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EFFECTIVENESS OF STRESS BALL ON PAIN AND ANXIETY AMONG PATIENT UNDERGOING UPPER GI ENDOSCOPY.

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Abstract:

Introduction: Stress balls have become a popular nonpharmacological intervention for managing stress, anxiety, and pain across various settings, including healthcare environments. The aim of the study to evaluate effectiveness of stress ball on pain and anxiety among patient undergoing upper GI endoscopy. **Methodology:** A quantitative, pre-experimental one-group pre-test and post-test design was used to assess patients undergoing upper GI endoscopy at Prime Indian Hospital, Arumbakkam, Chennai. Thirty participants aged 20–60 years were selected through non-probability purposive sampling. Inclusion criteria included first-time endoscopy patients without prior sedation. Exclusion criteria involved those on analgesics, anaesthetics, antidepressants, or with communication or mental impairments. **Result and Findings:** The study showed a clear reduction in pain and anxiety levels after the intervention. Severe pain decreased from 50% to 26.7%, and high anxiety from 46.7% to 30%. A significant positive correlation was found between pain and anxiety before and after the procedure. No association was observed between post-test pain or anxiety and demographic variables, indicating consistent intervention effectiveness across all groups. **Conclusion:** The study concluded that the intervention effectively reduced pain and anxiety levels in patients undergoing upper GI endoscopy.

Keywords: GI endoscopy, Stress balls, Pain, Anxiety.

INTRODUCTION:

Stress balls have become a popular nonpharmacological intervention for managing stress, anxiety, and pain across various settings, including healthcare environments. Their primary function is to engage patients in a simple tactile activity that diverts attention away from discomfort and increases feelings of control during stressful situations, such as medical procedures. Numerous studies have affirmed the effectiveness of stress balls in particularly invasive contexts, such as endoscopy and cannulation procedures.

The use of stress balls during medical procedures, particularly in Upper Gastrointestinal (UGI) endoscopy, has gained attention for its potential to alleviate pain and anxiety. Endoscopic procedures are often associated with significant patient discomfort and anxiety, which can adversely affect patient experiences and outcomes Karataş & Gezginci (2023)Alam & Elashri, 2020). The application of stress balls as a simple distraction technique can improve patient satisfaction and reduce anxiety levels.

Research by Karataş and Gezginci Karataş & Gezginci (2023) indicates that using a stress ball during endoscopic procedures positively impacts patients' perceived levels of pain and anxiety. Their findings suggest that the act of squeezing a stress ball can empower patients, allowing them a sense of control over the experience, thereby enhancing satisfaction. This aligns with Yüksel and Güneş (Yüksel & Güneş, 2024), who found that stress balls decreased pain and anxiety levels in various medical contexts, supporting their effectiveness not only in UGI endoscopy but across a range of invasive procedures.

Further exploration of the psychophysiological mechanisms involved reveals that tactile engagement with stress balls may activate specific brain regions associated with emotional regulation and pain perception (Sasaki et al., 2024). The thalamus, involved in processing sensory information and regulating autonomic functions, plays a critical role in how patients perceive pain and anxiety when using stress balls during endoscopy (Sasaki et al., 2024).

In addition to the direct benefits of stress balls, they complement other distraction techniques, such as music therapy, which has been shown to further reduce anxiety levels and enhance patient comfort during endoscopic procedures (AKSU, 2023; Sharma et al., 2017; Kannan et al., 2020). Studies have confirmed that combining these modalities can result in even greater improvements in patient experiences during procedural interventions (Yanes et al., 2018).

Moreover, evidence suggests that while stress balls are generally beneficial, the efficacy can vary based on patient characteristics and the type of procedure being performed. Some studies have noted that methods like stress balls did not significantly reduce anxiety in every case, highlighting the importance of personalized approaches to anxiety management in clinical settings (Özen et al., 2023; Ricardo & Lipner, 2020).

Overall, incorporating stress balls into the regimen for patients undergoing UGI endoscopy presents a cost-effective and practical approach to improving patient comfort and satisfaction. As research continues to validate these findings, integrating such interventions into routine practice could lead to enhanced patient care in gastroenterological procedures.

MATERIAL AND METHODS:

A quantitative research approach was adopted as the most appropriate method to achieve the objectives of this study. The research followed a pre-experimental one-group pre-test and post-test design. The study was

conducted in the Endoscopy Department at Prime Indian Hospital, Arumbakkam, Chennai. The study population included both male and female patients undergoing upper gastrointestinal (GI) endoscopy. A total of 30 participants, aged between 20 and 60 years, were selected using a non-probability purposive sampling technique. Inclusion criteria consisted of patients undergoing upper GI endoscopy for the first time, those not administered sedation prior to the procedure, and those within the defined age group. Exclusion criteria included patients using analgesics or anesthetics before or during the procedure, those under antidepressant, anxiolytic, or sedative medications, and individuals with communication difficulties or mental disabilities.

