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"A Study To Assess The Effectiveness Of Birthing Ball Exercises Toward The Labour Pain Intensity During First Stage Of Labour Among Primiparturient Mothers In The Selected Hospitals At Ankleshwar,Gujarat."

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Abstract: *Labor pain management is a crucial aspect of childbirth, with implications for maternal well-being and birth outcomes. Childbirth is characterized by the unavoidable and intense sensation of labor pain, recognized as one of the most challenging physical ordeals for women. Throughout history, various strategies have been devised to alleviate this discomfort, aiming to facilitate a more comfortable and seamless birthing process for both mother and baby. Birthing ball exercises have emerged as an increasingly favored method among these approaches. In this work, to evaluate the effectiveness of birthing ball exercise in reducing labour pain intensity among primiparturient mothers during the first stage of labour, compared to a control group. The research utilized a quantitative approach with a quasi-experimental time series design. The study population consisted of 80 primipaturient mothers aged 19-35 years, divided into control and experimental groups, in selected hospitals. Data was collected using clinical obstetrical data,socio-demographic data, and a modified Numerical pain rating scale.Both descriptive and inferential statistical methods were used for analysis. The study aimed to compare labor pain intensity before and after birthing ball exercises, evaluate differences between groups, and examine associations with clinical and socio-demographic factors. The study found that birthing ball exercises effectively reduced labor pain intensity during the first stage of labor among primiparturient mothers.*

keywords: *Effectiveness, Birthing Ball Exercises, LaborPain Intensity, Primiparturient Mother.*

INTRODUCTION:

Childbirth, a pivotal event in the human experience, represents the culmination of the intricate journey of pregnancy and the transition to parenthood. It embodies a profound and transformative process through which new life enters the world. This journey is characterized by a series of stages, each imbued with its own set of physiological and emotional challenges, as the mother's body orchestrates the miraculous feat of bringing forth a baby.[1] At the heart of this process lies labor, the pivotal stage wherein the body initiates the process of childbirth. Labor, often considered the defining moment of pregnancy, is a dynamic and multifaceted phenomenon, heralding the onset of contractions that propel the baby towards delivery. It unfolds in a series of stages, each meticulously choreographed by the body's intricate hormonal and neurological mechanisms.[2] The experience of labor pain transcends mere physical discomfort, exerting profound influences on both the physiological and psychological well-being of women during childbirth. At its zenith, the intensity of labor pain can evoke a cascade of responses, ranging from heightened stress and anxiety to profound exhaustion, each leaving an indelible imprint on the birthing experience.[3] Birthing ball exercises have garnered attention as a non-pharmacological intervention for managing labor pain, offering women a holistic approach to pain relief and empowerment during childbirth. These exercises involve the use of a large inflatable ball, typically known as a birthing ball or stability ball, to perform a variety of movements and positions throughout labor.[4]

Advocates of birthing ball exercises suggest that they offer numerous benefits for women during labor. Firstly, these exercises promote relaxation and reduce muscle tension, providing women with a means to alleviate discomfort and stress during the intense experience of childbirth. The gentle rocking and swaying motions facilitated by the birthing ball can induce a sense of calm and comfort, helping women to cope with the physical sensations of labor more effectively.[5] Additionally, birthing ball exercises are believed to enhance pelvic mobility, which can be particularly beneficial during the first stage of labor when the cervix is dilating and the baby is descending through the birth canal. By encouraging movement and positioning that promote optimal alignment of the pelvis and fetal positioning, birthing ball exercises may facilitate

the progress of labor and contribute to smoother delivery outcomes.[6] Therefore, the primary aim of this study is to bridge the gap in the existing literature by conducting a comprehensive assessment of the effectiveness of birthing ball exercises in reducing labor pain intensity among primiparturient mothers during the first stage of labor. By focusing specifically on this demographic and stage of labor, the study seeks to provide insights tailored to the unique needs and experiences of primiparturient women.7

METHODOLOGY:

The research utilized a quantitative approach with a quasi-experimental time series design. The study population consisted of 80 primipaturient mothers aged 19-35 years, divided into control and experimental groups, in selected hospitals. Data collection tools included clinical obstetrical data, socio-demographic variables, and a modified pain intensity scale (the numerical pain rating scale). Descriptive and inferential statistical methods were used for data analysis. The study aimed to assess labor pain intensity before and after the use of birthing ball exercises, compare labour pain intensity between control and experimental groups, and explore the associations between pre labour pain intensity and selected clinical obstetrical data and selected socio-demographic data.

