

# Pain Management in Nursing Homes

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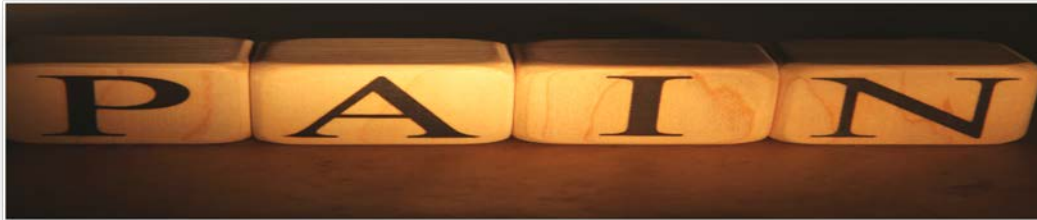
# Acknowledgements

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- ❖ Faculty Project Advisor: Donna Hamby DNP, RN, APRN, ACNP-BC
- ❖ Statistician: Richard E. Gilder, RN-BC, MS

# Background

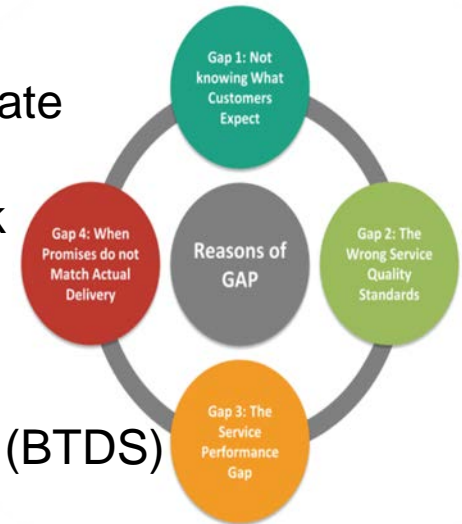
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- ❖ Universal human experience - 5<sup>th</sup> vital sign (McCaffery, 1999)
- ❖ Pain management – a national epidemic (IOM, 2011)
  - Leading cause of disability
  - Annual cost = \$ 635 billion
  - Affects > 100 million adults in the U.S., mostly elderly
  - 1.4 million older adults reside in nursing homes
  - Over 85% of nursing home residents experience pain regularly (Atkinson, 2013)
  - Pain under-assessed, under-treated, under-managed in nursing homes (Parker, 2013)

# Gap Analysis

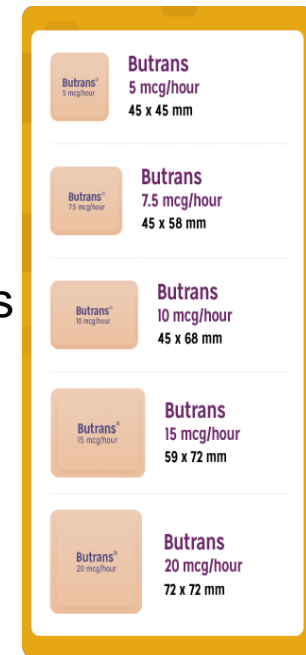
- ❖ Hydrocodone changed to Schedule II on October 6, 2014
- ❖ Challenge for healthcare providers in nursing homes
- ❖ Patients transferred from other healthcare facilities without triplicates for Schedule II medications.
- ❖ Pharmacist unable to dispense Sch II Rx without a triplicate
- ❖ Physicians make 1 or 2 visits to nursing homes per week
- ❖ Patients suffer until seen by their physician
- ❖ Pain protocol using Buprenorphine Transdermal System (BTDS)



# Literature Review



- ❖ Pharmacokinetics and pharmacodynamics of BTDS
  - Buprenorphine – semisynthetic opioid
  - Partial  $\mu$  and  $\delta$  receptor agonist
  - Partial  $\kappa$  receptor antagonist
  - Half-life of 32 hours – sustained analgesia
  - Metabolized in liver and primarily excreted in feces  
(Pergolizzi et al., 2015)
- ❖ Randomized controlled trials (RCTs)
- ❖ Non-RCTs, longitudinal, observational studies
- ❖ Somatic, nociceptive, neuropathic, cancer pain, mixed pain
- ❖ Efficacy, tolerability, and safety of BTDS



