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"A SINGLE-GROUP OBSERVATIONAL STUDY ASSESSING THE HEMODYNAMIC EFFECTS OF *SHIRODHARA* ON VITAL SIGNS"

Prof. Dr. Gopesh Mangal[1*], Dr. Avvinish Narine[2], Dr. Karishma Singh[3], Dr. Pratibha Chowdhary[4], Dr. Surajita Biswal[4], Dr. Arju[4], Dr. Annu Kaushik[4], Dr. Sneh Kanwar[4], Dr. Abhishek Ranjan Jha[4], Dr. Nisha Bhoi[4], Dr. Laxmi Sharma[4], Dr. Shubhechchha Lamichhane[4] and Dr. Rajkumar Banjaray[4]

[1]P.G. Dean, Professor and Head of Department, Department of Panchkarma, National Institute of Ayurveda, (Deemed University), Jaipur.

[2]Ph. D Scholar, Department of Panchkarma, National Institute of Ayurveda, (Deemed University), Jaipur.

[3]Research Officer (Ay.)

[4]PG Scholar, Department of Panchkarma, National Institute of Ayurveda, (Deemed University), Jaipur.

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***Corresponding Author**
Prof. Dr. Gopesh Mangal
P.G. Dean, Professor and Head of Department, Department of Panchkarma, National Institute of Ayurveda, (Deemed University), Jaipur.

ABSTRACT

Shirodhara is a classical Ayurvedic therapy involving the rhythmic pouring of medicated liquids over the forehead (Shira). Traditionally used for psychosomatic and neurological conditions, this intervention has also shown promising calming effects on physiological parameters. The present study was planned to evaluate the immediate and short-term physiological effects of *Shirodhara* in patients irrespective of their underlying disease condition and the type of medicated liquid used. In order to assess the effect of *Shirodhara*, 100 subjects aged 18 to 70 years who were prescribed *Shirodhara* at the Department of Panchakarma, National Institute of Ayurveda, Jaipur, were enrolled for this observational study. The subjects were advised to undergo *Shirodhara* for 30 minutes daily, for a continuous period of 7 days. The procedure involved the pouring of warm medicated oil or *Ksheera* from a height of 4 *Angula* over the forehead in a rhythmic oscillating manner, maintaining a temperature between 38–40°C. Standard

procedural safety measures like gauze above the eyebrows, eye pads, and ear plugs were implemented for all participants. Vital physiological parameters including systolic and diastolic blood pressure, pulse rate, blood oxygen saturation (SpO_2), respiratory rate and body temperature were assessed at three intervals: A) Before *Shirodhara*, B) Immediately after, and C) 15 minutes after the therapy. This is an open-labelled, single-armed, single-centric, non-interventional observational study. The final outcome of the study indicates a noticeable reduction in systolic and diastolic blood pressure, a calming trend in pulse rate, and stable oxygen saturation levels. The therapy demonstrated a mild, homeostatic influence on body temperature. The findings affirm *Shirodhara's* value not only as a traditional Ayurvedic therapy for inducing mind-body relaxation but also as a promising supportive intervention in managing stress-related cardiovascular imbalances

KEYWORDS: Ayurveda, Hemodynamic effect, *Shirodhara*, Panchkarma, Vital Parameters.

INTRODUCTION

Shirodhara is one of the most revered classical procedures in Ayurvedic Panchkarma therapy, widely practiced both in India and internationally. It involves the gentle and continuous pouring of medicated oil or other therapeutic liquids over the forehead, specifically on the region of the *Ajna Chakra*, an area closely associated with higher neurological and psychological functions in both traditional yogic and anatomical frameworks. This therapy, known for its soothing, harmonizing, and *Shamana* (~palliative) properties, is traditionally indicated in conditions such as *Manasika Rogas* (~mental disorders), Vata-Pitta imbalances, and lifestyle-related stress syndromes. However, beyond disease-specific indications, *Shirodhara* has long been celebrated for its generalized calming effect on the central nervous system and its contribution to improved mental clarity, emotional stability, and overall vitality.

Purpose of the Study

The primary aim of this study is to evaluate the hemodynamic and physiological effects of *Shirodhara* by observing changes in vital parameters. Specifically, the study focuses on assessing systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse rate (PR), oxygen saturation (SpO_2), respiratory rate and body temperature before and after the intervention across a 7-day observational period.

Need for the Study

Despite its deep roots in Ayurvedic clinical practice and anecdotal evidence supporting its psycho-physiological benefits, the objective quantification of *Shirodhara's* physiological effects remains underexplored. Contemporary biomedical models suggest that the procedure's effects may be mediated via continuous afferent stimulation of the trigeminal and facial nerve branches, leading to cortical modulation and autonomic down-regulation.

Neurophysiological studies have proposed that *Shirodhara* may induce coherence in alpha brain waves, reduce sympathetic nervous system outflow, and promote parasympathetic dominance — all of which contribute to hemodynamic stabilization and relaxation.

Furthermore, the central forehead region, evolutionarily associated with the pineal gland, is anatomically a convergence point for neurovascular inputs and spiritually referred to as the *Ajna Chakra* in yogic science. Focusing on this region has been shown to promote psychosomatic balance and inner tranquillity. In Dhara therapy, the repetitive thermal and tactile stimulation of this zone may thus influence the hypothalamic-pituitary-adrenal axis and modulate cardiovascular functions indirectly.

Hence, there exists a strong rationale to conduct a systematic observational study to document the immediate and short-term effects of *Shirodhara* on measurable vital parameters, thereby building a bridge between traditional Ayurvedic knowledge and contemporary scientific validation.

MATERIALS AND METHODS

This was a single-group, observational, open-label study conducted over a period of six months at the Department of Panchakarma, National Institute of Ayurveda, Jaipur. The objective was to assess the effect of *Shirodhara* on vital physiological parameters in a real-world clinical setting. A total of 100 patients prescribed for *Shirodhara* therapy, regardless of their primary disease condition or the specific medicated liquid used (*Taila/Ksheera*), were recruited.

Inclusion Criteria

a. Patients between 18 and 60 years of age of either sex.
b. Patients irrespective of their disease condition, willing to participate in the study.

Exclusion Criteria

a. Patients with uncontrolled Hypertension, Diabetes.
b. Pregnant women
c. Patients with wounds, Infective conditions
d. Patients not willing to participate in the study

Removal of Subjects from Therapy or Assessment

It was planned that the investigators may withdraw a subject from the study for any of the following reasons:

a. If the subject request discontinuation or withdraws consent.
b. If the product exhibits intolerable AE (according to discretion of Investigator).
c. If subject uses any prohibited medication which in the Investigator's judgment may affect the efficacy or safety of test product.
d. In case of screening error where any subject who was enrolled into the study (e.g. was attributed or CRF with subject number) but was withdrawn prior to administration of the test product due to various reasons such as protocol violation (inclusion/exclusion criteria) or withdrawal of consent.
e. In case of death of the subject.

Outcome Measures

Vital parameters were assessed at three specific time-points:

- Before *Shirodhara*
- Immediately after *Shirodhara*
- 15 minutes post *Shirodhara*

The following physiological parameters were recorded:

- Systolic and Diastolic Blood Pressure (SBP/DBP): Measured using a standard Aneroid Sphygmomanometer.
- Pulse Rate (PR) and Oxygen Saturation (SpO_2): Recorded using a Digital Pulse Oximeter.
- Body Temperature: Assessed using a Digital Thermometer.
- Ethical Considerations
- Ethical clearance was obtained from the Institutional Ethics Committee.
- Written informed consent was obtained from all participants.

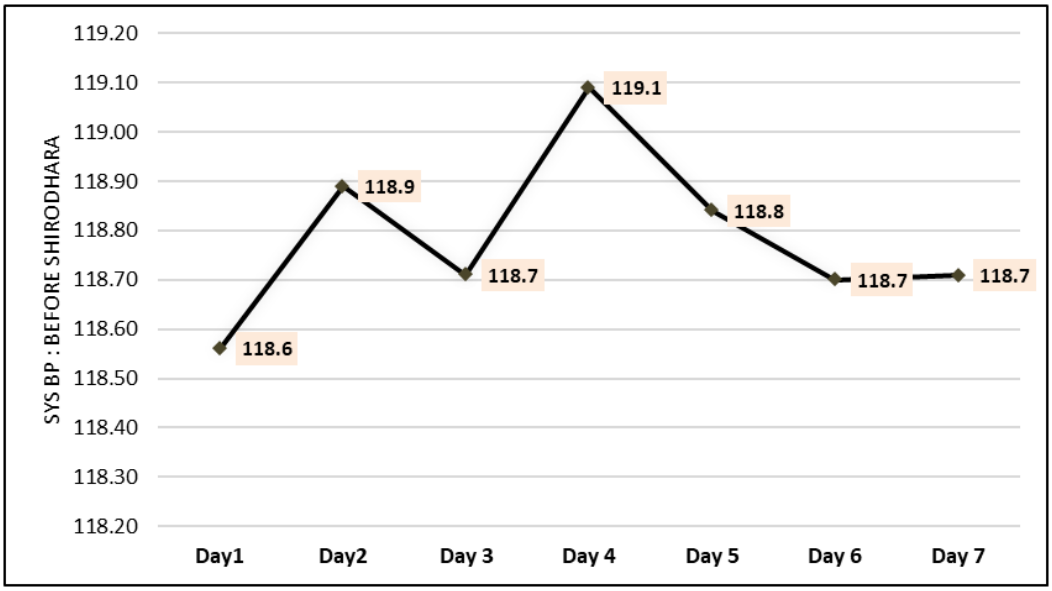
- The study adhered to the principles of the Declaration of Helsinki and relevant Ayurvedic clinical research guidelines.

Assessment of Results

Changes in Systolic BP from Day1 to Day 7 Before *Shirodhara.*

Before *Shirodhara*	Sys BP			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	118.56	6.80	-	-	-
Day2	118.89	6.65	0.33	0.93	0.356
Day 3	118.71	7.08	0.15	0.41	0.685
Day 4	119.09	6.70	0.53	1.42	0.158
Day 5	118.84	6.24	0.28	0.80	0.428
Day 6	118.70	5.67	0.14	0.34	0.736
Day 7	118.71	5.05	0.15	0.32	0.748

Systolic blood pressure (SBP) measurements before *Shirodhara* were recorded over seven consecutive days, showing minimal variations in the mean values. On Day 1, the mean SBP was 118.56 ± 6.80 mmHg. Subsequent days showed slight increases in SBP, with the mean values being 118.89 ± 6.65 mmHg on Day 2 (mean change = 0.33 mmHg, t = 0.93, p = 0.356), 118.71 ± 7.08 mmHg on Day 3 (mean change = 0.15 mmHg, t = 0.41, p = 0.685), and 119.09 ± 6.70 mmHg on Day 4 (mean change = 0.53 mmHg, t = 1.42, p = 0.158). Similarly, on Day 5, the SBP was 118.84 ± 6.24 mmHg (mean change = 0.28 mmHg, t = 0.80, p = 0.428), on Day 6 it was 118.70 ± 5.67 mmHg (mean change = 0.14 mmHg, t = 0.34, p = 0.736), and on Day 7 it was 118.71 ± 5.05 mmHg (mean change = 0.15 mmHg, t = 0.32, p = 0.748). None of the changes in SBP over the days were statistically significant.