RESULTS AND DISCUSSION:

Finding related to the labour pain intensity during first stage of labour among primiparturient mothers in the control and experimental group

N=80

Group	Cervical dilatation	Observation	Pre-test			Post-test		
			Range	Mean	SD	Range	Mean	SD
CONTROL GROUP	2 cm (N=26)	I	3-5	3.77	0.71	3-5	4.35	0.56
		II	5-6	5.73	0.45	5-7	5.77	0.59
		III	6-8	6.88	0.52	6-8	6.77	0.65
		IV	7-9	7.50	0.58	5-8	7.15	0.73
		V	7-9	7.96	0.53	7-9	8.42	0.70
	3 cm (N=8)	I	4-6	5.00	0.53	5-6	5.63	0.52
		II	6-7	6.25	0.46	6-7	6.63	0.52
		III	6-7	6.88	0.35	6-7	6.88	0.35
		IV	7-8	7.50	0.53	7-8	7.50	0.53
		V	8	8.0	0	8-9	8.50	0.53
	4 cm (N=6)	I	6-7	6.18	0.41	5-7	6.33	0.82
		II	7	7.00	0	6-8	7.00	0.63
		III	7-8	7.67	0.52	7-8	7.33	0.52
		IV	8	8.0	0	7-9	8.17	0.75
		V	8-9	8.33	0.52	8-9	8.83	0.41
EXPERIMENTAL GROUP	2 cm (N=23)	I	3-5	3.87	0.69	2-5	3.26	0.86
		II	5-7	5.65	0.65	3-6	4.48	0.85
		III	6-7	6.35	0.49	4-6	5.00	0.60
		IV	6-8	7.13	0.46	5-6	5.57	0.51
		V (N-11)	7-8	7.36	0.50	4-6	5.36	0.67
	3 cm (N=9)	I	2-6	4.22	1.56	3-6	4.33	1.12
		II	4-7	5.78	0.97	3-6	4.78	1.09
		III	5-7	6.33	0.71	3-6	4.89	0.93
		IV	6-8	7.0	0.71	4-6	5.33	0.71
		V	-	-	-	-	-	-
	4 cm (N=8)	I	6-7	6.25	0.46	5-7	5.88	7.12
		II	7-8	7.13	0.35	6-7	6.25	0.46
		III	7-8	7.63	0.52	5-8	6.75	0.89
		IV	-	-	-	-	-	-

		V	-	-	-	-	-	-

Table shows finding related to the labour pain intensity during first stage of labour among primiparturient mothers in the control and experimental group.

This study analyzed labor pain intensity among primiparturient mothers during the first stage of labor, comparing control and experimental groups. In the control group, 40 mothers with cervical dilations of 2cm, 3cm, and 4cm participated. The pain intensity scores increased or remained stable in post-test assessments. For mothers with 2cm cervical dilation, pre-test pain ranged from 3–8, with post-test scores reaching 5.73–8.42. Similarly, mothers with 3cm dilation had pre-test pain scores of 4–8, increasing to 5.63–8.50 post-test. Those with 4cm dilation had pain scores ranging from 6–9 pre-test, slightly increasing to 6.33–8.83 post-test. These findings indicate that pain intensity in the control group remained unchanged or worsened as labor progressed. In contrast, the experimental group, consisting of 40 mothers who engaged in birthing ball exercises, exhibited a noticeable reduction in pain intensity. Among mothers with 2cm dilation, pain scores ranged from 3.87–7.36 pre-test but decreased to 3.26–5.36 post-test. Those with 3cm dilation showed pre-test pain scores of 4.22–7.00, which dropped to 4.33–5.33 post-test. Similarly, mothers with 4cm cervical dilation reported pre-test scores between 6.25–7.63, decreasing to 5.88–6.75 post-test. The declining pain intensity across all cervical dilations in the experimental group suggests that birthing ball exercises effectively reduced labor pain. Overall, the study's findings indicate that labor pain intensity increased in the control group but significantly decreased in the experimental group following birthing ball exercises. These results support the use of birthing ball exercises as a non-pharmacological intervention for managing labor pain, improving maternal comfort during childbirth.