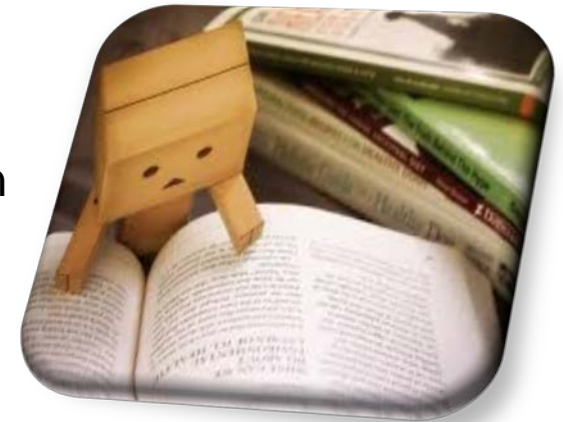
# Literature Review

## ❖ Therapeutic Efficacy

- Statistical significant result for BTDS patch compared to Hydrocodone, Oxycodone, MS Contin, Percocet, and Fentanyl patch (Leng et al.,2015; Gordon et al.,2010; Steiner et al.,2011, Miller et al.,2013)

## ❖ Tolerability

- Fewer nausea, vomiting, and constipation.
  - Minimal withdrawal effect and adverse site reaction
- (Ripa et al., 2012; Wolff et al., 2012; Conaghan et al.,2011)



## ❖ Safety

- No dosage adjustment needed in elderly
  - Ceiling effect for respiratory depression at lower dosages
  - No potential for drug abuse
  - Suitable for renal impairments and hemodialysis
- (Mitra et al., 2013; Pergolizzi et al., 2015)

# Framework



## ❖ The IOWA Model of Evidence-Based Practice

- Dr. Marita Titler, 1994
- Assessment of problem
  - ✓ Clinical versus knowledge deficit issue
- Priority for organization
- Review of literature
- Synthesize and critique findings
- Conduct pilot study
- Appraise the feasibility to implement results
- Implement the change
- Evaluate the outcomes



# Inquiry Question

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In nursing home patients admitted with moderate to severe pain, what is the effect of a pain protocol compared to the usual standard of care on pain scores during a four-month period?





# Methods

## ❖ Project Design

- Pre-test, intervention, and post-test design
- Pain scores for admission, 48 hours, 72 hours, week 1, week 2, and week 3 were compared and analyzed.

## ❖ Setting

- Nursing home
- Non-probability sample of convenience

## ❖ Population

- **Inclusion Criteria:** Patients requiring Sch II pain Rx with moderate to severe pain
- **Exclusion Criteria:** COPD, ILD, neuropathy, cancer patients



