STUDY TITLE:

Relaxing Environment to Lower Anxiety during Onabotulinum Toxin Chemodenervation of the Bladder: RELAX Trial

NCT06319898

Document Date: 05/01/2024

STUDY TITLE:
Relaxing Environment to Lower Anxiety during Onabotulinum Toxin Chemodenervation of the Bladder: RELAX Trial

Principal Investigator:
Megan Tarr, MD
Atrium Health
Wake Forest University School of Medicine
Megan.tarr@atriumhealth.org

Co-investigator(s):
Erin Franks, MD
Atrium Health
Wake Forest University School of Medicine
Erin.franks@atriumhealth.org

Michael Kennelly, MD
Atrium Health
Wake Forest University School of Medicine
Michael.kennelly@atriumhealth.org

Erinn Myers, MD
Atrium Health
Wake Forest University School of Medicine
Erinn.myers@atriumhealth.org

Zahra Bahrani-Mostafavi, PhD
Atrium Health
Wake Forest University School of Medicine
Zahra.bahranimostafavi@atriumhealth.org

Joseph Rigdon, PhD
Wake Forest University School of Medicine
Jrigdon@wakehealth.edu

Kelley Kaczmarski, RN, BSN
Atrium Health
Wake Forest University School of Medicine
Kelley.kaczemarski@atriumhealth.org

Sponsor or funding source: Departmental

BACKGROUND
Chemodenervation of the bladder with onabotulinum toxin A is an effective treatment option for patients with refractory overactive bladder (OAB) or urgency urinary incontinence (UUI)[1]. It is often performed as an office-based procedure under local anesthesia. Alternatively, it can be performed in the operating room under general anesthesia. The ability to receive intra-detrusor chemodenervation in the office allows patients to avoid the risks associated with general anesthesia and is significantly more cost effective[2]. The procedure, however, is painful and can be anxiety provoking for patients; especially given that patients typically return every six to nine months for repeat injections[1,2].

Relaxation and distraction techniques are one way to ease patients' anxiety before an office-based procedure. Aromatherapy and music have been shown to reduce anxiety and pain during procedures such as intravenous line placement, bone marrow biopsy, and cystoscopy[3-7]. In the urogynecologic population, both lavender aromatherapy and listening to music during multi-channel urodynamics decreased patient anxiety and improved satisfaction[8-9]. There have not, however, been any studies evaluating the use of aromatherapy or music during intra-detrusor chemodenervation procedures.

While we do not know exactly how anxiety provoking office bladder chemodenervation is for patients, we do know that anxiety disorders are highly prevalent in women with overactive bladder as a population[10]. One study of 274 women with OAB found that 62.4% had moderate to severe anxiety[10]. Addressing pre-procedural anxiety is important so patients will continue to pursue treatment of their OAB/UUI in the outpatient environment. Achieving a relaxing office environment with simple adjustments to aroma, music, and lighting may be one way to help patients feel less anxious, reduce the perception of procedural pain, and increase satisfaction with their procedural experience.

STUDY PURPOSE

This study aims to investigate whether women with OAB/UUI who receive office intra-detrusor chemodenervation injections performed in a relaxing environment of lavender aromatherapy, calming music, dim lighting, and modest positioning (Relaxing Environment Package) will have decreased anxiety and pain as well as increased post-procedure satisfaction compared to patients who receive chemodenervation in a typical office environment. We will also investigate whether exposure to the relaxing environment impacts the well-being of staff involved in these procedures.

STUDY OBJECTIVES

Primary Objective

Determine if women with OAB/UUI exposed to a Relaxing Environment Package during office administration of intra-detrusor onabotulinum toxin A injections have decreased pre-procedure anxiety based on a visual analog scale compared to women receiving intra-detrusor onabotulinum toxin A injections performed in a typical office setting.

Secondary Objectives

1. Determine if the Relaxing Environment Package reduces a patient's pain during office administration of intra-detrusor onabotulinum toxin A injections based on a visual analog scale.
2. Determine if the Relaxing Environment Package increases patient satisfaction with their procedure experience based on a visual analog scale.
3. Determine if the Relaxing Environment Package decreases procedure staff burnout based on a visual analog scale.

