

# Effect of Electroacupuncture In Neurogenic Bladder: A Quasi-Experimental Study



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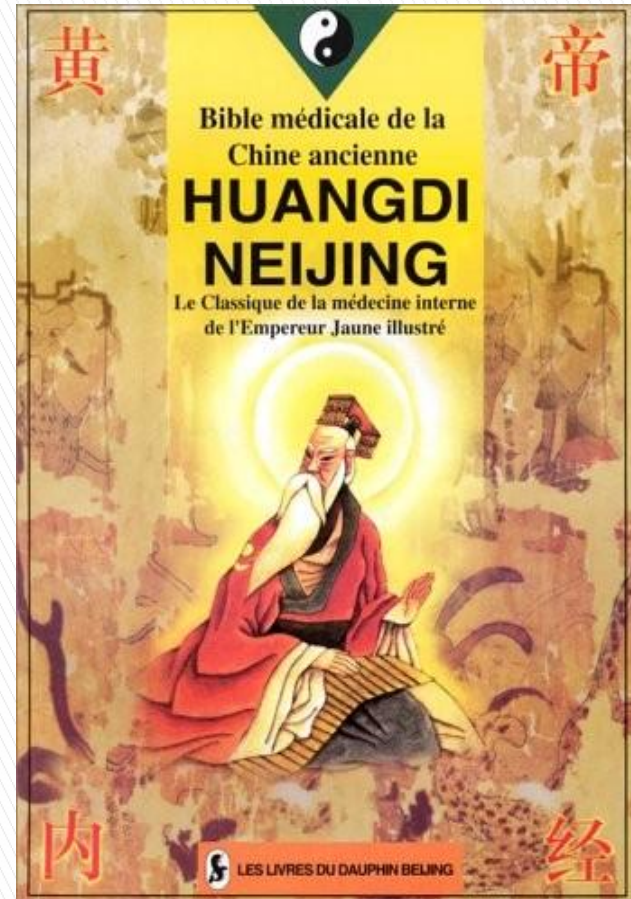
# INTRODUCTION OF NEUROGENIC BLADDER

- ▶ **Neurogenic bladder** : Dysfunction of either the urinary bladder, bladder neck and its sphincters due to diseases of the peripheral or central nervous system.
- ▶ **Types:** 1. Overactive bladder  
2. Underactive bladder
- ▶ **Prevalence** -Parkinson's disease 38-71%, MS 40-90%; Spinal cord injury 70-84% and stroke and diabetic neuropathy 15%.

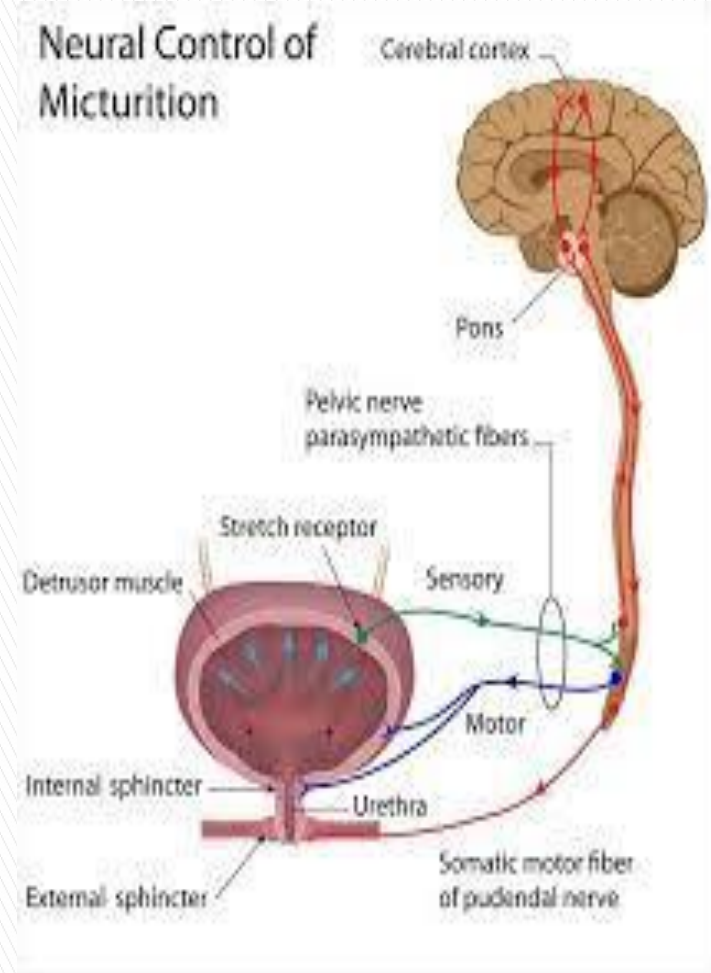
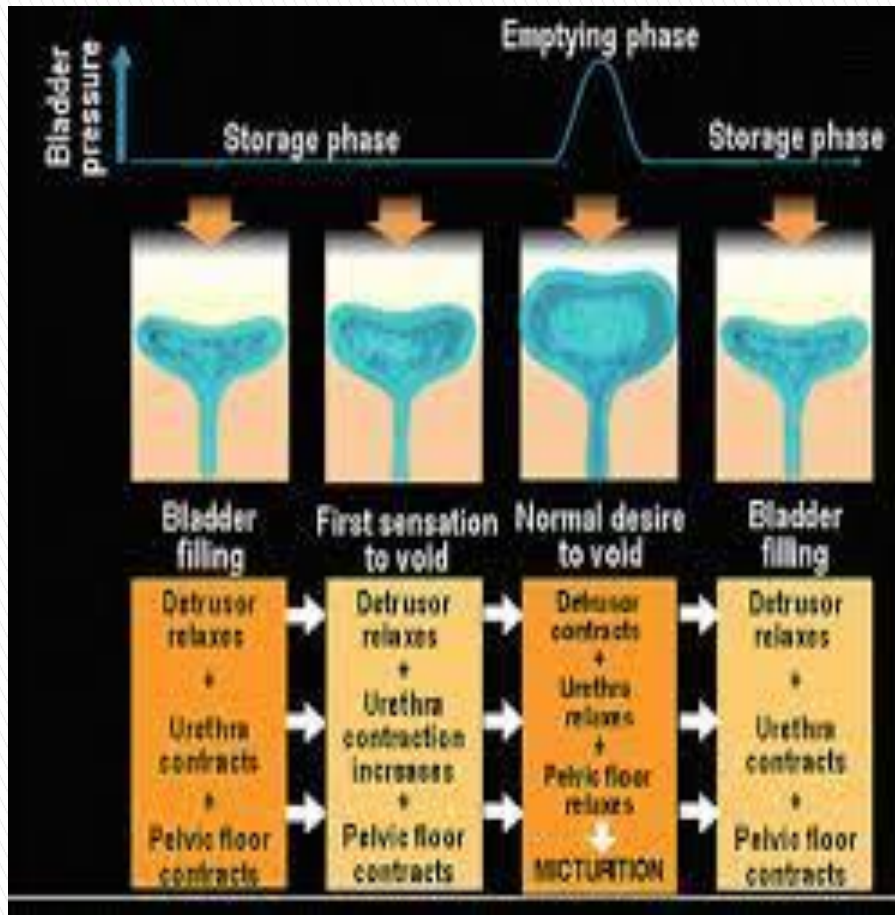
*Ismail S, Karsenty G, Chartier-Kastler E, et.al. 2018*