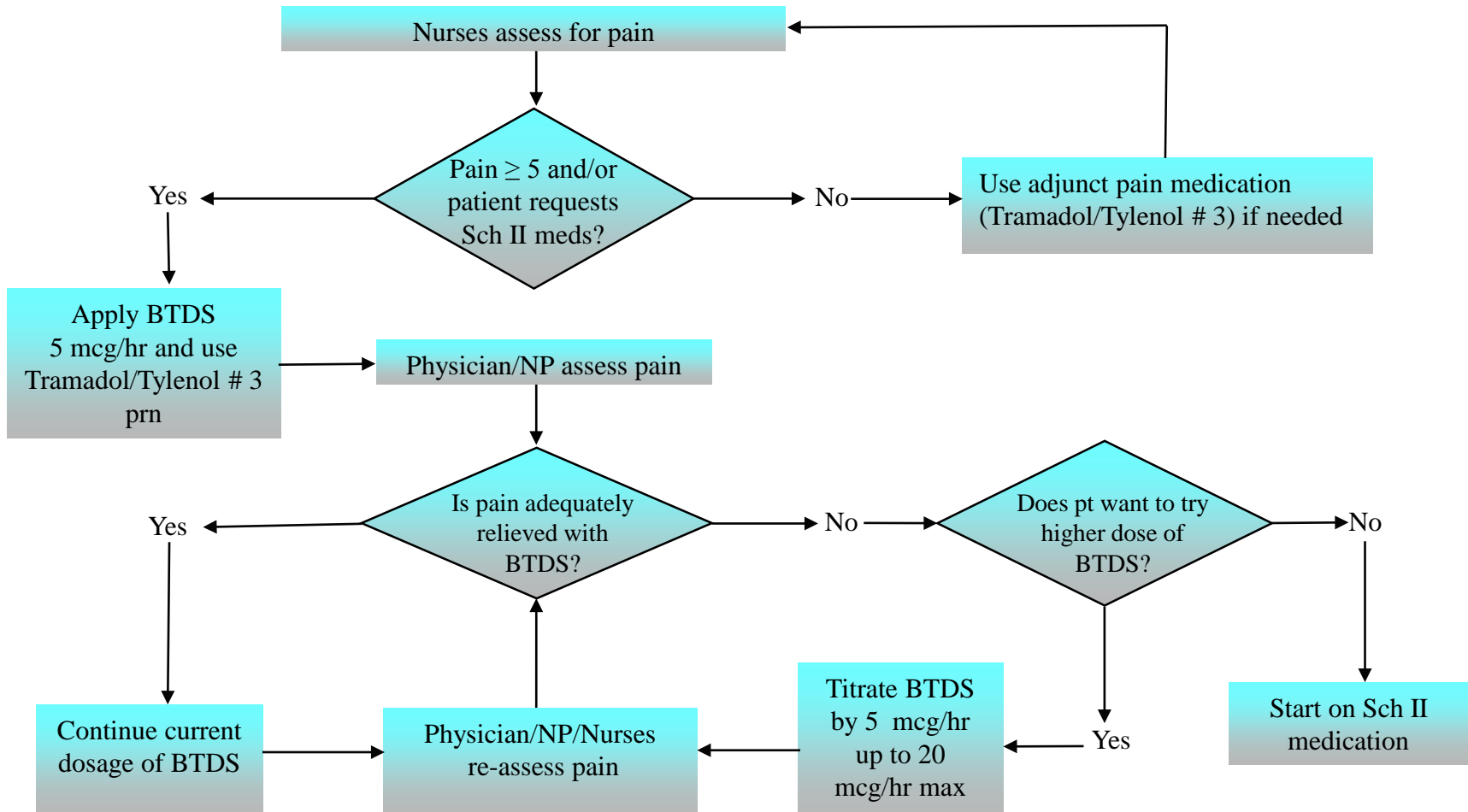
# Tool



Universal pain assessment tool											
This pain assessment tool is intended to help patient care providers assess pain according to individual patient needs. Explain and use 0–10 scale for patient self-assessment. Use the faces or behavioral observations to interpret expressed pain when patient cannot communicate his/her pain intensity.											
	0	1	2	3	4	5	6	7	8	9	10
Verbal descriptor scale	No pain		Mild pain		Moderate pain		Moderate pain		Severe pain		Worst pain possible
Wong-Baker facial grimace scale	Alert smiling	No humor serious flat	Furrowed brow pursed lips breath holding	Wrinkled nose raised upper lips rapid breathing	Slow blink open mouth	Eyes closed moaning crying					
Activity tolerance scale	No pain		Can be ignored		Interferes with tasks		Interferes with concentration		Interferes with basic needs		Bedrest required

- ❖ Internal consistency with Cronbach's  $\alpha$  coefficients from 0.85 to 0.89.
- ❖ Test-retest reliability ranged from 0.57 to 0.83
- ❖ Scales were found to be valid according to the factor analysis (Herr, Spratt, Mobily, & Richardson, 2004).