Table depicts comparison of the labour pain intensity after intervention among primiparturient mothers in control and experimental group

N=80

Cervical dilatation	**Observation**	**Control group**		**Experimental group**		**Mean difference**	**DF**	**calculated t value**	**Table value**	**p value**
		Mean	**SD**	**Mean**	**SD**					
2 cm	**I**	4.35	0.56	3.26	0.86	0.09	47	5.271	2.00	<0.05*
	II	5.77	0.59	4.48	0.85	1.29	47	6.265	2.00	<0.05*
	III	6.77	0.65	5.00	0.60	1.77	47	9.821	2.00	<0.05*
	IV	7.15	0.73	5.57	0.51	1.59	47	8.720	2.00	<0.05*
	V (N=11)	8.42	0.70	5.36	0.67	0.26	35	12.244	2.02	<0.05*
3 cm	**I**	5.63	0.52	4.33	1.12	1.029	15	2.988	2.13	<0.05*
	II	6.63	0.52	4.78	1.09	1.85	15	4.355	2.13	<0.05*
	III	6.88	0.35	4.89	0.93	1.99	15	5.681	2.13	<0.05*
	IV	7.50	0.53	5.33	0.71	2.17	15	7.050	2.13	<0.05*
	V	8.50	0.53	-	-	-	-	-	-	-
4 cm	**I**	6.33	0.82	5.88	7.12	0.46	12	1.026	2.18	0.325 (NS)
	II	7.00	0.63	6.25	0.46	0.75	12	2.571	2.18	0.05*
	III	7.33	0.52	6.75	0.89	0.58	12	1.431	2.18	0.178 (NS)
	IV	8.17	0.75	-	-	-	-	-	-	-
	V	8.83	0.41	-	-	-	-	-	-	-

Table shows comparison of the labour pain intensity after intervention among primiparturient mothers in control and experimental group

* Significant at 0.05 level, NS- Not significant

Table presents the comparision of the labour pain intensity after intervention among the primiparturient mothers in the control and experimental groups by using un-paired t-test.the tables includes mean score, standard deviations, mean differences,degree of freedom, t-value and p-value. Mothers with 2cm cervical dilatation in the observation I, the control group had a mean pain score of 4.35 (SD=0.56),significantly higher than the experimental group's score of 3.26 (SD=0.86),with calculated t value of 5.271, exceeding the table value of 2.00 ($p<0.05$). Similar patterns were observed in the following sittings observations II,III,IV and V, with the control group consistently showing higher pain scores compared to the experimental group. Mothers with 3cm cervical dilatation in the observation II, the control group had a mean pain score of 6.63 (SD=0.52),significantly higher than the experimental group's score of 4.78(SD=1.09),with calculated t value of 4.355, exceeding the table value of 2.13 ($p<0.05$). Similar patterns were observed in the following sittings observations, with the control group consistently showing higher pain scores compared to the experimental group. Mothers with 4cm cervical dilatation in the observation II, the control group had a mean pain score of 7.00 (SD=0.63),significantly higher than the experimental group's score of 6.25 (SD=0.46),with calculated t value of 2.571, exceeding the table value of 2.18 ($p<0.05$). Similar patterns were not observed in the following sittings observations, with the control group consistently showing reduction in pain scores compared to the experimental group.

