

POLITECNICO DI TORINO
 SECOND SCHOOL OF ARCHITECTURE
 Master of Science in Architecture for Sustainability
Honors theses

Visual comfort in bedded areas of healthcare buildings: experimental analysis of a case - study and intervention proposals

by Francesca Messina

Tutor: Chiara Aghemo

Co-tutors: Federica Caffaro, Valerio R.M. Lo Verso

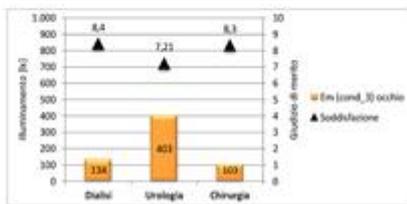
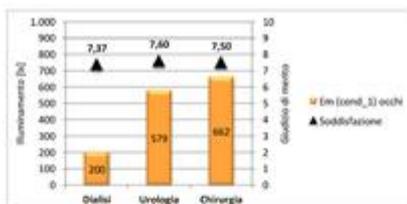
This thesis is part of activities carried out previously on other hospitals. It has as objective to consolidate a working method that enables to identify the guidelines for hospital lighting design.

We want to ensure that this research is not based only on theoretical concepts or regulatory requirements but also includes the subjective point of view of users.

It was then decided to proceed on an experimental approach consists of a subjective and an objective analysis, in order to compare the data obtained from measurements made on patient beds and questionnaires them submitted.

CONFRONTO ANALISI OGGETTIVA E SOGGETTIVA sulla MANCANZA DI ABBAGLIAMENTO

	Em (cond_1) occhi	Soddisfazione mancanza abbagliamento	Em (cond_3) occhio	Soddisfazione mancanza abbagliamento
DIALISI	200	7,37	134	8,4
UROLOGIA	579	7,60	403	7,21
CHIRURGIA	662	7,50	103	8,3



Questo elaborato ha come finalità un confronto più immediato, dei risultati delle due tipologie di analisi svolte. Si è deciso di confrontare come misure oggettive gli illuminamenti medi della condizione 1 e 3, mentre come misure oggettive sono stati scelti i giudizi di soddisfazione espressi per la mancanza di abbagliamento.

CONDIZIONE 1

Per quanto riguarda la mancanza di abbagliamento non si trova una correlazione tra alti valori di illuminamento e i gradi di soddisfazione, che non si discostano da un valore medio di circa 7,5, nonostante grandi differenze tra i valori di illuminamento misurati

CONDIZIONE 3

Per quanto riguarda la mancanza di abbagliamento in condizione di sola luce artificiale la soddisfazione registrata aumenta al decrescere dei valori di illuminamento

Possiamo dire quindi che il valore richiesto dalla normativa per l'illuminazione artificiale nelle stanze di degenza va a contrastare con la percezione di abbagliamento da parte dell'utente.

Subjective analysis

The analysis developed through questionnaires elaborated with the cooperation of the Psychology Department from Turin University.

The questionnaire was submitted from me directly to the patients that agreed to work with us, in order to make easier the comprehension of the questions and the compilation of the questionnaire.

We've chosen to submit the questionnaire only to residents who are much more sensitive and critical to the kind of treatment they receive.

In my case it was possible to compare two different types of wards in terms of permanence within the hospital.

Patients present in the dialysis Department, in turn, were divided in three categories.

First category is that of patients that submit to the therapy for 4 hours and for 4 days/week; second category is that of patients that follow the same therapy of first category but in the afternoon and third category is that of night's patients that follows therapy for 6 hours during night sleep. Dialysis patients are therefore of "regular guests", they know the structure for years, and apart from some sudden change, stationed during therapy in the same bed.

In the Urology, General Surgery and Vascular Surgery departments patients are kept in hospital according to the healing time that can be short as a few days or longer, up to a month.

It is assumed that patients that remains for months in the hospital are much more interested and careful of the quality of light and they have a perception even more aware than the patient admitted for a few days.

The questionnaires had a first part where we collected general data such as age, sex, visual disturbances, permanence, in order to make the appropriate comparisons between the different departments.