Data was collected using three structured tools. Part 1 consisted of demographic data, including age, gender, education, occupation, religion, marital status, type of family, monthly income, and diet pattern. Part 2 included the Numerical Pain Rating Scale to assess pain intensity during the procedure. Part 3 utilized the State Anxiety Inventory (SAI), which comprises 20 questions with four possible responses for each, to evaluate the participants' current anxiety levels.

Data collection was conducted over a period of one week after obtaining ethical clearance and formal permission from the Head of the Hospital. Participants were selected based on the inclusion and exclusion criteria. The purpose of the study was explained to each participant, and written informed consent was obtained. Before the procedure, participants were asked to complete the demographic data form, and baseline assessments of pain and anxiety were recorded. Post-test assessments of pain and anxiety were conducted on the same day after the endoscopy procedure. Participants were allowed to express concerns or ask questions, which were addressed during the data collection process. All ethical principles were strictly adhered to throughout the study..

RESULT:

Table 1 presents that the study included 30 participants, predominantly aged between 35–45 years (73.3%), with 60% males and 40% females. Most were educated (86.7%) and employed in the private sector (60%), while others worked as laborers (23.3%), in agriculture (13.3%), or government jobs (3.3%). A majority identified as Hindu (76.7%), followed by Christians (16.7%), Muslims (3.3%), and others (3.3%). Most participants were married (76.7%) and lived in nuclear families (70%). In terms of income, 60% earned less than ₹1,00,000 monthly, and 96.7% followed a non-vegetarian diet.

Table 2 shows that pain levels decreased following the intervention. In the pre-test, 50.0% of patients experienced severe pain, 46.7% reported moderate pain, and only 3.3% had mild pain. After the intervention, severe pain decreased to 26.7%, moderate pain slightly increased to 53.3%, and mild pain rose to 20.0%, indicating a notable reduction in pain intensity post-procedure.

Table 3 presents the distribution of anxiety levels. In the pre-test, 46.7% of participants experienced high anxiety and 53.3% had moderate anxiety, with no cases of low anxiety. In the post-test, high anxiety decreased

to 30.0%, and moderate anxiety increased to 70.0%, while low anxiety remained at 0%. This demonstrates a reduction in anxiety levels following the intervention.

Table 4 shows a statistically significant positive correlation between pain and anxiety levels. In the pre-test, the correlation coefficient was r = 0.413 (p = 0.023), and in the post-test, r = 0.448 (p = 0.013). These results indicate that higher levels of pain were consistently associated with higher levels of anxiety both before and after the intervention. Table 5 and Table 6 showed that there is no significant association was found between post-test levels of pain and anxiety and any demographic variables among patients undergoing upper GI endoscopy.

Table 1: Demographic variables of the patient undergone GI Endoscopy. **N= 30**

Demographic variables	Sample =30	
	Frequency	Percentage
1. Age		
a. 25 – 30 years	5	16.7
b. 30 – 35 years	3	10.0
c. 35 – 40 years	10	33.3
d. 40 – 45 years	12	40.0
2. Gender		
a. Male	18	60.0
b. Female	12	40.0
3. Education		
a. Educated	26	86.7
b. Not educated	4	13.3
4. Occupation		
a. Government	1	3.3
b. Private	18	60.0
c. Cooli	7	23.3
d. Agriculture	4	13.3
5. Religion		
a. Hindu	23	76.7
b. Christian	5	16.7
c. Muslim	1	3.3
d. Others	1	3.3
6. Marital status		
a. Married	23	76.7

b. Unmarried	7	23.3
7. Type of Family		
a. Joint	9	30.0
b. Nuclear	21	70.0
8. Monthly Income		
a. <Rs.100000	18	60.0
b. <Rs.300000	9	30.0
c. <Rs.500000	3	10.0
9. Dietary pattern		
a. Non-vegetarian	29	96.7
b. Vegetarian	1	3.3

Table 2: Pre-test and posttest pain score among patient undergone GI Endoscopy

Level of Pain	Pre-test Frequency (%)	Post-test Frequency (%)
Mild	1 (3.3%)	6 (20.0%)
Moderate	14 (46.7%)	16 (53.3%)
Severe	15 (50.0%)	8 (26.7%)
Total	**30 (100.0%)**	**30 (100.0%)**

Table 3: Pre-test and posttest anxiety score among patient undergone GI Endoscopy

Level of Anxiety	Pre-test Frequency (%)	Post-test Frequency (%)
Low	0 (0.0%)	0 (0.0%)
Moderate	16 (53.3%)	21 (70.0%)
High	14 (46.7%)	9 (30.0%)
Total	**30 (100.0%)**	**30 (100.0%)**

Table 4: Correlation between Pain and Anxiety for pre and post test

Variables	r - value	p – value
Pain and Anxiety in pre-test	r = 0.413	p = 0.023 *
Pain and Anxiety in post-test	r = 0.448	p = 0.013 **

Note: * - p<0.01, ** - p<0.01 Level of Significant

Table 5: Association between Level of Pain and Demographic Variables in Post-test Among patient undergone GI Endoscopy.