# Data Collection



# Data Collection



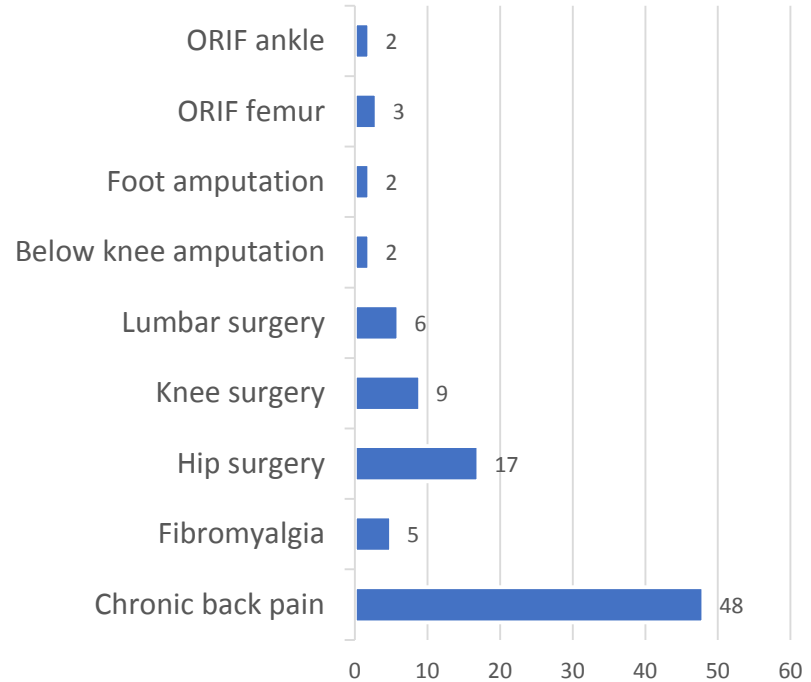
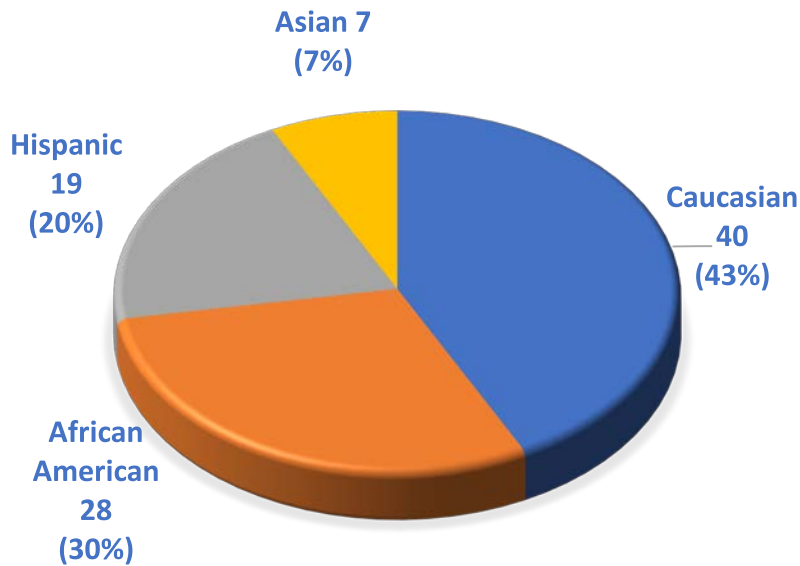
- ❖ Nurses recorded the pain scores in the electronic health record (EHR) every shift and every time a pain medication was given.
- ❖ Patient's unique ID, age, gender, ethnicity, diagnosis, and pain scores were recorded in the Excel Spreadsheet
- ❖ Patients were divided into two broad categories – chronic pain group and post-operative pain group
- ❖ Information transferred to Statistical Package for the Social Science (SPSS) for data analysis

# Data Analysis



- ❖ Descriptive statistics such as frequency, mean, median, range, and standard deviation were used to compute age and pain scores.
- ❖ Non-parametric Independent Samples Kruskal-Wallis test was used to determine the significance of difference between the pain scores.
- ❖ Post-hoc analysis was conducted to analyze the statistical difference among the various pain scores.
- ❖ The level of significance was set at 0.05 (95%).
- ❖ All analyses were performed for total sample, chronic pain group, and post-operative pain group.