HYPOTHESIS

We hypothesize that patients who experience a relaxing environment of lavender aromatherapy, calming music, dim lighting, and modest positioning during office intra-detrusor chemodenervation procedures will have less pre-procedure anxiety, less pain during the procedure, and greater procedure satisfaction compared to patients who experience a typical office setting. We additionally hypothesize that staff who are exposed to the relaxing environment will experience less burnout.

METHODS and MEASURES

Design and Setting

This is a single center prospective randomized controlled trial of women with overactive bladder undergoing their first or repeat office intra-detrusor chemodenervation with onabotulinum toxin A. The trial will be performed in an academic medical center outpatient Urogynecology clinic (Women's Center for Pelvic Health (Mercy), Atrium Health, Charlotte, NC). Approval by the Atrium Health Institutional Review Board will be obtained before data collection.

Subject Selection Criteria
Women scheduled for office intra-detrusor chemodenervation with onabotulinum toxin A for a diagnosis of overactive bladder (OAB), urinary urgency (UU), or urgency urinary incontinence (UUI) based on subjective or objective data will be identified and screened against inclusion and exclusion criteria. If potential subjects meet the requirements for the study, they will be eligible to be invited for participation. Subjects will be consented for study enrollment by physicians, fellow physicians, and/or a delegated study team member on the day of their procedure.

Inclusion Criteria
- Non-pregnant females
- Age 18 years and older
- English as a primary language
- Scheduled for office intra-detrusor chemodenervation for diagnosis of OAB/UU/UUI
- Baseline visual analog scale for anxiety ≥12mm

Exclusion Criteria
- Allergy to lavender oil
- Contraindication to intra-detrusor chemodenervation procedure as determined by the physician

Inclusion of Women and Minorities
Women of all races and ethnicity who meet the above-described eligibility criteria are eligible for this study. All participants will be women.

Study Withdrawal
Subjects may withdraw from the study at any point in time. Documentation of the reason for withdrawal will be captured in the data collection forms. There will be no risk to subjects that choose to withdraw.

Sample Size
Our sample size calculation was based on a prior study within the urogynecologic population which showed a statistically significant reduction in VAS-anxiety when aromatherapy was used during multichannel urodynamics, a common urogynecologic office procedure[8]. With a sample size of n=80 we would have 80% power to detect a mean clinically important difference of 12mm out of 100mm on the anxiety visual analog scale assuming a standard deviation of 18.8 and p-value 0.05. As the intervention is delivered at the week level, if we reach n=80 early in the week, we will plan to finish out the week and thus may reach a total sample size slightly greater than 80, increasing statistical power.

Interventions and Interactions
Patients scheduled for office intra-detrusor chemodenervation will be contacted by study staff via phone to introduce the study and gauge interest in participating. Interested and eligible patients will be asked to arrive thirty minutes before their scheduled procedure time to complete the consent process. Upon arrival, patients will be escorted to a research office where informed consent will be obtained. After obtaining informed consent, all participants will fill out a pre-procedure visual analog scale (VAS) for

anxiety[11] (Figure 1) and a VAS for pain[12] (Figure 2). If all inclusion criteria are met, including VAS-anxiety ≥12mm on 100mm scale, participants will be enrolled and then escorted to the procedure room.

Intervention:

Group 1: Intervention

- Lavender aromatherapy sticker on patient, procedure staff, MD lapel
- Calming music from Sirius XM station 68 (Spa) playing via overhead speakers
- Overhead lights off, two lanterns lit to provide dim lighting
- Avoid stirrup use

Group 2: Control

- Non-aromatic (placebo) sticker on patient, procedure staff, MD lapel
- No music playing
- Overhead lights on
- Stirrups used

In order to create the least disruption to our clinical workflow, we propose randomizing the weeks of the study rather than randomizing participants. Permuted block randomization will be used such that a random sequence of blocks of 4 or 6 weeks (totaling to the number of weeks planned for the study) will be chosen. Within each block of 4 or 6 weeks, the weeks will be equally randomized to treatment or control. For example, within a four-week block, two of four weeks will be randomized treatment and two to control. Permuted block randomization will ensure that (i) prognostic factors (e.g., first-time vs. repeat patient) are balanced over the course of the study and (ii) seasonality is addressed (e.g., within summer, half of the weeks are control and half treatment). Each week of the study will be randomized to either Relaxing Environment Package or Typical Office Environment (control), rather than randomizing individual patients. On Monday of every week, an envelope will be opened to determine if it is a Relaxing Environment Package week or Control week. Randomization will be discussed in more detail below.