Day wise Changes in Sys BP from Day1 to Day 7 Before *Shirodhara.*

Before *Shirodhara*	Systolic BP		
	Mean change	t-value	p-value
Day 1 to Day 2	0.33	0.93	0.356
Day 2 to Day 3	-0.18	-0.57	0.568
Day 3 to Day 4	0.38	1.34	0.182
Day 4 to Day 5	-0.25	-0.90	0.372
Day 5 to Day 6	-0.14	-0.39	0.700
Day 6 to Day 7	0.01	0.03	0.973

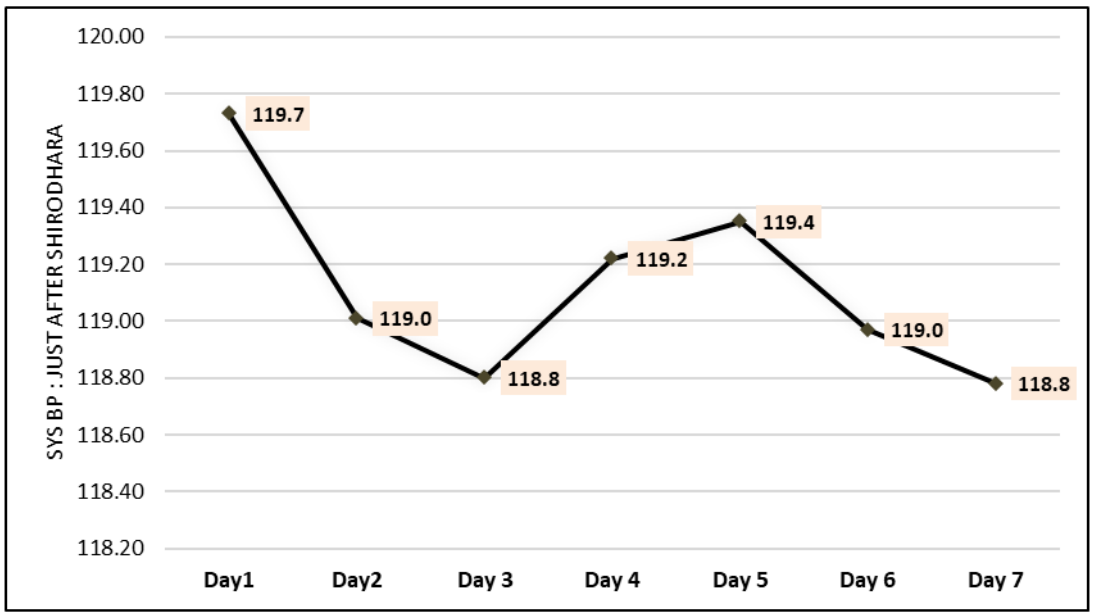
The changes in systolic blood pressure (SBP) before *Shirodhara* across consecutive days were analyzed, and the results showed no statistically significant differences. From Day 1 to Day 2, the mean change was 0.33 mmHg (t = 0.93, p = 0.356), while from Day 2 to Day 3, there was a slight decrease of -0.18 mmHg (t = -0.57, p = 0.568). The change from Day 3 to Day 4 showed an increase of 0.38 mmHg (t = 1.34, p = 0.182), followed by a decrease of -0.25 mmHg from Day 4 to Day 5 (t = -0.90, p = 0.372). Similarly, from Day 5 to Day 6, the change was -0.14 mmHg (t = -0.39, p = 0.700), and from Day 6 to Day 7, it was almost negligible at 0.01 mmHg (t = 0.03, p = 0.973). These findings indicate that SBP remained relatively stable throughout the observation period.

Changes in Sys BP from Day1 to Day 7 Just After *Shirodhara*.

Just After ***Shirodhara***	Sys BP			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	119.73	7.69	-	-	-
Day2	119.01	6.92	-0.72	-1.82	0.072
Day 3	118.80	6.79	-0.93	-2.34	**0.021**
Day 4	119.22	6.56	-0.51	-1.16	0.250
Day 5	119.35	6.54	-0.38	-0.96	0.339
Day 6	118.97	5.96	-0.76	-1.63	0.107
Day 7	118.78	5.25	-0.95	-1.77	0.079

The systolic blood pressure (SBP) measured just after *Shirodhara* showed slight variations over seven days, with no consistently significant changes observed. On Day 2, the mean SBP decreased by 0.72 mmHg compared to Day 1 (t = -1.82, p = 0.072). A further reduction was noted on Day 3, with a mean change of -0.93 mmHg (t = -2.34, p = 0.021), which was statistically significant. On Day 4, the SBP showed a smaller reduction of -0.51 mmHg (t = -1.16, p = 0.250), and on Day 5, the decrease was -0.38 mmHg (t = -0.96, p = 0.339). By Day 6, the SBP decreased by -0.76 mmHg (t = -1.63, p = 0.107), while on Day 7, the reduction

was -0.95 mmHg (t = -1.77, p = 0.079). These findings indicate that while slight decreases in SBP were observed over time, most were not statistically significant except for Day 3.



Daywise Changes in Sys BP from Day1 to Day 7 Just After *Shirodhara*.

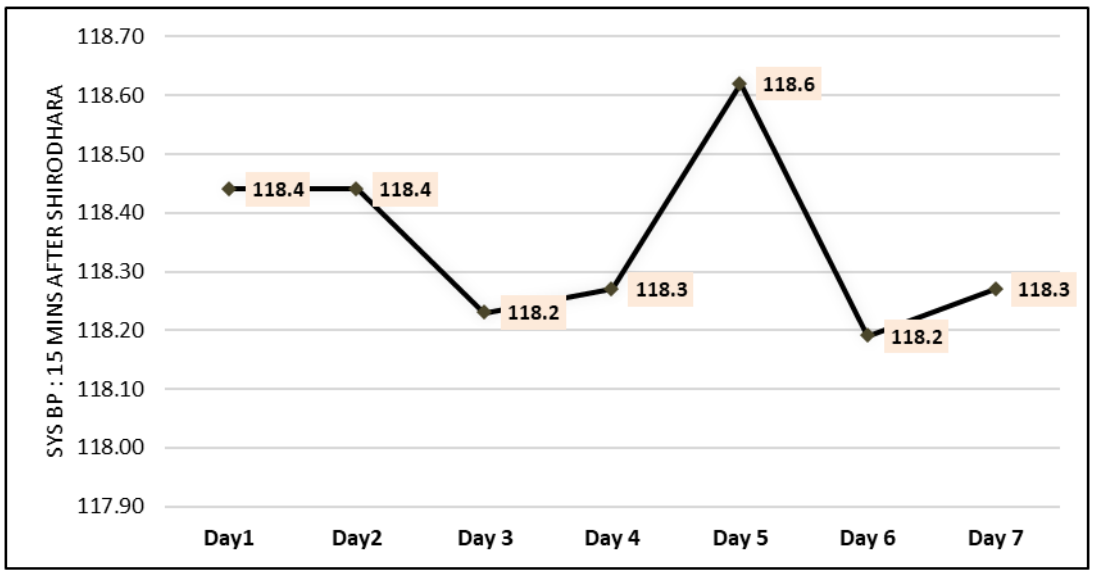
Just After *Shirodhara*	Systolic BP		
	Mean change	t-value	p-value
Day 1 to Day 2	-0.72	-1.82	0.072
Day 2 to Day 3	-0.21	-0.66	0.514
Day 3 to Day 4	0.42	1.23	0.220
Day 4 to Day 5	0.13	0.44	0.664
Day 5 to Day 6	-0.38	-1.22	0.227
Day 6 to Day 7	-0.19	-0.73	0.467

The systolic blood pressure (SBP) measured just after *Shirodhara* demonstrated small fluctuations across consecutive days. From Day 1 to Day 2, there was a mean reduction of 0.72 mmHg (t = -1.82, p = 0.072), which was not statistically significant. From Day 2 to Day 3, the decrease was minimal at -0.21 mmHg (t = -0.66, p = 0.514). A slight increase of 0.42 mmHg was observed from Day 3 to Day 4 (t = 1.23, p = 0.220), followed by a smaller rise of 0.13 mmHg from Day 4 to Day 5 (t = 0.44, p = 0.664). Between Day 5 and Day 6, the SBP decreased by 0.38 mmHg (t = -1.22, p = 0.227), and from Day 6 to Day 7, a further reduction of 0.19 mmHg was noted (t = -0.73, p = 0.467). These findings indicate no significant day-to-day changes in SBP throughout the assessment period.

Changes in Sys BP from Day1 to Day 7 15 Mins After *Shirodhara.*

15 Mins After *Shirodhara*	Sys BP			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	118.44	7.28	-	-	-
Day2	118.44	6.92	0.00	0.00	1.000
Day 3	118.23	7.00	-0.21	-0.76	0.450
Day 4	118.27	6.72	-0.17	-0.50	0.616
Day 5	118.62	6.23	0.18	0.47	0.637
Day 6	118.19	5.86	-0.25	-0.62	0.535
Day 7	118.27	5.33	-0.17	-0.40	0.692

The systolic blood pressure (SBP) measured 15 minutes after *Shirodhara* showed minimal day-to-day changes throughout the assessment period. On Day 2, the SBP remained the same as on Day 1 with a mean change of 0.00 mmHg (t = 0.00, p = 1.000). A slight decrease of -0.21 mmHg was observed from Day 2 to Day 3 (t = -0.76, p = 0.450), followed by a marginal increase of 0.04 mmHg from Day 3 to Day 4 (t = -0.50, p = 0.616). From Day 4 to Day 5, the SBP rose slightly by 0.18 mmHg (t = 0.47, p = 0.637), while a small reduction of -0.25 mmHg occurred between Day 5 and Day 6 (t = -0.62, p = 0.535). Finally, a negligible increase of 0.08 mmHg was noted from Day 6 to Day 7 (t = -0.40, p = 0.692). Overall, these changes were statistically insignificant, suggesting stability in SBP over the observed period.