# Results



Total Sample: 94

Chronic Pain: 53

Post-Operative Pain: 41

# Results

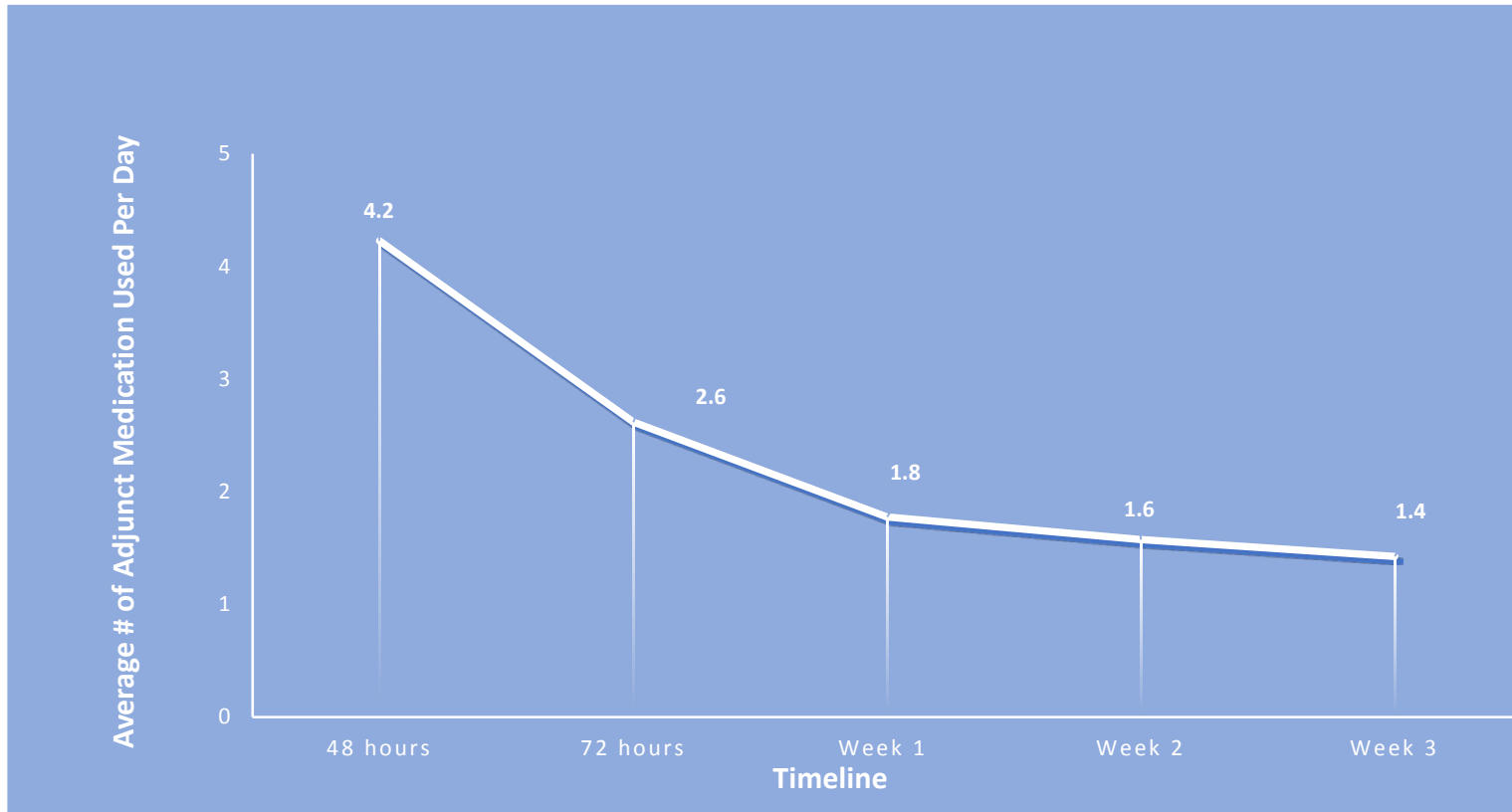
Maximum BTDS Dosage	Frequency (Patients)	Percent	Valid Percent	Cumulative Percent
5 mcg/hr	3	3.2	3.2	3.2
10 mcg/hr	73	77.7	77.7	80.9
15 mcg/hr	18	19.1	19.1	100.0
Total	94	100.0	100.0	