If the week is randomized to a *Relaxing Environment Package,* the patient, procedure staff, and MD will enter the procedure room and receive a lavender aromatherapy sticker to be worn on their lapels. The lavender aromatherapy sticker will be ordered from Aroma Stickers store website (https://aroma-stickers.com). Calming music from Sirius XM station 68 (Spa) will be playing softly in the background via overhead speakers. If the patient had planned to listen to their own music during the procedure, this will be permitted and documented. Procedure consent and preprocedural preparation (see below) will take place. The overhead lights will then be turned off, and two battery powered lanterns will be lit to provide dim lighting. Stirrups will be avoided, if possible, during the preparation and procedure.

If the week is randomized to *Typical Office Environment*, the patient, procedure staff, and MD will enter the procedure room and receive a non-aromatic (placebo) sticker to be worn on their lapels. The non-aromatic sticker will be obtained from an office supply store. No music will be playing, and all of the lights will be on as is typical in our practice. Procedure consent and preprocedural preparation (see below) will take place. The lights may then be adjusted during cystoscopy per provider preference for adequate visualization.

To minimize lavender cross contamination and unintended topical or environmental exposure in those not participating in the study or with lavender allergy, we opted to use a lavender aromatherapy sticker rather than a diffuser. Unlike a diffuser, the aromatic sticker does not leave a scent in the air once the sticker is removed from the room. When the aromatic sticker is worn on a shirt lapel it can only be smelled at close distances, typically only by the individual wearing the sticker. Aromatic stickers will be maintained outside the procedure room in a sealed bag. If a patient is randomized to the Relaxing Environment Package, the stickers will be brought into the procedure room and distributed to patients and staff. The sticker will be placed on the subjects' shirt lapel. Once the procedure is completed the stickers will be recollected, placed back in the sealed bag, and disposed of by study staff. This will limit any environmental exposure to lavender for the next patient. Routine hand washing or sanitization by MD and procedure staff and routine cleaning of procedure room between patient encounters will limit any cross contamination or unintended topical exposure. For patients or staff not participating, we believe that lavender levels will not be above those expected in everyday life. Additionally, our office has a second procedure room that can be used for any patients with a lavender allergy.
All patients will receive routine preprocedural antibiotic prophylaxis, sterile urethral preparation with betadine or chlorhexidine, and 60cc viscous intravesical 1% lidocaine will be instilled into the bladder with sterile technique. After staying in the environment in the supine position with a sheet covering the lower half of their body and legs for at least 10 minutes while the local anesthetic takes effect, participants will then fill out a 2nd VAS for anxiety. The procedure will be performed, and any patient requested modifications to the protocol will be recorded. After the procedure and once participants are dressed, they will fill out a 2nd VAS for pain and a VAS for procedure satisfaction (Figure 3).

The procedure staff and MD will fill out the Burnout Battery visual analog scale[13] (Figure 4) at the start of the day prior to seeing any patients. They will again complete the Burnout Battery visual analog scale at the day's conclusion, after seeing their last patient. They will also record how many chemodenervation procedures they participated in that day.

The electronic medical record, with participant permission, will be reviewed to establish patient demographics, indication for procedure, whether primary or repeat procedure, and medical history. Years of experience and demographic information of the procedure staff and MD will also be recorded.

