Lee & Brand, 2005)
• Major loss of this control in hospital settings (Huisman, Morales, Van Hoof, & Kort, 2012)
Perceived control

• Patients need self supporting systems—opportunities for control
  – Position of bed
  – Amount of natural light
  – Information about healthcare status
  – Entertainment (Internet, television, music)
Whiteboard provides control

<table>
<thead>
<tr>
<th>Room: 4206</th>
<th>Phone #:</th>
<th>Ext. 2820</th>
<th>Date:</th>
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<tbody>
<tr>
<td>Plan of Care:</td>
<td></td>
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<table>
<thead>
<tr>
<th>Meal: #3463</th>
<th>Diet:</th>
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<tbody>
<tr>
<td>MD:</td>
<td>Nurse:</td>
</tr>
<tr>
<td>PCA:</td>
<td>PT:</td>
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<tr>
<td>OT:</td>
<td>Case Mgr:</td>
</tr>
<tr>
<td>EVS:</td>
<td>Nurse Mgr:</td>
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</table>

<table>
<thead>
<tr>
<th>Activity:</th>
<th>Equipment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ No Lift</td>
<td>□ Sit to Stand</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transport:</th>
<th>Alarm: Y N</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>PDD/Discharge:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
</tr>
<tr>
<td>Time:</td>
</tr>
<tr>
<td>D/C To:</td>
</tr>
</tbody>
</table>
Bed adjustable by patient provides control
Social support

• Families members/visitors reduce stress
  – (Bolger & Amarel, 2007; Kornblith et al., 2001; Uchino, 2009)
  – Accommodation for presence (Mayo Clinic)
Seating for visitors
Positive distraction

• Most heavily researched of Ulrich’s model (easiest to implement?)
  Malenbaum et al., 2008; Ulrich & Gilpin, 2003)

Art on wall, reading material, fish tank
Representational scenes of nature (Eisen et al., 2008, Hathorn & Nanda, 2008; Mazer, 2010)
Model not verified experimentally in field settings

• Andrade & Devlin (2015)
  – Verified in laboratory setting with hypothetical situation

• Number of elements in the hospital room affects expected stress through perceptions of how much **PD and SS** room is perceived to provide, but **NOT** through perception of level of **PC** available.
This project: Field settings in hospitals

- 1 hospital in US (2 units)
- 3 hospitals in Portugal
- all orthopedic units
US Hospital Connecticut 252 beds

- One unrenovated unit (24 single rooms)
- One renovated unit (22 singles, 4 doubles)
- Only singles in study
Old Unit (US)
New Unit
Inboard toilet and shower room
Hospital da Luz (Portugal)

- opened in 2006
- largest private hospital in Portugal
- 168 rooms
- data were collected on two surgery units
- 3 large suites (size: 399.9 sq. ft.)
- 25 singles
- 35 double rooms (both 263.1 sq. ft.)
Single room (viewed from hallway)
Toilet room and shower
shower
Double room
Shared toilet/shower room for double
Shared shower double
suite
The Hospital dos SAMS in Lisbon
opened in 1994
dedicated to serve individuals who are bank employees, including current or retired employees and their families
121 inpatient beds.
• 13 single rooms (between 156.1 sq. ft. and 239.0 sq. ft.)
• 5 double rooms (size: between 241.1 sq. ft. and 274.5 sq. ft.)
• 1 triple room (324.0 sq. ft.)
• single rooms had a private toilet and shower room
• the doubles and the triple had a shared private toilet and shower room
SAMS: single room toilet & shower
SAMS: double room
SAMS: Shared toilet & shower room
Hospital Curry Cabral (HCC; Portugal)

- Opened 1998
- public
- ~500 inpatient beds
- Research rooms:
  - 8 singles (between 160.4- 241.1 sq. ft.)
  - 1 double (159.3 sq. ft.)
  - 1 triple rooms(385.3 sq. ft.).
HCC

• single rooms:
  – 7 w/private toilet and shower room
  – 1 had no private toilet room

• double had no private toilet and shower room

• triple had a shared private toilet and shower room
HCC: single
HCC: toilet room & shower
HCC: double bed room
HCC: triple bed room
## Observation checklist: Elements