Day wise Changes in Sys BP from Day1 to Day 7 15 Mins After *Shirodhara.*

15 Mins After *Shirodhara*	Systolic BP		
	Mean change	t-value	p-value
Day 1 to Day 2	0.00	0.00	1.000
Day 2 to Day 3	-0.21	-0.77	0.446

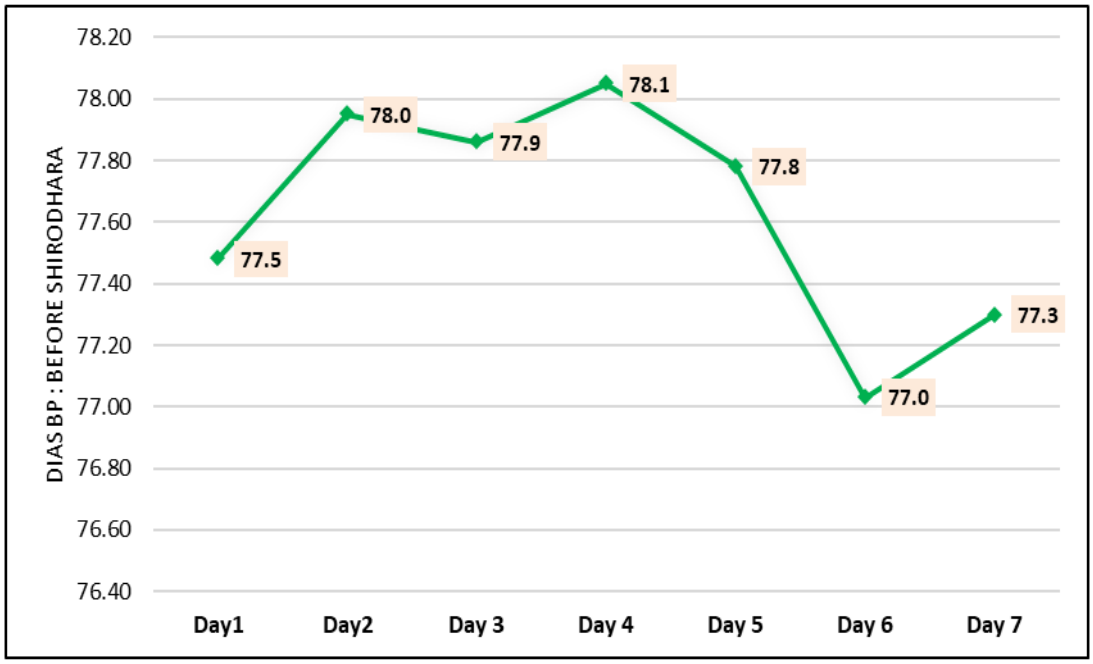
Day 3 to Day 4	0.04	0.14	0.889
Day 4 to Day 5	0.35	1.13	0.263
Day 5 to Day 6	-0.43	-1.55	0.125
Day 6 to Day 7	0.08	0.38	0.707

The systolic blood pressure (SBP) measured 15 minutes after *Shirodhara* showed minimal changes between consecutive days. From Day 1 to Day 2, there was no change in SBP (mean change = 0.00 mmHg, t = 0.00, p = 1.000). Between Day 2 and Day 3, a slight decrease of -0.21 mmHg was observed (t = -0.77, p = 0.446). From Day 3 to Day 4, a negligible increase of 0.04 mmHg occurred (t = 0.14, p = 0.889), followed by a slight rise of 0.35 mmHg from Day 4 to Day 5 (t = 1.13, p = 0.263). A minor reduction of -0.43 mmHg was noted between Day 5 and Day 6 (t = -1.55, p = 0.125), and a small increase of 0.08 mmHg occurred from Day 6 to Day 7 (t = 0.38, p = 0.707). Overall, these variations were statistically insignificant, indicating stability in SBP over time.

Table C7: Changes in Diastolic BP from Day1 to Day 7 Before *Shirodhara*.

Before *Shirodhara*	**Diastolic BP**			**paired t test**	
	Mean	**SD**	**Mean change**	**t-value**	**p-value**
Day1	77.48	5.91	-	-	-
Day2	77.95	5.33	0.47	1.19	0.237
Day 3	77.86	6.35	0.38	0.70	0.484
Day 4	78.05	4.94	0.57	1.70	0.092
Day 5	77.78	4.02	0.30	0.74	0.462
Day 6	77.03	4.52	-0.45	-1.09	0.277
Day 7	77.30	4.25	-0.18	-0.37	0.709

The diastolic blood pressure (DBP) measured before *Shirodhara* showed slight fluctuations over the days, but none were statistically significant. On Day 2, there was an increase of 0.47 mmHg compared to Day 1 (t = 1.19, p = 0.237). Between Day 2 and Day 3, DBP decreased slightly by -0.09 mmHg (t = 0.70, p = 0.484), followed by a minor rise of 0.19 mmHg from Day 3 to Day 4 (t = 1.70, p = 0.092). From Day 4 to Day 5, DBP dropped marginally by -0.27 mmHg (t = 0.74, p = 0.462). There was a small decline of -0.75 mmHg from Day 5 to Day 6 (t = -1.09, p = 0.277), and finally, a negligible increase of 0.27 mmHg between Day 6 and Day 7 (t = -0.37, p = 0.709). These changes indicate overall stability in DBP across the study period.



Day wise Changes in Diastolic BP from Day1 to Day 7 Before *Shirodhara*.

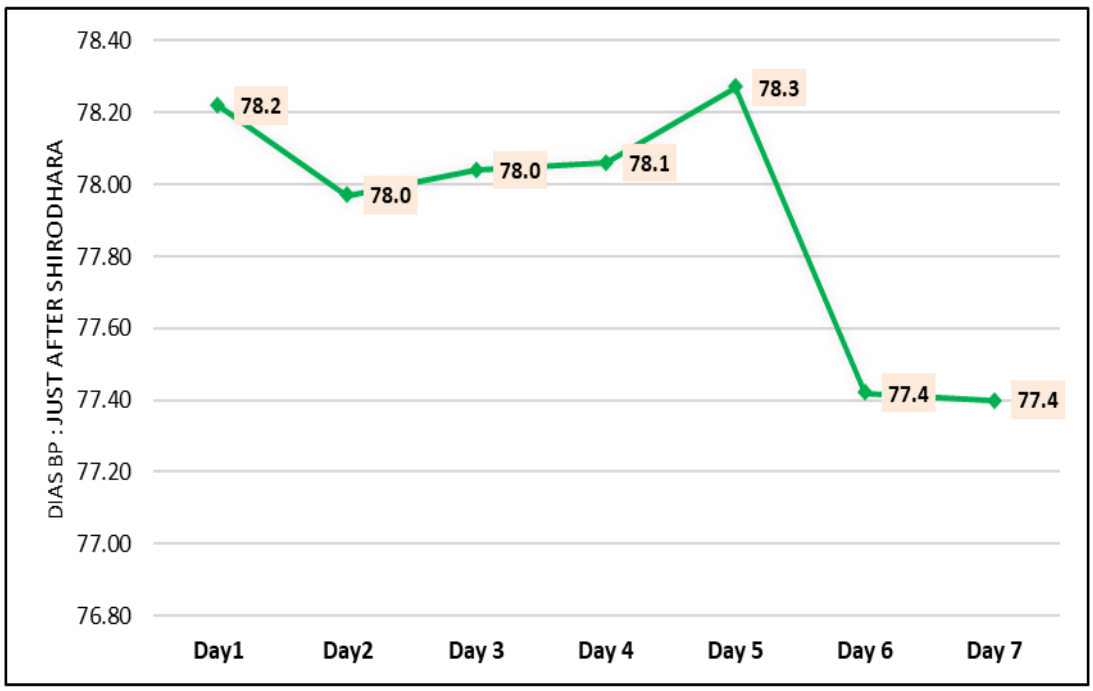
Before *Shirodhara*	Diastolic BP		
	Mean change	t-value	p-value
Day 1 to Day 2	0.47	1.19	0.237
Day 2 to Day 3	-0.09	-0.33	0.740
Day 3 to Day 4	0.19	0.36	0.718
Day 4 to Day 5	-0.27	-0.81	0.420
Day 5 to Day 6	-0.75	-2.94	**0.004**
Day 6 to Day 7	0.27	0.77	0.443

The diastolic blood pressure (DBP) recorded before *Shirodhara* demonstrated minor variations over consecutive days. From Day 1 to Day 2, there was an increase of 0.47 mmHg ($t = 1.19$, $p = 0.237$), followed by a slight decrease of -0.09 mmHg from Day 2 to Day 3 ($t = -0.33$, $p = 0.740$). Between Day 3 and Day 4, DBP increased marginally by 0.19 mmHg ($t = 0.36$, $p = 0.718$), while a decrease of -0.27 mmHg was observed from Day 4 to Day 5 ($t = -0.81$, $p = 0.420$). A statistically significant reduction of -0.75 mmHg was noted between Day 5 and Day 6 ($t = -2.94$, $p = 0.004$), followed by a small rebound increase of 0.27 mmHg from Day 6 to Day 7 ($t = 0.77$, $p = 0.443$). Overall, the DBP exhibited subtle changes, with a significant decline only between Days 5 and 6.

Changes in Diastolic BP from Day1 to Day 7 Just After *Shirodhara*.

Just After *Shirodhara*	Dias BP			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	78.22	5.53	-	-	-
Day2	77.97	5.13	-0.25	-0.67	0.506
Day 3	78.04	4.85	-0.18	-0.49	0.626
Day 4	78.06	4.90	-0.16	-0.45	0.657
Day 5	78.27	4.39	0.05	0.17	0.869
Day 6	77.42	4.42	-0.80	-1.92	0.057
Day 7	77.40	4.33	-0.82	-2.17	0.033

The diastolic blood pressure (DBP) measured just after *Shirodhara* showed slight fluctuations over seven days. On Day 2, there was a minor decrease of -0.25 mmHg compared to Day 1 (t = -0.67, p = 0.506), followed by a negligible change of -0.18 mmHg on Day 3 (t = -0.49, p = 0.626) and -0.16 mmHg on Day 4 (t = -0.45, p = 0.657). A slight increase of 0.05 mmHg was observed on Day 5 (t = 0.17, p = 0.869). However, there was a more pronounced decline of -0.80 mmHg on Day 6 (t = -1.92, p = 0.057), followed by a statistically significant reduction of -0.82 mmHg on Day 7 compared to Day 1 (t = -2.17, p = 0.033). These findings suggest minor day-to-day changes in DBP, with a significant decrease noted on Day 7.



Day wise Changes in Diastolic BP from Day1 to Day 7 Just After *Shirodhara*.