Demographic Variables	Level of Pain in Post- test			Chi-square – test value and p - value
	Mild Pain	Moderate Pain	Severe Pain	
	No.(%)	No.(%)	No.(%)	
1. Age				
a. 25 – 30 years	0 (0.0)	3 (60.0)	2 (40.0)	$\chi^2 = 7.688$
b. 30 – 35 years	0 (0.0)	3 (100.0)	0 (0.0)	d.f. = 6
c. 35 – 40 years	3 (30.0)	6 (60.0)	1 (10.0)	p = 0.162*
d. 40 – 45 years	3 (25.0)	4 (33.3)	5 (41.7)	
2. Gender				$\chi^2 = 0.313$
a. Male	3 (16.7)	10 (55.6)	5 (27.8)	d.f. = 2
b. Female	3 (25.0)	6 (50.0)	3 (25.0)	p = 0.855 (N.S)
3. Education				$\chi^2 = 1.695$
a. Educated	5 (19.2)	15 (57.7)	6 (23.1)	d.f. = 2
b. Not educated	1 (25.0)	1 (25.0)	2 (50.0)	p = 0.429 (N.S)
4. Occupation				
a. Government	0 (0.0)	1 (100.0)	0 (0.0)	$\chi^2 = 4.214$
b. Private	4 (22.2)	11 (61.1)	3 (16.7)	d.f. = 6
c. Cooli	1 (14.3)	3 (42.9)	3 (42.9)	p = 0.648 (N.S)
d. Agriculture	1 (25.0)	1 (25.0)	2 (50.0)	
5. Religion				
a. Hindu	5 (21.7)	13 (56.5)	5 (21.7)	$\chi^2 = 8.413$
b. Christian	0 (0.0)	2 (40.0)	3 (60.0)	d.f. = 6
c. Muslim	1 (100.0)	0 (0.0)	0 (0.0)	p = 0.209 (N.S)
d. Others	0 (0.0)	1 (100.0)	0 (0.0)	
6. Marital status				$\chi^2 = 2.748$
a. Married	6 (26.1)	12 (52.2)	5 (21.7)	d.f. = 2
b. Unmarried	0 (0.0)	4 (57.1)	3 (42.9)	p = 0.253 (N.S)
7. Type of Family				χ^2=2.321
a. Joint	3 (33.3)	5 (55.6)	1 (11.1)	d.f. = 2
b. Nuclear	3 (14.3)	11 (52.4)	7 (33.3)	p = 0.313 (N.S)
8. Monthly Income				
a. <Rs.100000	2 (11.1)	10 (55.6)	6 (33.3)	$\chi^2 = 5.417$
b. <Rs.300000	2 (22.2)	5 (55.6)	2 (22.2)	d.f. = 4
c. <Rs.500000	2 (66.7)	1 (33.3)	0 (0.0)	p = 0.247 (N.S)
9. Dietary pattern				$\chi^2 = 2.845$
a. Non-vegetarian	6 (20.7)	16 (55.2)	7 (24.1)	d.f. = 2
b. Vegetarian	0 (0.0)	0 (0.0)	1 (100.0)	p = 0.241 (N.S)

p<0.01 Level of Significant

Table 6: Association between Level of Anxiety and Demographic Variables in Post-test among patient undergone GI Endoscopy