<table>
<thead>
<tr>
<th>Perceived Control</th>
<th>Social Support</th>
<th>Positive Distraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Closet for belongings</td>
<td>• Room type (suite, single, double)</td>
<td>• Television</td>
</tr>
<tr>
<td>• Lighting adj. by patient</td>
<td>• chairs for visitors</td>
<td>• Prints/posters of nature/landscapes</td>
</tr>
<tr>
<td>• Whiteboard for status</td>
<td>• Internet (Wi-Fi)</td>
<td>• View to nature</td>
</tr>
<tr>
<td>• Bedside table</td>
<td>• Bench to sit/sleep</td>
<td>• space to put photos</td>
</tr>
<tr>
<td>• Call button</td>
<td>• Bedside phone</td>
<td>• closet to screen laundry</td>
</tr>
<tr>
<td>• TV adj. by patient</td>
<td>• chair for patient</td>
<td>• window is large (whole wall)</td>
</tr>
<tr>
<td>• Additional table</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Clock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Room service menu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Private toilet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Temperature adj. by patient</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


# Mean # elements by hospital

<table>
<thead>
<tr>
<th></th>
<th>PC (0-11)</th>
<th>SS (0-6)</th>
<th>PD (0-6.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L&amp;M Old</td>
<td>10.75</td>
<td>5.00</td>
<td>3.66</td>
</tr>
<tr>
<td>L&amp;M New</td>
<td>10.00</td>
<td>6.00</td>
<td>6.35</td>
</tr>
<tr>
<td>HCC</td>
<td>4.46</td>
<td>2.60</td>
<td>2.06</td>
</tr>
<tr>
<td>SAMS</td>
<td>8.23</td>
<td>5.73</td>
<td>3.76</td>
</tr>
<tr>
<td>LUZ</td>
<td>8.12</td>
<td>5.67</td>
<td>3.15</td>
</tr>
</tbody>
</table>
Survey for patients: 4 sections

• Expectations before hospitalization
• Feelings at time of survey, incl. stress and PC, SS, SD
• Overall evaluations of hospitalization
• Background information
Stress

• Spielberger 20 item State-trait Anxiety Inventory (STAI)

• “I am tense”
• 1=not at all to 4=very much so
PC (5), SS (4), PD (4)

“Please tell us what you think about the features of your hospital room.”

Adapted from other scales
21 items; 8 removed from CFA leaving 13 mixed presentation
1=strongly disagree to 5=strongly agree
Perceived Control

1. In this hospital room, I am able to control my environment.
3. I can personalize my hospital room. (*)
4. Health care providers have complete control over my hospital room during my hospitalization. (*)
7. I can control the physical features of my hospital room.
11. There are choices I can make about the physical features of my hospital room.
15. In this room I can adjust, re-arrange, and re-organize things as needed.
21. I determine the organization/appearance of my hospital room.
Social support

• 2. In this hospital room there are possibilities to keep in contact with close others. (*)
• 5. This hospital room allows me to interact with visiting family and friends.
  9. This hospital room provides good opportunities for engaging in social activities. (*)
• 12. My family and friends can feel comfortable in this hospital room.
• 17. In this hospital room I can enjoy the company of visiting family and friends.
  20. This hospital room provides a supportive environment for visiting family and friends.
6. In this room my attention is drawn to interesting things.
8. There is much to explore and discover in this room. (*)
10. In this room I can spend time looking at the surroundings. (*)
13. In this room there are objects that attract my attention.
14. In this room I am absorbed by the surroundings.
16. There is plenty that I want to keep looking at here.
18. In this room time passes quickly. (*)
19. Being in this room helps ease the experience of being sick in the hospital. (*)
Satisfaction

- How satisfied in general w/ exper. (1-9)
- To what extent unit met expectations (1-9)
- To what extent unit met needs (1-9)
- How far unit was from perfect care unit (0=very distant to 10=very close)
Demographic Section

- age
- gender
- race/ethnicity
- estimate of family income
- highest level of education
- number of times hospitalized overnight
- whether hospitalized at that particular hospital previously
Health status data

• measures of self-reported pain (from 0 to 10)
• blood pressure and heart rate used to monitor patients
• the amount of daily medication for pain that patients took during hospitalization
Patients

