Citation: **Dalia Tamamm et al. (2022), Supportive design: Therapeutic effects of color and light of inpatient spaces, International Design Journal, Vol. 12 No. 4, (July 2022) pp 293-303**

Supportive design: Therapeutic effects of color and light of inpatient spaces

Dalia Hasan Tamamm
Architect, Engineering Affairs Department, Assiut University. Dilla_tmamm@farts.aun.edu.eg
Prof. Ezzat Abdel Moneim Marghani
Professor of Architecture, Department of Architecture, Faculty of Engineering, Assiut University. ezzatmorghany@aun.edu.eg
Dr. Khaled Salah Said Abdel Meguid
Assistant Professor of Architecture, Department of Architecture, Faculty of Engineering, Assiut University. khaled@aun.edu.eg

Abstract:

Color and light are used in healthcare environments as a visual and aesthetical element, neglecting different effects on patients and the supportive role of color and light. **Statement of the problem**: This paper asks about the ability of color and light of inpatient rooms to treat patients and support the recovery process. In addition, it asks sub-questions about the concept of supportive design, how it can support patients' recovery process, how color and colored light are used for therapeutic purposes, and what are the levels, if any? **Objective**: The paper seeks an answer to its central question by investigating the ability of color and colored light to treat some physiological and psychological diseases; and how they can become a supportive design element in therapeutic environments. **Method**: A deductive approach used to deduct how the color and light of inpatient spaces can contribute to the therapy of some diseases and support the recovery process. The paper investigates the concept of supportive design, the historical and temporal experiments of using color in therapeutic process in both direct and indirect sides. **Results**: The study confirmed the ability of color and colored light in inpatient spaces to support the recovery process on both physiological and psychological sides. In addition to the main result, the paper concludes on the colors' properties and their therapeutic or supportive effects, which the designer can refer to in selecting color schemes for inpatient spaces to support the recovery process.

Keywords:

Supportive design, recovery, Psychological effect

References:

1- Al-Quisi, Ahmed Fadhel and Al-Anee, Auday M. and AL-jumaily, Hassanien A. and Bahr, Eman F. and Finjan, Dina A., (2019) "Efficacy of the LED Red Light Therapy in the Treatment of Temporomandibular Disorders: Double Blind Randomized Controlled Trial", Pain Research and Treatment, vol. 2019, Article ID 8578703, 5 pages, https://doi.org/10.1155/2019/8578703
2- Abd Elrashid, Nesrein A. and Sanad, Doaa A. and Mahmoud, Noha F. and Hamada, Hamada A. and Abdelmoety, Alshaimaa M. and Kenawy, Ahmed M., (2018) "Effect of orange polarized light on post burn pediatric scar: a single blind randomized clinical trial", The Journal of Physical Therapy Science, Vol.30, P.1227, https://doi.org/10.1589/jpts.30.1227
3- Azeemi, Khawaja Shamsuddin, (2007) "Colour Therapy", First Edition, Burkhiya Educatio Foundation, Al-Kitab Publications, Karachi, https:/archive.org/details/colour-therapy-english-version-by-khawaja-shamsuddin-azeemi
4- Azeemi, Samina Tazayyen Yousuf: "A Quantitative Study On Chromotherapy", A thesis submitted for the degree of doctorate, Physics Department, University of Balochistan, Quetta, Quetta, Pakistan.
5- Avci, Pinar and Gupta, Asheesh and Sadasivam, Magesh and Vecchio, Daniela and Pam, Zeev and Pam, Nadav and R., Michael, (2013) "Low-Level Laser (Light) Therapy (LLLT) in Skin: Stimulating, Healing, Restoring, Seminars in Cutaneous Medicine and Surgery", P. 47, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4126803/
6- Becker, Detlef and Langer, Elise and Seemann, Martin. and Seemann, Gunda and Fell, Isabel and Saloga, Joachim and Grabbe, Stephan and Stebut, Esther von, (2011) "Clinical Efficacy of Blue Light Full Body Irradiation as Treatment Option for Severe Atopic Dermatitis", PLoS ONE, Issue 6, Volume 6, https://dx.doi.org/10.1371%2Fjournal.pone.0020566
7- Babbitt, Edwin D., (1878) "The Principles of Lighting and Color", Babbitt & CO., Science Hall, 141 Enghith Street, New York, 1878, P. 279, https:/archive.org/details/principlesoflightandcolor
8- Bankenahally, R and Kovvidi, H, (2016) "Autonomic nervous system: anatomy, physiology, and relevance in anesthesia And critical care medicine", Plumx Metrics,Issue11,Vol.16, https://doi.org/10.1093/bjaed/mkw011
9- Clarke, Tom and Costall, Alan, (2008) "The Emotional Connotations of Color: A Qualitative Investigation", Department of Psychology, University of Portsmouth, King Henry I Street, Portsmouth, PO1 2DY, United Kingdom, P.406, https://doi.org/10.1002/col.20435
10- COLVILLE, W. J., Babbitt, Edwin Dwight, (1914) "light and colors Nature's Fine Forces considered as Promoters of Health in all conditions", Macoy Publishing & Masonic Supply Co., 45-49 John Street, New