	Baseline	**Procedure**	**Post-procedure**
Informed Consent	x		
Medical History	x		
Medication review	x		
***Other Demographics**	x		
VAS Anxiety #1	x		
VAS Pain #1	x		
Randomization	x		
VAS Anxiety #2		x	
****Procedure**		x	

VAS Pain #2			x
VAS Patient Satisfaction			x

Table 1. Patient Data Collection Schedule

*Other demographic data includes: Age (years), Race, Body Mass Index (BMI in kg/m 2), smoking status (current/former/never), insurance type (private/Medicare/Medicaid/None), use of aromatherapy at home in the last six months (yes/no)

**Procedure data includes: first time injection (yes/no), repeat procedure (yes/no), time of patient entering room, time of VAS anxiety #2, protocol modifications (stirrups used, support person present, listening to personal music, other relaxation techniques used, etc)

	Baseline	Start of clinic day	End of clinic day
Informed Consent	x		
***Demographics**	x		
Burnout Battery		x	x

Table 2. MD and Procedure Staff Data Collection Schedule

*MD gender, MD years of experience performing office bladder chemodenervation, procedure staff gender, procedure staff years of experience supporting office procedures, MD and procedure staff use of aromatherapy at home in the last 6 months (yes/no)

RANDOMIZATION

A permuted block randomization scheme will be used to assign weeks in a 1:1 ratio to intervention or control. The permutated blocks will prevent clinic staff from being able to predict which weeks will be Relaxing Environment Package or control. However, it will not be possible to blind subjects, staff, or investigators. Our statistician will be blinded. Randomization of weeks rather than patients was selected to minimize impact to clinic flow and help prevent protocol deviation among our busy clinic staff who often have back-to-back procedures. It will also allow assessment of procedure team burnout. Patients will only participate in the study once.

OUTCOME MEASURES

Primary Outcome Measure:

The primary outcome is to compare the mean change in patients' anxiety level from when they arrive for their procedure to their anxiety level after at least 10 minutes of exposure to the relaxing or typical office environment (while the lidocaine anesthetic is given time to work in the bladder). The mean change in anxiety levels will be compared between the intervention and control groups. Anxiety will be assessed using a visual analog scale (VAS) (Figure 1). The VAS for anxiety is a validated scale that ranges from 0-100mm[14]. 0mm is equivalent to "no anxiety" and is located on the left. 100mm is equivalent to "extremely anxious" and is located on the right. Subjects are asked to draw a vertical line on the scale that corresponds to their level of anxiety. The first VAS anxiety score (baseline) will be collected the day of the procedure in the research office after obtaining consent. The second VAS anxiety score (after exposure) will be collected just prior to starting the procedure after at least 10 minutes of exposure to the procedure room environment. The minimum clinically important difference for VAS anxiety is a change of 12mm on a 100mm scale.

Secondary Outcome Measures

Procedure pain: Pain during the chemodenervation procedure will be assessed using a visual analog scale for pain (Figure 2). The VAS for pain is a validated scale that ranges from 0-100mm[15]. 0mm is equivalent to "no pain" and is located on the left. 100mm is equivalent to "worst possible pain" and is located on the right. Subjects are asked to draw a vertical line on the scale that corresponds to their level of pain during the procedure. Baseline scores will be collected on the day of the procedure in the research office after obtaining consent. Patients will then be asked to circle the pain scores that corresponded to the pain experienced during the procedure. This will be collected by study staff after the procedure once the patient is dressed.

Satisfaction with experience: Patient satisfaction with their procedure experience will be assessed using a visual analog scale for patient satisfaction (Figure 3). The VAS for patient satisfaction is a validated scale ranging from 0-100mm[16]. 0mm is equivalent to "no satisfaction" and 100mm is equivalent to "extreme satisfaction". Subjects are asked to draw a vertical line that corresponds to their level of satisfaction with their procedure experience.

Procedure team burnout: Procedure team burnout will be assessed using a Burnout Battery visual analog scale for healthcare worker burnout (Figure 4). This tool was created to assess the working energy states of healthcare providers and is correlated with the Maslach Burnout Inventory which is a validated 22 question survey regarding workplace burnout[13]. The RN(s) assigned to chemodenervation procedures as well as the physician performing the procedure will fill out the Burnout Battery VAS at the beginning and end of the clinic day. Providers are asked to circle the battery that represents their current energy level.