# CONCEPT OF NEUROGENIC BLADDER IN TCM

- ▶ NB（神经源性膀胱）-“癃闭 long bi”，“淋证 linzheng”，“yini” etc.
- ▶ 癃 means-unsmooth urination with dribbling. “闭bi” means obstructed urination.
- ▶ First mentioned in 黄帝内经.

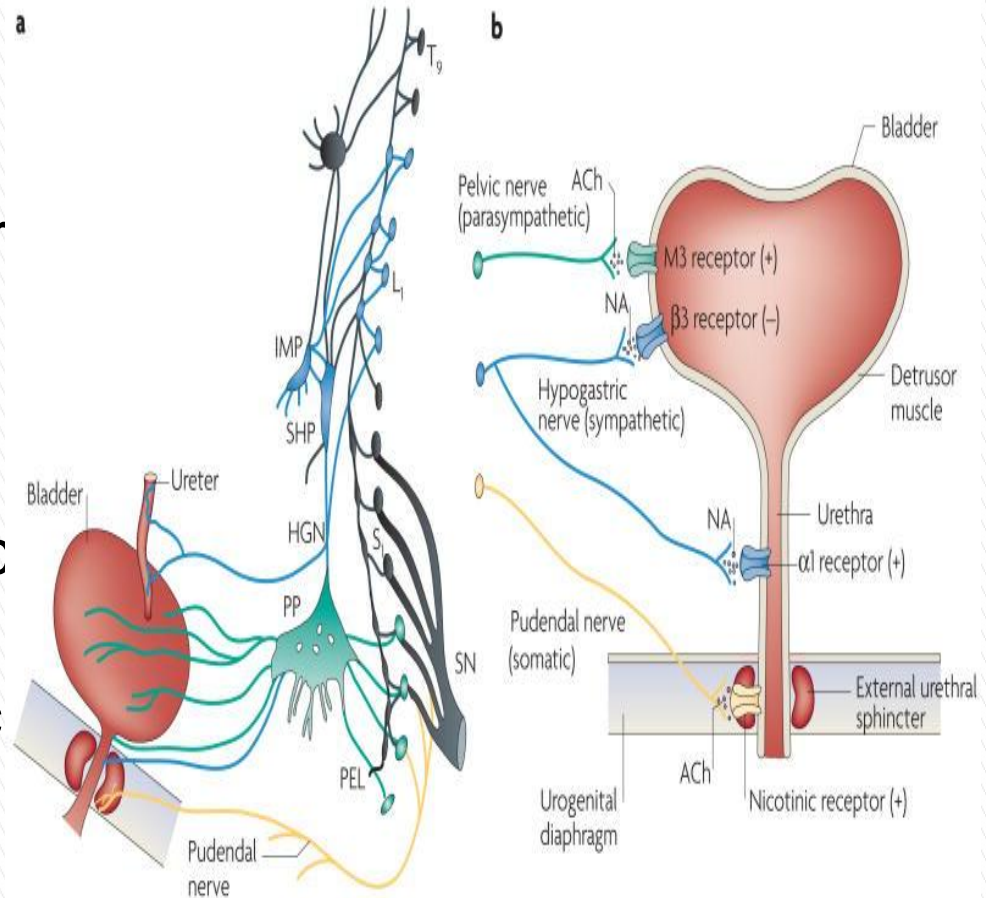


# Micturition Phase



# Control of Micturition

- ▶ Cortical Micturition Center
- ▶ Pontine micturition center (PMC)-or Barrington's nucleus.
- ▶ Spinal micturition center-  
Sympathetic: Hypogastric nerve (T12 – L2).  
Parasympathetic: Pelvic nerve (S2-S4) .  
Somatic: Pudendal (Onuf's) nucleus (S2-S4).
- ▶ Peripheral nerves