*Frequency of maximum dose of BTDS used*

BTDS Titrated at	Frequency (Patients)	Percent	Valid Percent	Cumulative Percent
48 hrs	62	66	66	66
48 hrs and 1 week	13	13.8	13.8	79.8
48 hrs and 72 hrs	4	4.3	4.3	84.1
72 hrs	10	10.6	10.6	94.7
72 hrs and 2 week	2	2.1	2.1	96.8
None	3	3.2	3.2	100.0
Total	94	100.0	100.0	

*Titration of BTDS at various points on timeline*

# Results



*Frequency of Adjunct Pain Medications Used*



# Results

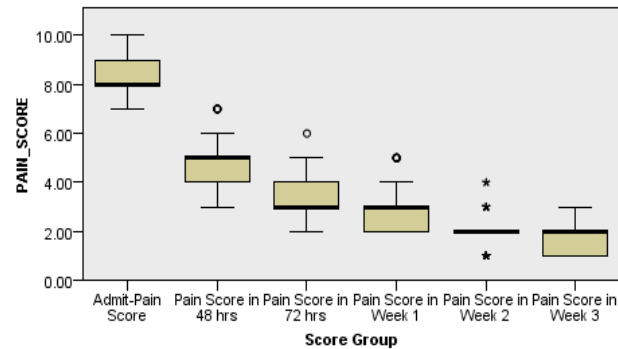
## Total Sample

### Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of PAIN_SCORE is the same across categories of Score Group.	Independent-Samples Kruskal-Wallis Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

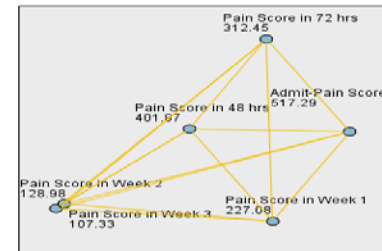
### Independent-Samples Kruskal-Wallis Test



Total N	564
Test Statistic	472.154
Degrees of Freedom	5
Asymptotic Sig. (2-sided test)	.000

1. The test statistic is adjusted for ties.

### Pairwise Comparisons of Score Group



Each node shows the sample average rank of Score Group.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Pain Score in Week 3-Pain Score in Week 2	21.654	23.248	.931	.352	1.000
Pain Score in Week 3-Pain Score in Week 1	119.750	23.248	5.151	.000	.000
Pain Score in Week 3-Pain Score in 72 hrs	205.122	23.248	8.823	.000	.000
Pain Score in Week 3-Pain Score in 48 hrs	294.537	23.248	12.669	.000	.000
Pain Score in Week 3-Admit-Pain Score	409.957	23.248	17.634	.000	.000
Pain Score in Week 2-Pain Score in Week 1	98.096	23.248	4.220	.000	.000
Pain Score in Week 2-Pain Score in 72 hrs	183.468	23.248	7.892	.000	.000
Pain Score in Week 2-Pain Score in 48 hrs	272.883	23.248	11.738	.000	.000
Pain Score in Week 2-Admit-Pain Score	388.303	23.248	16.703	.000	.000
Pain Score in Week 1-Pain Score in 72 hrs	85.372	23.248	3.672	.000	.004
Pain Score in Week 1-Pain Score in 48 hrs	174.787	23.248	7.518	.000	.000
Pain Score in Week 1-Admit-Pain Score	290.207	23.248	12.483	.000	.000
Pain Score in 72 hrs-Pain Score in 48 hrs	89.415	23.248	3.846	.000	.002
Pain Score in 72 hrs-Admit-Pain Score	204.835	23.248	8.811	.000	.000
Pain Score in 48 hrs-Admit-Pain Score	115.420	23.248	4.965	.000	.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