ANALYTICAL PLAN

Descriptive statistics will be used to summarize baseline characteristics of treatment and control groups. Means and standard deviations (or medians and interquartile ranges) will be used to summarize continuous variables such as age, and frequencies and percentages will be used to summarize categorical variables such as first-time vs. repeat patient. Regression analyses will be performed to test the hypotheses about treatment effects on primary and secondary outcomes. Planned regression models can flexibly address missing data and include covariate adjustment for important prognostic variables (such as first-time vs. repeat patient), as necessary. Exploratory subgroup analyses will be performed to characterize treatment effects within groups of interest, such as first-time or repeat patients.

SUBJECT RECRUITMENT METHODS

All patients who plan to undergo intra-detrusor chemodenervation will be identified on the clinic schedule prior to their procedure, screened, and approached for participation in the study. Informed consent will be obtained in a separate room prior to entering the procedure room. Subjects who do not meet the inclusion or exclusion criteria will be considered screen failures. Screen failures will be captured, and the cause for screen failure will be documented.

If a patient agrees to participate in study, baseline demographic information and medical history will be collected from Encompass (EPIC) electronic medical record.

All MD and procedure staff assisting with bladder chemodenervation procedures at our facility will be invited to participate. Informed consent will be obtained from interested MD and procedure staff privately, before participating in any study procedures, so they have time to read the consent and ask questions. They will be provided with a printed copy of the informed consent. After informed consent is obtained baseline data will be collected.

All study data will be recorded by research staff and securely maintained at the Mercy study site. The data flow will consist of paper data collection for eligibility assessment, baseline data, randomization, intervention group, primary and secondary outcomes, adverse events, and protocol deviations.

Data will be entered by study staff into the Research Electronic Data Capture (REDCap) database that will be stored on a secure server at Atrium Health. REDCap is a secure, web-based application designed to support data capture for research studies, providing: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources. Data will be entered into REDCap within 30 business days of collection.

Each subject will have a unique identification number to which only the principal and sub-investigators will have access. The data collection spreadsheet will not contain any patient identifiers and will be password protected. The master list that links the patients and their study identification number will be stored separately from the database. All collected information will be stored separately on a password protected hard drive. A back up copy of the file will be stored on a password protected hospital network drive. All hard copies of study data will be stored in a locked cabinet in the office of the research nurse, which will also be locked.

Electronic data will be stored to safe-guard confidentiality using a password protected computer. Principal investigator, co-investigators, research Coordinator nurse, and statisticians will have access to harvested patient data. Harvested patient data and identifiers will be destroyed upon completion of data analysis, manuscript acceptance and publication in accordance with Atrium Research policy and guidelines.

INFORMED CONSENT

Signed informed consent will be obtained from each patient subject by a delegated study team member in-person on the day of the schedule procedure.

Signed informed consent will be obtained from MD and procedure staff subjects by a delegated study team member prior to participation in any study procedures.

CONFIDENTIALITY AND PRIVACY

Confidentiality will be protected by collecting only information needed to assess study outcomes, minimizing to the fullest extent possible the collection of any information that could directly identify subjects, and maintaining all study information in a secure manner. To help ensure subject privacy and confidentiality, only a unique study identifier will appear on the data collection form. Any collected patient identifying information corresponding to the unique study identifier will be maintained on a linkage file, store separately from the data. The linkage file will be kept secure, with access limited to designated study personnel. Following data collection subject identifying information will be destroyed upon completion of data analysis, manuscript acceptance and publication in accordance with Atrium Research policy and guidelines consistent with data validation and study design, producing an anonymous analytical data set. Data access will be limited to study staff. Data and records will be kept locked and secured, with any computer data password protected. No reference to any individual participant will appear in reports, presentations, or publications that may arise from the study.

DATA AND SAFETY MONITORING

The principal investigator will be responsible for monitoring the data and safety of study participants. The principal investigator will be assisted by other members of the study staff.