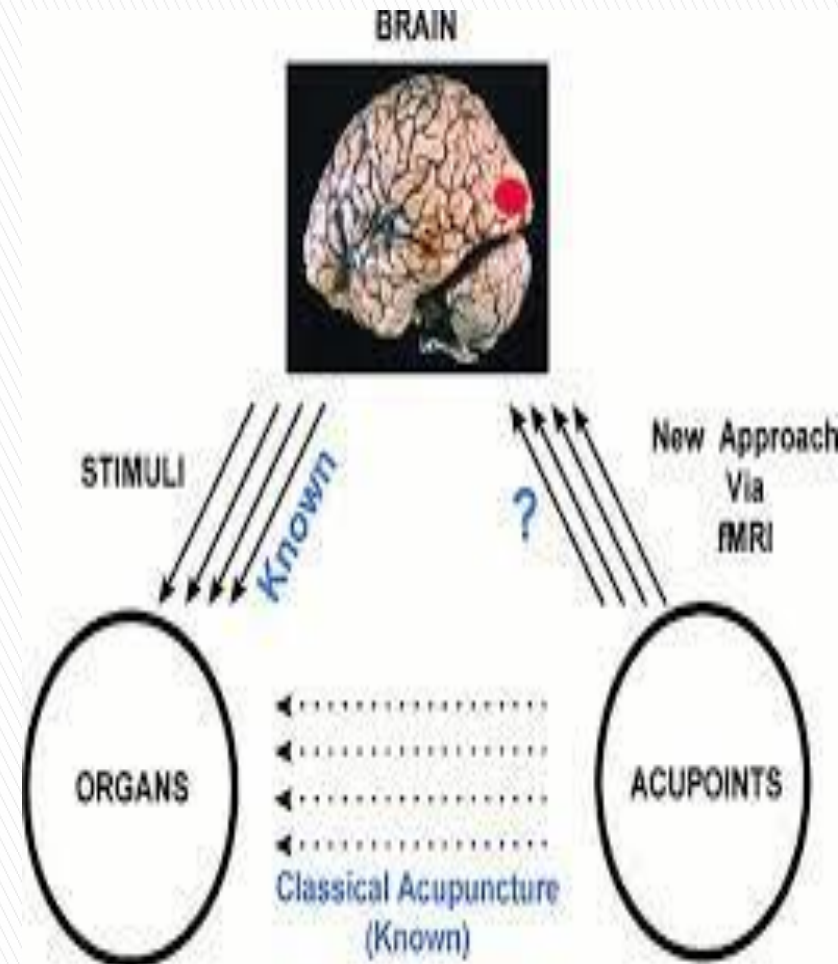
# LITERATURE REVIEW

- ▶ ***Wei Xinchun et.al 2021***: EA in bladder meridian significantly reduce the residual urine volume, improve the functional state of bladder, and improve the quality of life.
- ▶ ***Huiyong chen et al 2020***: showed EA reduce Over active bladder symptoms.
- ▶ ***Study done by Z. yuan et .al***: showed acupuncture is effective as anticholinergics in reducing the frequency, incontinence, nocturia and increase the urine volume.
- ▶ ***Tong Zhang et. al ,2018*** : after EA bladder tissue morphological changes in rats were due to the protein expression level of NGF, TrkA, p-TrkA , AKT and p-AKT signaling in the local nerve of the damaged spinal cord.

- ▶ ***Jun-Yan Lu et.al ,2020*** : EA at the Ciliao acupoint significantly reduced inflammation and edema and inhibited HCN channel expression.
- ▶ ***Yan Liu et al 2013***: EA at points Baliao and Huiyang is an effective treatment for post-stroke detrusor overactivity. Improved cystometric capacity , bladder compliance, decreased detrusor leak point pressure, lower urinary tract symptoms, and the risk of upper urinary tract damage.
- ▶ ***Yue Ning Deng et. al , 2021***: Acupuncture at Dazhui“ (GV14) and ”Ciliao“ (BL32) improve urinary function in rats by activating the Wnt/ $\beta$ -catenin signaling pathway and promoting the protein expression of Wnt-1,  $\beta$ -catenin and Ngn1.
- ▶ ***Ai K et.al*** : EA at Ciliao (BL32), Zhongji(CV3) and Sanyinjiao (SP6) improve the bladder functions by activating the PACAP/cAMP/PKA signaling pathway.

# NEED FOR STUDY

- ▶ NB results long term disability, increase risk of urinary complications and reducing quality of life.
- ▶ Anticholinergic medicine, Surgical management, Botox injection, Neuromodulation, CIC are in practice with no satisfactory results.
- ▶ The aim of my study is to determine the role of EA in NB




# OBJECTIVES

## **General objectives**

- ▶ To determine the effectiveness of Electroacupuncture in improving the symptoms of neurogenic bladder.

## **Specific Objectives**

- ▶ To assess the difference in symptoms of overactive bladder and underactive bladder issues assessed by NBSS score between the intervention and control group.
  - ▶ To assess the difference in consequences of Neurogenic bladder using NBSS Scores .
  - ▶ To assess the difference in quality of life between intervention and control group.
- 

# HYPOTHESIS

- ▶ **Alternate Hypothesis**  
Integrated therapy of EA combined with conventional management is effective.
- ▶ **Null Hypothesis**  
Integrated therapy of EA combined with conventional management is not effective.



# VARIABLES

Age  
Gender  
Types of NB  
Neurological diseases

Bladder  
Management  
Day time frequency  
Saturation of pad  
No of pad  
Nocturnal  
Incontinence  
Longest interval  
Interval without  
leak  
Skin problems  
Nocturia  
Straining  
Stream  
Post voidal fullness  
UTI Frequency  
Quality of life.

Independent Variables

Dependent Variables

# METHOD

- ▶ **Design:**

- Quasi Experimental study

- ▶ **Sampling technique**

- Non-randomized, convenient sampling

- ▶ **Sample size**

- 60 (30 in Experimental & 30 in Control Group)

- ▶ **Duration of treatment**

- 3 weeks (six days per week)

- ▶ **Duration of Study**

- 1 years (From 2022 January - 2023 February)



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**Annapurna Neurological  
Institute and Allied Sciences**