# Results

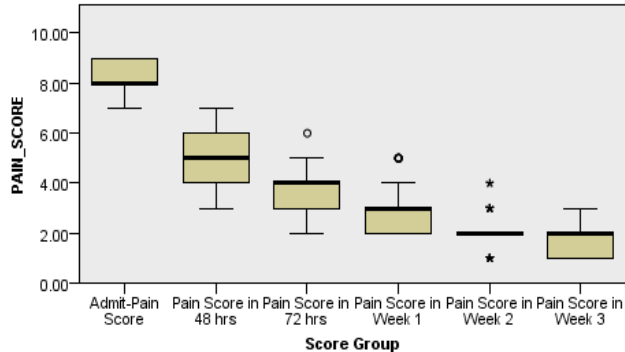
## Chronic Pain Group

### Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of PAIN_SCORE is the same across categories of Score Group.	Independent-Samples Kruskal-Wallis Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

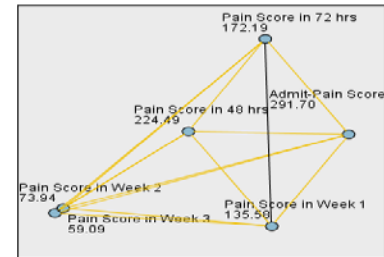
### Independent-Samples Kruskal-Wallis Test



Total N	318
Test Statistic	259.337
Degrees of Freedom	5
Asymptotic Sig. (2-sided test)	.000

1. The test statistic is adjusted for ties.

### Pairwise Comparisons of Score Group



Each node shows the sample average rank of Score Group.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Pain Score in Week 3 Pain Score in Week 2	14.849	17.527	.847	.397	1.000
Pain Score in Week 3 Pain Score in Week 1	76.491	17.527	4.364	.000	.000
Pain Score in Week 3 Pain Score in 72 hrs	113.094	17.527	6.453	.000	.000
Pain Score in Week 3 Pain Score in 48 hrs	165.396	17.527	9.437	.000	.000
Pain Score in Week 3-Admit-Pain Score	232.604	17.527	13.271	.000	.000
Pain Score in Week 2 Pain Score in Week 1	61.642	17.527	3.517	.000	.007
Pain Score in Week 2 Pain Score in 72 hrs	98.245	17.527	5.605	.000	.000
Pain Score in Week 2-Pain Score in 48 hrs	150.547	17.527	8.589	.000	.000
Pain Score in Week 2-Admit-Pain Score	217.755	17.527	12.424	.000	.000
Pain Score in Week 1-Pain Score in 72 hrs	36.604	17.527	2.088	.037	.551
Pain Score in Week 1-Pain Score in 48 hrs	88.906	17.527	5.072	.000	.000
Pain Score in Week 1-Admit-Pain Score	156.113	17.527	8.907	.000	.000
Pain Score in 72 hrs-Pain Score in 48 hrs	52.302	17.527	2.984	.003	.043
Pain Score in 72 hrs-Admit-Pain Score	119.509	17.527	6.819	.000	.000
Pain Score in 48 hrs-Admit-Pain Score	67.208	17.527	3.834	.000	.002

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

# Results

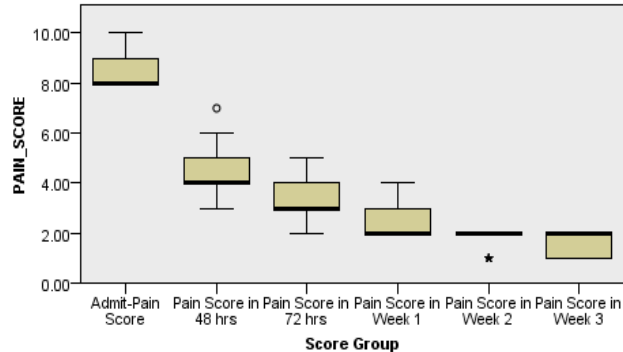
## Post-Operative Pain Group

### Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of PAIN_SCORE is the same across categories of Score Group.	Independent-Samples Kruskal-Wallis Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

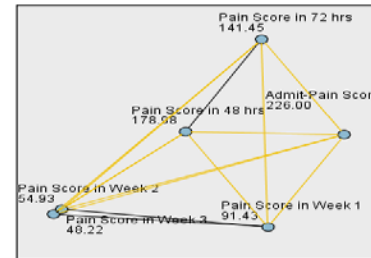
### Independent-Samples Kruskal-Wallis Test