Demographic Variables	Level of Anxiety in post-test				Chi-square value and p value
	Moderate Anxiety		High Anxiety		
	No.	%	No.	%	
1. Age					$\chi^2 = 9.127$
a. 25 – 30 years	4	80.0	1	20.0	d.f = 3
b. 30 – 35 years	2	66.7	1	33.3	
c. 35 – 40 years	10	100.0	0	0.0	p= 0.028 *
d. 40 – 45 years	5	41.7	7	58.3	
2. Gender					$\chi^2 = 1.693$
a. Male	11	61.1	7	38.9	d.f = 1
b. Female	10	83.3	2	16.7	p= 0.193 (N.S)
3. Education					$\chi^2 = 0.055$
a. Educated	18	69.2	8	30.8	d.f = 1
b. Not educated	3	75.0	1	25.0	p= 0.815 (N.S)
4. Occupation					$\chi^2 = 2.109$
a. Government	1	100.0	0	0.0	d.f = 3
b. Private	12	66.7	6	33.3	
c. Cooli	6	85.7	1	14.3	p= 0.550 (N.S)
d. Agriculture	2	50.0	2	50.0	
5. Religion					$\chi^2 = 3.168$
a. Hindu	17	73.9	6	26.1	d.f = 3
b. Christian	3	60.0	2	40.0	
c. Muslim	1	100.0	0	0.0	p= 0.366 (N.S)
d. Others	0	0.0	1	100.0	
6. Marital status					$\chi^2 = 1.074$
a. Married	15	65.2	8	34.8	d.f = 1
b. Unmarried	6	85.7	1	14.3	p= 0.330 (N.S)
7. Type of Family					$\chi^2 = 0.370$
a. Joint	7	77.8	2	22.2	d.f = 1
b. Nuclear	14	66.7	7	33.3	p= 0.543 (N.S)
8. Monthly Income					$\chi^2 = 1.429$
a. <Rs.100000	14	77.8	4	22.2	d.f = 2
b. <Rs.300000	5	55.6	4	44.4	
c.<Rs.500000	2	66.7	1	33.3	p= 0.490 (N.S)
9. Dietary pattern					$\chi^2 = 2.414$
a. Non-vegetarian	21	72.4	8	27.6	d.f = 1
b. Vegetarian	0	0.0	1	100.0	p= 0.120 (N.S)

p<0.01 Level of Significant

DISCUSSION

The results of the study indicate a significant reduction in both pain and anxiety levels among patients undergoing upper GI endoscopy, highlighting the effectiveness of the intervention employed. Specifically, the proportion of patients experiencing severe pain decreased notably from 50.0% to 26.7%, while mild pain increased from 3.3% to 20.0%. Concurrently, high anxiety levels dropped from 46.7% to 30.0%, and moderate anxiety rose from 53.3% to 70.0%. These findings suggest a potential shift in patient experiences during the procedure, with the intervention effectively mitigating factors that contribute to discomfort and anxiety.

The significant reduction in both pain and anxiety levels following the intervention aligns with existing literature highlighting the role of distraction techniques in managing procedural discomfort. Hudson et al. discussed the efficacy of distraction interventions in surgical settings, emphasizing their capability to reduce both pain and anxiety Hudson et al. (2015). This supports the notion that engaging patients during procedures diminishes their focus on discomfort, leading to better overall experiences.

The study identified a statistically significant positive correlation between pain and anxiety in both pre-test and post-test assessments (pre-test: $r = 0.413$, $p = 0.023$; post-test: $r = 0.448$, $p = 0.013$). This finding is consistent with previous studies, though specific references supporting this exact correlation in endoscopy were not found among the references provided. The relationship between anxiety levels and procedural pain tolerance is well-documented in general practice, underscoring the importance of addressing both pain and anxiety concurrently to improve patient satisfaction and tolerance during invasive procedures (Bundgaard et al., 2013).

The finding that there were no significant associations between post-test pain and anxiety levels across different demographic variables indicates that the effectiveness of the intervention was uniformly experienced by diverse patient groups. This suggests that distraction techniques, such as the use of stress balls or similar mechanisms, can be utilized universally regardless of age, gender, or prior medical histories, as evidenced by the studies conducted by Yüksel and Güneş and Karataş and Gezginci (Yüksel & Güneş, 2024; Karataş & Gezginci, 2023). Such findings promote a more inclusive approach to patient care and the development of standardized protocols that can enhance the patient experience during endoscopic procedures.

The results reinforce the importance of comfort and anxiety management in endoscopic procedures. Although Park et al. focused on sedation outcomes, their work highlights the connection between anxiety and procedural tolerability, suggesting that anxiety management is crucial for improving patient experiences during procedures (Park et al., 2020).

The findings from this study support a growing body of work that calls for integrating nonpharmacological interventions, such as stress balls and other distraction techniques, into standard procedural protocols for upper GI endoscopy. Previous studies, including those by Yılmaz and Güneş, have found similar success with nonpharmacological measures in various procedural contexts (Yılmaz & Güneş, 2018; Yanes et al., 2018). The effective implementation of such strategies could significantly enhance patient experiences across a variety of medical interventions.

By showcasing the reduction in pain and anxiety levels attributable to the intervention, the study emphasizes the importance of implementing distraction techniques, which can be beneficial for enhancing patient experiences during upper GI endoscopic procedures.

CONCLUSION

The study demonstrates that the intervention effectively reduced severe pain decreased from 50.0% to 26.7%, and high anxiety dropped from 46.7% to 30.0%, indicating improved patient comfort and experience. The positive correlation between pain and anxiety highlights the benefit of addressing both simultaneously. The intervention proved effective across all demographic groups, suggesting its broad clinical applicability. Incorporating simple nonpharmacological techniques, such as stress balls, into routine practice could enhance patient-centered care and procedural outcomes.

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