# METHODOLOGY

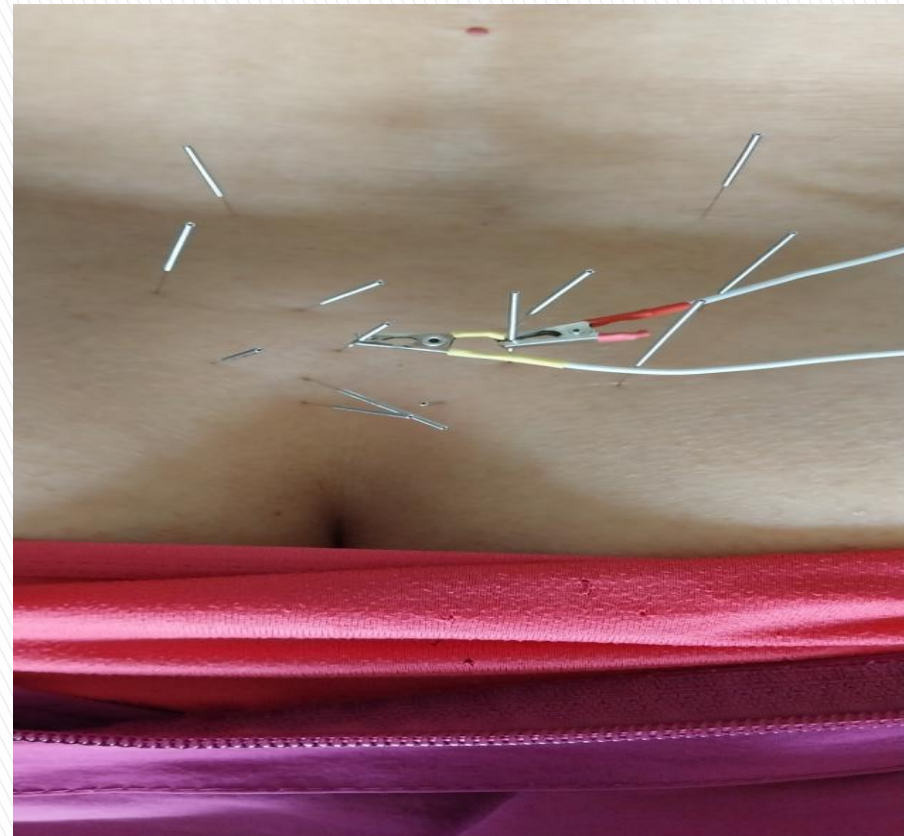
## Acupuncture Prescription

- ▶ **1. Near by points:** Qugu(CV2), Zhongji(CV3) and Qihai(CV6).
- ▶ **2. Distant points:** Sanyinjiao(SP6), Yinlingquan(SP9), Baihui (GV20) and Zhaohai(KL6).
- ▶ **3. Symptomatic points:** Shenshu(BL23), Panguanshu(BL28), Ciliao(BL23), Zhongliao(BL33), Xialiao(BL34), Guanyuanshu (BL26).
- ▶ Electracupuncture in B/L Ciliao(BL23) and B/L Shuidao(ST28).

Total 60 patients

## **GROUP A (INTERVENTION GROUP)**

EA, 6 times a week for three weeks along with conventional therapy.



# Overactive and Underactive Bladder

Bladder Types	Used Acupoints	Manipulation Technique
Overactive Bladder	All of the above mentioned acupoints	Reducing Manipulation
Underactive Bladder	Same as above	Reinforcing Manipulation



# GROUP B (CONTROL GROUP)

- ▶ Categorized into overactive and underactive problems. Capsule Urimax 0.4 mg - Tamsulosin (CIPLA INDIAN COMPANY) was given orally thirty minutes after meal once a day.
- ▶ For voiding dysfunctions Clean Intermittent Catheterization CIC was advised and taught.
- ▶ Indwelling catheter was used if participants were unable to perform CIC.

**NOTE :** All the prescribed medications were taken through the study period and were stopped once the symptoms improved.

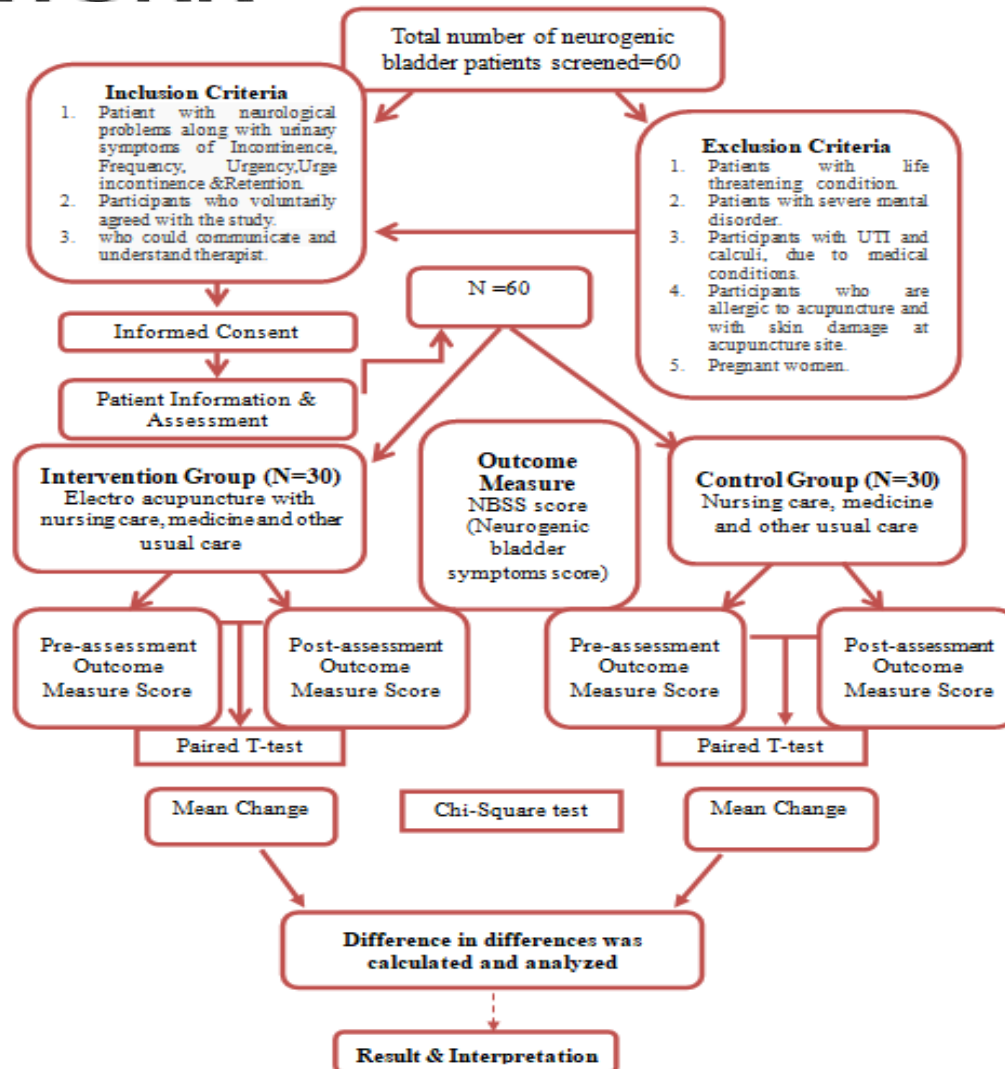
- ▶ Patient with defined or undefined neurological problems along with bladder symptoms.
- ▶ Could communicate and understand therapist's verbal command.
- ▶ Participants 18 years or above.
- ▶ Voluntarily provide the informed consent form.