Just After *Shirodhara*	Diastolic BP		
	Mean change	t-value	p-value
Day 1 to Day 2	-0.25	-0.67	0.506
Day 2 to Day 3	0.07	0.25	0.806
Day 3 to Day 4	0.02	0.06	0.949
Day 4 to Day 5	0.21	0.75	0.453
Day 5 to Day 6	-0.85	-2.90	**0.005**
Day 6 to Day 7	-0.02	-0.05	0.958

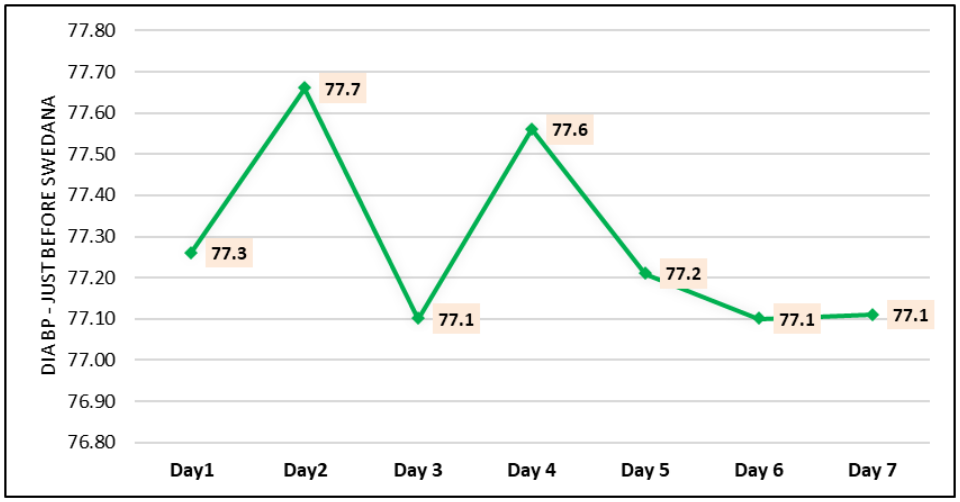
The diastolic blood pressure (DBP) recorded just after *Shirodhara* showed varying mean changes across consecutive days. Between Day 1 and Day 2, the DBP decreased slightly by -0.25 mmHg (t = -0.67, p = 0.506), followed by a minimal increase of 0.07 mmHg from Day 2 to Day 3 (t = 0.25, p = 0.806) and an even smaller change of 0.02 mmHg from Day 3 to Day 4 (t = 0.06, p = 0.949). Between Day 4 and Day 5, the DBP increased slightly by 0.21 mmHg (t = 0.75, p = 0.453). A notable and statistically significant decline of -0.85 mmHg occurred from Day 5 to Day 6 (t = -2.90, p = 0.005), but this was followed by a negligible change of -0.02 mmHg from Day 6 to Day 7 (t = -0.05, p = 0.958). These results highlight significant reductions in DBP only on certain days, particularly between Days 5 and 6.

Changes in Diastolic BP from Day1 to Day 7 15 min After *Shirodhara*.

15 Mins After *Shirodhara*	Dias BP			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	77.26	5.07	-	-	-
Day2	77.66	5.02	0.40	1.41	0.160
Day 3	77.10	5.00	-0.16	-0.51	0.611
Day 4	77.56	4.58	0.30	1.00	0.322
Day 5	77.21	4.91	-0.05	-0.18	0.857
Day 6	77.10	4.28	-0.16	-0.43	0.670
Day 7	77.11	4.15	-0.15	-0.42	0.676

The diastolic blood pressure (DBP) recorded 15 minutes after *Shirodhara* showed minor fluctuations over the course of the study. Between Day 1 and Day 2, DBP increased slightly by 0.40 mmHg (t = 1.41, p = 0.160), but this change was not statistically significant. From Day 2 to Day 3, there was a slight decrease of -0.16 mmHg (t = -0.51, p = 0.611), followed by an increase of 0.30 mmHg between Day 3 and Day 4 (t = 1.00, p = 0.322). A minimal decrease of -0.05 mmHg occurred from Day 4 to Day 5 (t = -0.18, p = 0.857), with a subsequent decrease of -0.16 mmHg from Day 5 to Day 6 (t = -0.43, p = 0.670). Finally, from

Day 6 to Day 7, DBP decreased by -0.15 mmHg (t = -0.42, p = 0.676). These results indicate no statistically significant changes in DBP during the period measured, with the fluctuations remaining minor throughout the week.



Day wise Changes in Diastolic BP from Day1 to Day 7 15 min After *Shirodhara*.

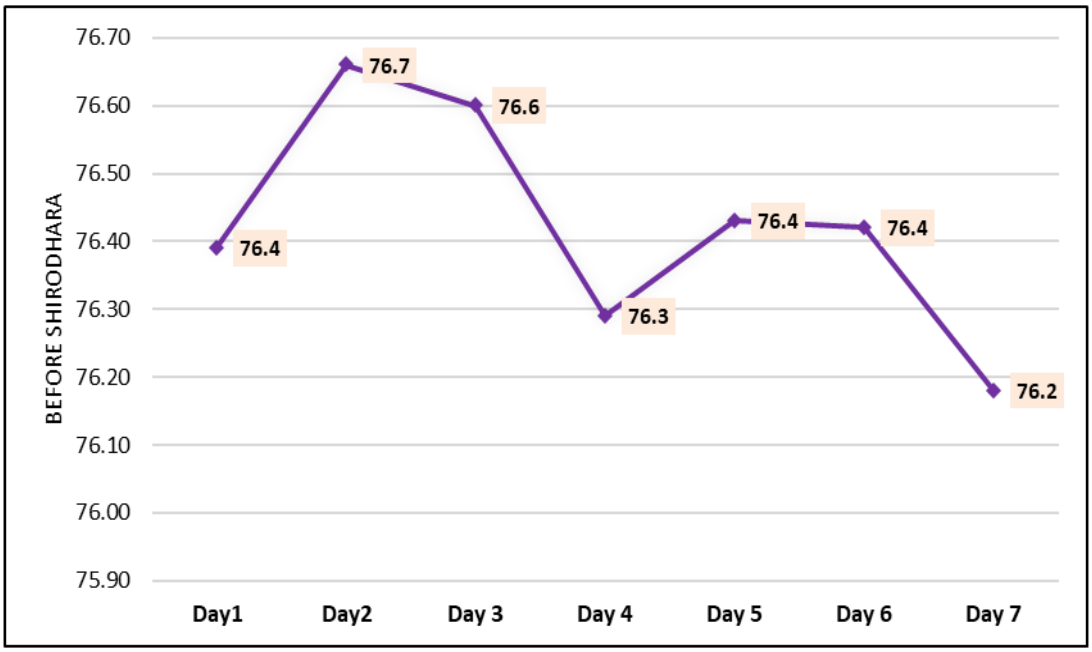
15 Mins After *Shirodhara*	Diastolic BP		
	Mean change	t-value	p-value
Day 1 to Day 2	0.40	1.41	0.160
Day 2 to Day 3	-0.56	-1.77	0.080
Day 3 to Day 4	0.46	1.47	0.146
Day 4 to Day 5	-0.35	-1.24	0.219
Day 5 to Day 6	-0.11	-0.34	0.732
Day 6 to Day 7	0.01	0.03	0.978

The diastolic blood pressure (DBP) measured 15 minutes after *Shirodhara* exhibited varying trends throughout the study period. From Day 1 to Day 2, DBP increased by 0.40 mmHg (t = 1.41, p = 0.160), but this change was not statistically significant. Between Day 2 and Day 3, there was a slight decrease of -0.56 mmHg (t = -1.77, p = 0.080), approaching significance. From Day 3 to Day 4, DBP increased by 0.46 mmHg (t = 1.47, p = 0.146), though the change was not significant. There was a -0.35 mmHg decrease from Day 4 to Day 5 (t = -1.24, p = 0.219), followed by a minimal -0.11 mmHg drop from Day 5 to Day 6 (t = -0.34, p = 0.732). Finally, between Day 6 and Day 7, there was a negligible change of 0.01 mmHg (t = 0.03, p = 0.978), indicating no significant change in DBP over the course of the week.

Changes in Pulse rate from Day1 to Day 7 Before *Shirodhara.*

Before *Shirodhara*	Pulse Rate			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	76.39	4.90	-	-	-
Day2	76.66	4.50	0.27	1.26	0.211
Day 3	76.60	4.42	0.21	1.00	0.322
Day 4	76.29	4.50	-0.10	-0.51	0.609
Day 5	76.43	4.36	0.04	0.20	0.840
Day 6	76.42	4.17	0.03	0.15	0.883
Day 7	76.18	3.75	-0.21	-0.97	0.334

Before *Shirodhara*, the pulse rate measurements were taken over the course of seven days. On Day 1, the mean pulse rate was 76.39 bpm (SD = 4.90). On Day 2, there was a slight increase of 0.27 bpm (t = 1.26, p = 0.211), which was not statistically significant. Similarly, on Day 3, the pulse rate showed a small increase of 0.21 bpm (t = 1.00, p = 0.322), with no significant difference. From Day 4 onward, the changes became less pronounced: a slight decrease of -0.10 bpm (t = -0.51, p = 0.609) on Day 4, a minimal increase of 0.04 bpm (t = 0.20, p = 0.840) on Day 5, and a small increase of 0.03 bpm (t = 0.15, p = 0.883) on Day 6. On Day 7, there was a small decrease of -0.21 bpm (t = -0.97, p = 0.334), but again, the changes were not statistically significant. Overall, no significant fluctuations were observed in pulse rate before *Shirodhara*.



Daywise Changes in Pulse rate from Day1 to Day 7 Before *Shirodhara.*

Before *Shirodhara*	Pulse Rate		
	Mean change	t-value	p-value
Day 1 to Day 2	0.27	1.26	0.211
Day 2 to Day 3	-0.06	-0.29	0.774
Day 3 to Day 4	-0.31	-1.75	0.083
Day 4 to Day 5	0.14	0.66	0.514
Day 5 to Day 6	-0.01	-0.05	0.958
Day 6 to Day 7	-0.24	-1.24	0.219