REPORTING OF UNANTICIPATED PROBLEMS, ADVERSE EVENTS OR DEVIATIONS
Any unanticipated problems, serious and unexpected adverse events, deviations or protocol changes will be promptly reported by the principal investigator or designated member of the research team to the IRB or appropriate government agency if appropriate.

FIGURES
Figure 1

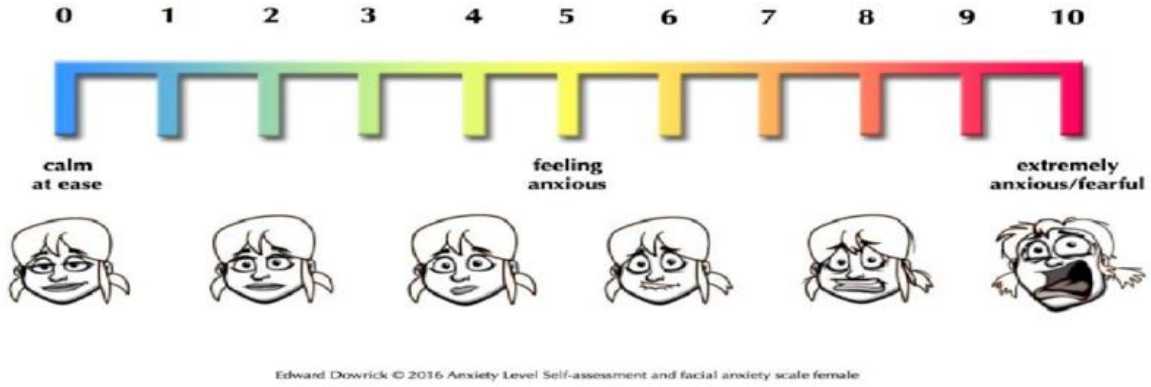


Figure 2

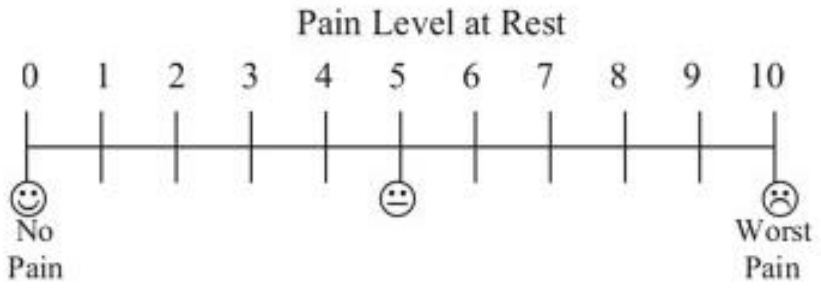


Figure 3

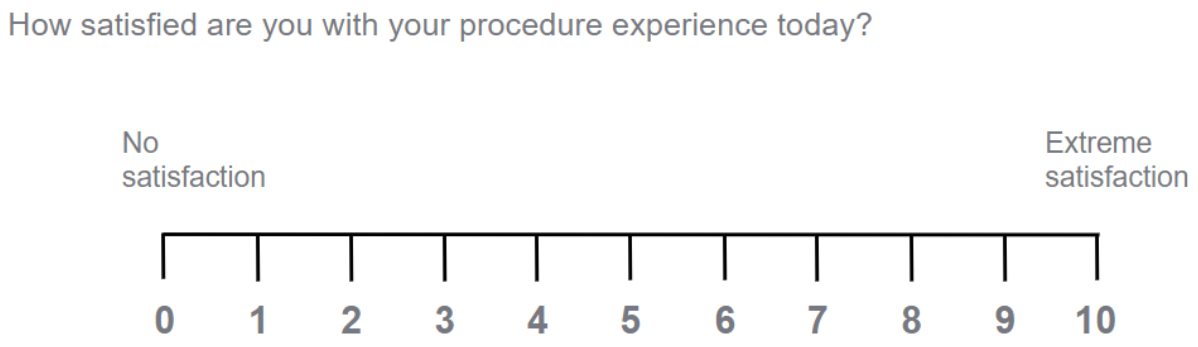
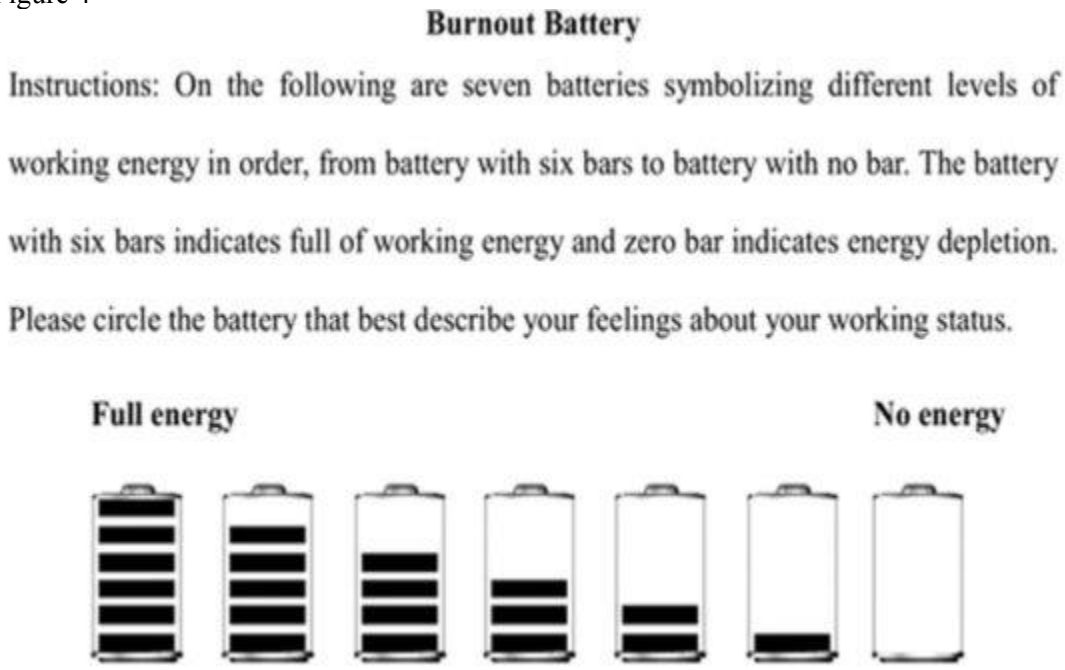


Figure 4



REFERENCES

1. Bradley, M. & Amundsen, C. (2022). Refractory Overactive Bladder. Walters, M. & Karram, M. (Eds.), Urogynecology and Reconstructive Pelvic Surgery Fifth Edition (Pp. 524-526). Elsevier.
2. Faure Walker N, Macpherson F, Tasleem A, Rampal T. Interventions to improve tolerability of local anesthetic intradetrusor Botulinum toxin injections: A systematic review. Neurourol Urodyn. 2023 Jan;42(1):23-32. doi: 10.1002/nau.25061. Epub 2022 Oct 23. PMID: 36378811; PMCID: PMC10092540.
3. Karaman T, Karaman S, Dogru S, Tapar H, Sahin A, Suren M, Arici S, Kaya Z. Evaluating the efficacy of lavender aromatherapy on peripheral venous cannulation pain and anxiety: A prospective, randomized study. Complement Ther Clin Pract. 2016 May;23:64-8. doi: 10.1016/j.ctcp.2016.03.008. Epub 2016 Mar 25. PMID: 27157961.
4. Abbaszadeh R, Tabari F, Asadpour A. The Effect of Lavender Aroma on Anxiety of Patients Having Bone Marrow Biopsy. Asian Pac J Cancer Prev. 2020 Mar 1;21(3):771-775. doi: 10.31557/APJCP.2020.21.3.771. PMID: 32212806; PMCID: PMC7437323.