## **INCLUSION CRITERIA**

- ▶ Participants with severe life threatening primary disease.
- ▶ With severe mental disorder.
- ▶ Participants who are allergic to acupuncture.
- ▶ With UTI and calculi due to medical conditions.
- ▶ Pregnant women.

## **EXCLUSION CRITERIA**

# CONCEPTUAL FRAMEWORK



# OUTCOME MEASURES

Pre and Post intervention assessed by Neurogenic bladder symptoms score (NBSS).

**Reliability:** Good test-retest for total score (ICC = 0.91) and scale scores (ICC = 0.85-0.86). (ICC = 0.91) (ICC = 0.85-0.86) .

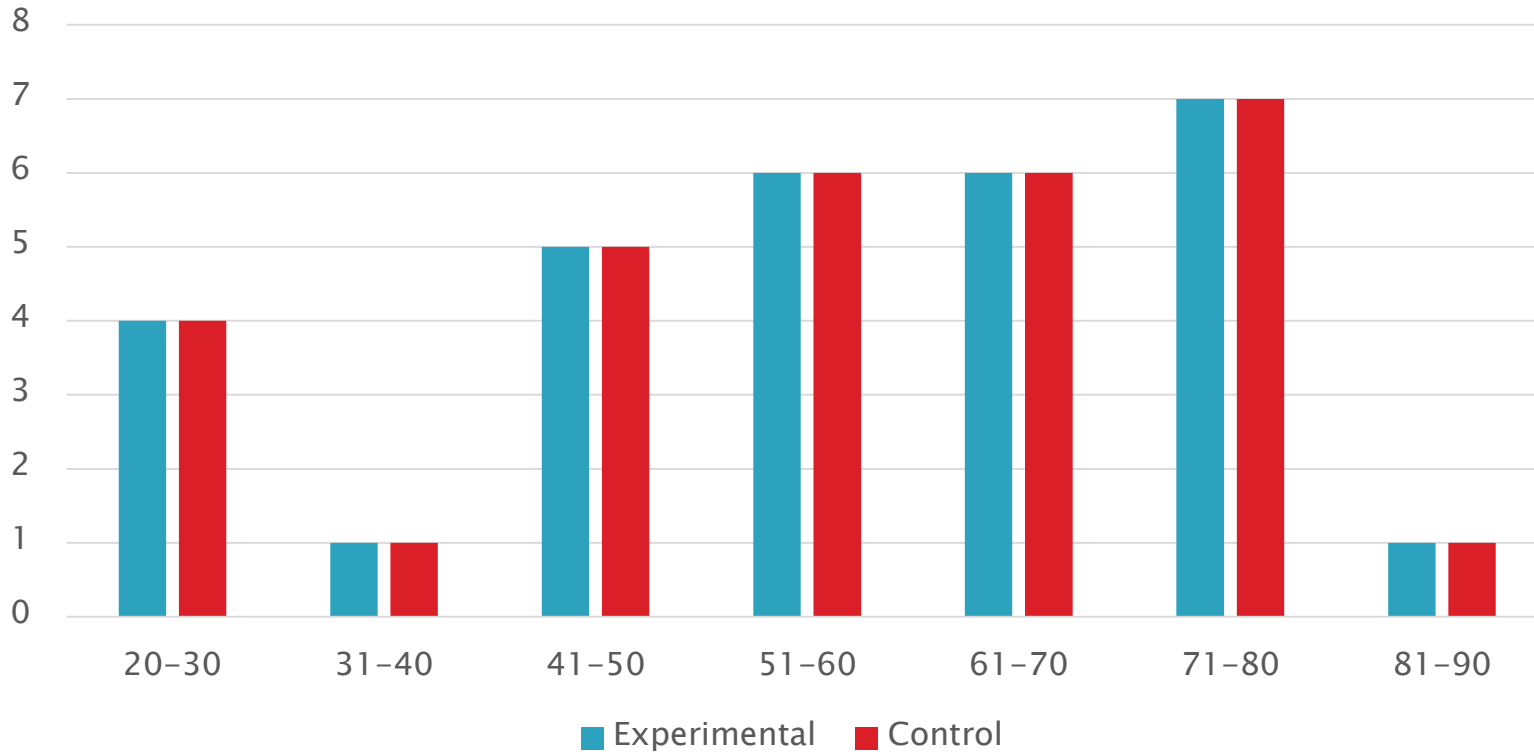
**Validity:** Good internal consistency total score (0.85). Variable for scale scores (0.49-0.93).

Date \_\_\_\_\_  
Patient ID \_\_\_\_\_

## Scoring Guide

Bladder Management	Incontinence	Storage & Voiding	Consequences
	A) Catheter/Bag B) Condom Catheter C) CIC D) Spontaneous voiding		
Q2 (Daytime frequency)	_____ (0-4)		
Q3 (Saturation of pads)	_____ (0-4)		
Q4 (Number of pads)	_____ (0-4)		
Q5 (Nocturnal incontinence)	_____ (0-4)		
Q6 (Liquid restriction)	_____ (0-3)		
Q7 (Skin problems)	_____ (0-3)		
Q8 (Limits activities)	_____ (0-3)		
Q9 (Frequency of urge)		_____ (0-3)	
Q10 (Urgency)		_____ (0-3)	
Q11 (Nocturia)		_____ (0-4)	
Q12 (longest interval)		_____ (0-3)	
Q13 (Interval without leak)	_____ (0-4)		
Q14 (Pain)			_____ (0-3)
Q15 (Postvoid fullness)		_____ (0-3)	
Q16 (Stream)		_____ (0-3)	
Q17 (Straining)		_____ (0-3)	
Q18 (UTI frequency)			_____ (0-4)
Q19 (UTI severity)			_____ (0-4)
Q20 (Kidney stones)			_____ (0-3)
Q21 (Bladder stones)			_____ (0-3)
Q22 (Bladder meds)			_____ (0-3)
Q23 (Effectiveness bladder meds)			_____ (0-3)
<b>Domain Totals</b>	_____ (0-29)	_____ (0-22)	_____ (0-23)
<b>Quality of Life (Q24):</b>	_____ (4, Unhappy to 0, Pleased)		