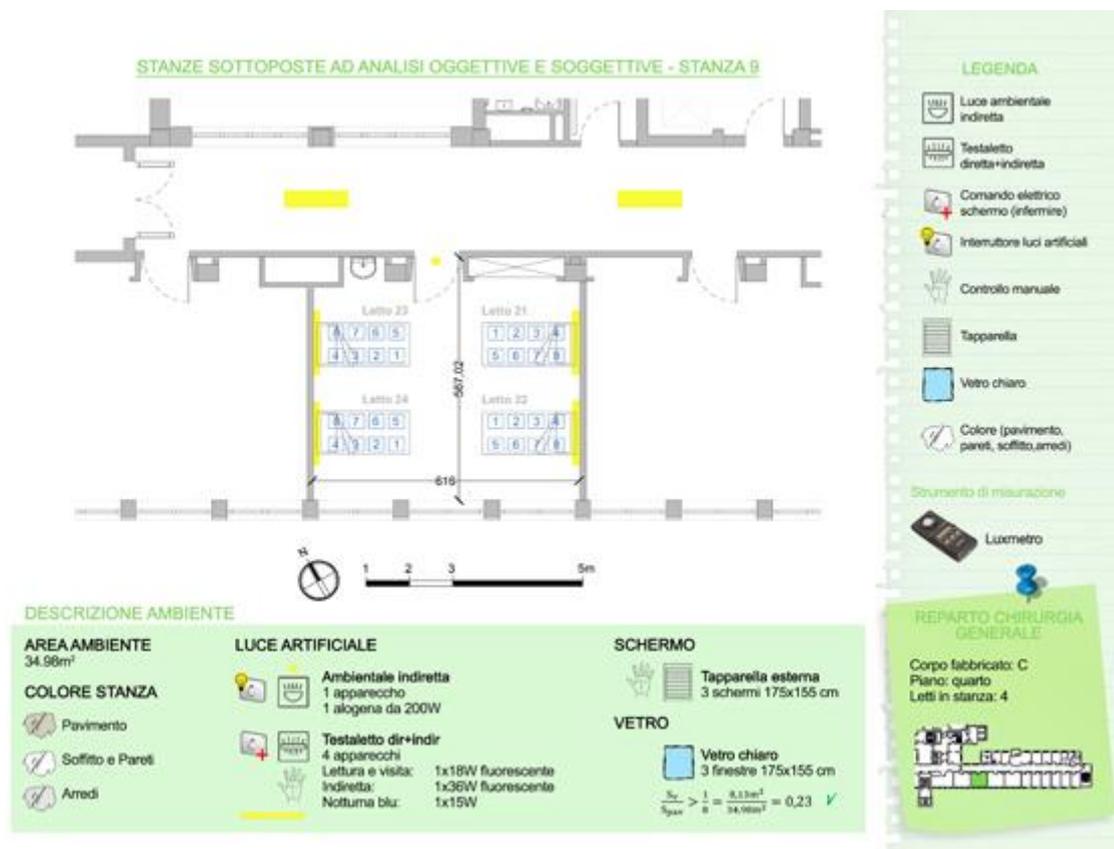
The patient is requested to answer questions through a ladder, expressing an opinion in terms of satisfaction and importance from 0 to 10 in three different conditions.

- ✚ Condition 1: the patient was placed in the room, then without changing any aspect of the environment.
- ✚ Condition 2: Just natural light, thereby raising all screens and turning off artificial lights lit.
- ✚ Condition 3: ambient light and headboard lit.

The conditions 1 and 2 were analyzed during the day usually from 09:00 to 13:00 condition 3 was analyzed in the afternoon and in the absence of natural light from 17:15 to 19:00.

Objective analysis

Three different departments of the hospital were involved in this analysis according to the orientation and restructuring state.



The instrument used was the luxmeter to evaluate the **illumination E [lx]** defined as the amount of light that affects surface area. Eight points were encountered on each bed examined.

LETTI SOTTOPOSTI AD ANALISI OGGETTIVE E SOGGETTIVE - STANZA 9

LETTO 21

12/12/2013
11:05 - 18:40
Condizione di cielo

Luca ambientale
Testataletto indiretto
Testataletto diretto
Schermo

	1	2	3	4	5	6	7	8	media
01/12/13	107	205	205	205	473	367	358	385	252
02/12/13	230	231	231	231	320	327	331	337	272
03/12/13	x	x	x	x	x	x	x	x	x
04/12/13	240	242	242	242	1200	872	721	657	390
05/12/13	233	233	233	233	130	134	137	135	134
06/12/13	x	x	x	x	x	x	x	x	x
07/12/13	120	120	120	120	120	142	126	119	114
08/12/13	x	x	x	x	x	x	x	x	x
09/12/13	11000								

LETTO 22

12/12/2013
11:05 - 18:15
Condizione di cielo

Luca ambientale
Testataletto indiretto
Testataletto diretto
Schermo

	1	2	3	4	5	6	7	8	media
01/12/13	238	242	242	242	131	131	131	131	232
02/12/13	x	x	x	x	x	x	x	x	x
03/12/13	110	109	109	109	200	200	200	200	104
04/12/13	237	237	237	237	130	134	135	134	134
05/12/13	x	x	x	x	x	x	x	x	x
06/12/13	120	118	118	117	117	117	118	118	117
07/12/13	x	x	x	x	x	x	x	x	x
08/12/13	114								
09/12/13	11000								

LETTO 23

19/12/2013
18:20
Condizione di cielo

Luca ambientale
Testataletto indiretto
Testataletto diretto
Schermo

	1	2	3	4	5	6	7	8	media
01/12/13	x	x	x	x	x	x	x	x	x
02/12/13	x	x	x	x	x	x	x	x	x
03/12/13	x	x	x	x	x	x	x	x	x
04/12/13	x	x	x	x	x	x	x	x	x
05/12/13	x	x	x	x	x	x	x	x	x
06/12/13	x	x	x	x	x	x	x	x	x
07/12/13	217	217	117	147	147	500	514	507	116
08/12/13	x	x	x	x	x	x	x	x	x
09/12/13	11000								

LEGENDA

- Giorno di misurazione
- Ora di misurazione
- Condizione di cielo
- Luca artificiale accesa
- Luca artificiale spenta
- Schermo alzato
- Schermo abbassato

Strumento di misurazione

Luxmetro

REPARTO CHIRURGIA GENERALE

Corpo fabbricato: C
Piano: quarto
Letti in stanza: 4

The collection of these data made possible to calculate other values of illumination as **the average illuminance, daylight factor (i) and the average daylight factor (FLDm)** which were compared with the reference norms.

For further information, e-mail:
 Francesca Messina: francescamessinaromana@yahoo.it