York, U.S.A.

11- Dinshah, Darius and N., S-C, (2012) "Let There Be Light", Based on the work of Col. Dinshah P. Ghadiali, Eleventh Edition, Dinshah Health Society, Malaga NJ 08328, U.S.A.

12- Elliot, Andrew J. and Maier, Markus A. and Moller, Arlen C. and Friedman, Ron and Meinhardt, Jo¨ rg, (2007) "Color and Psychological Functioning: The Effect of Red on Performance Attainment", Journal of Experimental Psychology, vol. 136, P. 154, https://doi.org/10.1037/0096-3445.136.1.154

13- Gupta, Rakesh, (2021) "Color Therapy in Mental Health and Well Being", International Journal of All Research Education and Scientific Methods (IJARESM), Issue 2, Volume 9, www.ijaresm.com

14- Gul, Somia and Nadeem, Rabia Khalid and Aslam, Anum, (2015) "Chromo therapy- An Effective Treatment Option or Just a Myth?? Critical Analysis on the Effectiveness of Chromo therapy", American Research Journal of Pharmacy, Issue 2, Volume 1, P.63, https://doi.org/10.21694/2380-5706.15002

15- Gerard, Robert, (1958) 'Differential effects of colored light on psychophysiological functions", university of Californiam, Los Angeles.

16- Hu, Yongqing and Zhang, Chunmin and Li, Shengli and Jiao, Ya and Qi, Tonggang and Wei, Guo and Han, Gangwen, (2017) "Effects of Photodynamic Therapy Using Yellow LED-light with Concomitant Hypocrellin B on Apoptotic Signaling in Keloid Fibroblasts", International Journal of Biological Sciences, Vol. 13, P. 319, https://dx.doi.org/10.7150%2Fijbs.17920

17- Hendy, Amany Mashhour, (2018) The role of interior design for enhancing positive emotions within the house", International Journal of innovation and Applied Studies, vol. 24, no. 1, pp. 147–161, August 2018**,** http://www.ijias.issr-journals.org/abstract.php?article=IJIAS-18-155-01

18- Ibrahima, Mohab M. and Patwardhan, Amol and Gilbraith, Kerry B. and Moutal, Aubin and Yang, Xiaofang and Chew, Lindsey A. and Largent-Milnes, Tally and Malan, T. Philip and Vanderah, Todd W. and Porreca, Frank and Khanna, Rajesh, (2017) "Long-lasting antinociceptive effects of green light in acute and chronic pain in rats", Research Paper Pain, No. 2, Vol. 158 , https://dx.doi.org/10.1097%2Fj.pain.0000000000000767

19- Jacobs, Keith W., (1972) "The Effects of the Four Psychological Primary Colors on GSR, Heart Rate, and Respiration Rate, master theses, IN THE GRADUATE SCHOOL", EASTERN ILLINOIS UNIVERSITY CHARLESTON, ILLINOIS, https://doi.org/10.2466/pms.1974.38.3.763

20- Klotsche, Charles, (2012) "COLOR MEDICINE: The Secrets of Color Vibrational Healing, Light Technology".