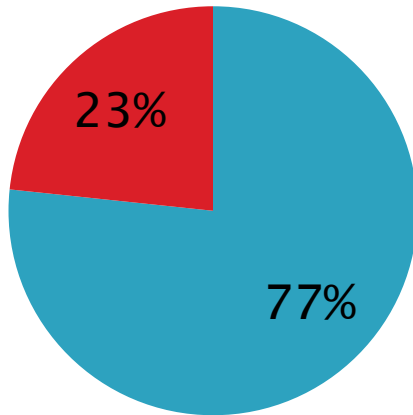
# RESULTS



**Age Distribution**

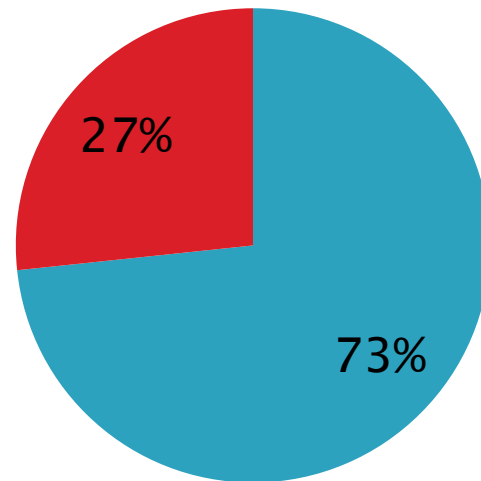
## Experimental

■ Male ■ Female



## Control

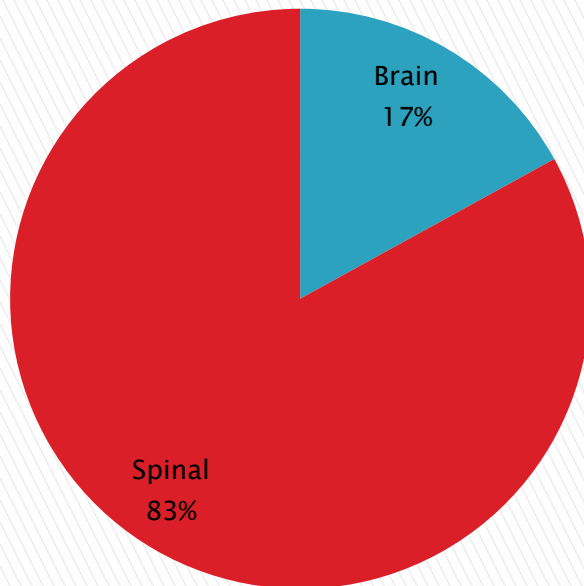
■ Male ■ Female



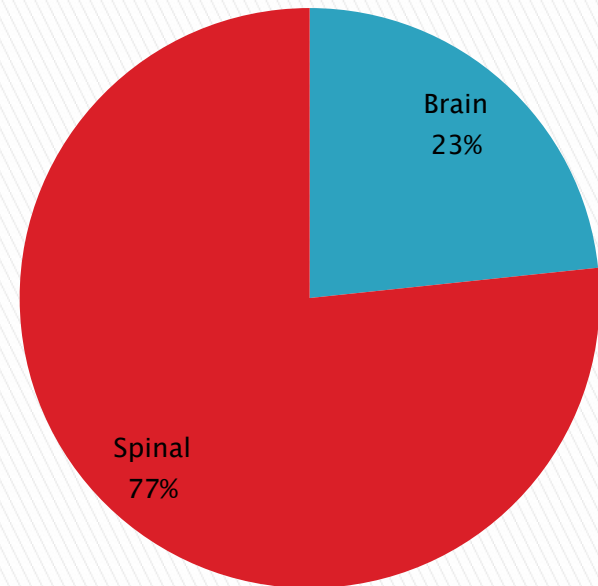
## Gender Distribution

# Classification of subjects according to the site of lesion

EXPERIMENTAL GROUP



CONTROL GROUP

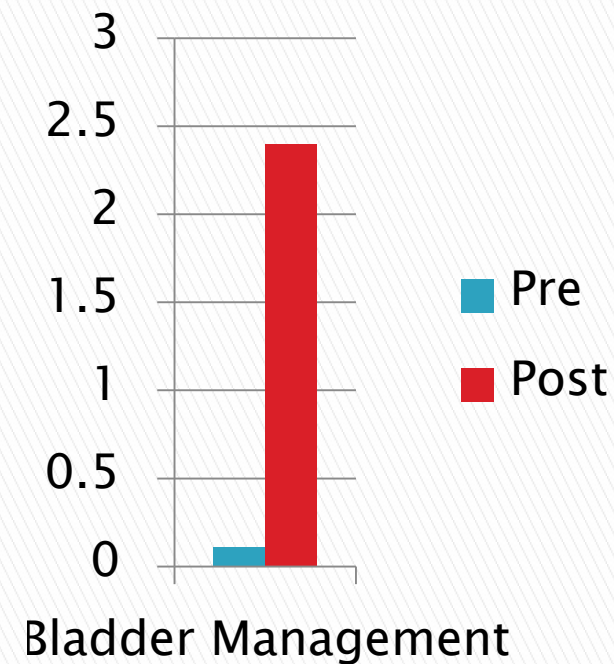


CASE GROUP

CONTROL GROUP

# Bladder Management Pre& Post Treatment Comparison

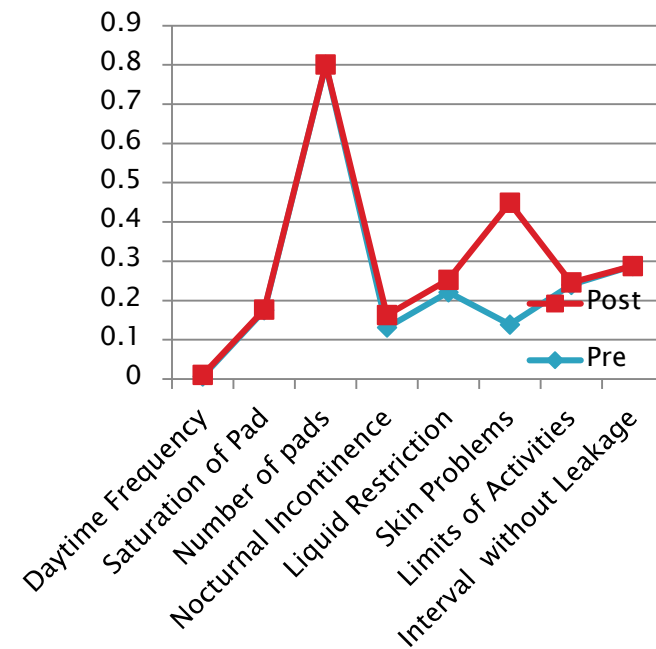
Group	Time	A (Catheter/ bag)	C (CIC)	D(self- voiding)	p value
Case	pre-treatment	17 (56.7%)	4 (13.3%)	9 (30%)	0.11 (pre)
	post-treatment	0 (0%)	2 (6.7%)	28 (93.3%)	
Control	pre-treatment	21 (70%)	0 (0%)	9 (30%)	*0.00 (post)
	post-treatment	16 (53.3%)	2 (6.7%)	12 (40%)	



Bladder management - Significant improvement from catheter to self voiding by 100% (17 to 0) in experimental group but improvement of 17% (21 to 16) in control group.

# INCONTINENCE

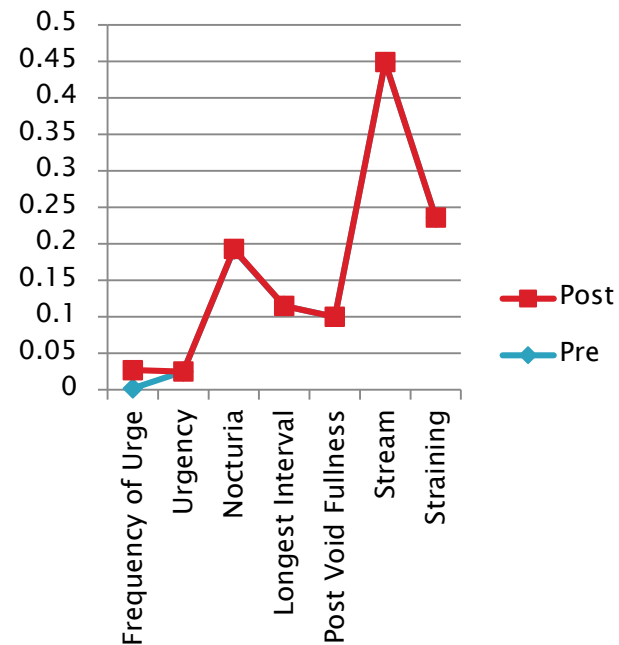