• 236
  – 78 US (23 old unit; 55 new unit)
  – 158 Portuguese
    • HCC (old public) 34
    • SAMS (older private) 56
    • da Luz (newer private) 68
Patients

• US:
  – 64.4 years
  – 55.1% women
  – 53.8% some college or college degree

• Portugal
  – 56.3 years
  – 60.1% women
  – 25.0% some college or college degree
Room assignments

• US: all in single rooms
• Portugal:
  – HCC: 18 singles, 10 doubles, 6 triple
  – SAMS: 25 singles, 23 doubles, 8 triple
  – da Luz: 18 singles, 50 doubles
Data collection

• All surveys delivered after at least 1 day on unit
• Informed consent
• Most preferred to be interviewed
• US health date from IT records
• Portugal-nurses printed out medical data on day of interview
PC: Mean level by hospital
1 = low 5 = high level of control

- Hospital L&M old: 2.50
- Hospital L&M new: 3.48
- Hospital Curry Cabral: 3.20
- Hospital dos SAMS: 3.99
- Hospital da Luz: 3.92
SS: Mean level by hospital
1=low to 5=high level of social support

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Mean Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital L&amp;M old</td>
<td>3.90</td>
</tr>
<tr>
<td>Hospital L&amp;M new</td>
<td>4.78</td>
</tr>
<tr>
<td>Hospital Curry Cabral</td>
<td>4.15</td>
</tr>
<tr>
<td>Hospital dos SAMS</td>
<td>4.48</td>
</tr>
<tr>
<td>Hospital da Luz</td>
<td>4.46</td>
</tr>
</tbody>
</table>
PD: Mean level by hospital
1=low to 5=high level of positive distraction

- Hospital L&M old: 2.55
- Hospital L&M new: 3.47
- Hospital Curry Cabral: 2.70
- Hospital dos SAMS: 3.62
- Hospital da Luz: 3.76
Summary

• In patients’ views, SS > PC or PD
• Old unit US similar to old public (HCC)

  Portugal
  – Even though Old US has more favorable elements than HCC
  – Likely the physical condition of the elements and not just their number matters
Correlations between # elements and PC, SS, and PD ratings

• SS and # elements \( r = .24, p < .01 \)
• PC and # elements \( r = -.20, p < .05 \) (opposite direction)
• PD and # elements \( r = .03, \) ns
Expectations

- Hospital L&M old: 7.84
- Hospital L&M new: 8.28
- Hospital Curry Cabral: 7.05
- Hospital dos SAMS: 8.00
- Hospital da Luz: 8.30
Overall level of satisfaction

- Hospital L&M old: 8.29
- Hospital L&M new: 9.61
- Hospital Curry Cabral: 7.55
- Hospital SAMS: 8.60
- Hospital Luz: 8.72
Anxiety

1 = not at all 4 = very much so

- Hospital L&M old: 1.65
- Hospital L&M new: 1.38
- Hospital Curry Cabral: 1.96
- Hospital dos SAMS: 1.69
- Hospital da Luz: 1.67
Correlations

• more favorable elements correlates with:
  - greater perceptions of:
    - social support
    - perceived control
    - positive distraction provided by the room
    - greater satisfaction with the service
    - greater intention to choose the room again
    - lower stress
Mediational analyses

• What is a mediational analysis?
“A mediating variable transmits the effect of an independent variable on a dependent variable” (MacKinnon, Fairchild, & Fritz, 2010)
What does this mean for our study??

- we have rooms elements (#s of PC, SS, PDs) as IVs
- we have stress, satisfaction ratings, health status data as DVs
- we want to know if perceptions of PC, SS, PD carry the effect of the IVs to the DVs

In other words, does it matter what people are thinking about PC, SS, PD that carries the effect of the elements to outcomes like stress???
The figures are %!@#
Important findings: Overall satisfaction

• Social support and positive distraction carry the effect (are mediators)
• Perceived control is not
Important findings: By country

• For US: social support and perceived control mediate satisfaction ratings

• For Portugal: social support and positive distraction mediate satisfaction ratings
Important findings: Stress

• Positive distraction and social support mediate stress (the higher ratings of these, the lower the stress)