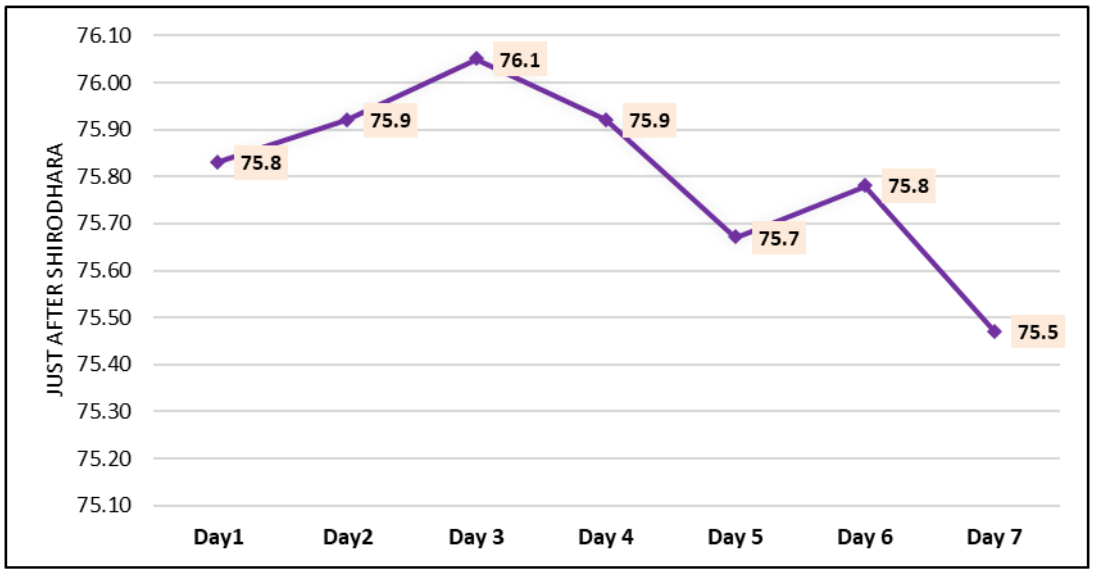
Before *Shirodhara*, the changes in pulse rate over the seven days showed minimal fluctuations. From Day 1 to Day 2, the mean change was an increase of 0.27 bpm (t = 1.26, p = 0.211), but this change was not statistically significant. The pulse rate slightly decreased by -0.06 bpm from Day 2 to Day 3 (t = -0.29, p = 0.774), again showing no significant change. A more notable decrease of -0.31 bpm was observed from Day 3 to Day 4 (t = -1.75, p = 0.083), though it remained marginally significant at the 0.05 level. On Day 4 to Day 5, there was a small increase of 0.14 bpm (t = 0.66, p = 0.514), and from Day 5 to Day 6, a negligible change of -0.01 bpm (t = -0.05, p = 0.958) was noted. Finally, from Day 6 to Day 7, there was a slight decrease of -0.24 bpm (t = -1.24, p = 0.219), but this was also not statistically significant. Overall, no significant changes in pulse rate were observed during this period.

Changes in Pulse rate from Day1 to Day 7 Just After *Shirodhara.*

Just After *Shirodhara*	Pulse Rate			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	75.83	4.04	-	-	-
Day2	75.92	3.74	0.09	0.55	0.586
Day 3	76.05	3.42	0.22	1.08	0.284
Day 4	75.92	3.83	0.09	0.59	0.556
Day 5	75.67	3.83	-0.16	-0.93	0.357
Day 6	75.78	3.61	-0.05	-0.23	0.820
Day 7	75.47	3.47	-0.36	-1.64	0.103

Just after *Shirodhara*, the changes in pulse rate over the seven days exhibited only minor fluctuations. On Day 1, the mean pulse rate was 75.83 bpm, and it slightly increased by 0.09 bpm on Day 2 (t = 0.55, p = 0.586), which was not statistically significant. The pulse rate further increased by 0.22 bpm on Day 3 (t = 1.08, p = 0.284), but this change also lacked statistical significance. On Day 4, the pulse rate remained essentially unchanged with a slight increase of 0.09 bpm (t = 0.59, p = 0.556). There was a small decrease of -0.16 bpm on Day 5

(t = -0.93, p = 0.357), followed by an even smaller decrease of -0.05 bpm on Day 6 (t = -0.23, p = 0.820), both of which were not statistically significant. By Day 7, the pulse rate decreased by -0.36 bpm (t = -1.64, p = 0.103), a change that was not statistically significant either. Overall, no significant changes in pulse rate were observed immediately after *Shirodhara*.



Day wise Changes in Pulse rate from Day1 to Day 7 Just After *Shirodhara*.

Just After *Shirodhara*	Pulse Rate		
	Mean change	t-value	p-value
Day 1 to Day 2	0.09	0.55	0.586
Day 2 to Day 3	0.13	0.67	0.506
Day 3 to Day 4	-0.13	-0.67	0.504
Day 4 to Day 5	-0.25	-1.32	0.191
Day 5 to Day 6	0.11	0.65	0.516
Day 6 to Day 7	-0.31	-1.60	0.113

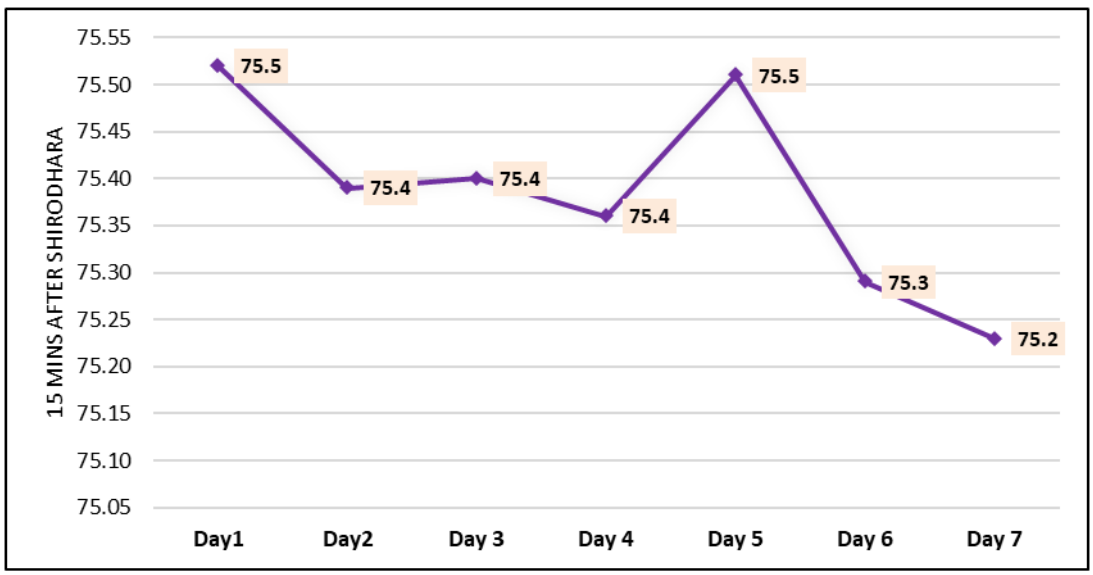
Just after *Shirodhara*, the changes in pulse rate from day to day were generally small and not statistically significant. From Day 1 to Day 2, there was a slight increase of 0.09 bpm (t = 0.55, p = 0.586), which was not statistically significant. On Day 2 to Day 3, the pulse rate increased by 0.13 bpm (t = 0.67, p = 0.506), again showing no significant change. From Day 3 to Day 4, there was a decrease of -0.13 bpm (t = -0.67, p = 0.504), which was also not statistically significant. On Day 4 to Day 5, the pulse rate decreased by -0.25 bpm (t = -1.32, p = 0.191), but this change was not significant either. From Day 5 to Day 6, there was a slight increase of 0.11 bpm (t = 0.65, p = 0.516), with no significant change. Finally, from Day 6 to Day 7, the pulse rate decreased by -0.31 bpm (t = -1.60, p = 0.113), which also did not reach

statistical significance. Overall, the changes in pulse rate just after *Shirodhara* were minimal and not statistically significant across the days.

Changes in Pulse rate from Day1 to Day 7 15 min After *Shirodhara.*

15 Mins After *Shirodhara*	Pulse Rate			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	75.52	3.70	-	-	-
Day2	75.39	3.53	-0.13	-0.66	0.509
Day 3	75.40	3.32	-0.12	-0.49	0.624
Day 4	75.36	3.71	-0.16	-0.86	0.394
Day 5	75.51	3.41	-0.01	-0.05	0.962
Day 6	75.29	3.25	-0.23	-1.06	0.290
Day 7	75.23	3.36	-0.29	-1.33	0.187

Fifteen minutes after *Shirodhara*, the pulse rate showed minor fluctuations, but these changes were not statistically significant. On Day 1 to Day 2, the pulse rate decreased by -0.13 bpm (t = -0.66, p = 0.509), which was not significant. From Day 2 to Day 3, the pulse rate decreased by -0.12 bpm (t = -0.49, p = 0.624), showing no significant change. The change from Day 3 to Day 4 was a decrease of -0.16 bpm (t = -0.86, p = 0.394), again not statistically significant. On Day 4 to Day 5, there was virtually no change, with a decrease of -0.01 bpm (t = -0.05, p = 0.962). From Day 5 to Day 6, the pulse rate decreased by -0.23 bpm (t = -1.06, p = 0.290), with no significant effect. Finally, from Day 6 to Day 7, the pulse rate decreased by -0.29 bpm (t = -1.33, p = 0.187), which was not statistically significant. Overall, the pulse rate did not change significantly over the days following *Shirodhara*.



Daywise Changes in Pulse rate from Day1 to Day 7 15 min After *Shirodhara.*

15 Mins After *Shirodhara*	Pulse Rate		
	Mean change	t-value	p-value
Day 1 to Day 2	-0.13	-0.66	0.509
Day 2 to Day 3	0.01	0.05	0.957
Day 3 to Day 4	-0.04	-0.18	0.856
Day 4 to Day 5	0.15	0.74	0.459
Day 5 to Day 6	-0.22	-1.47	0.144
Day 6 to Day 7	-0.06	-0.40	0.689

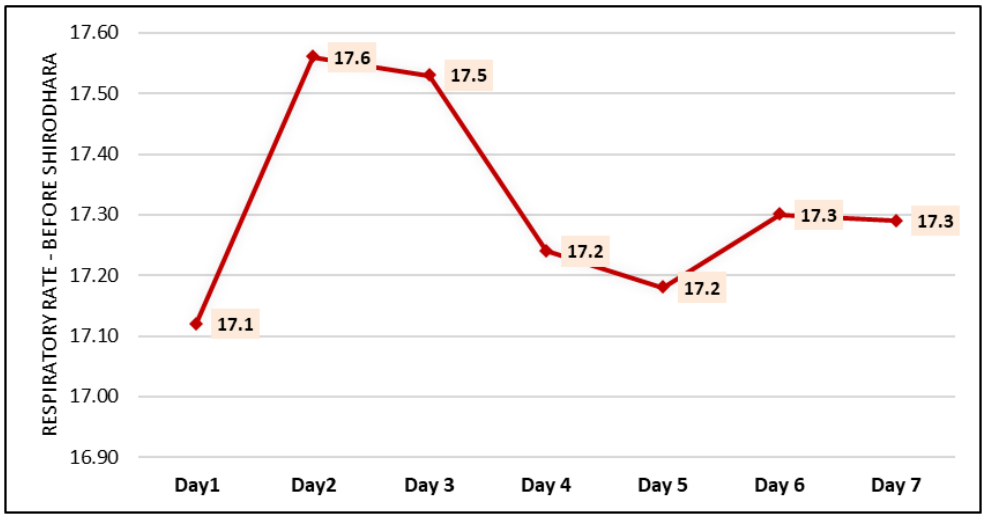
Fifteen minutes after *Shirodhara*, the pulse rate showed small fluctuations, none of which were statistically significant. From Day 1 to Day 2, the pulse rate decreased by -0.13 bpm (t = -0.66, p = 0.509), which was not significant. The change from Day 2 to Day 3 was minimal, with an increase of 0.01 bpm (t = 0.05, p = 0.957), showing no meaningful difference. From Day 3 to Day 4, the pulse rate decreased by -0.04 bpm (t = -0.18, p = 0.856), indicating no significant change. On Day 4 to Day 5, there was an increase of 0.15 bpm (t = 0.74, p = 0.459), which was also not statistically significant. The change from Day 5 to Day 6 was a decrease of -0.22 bpm (t = -1.47, p = 0.144), with no significant effect. Finally, from Day 6 to Day 7, the pulse rate decreased by -0.06 bpm (t = -0.40, p = 0.689), which was not statistically significant. In summary, the pulse rate remained relatively stable with no significant changes observed across the days following *Shirodhara*.