Total N	246
Test Statistic	216.495
Degrees of Freedom	5
Asymptotic Sig. (2-sided test)	.000

1. The test statistic is adjusted for ties.

### Pairwise Comparisons of Score Group

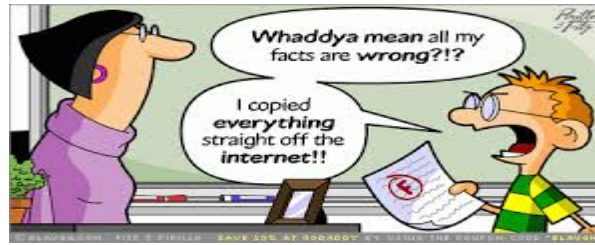


Each node shows the sample average rank of Score Group.

Sample1	Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Pain Score in Week 3	Pain Score in Week 2	6.707	15.289	.439	.661	1.000
Pain Score in Week 3	Pain Score in Week 1	43.207	15.289	2.826	.005	.071
Pain Score in Week 3	Pain Score in 72 hrs	93.232	15.289	6.098	.000	.000
Pain Score in Week 3	Pain Score in 48 hrs	130.756	15.289	8.552	.000	.000
Pain Score in Week 3	Admit-Pain Score	177.780	15.289	11.628	.000	.000
Pain Score in Week 2	Pain Score in Week 1	36.500	15.289	2.387	.017	.255
Pain Score in Week 2	Pain Score in 72 hrs	86.524	15.289	5.659	.000	.000
Pain Score in Week 2	Pain Score in 48 hrs	124.049	15.289	8.113	.000	.000
Pain Score in Week 2	Admit-Pain Score	171.073	15.289	11.189	.000	.000
Pain Score in Week 1	Pain Score in 72 hrs	50.024	15.289	3.272	.001	.016
Pain Score in Week 1	Pain Score in 48 hrs	87.549	15.289	5.726	.000	.000
Pain Score in Week 1	Admit-Pain Score	134.573	15.289	8.802	.000	.000
Pain Score in 72 hrs	Pain Score in 48 hrs	37.524	15.289	2.454	.014	.212
Pain Score in 72 hrs	Admit-Pain Score	84.549	15.289	5.530	.000	.000
Pain Score in 48 hrs	Admit-Pain Score	47.024	15.289	3.076	.002	.032

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

# Discussion



- ❖ Mean pain scores at admission, 48 hrs, 72 hrs, week 1, week 2, and week 3 were 8.3, 4.77, 3.47, 2.73, 1.9 , and 1.72 respectively
- ❖ 42.5% pain improvement in 48 hrs and 58.1% in 72 hrs
- ❖ Frequency of adjunct medication used went down by 38% between 48 hours to 72 hours
- ❖ 2 or less adjunct medications used per day after 72 hrs.
- ❖ Only 3 patients complained of nausea and 1 had constipation.
- ❖ Validated the findings of review of literature about the efficacy, safety, and tolerability of BTDS.

# Limitations



- ❖ Small sample size
  - Increased the risk of Type II error
  - Result not generalizable to larger population
- ❖ Staff turn over
- ❖ Change in the ownership of the facility
- ❖ Findings only limited to chronic pain and post-operative pain

# Implications



## ❖ Theoretical implication

- Gate control theory of pain – controlling pain by regulating opioid receptors

## ❖ Clinical implication

- BTDS can be safely and effectively substituted for Schedule II pain medications
- Provides better provision for healthcare providers to manage moderate to severe pain
- Future studies can explore the relationship between BTDS and functional status, fall, sleep, quality of life, patient satisfaction

# Conclusion



- ❖ Pain management in nursing home is a non-trivial problem
- ❖ Protocol based pain management with BTDS provided adequate and sustained pain relief among patients with chronic and post-operative pain
- ❖ BTDS is a safe, effective, and efficient alternative to Schedule II pain medications for managing moderate to severe pain in nursing home patients.







# References

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