Variables (变量)	Pre- test (预试验)	Post- test (试验后)
Daytime Frequency (日间尿频)	0.007	0.004
Saturation of Pad (尿垫饱和)	0.175	0.002
Number of Pad (尿垫数量)	0.80	0.001
Nocturnal Incontinece (夜间尿失禁)	0.131	0.032
Liquid Restriction (液体限制)	0.221	0.032
Skin Problems (皮肤问题)	0.139	0.310
Limits of Activities (活动限制)	0.240	0.006
Interval without Leak (无渗漏间隔)	0.288	0.000



EA had remarkable improvement in incontinence problems in patient with NB

# STORAGE AND VOIDING

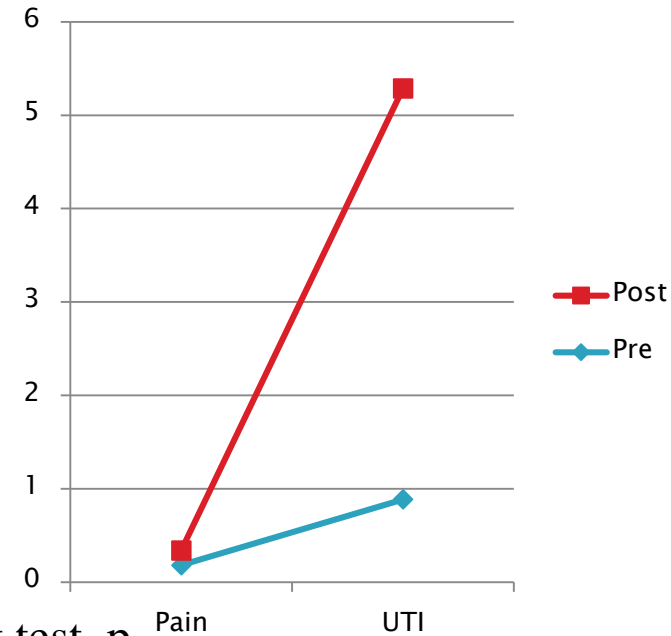
Variables (变量)	Pre-test (试验前)	Post-test (试验后)
Frequency of Urge (冲动频率)	0.002	0.025
Urgency (尿急)	0.025	0.000
Nocturia (夜尿)	0.192	0.001
Longest Interval (最长间隔)	0.115	0.000
Post Void Fullness (排尿后充盈)	0.100	0.000
Stream (尿流)	0.449	0.000
Straining (排尿困难)	0.236	0.000



Notable improvement after acupuncture . EA can help in improving both storage and voiding symptoms.

# CONSEQUENCES

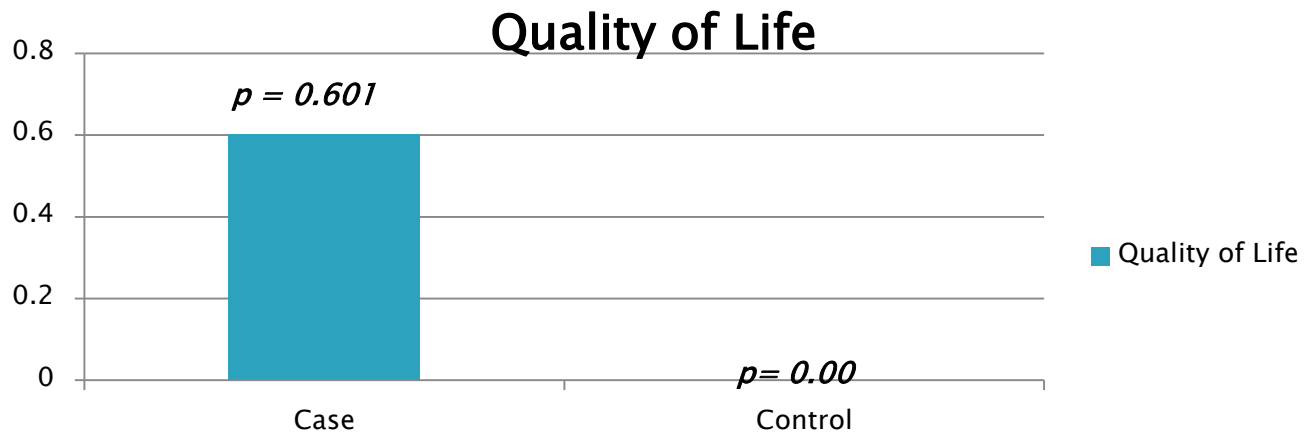
Variables (变量)	Pre-test(预试验)	Post-test (试验后)
UTI of Frequency (尿路感染频率)	0.886	0.066
Pain (疼痛)	0.182	0.158