Changes in Respiratory rate from Day1 to Day 7 Before *Shirodhara.*

Before *Shirodhara*	Respiratory Rate			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	17.12	1.94	-	-	-
Day2	17.56	2.29	0.44	3.12	**0.002**
Day 3	17.53	2.37	0.41	2.57	**0.012**
Day 4	17.24	2.08	0.12	0.82	0.415
Day 5	17.18	2.16	0.06	0.38	0.703
Day 6	17.30	2.07	0.18	1.14	0.255
Day 7	17.29	2.01	0.17	0.90	0.368

Before *Shirodhara*, the respiratory rate exhibited varying changes across the days. On Day 1, the mean respiratory rate was 17.12 breaths per minute (SD = 1.94). From Day 1 to Day 2, the rate increased by 0.44 breaths per minute (t = 3.12, p = 0.002), showing a statistically significant change. Similarly, from Day 2 to Day 3, the mean respiratory rate increased by 0.41 breaths per minute (t = 2.57, p = 0.012), also statistically significant. On Day 4, there

was a smaller increase of 0.12 breaths per minute (t = 0.82, p = 0.415), which was not statistically significant. The changes from Day 4 to Day 5 and from Day 5 to Day 6 were minimal, with the respiratory rate increasing by 0.06 breaths per minute (t = 0.38, p = 0.703) and 0.18 breaths per minute (t = 1.14, p = 0.255), respectively, both showing no significant change. On Day 7, the mean respiratory rate increased by 0.17 breaths per minute (t = 0.90, p = 0.368), which was also not significant. Overall, significant increases in respiratory rate were observed between Day 1 to Day 3, but the changes thereafter were either minimal or non-significant.



Day wise Changes in Respiratory rate from Day1 to Day 7 Before *Shirodhara.*

Before *Shirodhara*	Respiratory Rate		
	Mean change	t-value	p-value
Day 1 to Day 2	0.44	3.12	**0.002**
Day 2 to Day 3	-0.03	-0.16	0.870
Day 3 to Day 4	-0.29	-1.53	0.129
Day 4 to Day 5	-0.06	-0.36	0.718
Day 5 to Day 6	0.12	0.73	0.466
Day 6 to Day 7	-0.01	-0.07	0.947

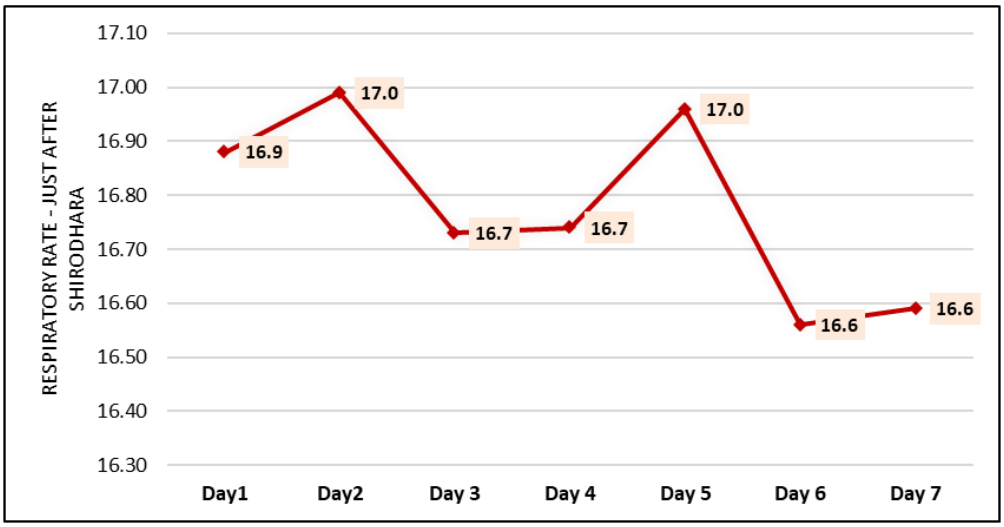
Before *Shirodhara*, the respiratory rate showed variable changes across the days. From Day 1 to Day 2, there was a significant increase in respiratory rate by 0.44 breaths per minute (t = 3.12, p = 0.002). However, from Day 2 to Day 3, there was a minimal change of -0.03 breaths per minute (t = -0.16, p = 0.870), which was not statistically significant. Similarly, from Day 3 to Day 4, the respiratory rate decreased by -0.29 breaths per minute (t = -1.53, p = 0.129), a change that also did not reach statistical significance. There was a small decrease of -0.06 breaths per minute from Day 4 to Day 5 (t = -0.36, p = 0.718) and a slight increase of 0.12

breaths per minute from Day 5 to Day 6 (t = 0.73, p = 0.466), both showing no significant changes. Finally, from Day 6 to Day 7, there was almost no change, with a mean decrease of -0.01 breaths per minute (t = -0.07, p = 0.947), indicating no significant difference.

Changes in Respiratory rate from Day1 to Day 7 Just After *Shirodhara.*

Just After *Shirodhara*	Respiratory Rate			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	16.88	2.33	-	-	-
Day2	16.99	2.21	0.11	0.82	0.414
Day 3	16.73	2.34	-0.15	-0.88	0.380
Day 4	16.74	2.36	-0.14	-0.89	0.377
Day 5	16.96	2.19	0.08	0.53	0.599
Day 6	16.56	2.48	-0.32	-1.72	0.089
Day 7	16.59	2.24	-0.29	-1.84	0.068

Just after *Shirodhara*, the respiratory rate exhibited small fluctuations across the days. From Day 1 to Day 2, there was a slight increase of 0.11 breaths per minute (t = 0.82, p = 0.414), which was not statistically significant. On Day 2 to Day 3, the rate decreased by -0.15 breaths per minute (t = -0.88, p = 0.380), showing no significant change. A further decrease of -0.14 breaths per minute was observed from Day 3 to Day 4 (t = -0.89, p = 0.377), again not reaching statistical significance. On Day 4 to Day 5, there was a minimal increase of 0.08 breaths per minute (t = 0.53, p = 0.599), with no meaningful difference. A decrease of -0.32 breaths per minute was seen from Day 5 to Day 6 (t = -1.72, p = 0.089), approaching but not reaching statistical significance. Finally, from Day 6 to Day 7, there was a -0.29 breaths per minute decrease (t = -1.84, p = 0.068), showing a trend towards significance, though not conclusive.



Day wise Changes in Respiratory rate from Day1 to Day 7 Just After *Shirodhara.*

Just After *Shirodhara*	Respiratory Rate		
	Mean change	t-value	p-value
Day 1 to Day 2	0.11	0.82	0.414
Day 2 to Day 3	-0.26	-1.58	0.117
Day 3 to Day 4	0.01	0.07	0.945
Day 4 to Day 5	0.22	1.48	0.142
Day 5 to Day 6	-0.40	-2.17	**0.032**
Day 6 to Day 7	0.03	0.17	0.868

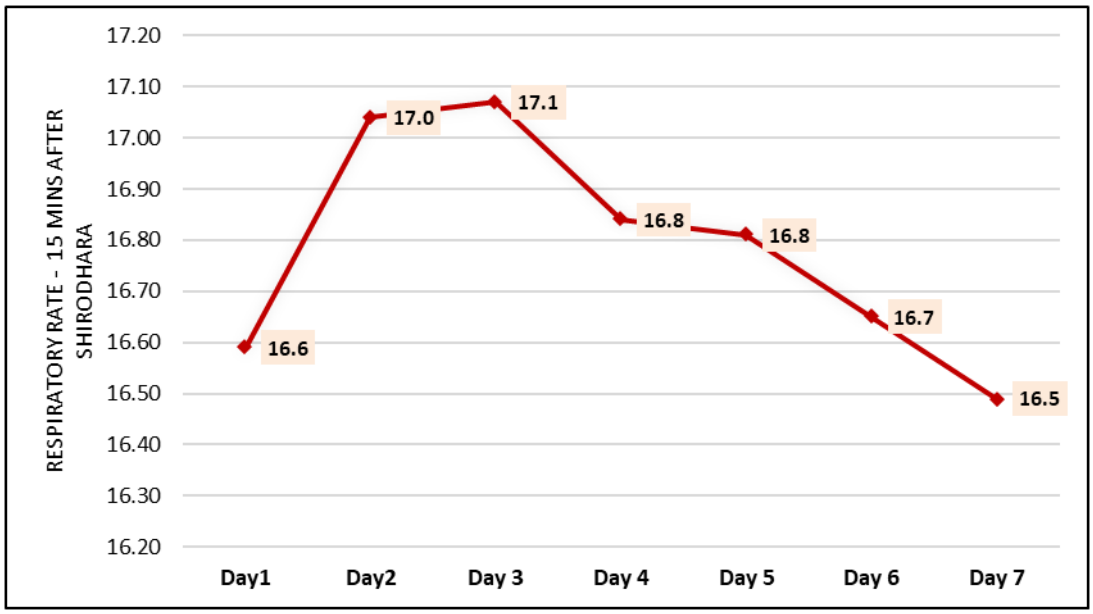
Just after *Shirodhara*, the respiratory rate showed some variations across the days. From Day 1 to Day 2, the mean change was an increase of 0.11 breaths per minute (t = 0.82, p = 0.414), which was not statistically significant. On Day 2 to Day 3, there was a -0.26 breaths per minute decrease (t = -1.58, p = 0.117), showing a trend toward a decrease, but not statistically significant. From Day 3 to Day 4, there was a minimal change of 0.01 breaths per minute (t = 0.07, p = 0.945), which was not significant. On Day 4 to Day 5, an increase of 0.22 breaths per minute was observed (t = 1.48, p = 0.142), with no significant change. However, from Day 5 to Day 6, a -0.40 breaths per minute decrease occurred (t = -2.17, p = 0.032), which was statistically significant. Finally, from Day 6 to Day 7, there was a minimal increase of 0.03 breaths per minute (t = 0.17, p = 0.868), showing no significant change.