Association between pre labour Pain intensity with selected demographic variables during first stage of labour in experimental group among primiparturient mothers

N= 40

Sr. No	Demographic variables	Control Group		Total	DF	χ^2 test	P value	Table value	Inference
		≤Median (≤4)	**>Median (>4)**						
1	**Age in years**				1	χ^2=0.017 p=0.896	0.05	3.84	NS
	19-20	0	0	0					
	21-25	14	10	24					
	26-30	9	7	16					
	31-35	0	0	0					
2	**Educational Status**				2	χ^2=6.304 p=0.043	0.05	5.99	S
	Illiterate	0	0	0					
	Primary	7	4	11					
	Secondary and higher secondary	8	12	20					
	Graduation or above	8	1	9					
3	**Area of residence**				2	χ^2=1.719 p= 0.423	0.05	5.99	NS
	Urban	19	12	31					
	Rural	4	4	8					
	Semi-urban	0	1	1					
4	**Occupation**				2	χ^2=0.541 p=0.763	0.05	5.99	NS
	House maker	12	9	21					
	Employed or self employed	6	3	9					
	Business	0	0	0					

	Labourer	5	5	10					
5	**Previous information regarding about birthing ball**				1	χ^2=1.954 p=0.162	0.05	3.84	NS
	Yes	7	2	9					
	No	16	15	31					

*Significant at 0.05 level, NS- Not Significant

Table presents association between pre labour Pain intensity with selected demographic variables during first stage of labour in experimental group among primiparturient mothers

The analysis indicates that there is no significant association between most of selected socio-demographic variables and the level of pre labour pain in the control group. Each variables such as age,area of residence, occupation, type of activity,previous information about birthing ball do not show a significant association with pain intensity ($p > 0.05$). except eductional status. Educational status show association with pre labour pain intensity in the experimental group with p value (0.043) and calculated chi square value is more(6.304) than table value of chi-square (5.99).

Using a birthing ball during the first stage of labor has been a topic of interest in the field of obstetrics, particularly in its potential to manage labor pain intensity among primiparturient mothers. The birthing ball, also known as an exercise or stability ball, is a large inflatable ball that can aid in positioning, relaxation, and comfort during labor. primiparturient mothers, being first-time mothers, may experience heightened anxiety and uncertainty during labor, making effective pain management strategies crucial.

While there is anecdotal evidence and some small-scale studies supporting the use of birthing balls during labor, more robust research is needed to definitively establish its efficacy in managing labor pain intensity among primiparous mothers. Randomized controlled trials comparing the use of birthing balls with general care would provide clearer insights into its effectiveness. Moreover, individual preferences and comfort levels should also be taken into account when considering the use of birthing balls during labor. Some women may find the birthing ball helpful and empowering, while others may prefer alternative methods of pain management. Therefore, a personalized approach that considers each mother's needs and preferences is essential in optimizing the childbirth experience.

CONCLUSION:

The study on the effectiveness of birthing ball exercises in managing labor pain among primiparturient women in Ankleshwar, Gujarat, provided valuable insights and outcomes. The meticulously designed and executed methodology, utilizing a quantitative research approach and a quasi-experimental time series design, ensured reliable and valid data collection. The study population of 80 primiparturient women in selected hospitals, divided into control and experimental groups, underwent thorough data collection using validated tools such as a clinical obstetrical data, socio-demographic proforma and a modified pain intensity scale. The major findings of the study revealed significant insights into clinical obstetrical data and socio-demographic variables of the participants, highlighting the prevalence of certain physiological and sociodemographic characteristics among primiparturient women in Ankleshwar. The findings related to labor pain intensity before and after the use of birthing ball exercises demonstrated a significant reduction in pain intensity in the experimental group compared to the control group. The study also identified associations between certain selected clinical obstetrical data and selected socio-demographic variables and pre labor pain intensity, providing further context to the effectiveness of birthing ball exercises. In conclusion, the study provides strong evidence supporting the effectiveness of birthing ball exercises in managing labor pain among primiparturient women. The findings underscore the importance of incorporating non-pharmacological methods like birthing ball exercises in maternity care to enhance the birthing experience for women. The study's rigorous methodology and comprehensive analysis contribute to the body of knowledge on labor pain management and provide a basis for further research and implementation of birthing ball exercises in maternity care practices.

CONFLICT OF INTERESTS: There is no conflict of interest related to the publishing of this manuscript.

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