Regarding consequences i.e. pain and UTI post test p value is highly significant.

# Table31:Quality of Life Pre& Post treatment Comparison

Group	Time	0 (pleased)	1 (satisfied)	2 (mixed)	3 (unsatisfied)	4 (unhappy)	p value
Case	pre-treatment	----	----	1 (3.3%)	1 (3.3%)	28(93.3%)	0.601 (pre)
	post-treatment	6 (20%)	23 (76.7%)	1 (3.3%)	0 (0%)	0 (0%)	
Control	pre-treatment	----	----	0 (0%)	1 (3.3%)	29(96.7%)	0.000 (post)
	post-treatment	0 (0%)	0 (0%)	2 (6.7%)	4 (13.3%)	24 (80%)	

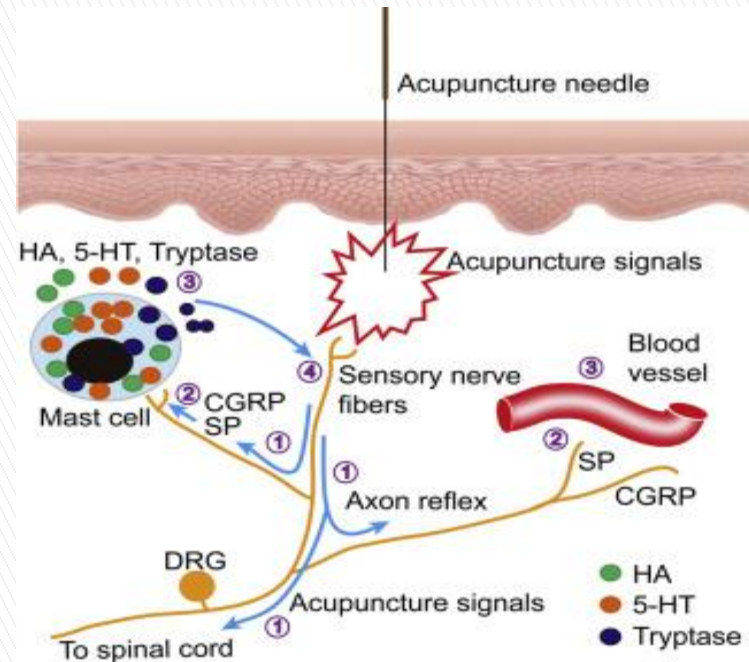


# DISCUSSION

- ▶ EA can transmits the nerve impulse to the sacral plexus through posterior tibial nerve and produces regulatory effects *Yujun He et.al*
- ▶ EA at Baliao acupoints are also known as electrical stimulation of pudendal nerve.
- ▶ Helps in neuroprotection and regeneration of TrkA and p75NTR which are the main receptors for nerve growth factors promoting growth of axons. Histopathological evaluation -improved muscle fiber alignment disorders and detrusor cell compensatory hypertrophy in bladder tissue. *Cheng LL et. al*
- ▶ EA in NB Weizhong, Sanyinjiao, Yinlingquan increases the intravesicle pressure and content of ATP in urinary bladder tissue. *Cheng LL et. al*

# CONCLUSION

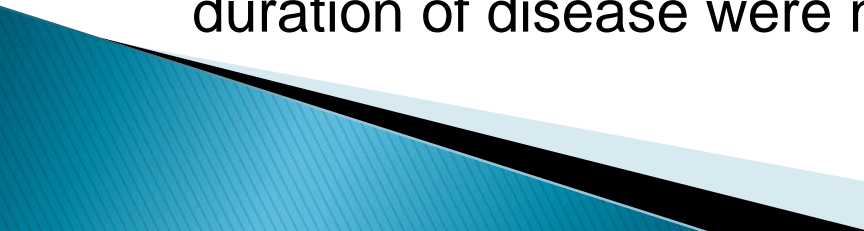
- ▶ The result of the present study suggest that 30 minutes of EA along with conventional managements is very effective intervention in improving symptoms of both overactive and underactive bladder issues compared to conventional managements only.



# ETHICAL CLEARANCE

- ▶ Obtained from the **Ethical Review Committee of Nepal Health Research Council**, which is a regulatory body under the supervision of Ministry of Health and Population, Government of Nepal
  
  - ▶ **Clinical Trial Registration no NPCTR2022000019**
- 

# LIMITATIONS

- ▶ Number of cases taken was minimal.
  - ▶ Specific group of NB was not taken. So, result can be generalized.
  - ▶ It is quasi experiment and there was no probability sampling.
  - ▶ As this study was carried out outside of China, there were lack of guidance especially in the acupuncture techniques and manipulation method .
  - ▶ Associated risk factors such as hypertension, diabetes, alcoholism, cigarette smoking, and age , site of lesion, time duration of disease were not considered in this study .
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# SCOPE FOR FURTHER STUDY

- ▶ Follow up can be done for the long term efficacy of the intervention.
- ▶ Specific outcome measure particularly related to NBSS can also be taken to evaluate the psychometric properties of those measures.
- ▶ Study can be conducted on large scale in various stages of disease progression.
- ▶ Double blind Randomized control trial would have been considered to establish effectiveness of EA.

# THANK YOU VERY MUCH



Prof. Dr Basant Pant



Prof. Dr Guo Yi