Changes in Respiratory rate from Day1 to Day 7 15 min After *Shirodhara.*

15 Mins After *Shirodhara*	Respiratory Rate			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	16.59	2.21	-	-	-
Day2	17.04	2.39	0.45	2.58	**0.011**
Day 3	17.07	2.63	0.48	2.34	**0.021**
Day 4	16.84	2.33	0.25	1.45	0.151
Day 5	16.81	2.36	0.22	1.23	0.222
Day 6	16.65	2.27	0.06	0.31	0.760
Day 7	16.49	2.31	-0.10	-0.52	0.602

Fifteen minutes after *Shirodhara*, the respiratory rate showed varying changes across the days. From Day 1 to Day 2, there was an increase of 0.45 breaths per minute (t = 2.58, p = 0.011), which was statistically significant. Similarly, from Day 2 to Day 3, there was a further increase of 0.48 breaths per minute (t = 2.34, p = 0.021), also significant. However, from Day 3 to Day 4, the increase slowed to 0.25 breaths per minute (t = 1.45, p = 0.151), which was not statistically significant. On Day 4 to Day 5, there was a slight increase of 0.22 breaths per

minute (t = 1.23, p = 0.222), with no significant change. From Day 5 to Day 6, the increase was minimal, with a mean change of 0.06 breaths per minute (t = 0.31, p = 0.760), showing no significant effect. Finally, from Day 6 to Day 7, a slight decrease of -0.10 breaths per minute (t = -0.52, p = 0.602) was observed, which was not statistically significant.



Daywise Changes in Respiratory rate from Day1 to Day 7 15 min After *Shirodhara.*

15 Mins After Shirodhara	Respiratory Rate		
	Mean change	t-value	p-value
Day 1 to Day 2	0.45	2.58	**0.011**
Day 2 to Day 3	0.03	0.19	0.850
Day 3 to Day 4	-0.23	-1.38	0.171
Day 4 to Day 5	-0.03	-0.19	0.852
Day 5 to Day 6	-0.16	-1.00	0.320
Day 6 to Day 7	-0.16	-0.96	0.342

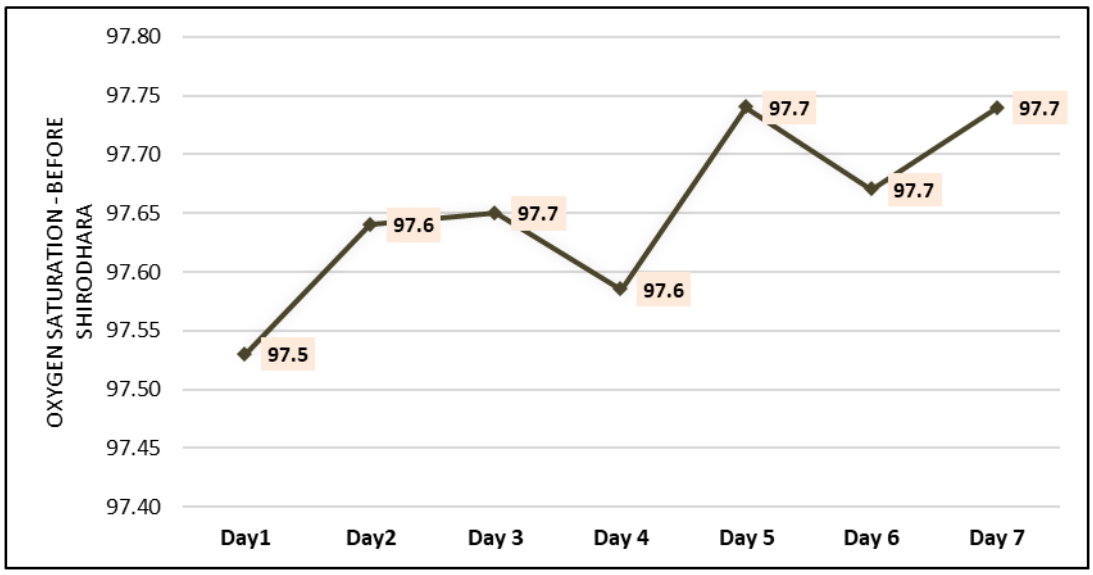
Fifteen minutes after *Shirodhara*, the respiratory rate exhibited a variety of changes. From Day 1 to Day 2, there was a significant increase of 0.45 breaths per minute (t = 2.58, p = 0.011). However, from Day 2 to Day 3, the change was minimal, with an increase of 0.03 breaths per minute (t = 0.19, p = 0.850), which was not statistically significant. From Day 3 to Day 4, there was a slight decrease of -0.23 breaths per minute (t = -1.38, p = 0.171), but this was also not statistically significant. On Day 4 to Day 5, there was a very minor decrease of -0.03 breaths per minute (t = -0.19, p = 0.852), showing no significant effect. From Day 5 to Day 6, the respiratory rate decreased by -0.16 breaths per minute (t = -1.00, p = 0.320), again showing no significant change. Similarly, from Day 6 to Day 7, a further decrease of -

0.16 breaths per minute (t = -0.96, p = 0.342) was observed, which was not statistically significant.

Changes in Oxygen Saturation from Day1 to Day 7 Before *Shirodhara.*

Before *Shirodhara*	Oxygen Saturation			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	97.53	0.89	-	-	-
Day2	97.64	0.81	0.11	1.33	0.187
Day 3	97.65	0.80	0.12	1.38	0.170
Day 4	97.59	0.80	0.05	0.59	0.554
Day 5	97.74	0.87	0.21	2.42	**0.017**
Day 6	97.67	0.82	0.14	1.52	0.132
Day 7	97.74	0.77	0.21	2.20	**0.030**

Before *Shirodhara*, the oxygen saturation levels showed minimal fluctuations throughout the week. On Day 1, the mean oxygen saturation was 97.53% with a standard deviation of 0.89. From Day 1 to Day 2, there was a slight increase of 0.11% (t = 1.33, p = 0.187), which was not statistically significant. On Day 2 to Day 3, the oxygen saturation increased by 0.12% (t = 1.38, p = 0.170), again showing no significant change. A smaller increase of 0.05% (t = 0.59, p = 0.554) was observed from Day 3 to Day 4, with no significant effect. From Day 4 to Day 5, there was a more noticeable increase of 0.21% (t = 2.42, p = 0.017), which was statistically significant. On Day 5 to Day 6, the oxygen saturation increased by 0.14% (t = 1.52, p = 0.132), but it was not statistically significant. Finally, from Day 6 to Day 7, there was another significant increase of 0.21% (t = 2.20, p = 0.030).



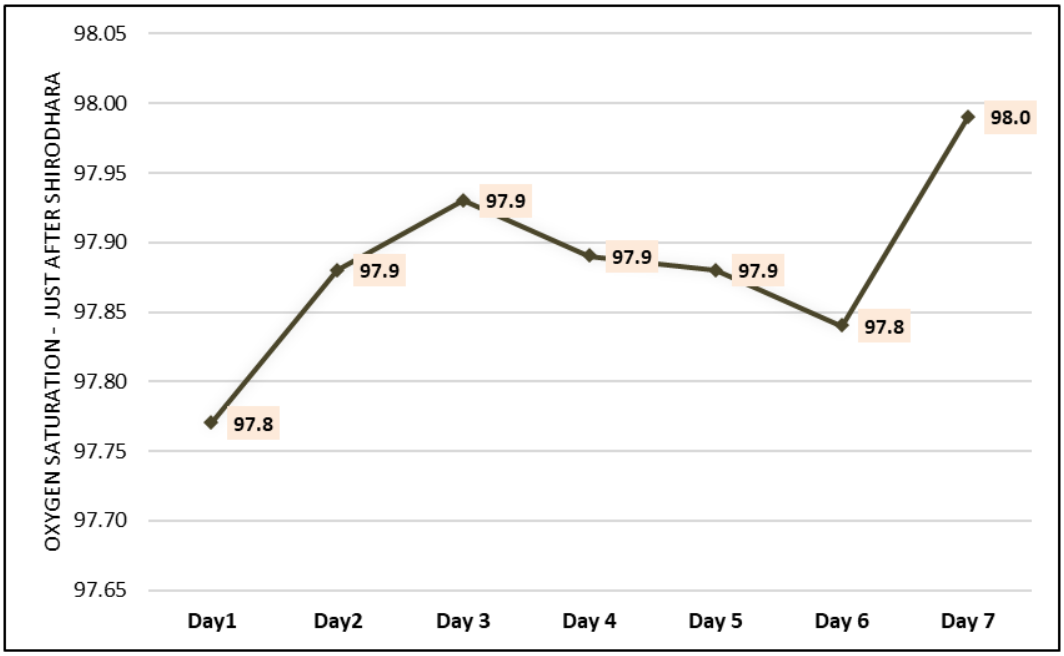
Changes in Oxygen Saturation from Day1 to Day 7 Before *Shirodhara*

Before *Shirodhara*	Oxygen Saturation		
	Mean change	t-value	p-value
Day 1 to Day 2	0.11	1.33	0.187
Day 2 to Day 3	0.01	0.10	0.923
Day 3 to Day 4	-0.07	-0.68	0.499
Day 4 to Day 5	0.16	1.46	0.148
Day 5 to Day 6	-0.07	-0.61	0.543
Day 6 to Day 7	0.07	0.75	0.456

Before *Shirodhara*, the oxygen saturation levels exhibited minimal changes across the week. From Day 1 to Day 2, there was a slight increase of 0.11% (t = 1.33, p = 0.187), which was not statistically significant. The change from Day 2 to Day 3 was almost negligible, with a 0.01% increase (t = 0.10, p = 0.923). From Day 3 to Day 4, a small decrease of 0.07% was noted (t = -0.68, p = 0.499), showing no significant change. A slightly higher increase of 0.16% was observed from Day 4 to Day 5 (t = 1.46, p = 0.148), but it was still not statistically significant. Similarly, there was no significant change between Day 5 and Day 6, with a decrease of 0.07% (t = -0.61, p = 0.543). From Day 6 to Day 7, a small increase of 0.07% was recorded (t = 0.75, p = 0.456), indicating no significant variation.

Changes in Oxygen Saturation from Day1 to Day 7 Just After *Shirodhara*.

Just After *Shirodhara*	Oxygen Saturation			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	97.77	0.85	-	-	-
Day2	97.88	0.81	0.11	1.35	0.180
Day 3	97.93	0.87	0.16	1.61	0.110
Day 4	97.89	0.78	0.12	1.51	0.134
Day 5	97.88	0.71	0.11	1.24	0.218
Day 6	97.84	0.75	0.07	0.70	0.484
Day 7	97.99	0.69	0.22	2.71	**0.008**



Day wise Changes in Oxygen Saturation from Day1 to Day 7 Just After *Shirodhara*.