5. Mumm JN, Eismann L, Rodler S, Vilsmaier T, Zehni AZ, Apfelbeck M, Pfitzinger PL, Volz Y, Chaloupka M, Bauer RM, Stief CG, Staehler M. Listening to Music during Outpatient Cystoscopy Reduces Pain and Anxiety and Increases Satisfaction: Results from a Prospective Randomized Study. Urol Int. 2021;105(9-10):792-798. doi: 10.1159/000517275. Epub 2021 Jul 19. PMID: 34280934.
6. Gupta S, Das SK, Jana D, Pal DK. Distraction during cystoscopy to reduce pain and increase satisfaction: Randomized control study between real-time visualization versus listening to music versus combined music and real-time visualization. Urol Ann. 2019 Jan-Mar;11(1):33-38. doi: 10.4103/UA.UA_191_17. PMID: 30787568; PMCID: PMC6362792.
7. Gauba A, Ramachandra MN, Saraogi M, Geraghty R, Hameed BMZ, Abumarzouk O, Somani BK. Music reduces patient-reported pain and anxiety and should be routinely offered during flexible cystoscopy: Outcomes of a systematic review. Arab J Urol. 2021 Mar 3;19(4):480-487. doi: 10.1080/2090598X.2021.1894814. PMID: 34881066; PMCID: PMC864802
8. Özel BZ, Quevedo A, Jung C, Shirazi F, Dancz CE. Lavender Aromatherapy for Anxiety and Pain During Multichannel Urodynamics: A Randomized Controlled Pilot Trial. Female Pelvic Med Reconstr Surg. 2021 Nov 1;27(11):654-658. doi: 10.1097/SPV.0000000000001032. PMID: 33626029.
9. Diri MA, Çetinkaya F, Gül M. The Effects of Listening to Music on Anxiety, Pain, and Satisfaction during Urodynamic Study: A Randomized Controlled Trial. Urol Int. 2019;103(4):444-449. doi: 10.1159/000502298. Epub 2019 Aug 13. PMID: 31408870.
10. Melotti IGR, Juliato CRT, Tanaka M, Riccetto CLZ. Severe depression and anxiety in women with overactive bladder. Neurourology and Urodynamics. 2018; 37: 223–228
11. Kumar, Kushee-Nidhi & Alam, Ambreen & Ng, Anna & Yellapu, Vikas. (2021). Open Access Journal of Clinical Anesthesiology: Aromatherapies can Reduce Incidence of Anxiety in Ambulatory Surgery Patients: A Pilot Study. Journal of Clinical Anesthesia.
12. Petrikovets A, Sheyn D, Sun HH, Chapman GC, Mahajan ST, Pollard RR, El-Nashar SA, Hijaz AK, Mangel J. Multimodal opioid-sparing postoperative pain regimen compared with the standard postoperative pain regimen in vaginal pelvic reconstructive surgery: a multicenter randomized controlled trial. Am J Obstet Gynecol. 2019 Nov;221(5):511.e1-511.e10. doi: 10.1016/j.ajog.2019.06.002.
13. Deng YT, Liu J, Zhang J, Huang BY, Yi TW, Wang YQ, Zheng B, Luo D, Du PX, Jiang Y. A multicenter study on the validation of the Burnout Battery: a new visual analog scale to screen job burnout in oncology professionals. Psychooncology. 2017 Aug;26(8):1120-1125. doi: 10.1002/pon.4291. Epub 2016 Oct 17. PMID: 2770973
14. Williams VS, Morlock RJ, Feltner D. Psychometric evaluation of a visual analog scale for the assessment of anxiety. Health Qual Life Outcomes. 2010 Jun 8;8:57. doi: 10.1186/1477-7525-8-57. PMID: 20529361; PMCID: PMC2904728.
15. Jensen MP, Chen C, Brugger AM (2003) Interpretation of visual analog scale ratings and change scores: a reanalysis of two clinical trials of postoperative pain. J Pain 4(7):407–414
16. Brokelman RB, Haverkamp D, van Loon C, Hol A, van Kampen A, Veth R. The validation of the visual analogue scale for patient satisfaction after total hip arthroplasty. Eur Orthop Traumatol. 2012 Jun;3(2):101-105. doi: 10.1007/s12570-012-0100-3. Epub 2012 Apr 12. PMID: 22798966; PMCID: PMC3389603.