21- K., Naveen and Telles, Shirley, (2006) "Psychophysiological Effects of Colored Light Used in Healing", International Digital Organization for Scientific Information, issue (1) Volume 1, https://doi.org/10.1093/ecam/neh137

22- Kondratova, A.A. and Kondratov, R.V., (2013) "Circadian clock and pathology of the ageing brain", Nature Reviews Neuroscience, Issue5, Vol.13, https://doi.org/10.1038/nrn3208

23- Kutchma, Teresa M., (2003) "The effects of room color on stress perception: red versus green environments", Journal of Undergraduate Research, issue 1, vol. 3, Minnesota State University, Mankato, P.1227, https://cornerstone.lib.mnsu.edu/jur/vol3/iss1/3

24- Lishchuk, I., (2019) "The influence of colorology on patient' psychological and mental health", Zhytomyr Medical Institute, https://conf.ztu.edu.ua/wp-content/uploads/2019/06/331.pdf

25- Martignago, Cintia C. S. and Tim, Carla Roberta and Assis, Lívia and Silva, Viviane R.D. and Santos, Estefany C. B. D. and Vieira, Fabiana N. and Parizotto, N. A. and Liebano, Richard E., (2019) "Effects of red and near-infrared LED light therapy on full-thickness skin graft in rats, Lasers in Medical Science", https://doi.org/10.1007/s10103-019-02812-6

26- Meesters, Ybe and Dekker, Vera and Schlangen, Luc JM and Bos, Elske H and Ruiter, Martine J, (2011) "Low-intensity blue-enriched white light (750 lux) and standard bright light (10 000 lux) are equally effective in treating SAD. A randomized controlled study", Meesters et al. BMC Psychiatry, http://doi:10.1186/1471-244X-11-17

27- N., Sembian and Aathi, Malar Kodi, (2016) "Chromo therapy: healing power of colors", i-manager's Journal on Nursing, issue No.4, Vol.5l, https://doi.org/10.26634/jnur.5.4.4811

28- Panhoca, Vitor and Lizarelli, R.F.Z. and Nunez, Silvia Cristina and Pizzo, Renata Campi de Andrade, (2015) 'Comparative clinical study of light analgesic effect on temporomandibular disorder (TMD) using red and infrared led therapy", Lasers Med Sci., https://doi.org/10.1007/s10103-013-1444-9.

29- Ulrich, Roger S., (1991) "Effects of interior design on wellness: Theory and recent scientific research", Journal of health care interior design: proceedings from the Symposium on Health Care Interior Desing,vol. 3, 97-109. https://pubmed.ncbi.nlm.nih.gov/10123973/

30- Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR), (2012) "Health Effects of Artificial Light European Union", report, P.25, http://ec.europa.eu/health/scientific_committees/policy/index_en.htm

31- Serrage, Hannah and Heiskanen, Vladimir and Palin, William M. and Cooper, Paul R. Milward, Michael R. and Hadis, Mohammed and Hamblin, Michael R., (2019) "Under the spotlight: mechanisms of photobiomodulation concentrating on blue and green light", Photochemical & Photobiological Sciences, official journal of the European Photochemistry Association and the European Society for Photobiology, issue 8, vol. 18, pp. 1877-1909. https://doi.org/10.1039/c9pp00089e

32- Sadowska, Magdalena and Narbutt, Joanna and Lesiak, Aleksandra, (2021) "Review Blue Light in Dermatology", Life journal, issue 670, Vol.11, https://doi.org/10.3390/life11070670

33- Takahashi, Fumiyo and Kawabata, Yasuhiro, (2018) "The Association between Colors and Emotions for Emotional Words and Facial Expressions", Department of Psychology, Hokkaido University, Sapporo, Japan, http://doi.org/10.1002/col.22186

34- Wajeh, Shamael Muhammed and Al-Haidari, Sana Abbas, (2010) "The role of multi-sensory responsive architecture in forming distinctness image sat interior spaces, the Iraqi journal of architecture and planning, issue 19, vol. 9, P. 363-383, https://doi.org/10.36041/iqjap.v9i1.213

Paper History:

Paper received 16th March 2021, Accepted 8th June 2022, Published 1st of July 2022