• But perceived control does not
Important findings: Stress by country

• US: perceived control and social support mediate this

• Portugal: the only mediator is positive distraction
Health Status Data

- Few differences
- Lack of confidence in these data

- No differences by country in
  - average pulse during hospitalization
    - Between either US unit
    - Among the 3 Portuguese units
Blood Pressure: Diastolic

- No differences between average diastolic BP US vs. Portugal

- US patients in old unit had higher DPB than those in new unit (p < .001)

- In Portugal, no differences across the 3 units
Blood pressure: Systolic

- No differences US vs. Portugal in average systolic blood pressure (SBP) during hospitalization
- No differences US old vs. new unit
- No differences Portugal across 3 units
Pain ratings

- US patients reported more pain (3.87) vs. Portuguese patients (0.74) on scale where 0=absence of pain to 10=strongest pain

US: no sign. difference bet. units
Portugal: da Luz sign. less than SAMS and HCC
Mediation analyses

• Analyses suggest that effect of room elements on BP is not mediated by SS, PC, and PD
Results summary thus far

- # room elements has positive effect on patients’ well-being
- # favorable elements improve satisfaction
- That perceptions involved (mediate) this process
WHICH elements may be involved?

- Qualitative comments
- Patients asked to list in rank order 3 room elements that influenced level of satisfaction with hospital experience
- We categorized into SS, PC, and PD
Number of comments

- US: sign. more + than - comments about new than old unit
- Portugal: sign. more + than – comments about da Luz vs. HCC, and SAMS vs. HCC but not da Luz vs. SAMS
Themes

• Most comments about PC (248)
  – Esp. functionality (whether something works)

• Followed by positive distraction (201)
  – Esp. view to outside and entertainment

• Then social support (138)
  – Esp. benefits of private room
• Perceived control
  – Whiteboard (old vs. new)
    • Same idea, but different legibility
  • “great to have patient information”
Whiteboard: old vs. new
Functionality of toilet & shower room

• Old:
  – neg. lack of shower in old unit

• New:
  – neg. need more than a shower curtain
  – More concave drainage area
  – Lip into toilet room a problem
Old toilet room
New toilet and shower room
View can be positive or negative
Social support through furniture…but
Hospital da Luz

- Positive distraction is the central theme
  - Television (entertainment console)
  - Natural light (literally hospital of light)
• (add photo)
Social support

- Room size (large single rooms; suites)
- Internet
- Relatively few negative comments overall
• (add photo)
Hospital dos SAMS

- Perceived control (hygiene, cleanliness)
- Positive distraction (window, view) Natural light specifically mentioned
- Negative comments spread across PC, PD, SS
• (add photo)
Hospital Curry Cabral (HCC)

- Different picture—negative, esp. positive distraction (lack of TV)
- If TV, donated by previous patient (but usually lack of remote control)
- Perceived control: + if water closet; - without
- Few comments about SS
• (add photo)
Discussion

- Why does the hospital physical environment matter?
- Because people think about it
- Specifically, perceptions of PC, SS, and PD affect their satisfaction and stress
• If we better understand how the elements influence perception, we will make better decisions about which elements to provide
What we showed

1) more favorable elements in the room lead to greater perceptions of SS, PC, and PD

2) more favorable elements in the room, greater the satisfaction with hospital experience, and the lower the stress
3) the 3 psychological constructs (SS, PC, and PD) mediate relationship between the elements and well being

- For satisfaction with hospital experience
- For Stress
- Not for blood pressure levels

We confirmed Ulrich’s model in a field setting
Cultural Differences

• Social support:
  – US: predicts satisfaction and stress
  – Portugal: predicts satisfaction

• Perceived control:
  – US: predicts satisfaction and stress

• Positive distraction:
  – Portugal: predicts satisfaction and stress
Why is PC more important in US and PD more important in Portugal?

- Locus of control?
- Individualistic vs. collectivistic cultures?
- Traditions of healthcare in the 2 countries
  - Biopsychosocial in US (more active)
  - Biomedical in Portugal (more passive)
• Clear example is whiteboard in US
Importance of windows and natural light in Portuguese sample
Practice recommendations

• Increase number of favorable room elements
• Consider role of culture
• Make sure equipment works
• Continue work on PC because we need better measures
Other Lessons learned

• Importance of site champion
• Difficulty with health status data
Flexibility and the Inpatient Room:

How positive distraction, social support and perceived control reduce stress

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