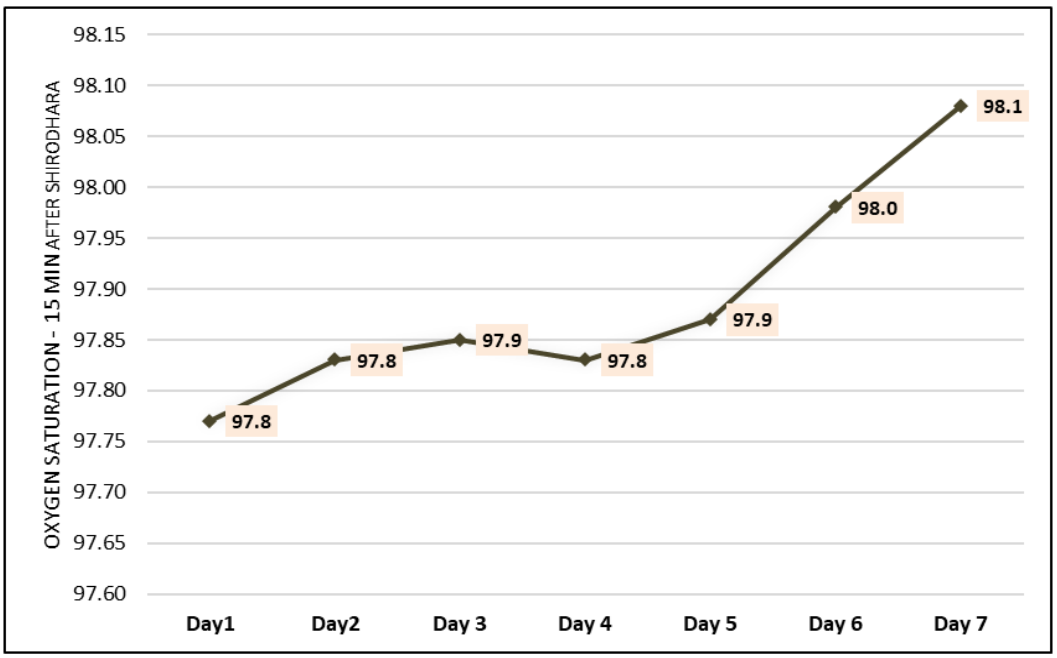
Just After *Shirodhara*	Oxygen Saturation		
	Mean change	t-value	p-value
Day 1 to Day 2	0.11	1.35	0.180
Day 2 to Day 3	0.05	0.56	0.576
Day 3 to Day 4	-0.04	-0.39	0.694
Day 4 to Day 5	-0.01	-0.11	0.915
Day 5 to Day 6	-0.04	-0.42	0.675
Day 6 to Day 7	0.15	1.57	0.120

Just after *Shirodhara*, the oxygen saturation levels showed slight variations over the course of the week. From Day 1 to Day 2, there was a small increase of 0.11% ($t = 1.35$, $p = 0.180$), which was not statistically significant. The increase from Day 2 to Day 3 was slightly higher, with a 0.16% change ($t = 1.61$, $p = 0.110$), but it remained statistically insignificant. Similarly, from Day 3 to Day 4, the increase was 0.12% ($t = 1.51$, $p = 0.134$), showing no significant difference. From Day 4 to Day 5, there was another 0.11% increase ($t = 1.24$, $p = 0.218$), which was not significant. Between Day 5 and Day 6, oxygen saturation rose by 0.07% ($t = 0.70$, $p = 0.484$), indicating minimal change. However, from Day 6 to Day 7, there was a statistically significant increase of 0.22% ($t = 2.71$, $p = 0.008$), showing a notable improvement.

Changes in Oxygen Saturation from Day1 to Day 7 15 min After *Shirodhara*.

15 Mins After *Shirodhara*	Oxygen Saturation			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	97.77	0.89	-	-	-
Day2	97.83	0.80	0.06	0.69	0.494
Day 3	97.85	0.83	0.08	0.89	0.374
Day 4	97.83	0.80	0.06	0.66	0.510
Day 5	97.87	0.76	0.10	1.03	0.305
Day 6	97.98	0.64	0.21	2.36	**0.020**
Day 7	98.08	0.76	0.31	3.19	**0.002**

Fifteen minutes after *Shirodhara*, oxygen saturation levels showed gradual improvements over the week. From Day 1 to Day 2, there was a slight increase of 0.06% (t = 0.69, p = 0.494), which was not statistically significant. The change continued to be minimal from Day 2 to Day 3, with a 0.08% increase (t = 0.89, p = 0.374), indicating no significant change. Similarly, from Day 3 to Day 4, the increase was 0.06% (t = 0.66, p = 0.510), which was not statistically significant. On Day 4 to Day 5, the oxygen saturation rose by 0.10% (t = 1.03, p = 0.305), again showing no significant difference. However, from Day 5 to Day 6, there was a more notable increase of 0.21% (t = 2.36, p = 0.020), which was statistically significant. The most significant change occurred from Day 6 to Day 7, with an increase of 0.31% (t = 3.19, p = 0.002), showing a clear improvement in oxygen saturation levels.



Daywise Changes in Oxygen Saturation from Day1 to Day 7 15 min After *Shirodhara*.

15 Mins After *Shirodhara*	Oxygen Saturation		
	Mean change	t-value	p-value
Day 1 to Day 2	0.06	0.69	0.494
Day 2 to Day 3	0.02	0.23	0.820
Day 3 to Day 4	-0.02	-0.23	0.822
Day 4 to Day 5	0.04	0.51	0.608
Day 5 to Day 6	0.11	1.39	0.167
Day 6 to Day 7	0.10	1.30	0.198

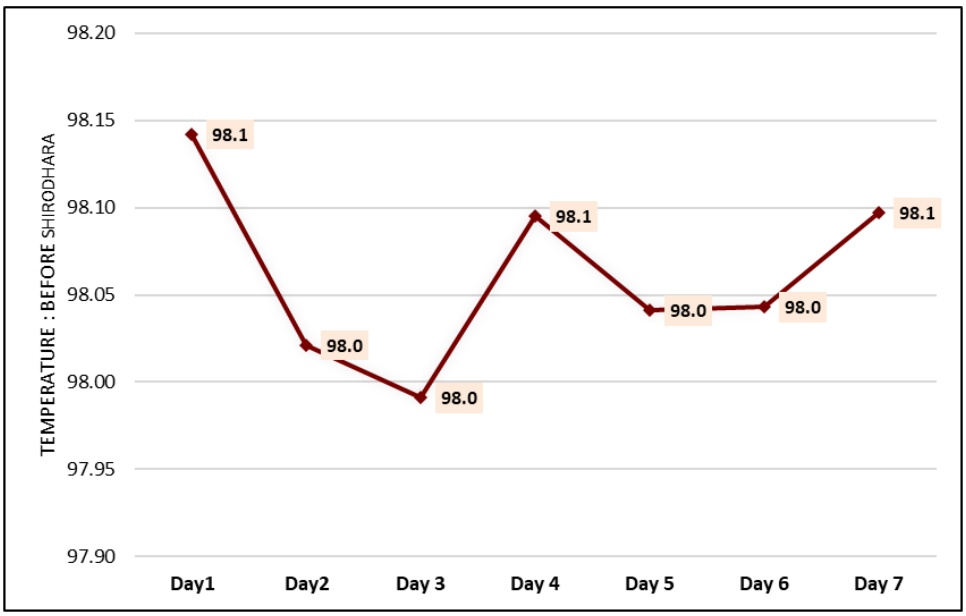
Fifteen minutes after *Shirodhara*, the changes in oxygen saturation were relatively minor across the week. From Day 1 to Day 2, there was a slight increase of 0.06% (t = 0.69, p = 0.494), which was not statistically significant. The change from Day 2 to Day 3 was even smaller, with an increase of just 0.02% (t = 0.23, p = 0.820), showing no significant difference. Similarly, from Day 3 to Day 4, there was a slight decrease of -0.02% (t = -0.23, p = 0.822), which also was not significant. From Day 4 to Day 5, the change was an increase of 0.04% (t = 0.51, p = 0.608), again not reaching statistical significance. On Day 5 to Day 6, oxygen saturation increased by 0.11% (t = 1.39, p = 0.167), a change that approached but did not reach significance. Lastly, from Day 6 to Day 7, there was a small increase of 0.10% (t = 1.30, p = 0.198), which was also not statistically significant. These results suggest that while there were some fluctuations in oxygen saturation, none of the changes over the seven days reached statistical significance.

Changes in Temperature from Day1 to Day 7 Before *Shirodhara*.

Before *Shirodhara*	Temperature (˚F)			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	98.14	0.46	-	-	-
Day2	98.02	0.53	-0.12	-2.57	0.012
Day 3	97.99	0.58	-0.15	-2.59	0.011
Day 4	98.10	0.57	-0.05	-0.93	0.354
Day 5	98.04	0.55	-0.10	-1.94	0.055
Day 6	98.04	0.55	-0.10	-2.13	0.035
Day 7	98.10	0.49	-0.05	-1.00	0.318

Before *Shirodhara*, temperature measurements in degrees Fahrenheit were recorded over seven days. On Day 1, the mean temperature was 98.14°F (SD = 0.46). From Day 1 to Day 2, there was a slight decrease of -0.12°F, with a t-value of -2.57 and a statistically significant p-value of 0.012. Similarly, from Day 2 to Day 3, the temperature decreased by -0.15°F, with a

t-value of -2.59 and a p-value of 0.011, also showing a significant result. However, from Day 3 to Day 4, the decrease in temperature was -0.05°F, and the t-value of -0.93 yielded a non-significant p-value of 0.354. From Day 4 to Day 5, the temperature decreased by -0.10°F, with a t-value of -1.94 and a p-value of 0.055, which was on the verge of significance. On Day 5 to Day 6, the temperature decreased again by -0.10°F, with a t-value of -2.13 and a significant p-value of 0.035. Lastly, from Day 6 to Day 7, the temperature remained almost unchanged, with a decrease of only -0.05°F, and a non-significant p-value of 0.318. These results indicate that significant reductions in temperature were observed early in the week, but the changes became less pronounced toward the end of the observation period.



Day wise Changes in Temperature from Day1 to Day 7 Before *Shirodhara*.

Before *Shirodhara*	Temperature (˚F)		
	Mean change	t-value	p-value
Day 1 to Day 2	-0.12	-2.57	**0.012**
Day 2 to Day 3	-0.03	-0.56	0.577
Day 3 to Day 4	0.10	1.79	0.076
Day 4 to Day 5	-0.05	-1.08	0.282
Day 5 to Day 6	0.00	0.04	0.970
Day 6 to Day 7	0.05	1.12	0.265

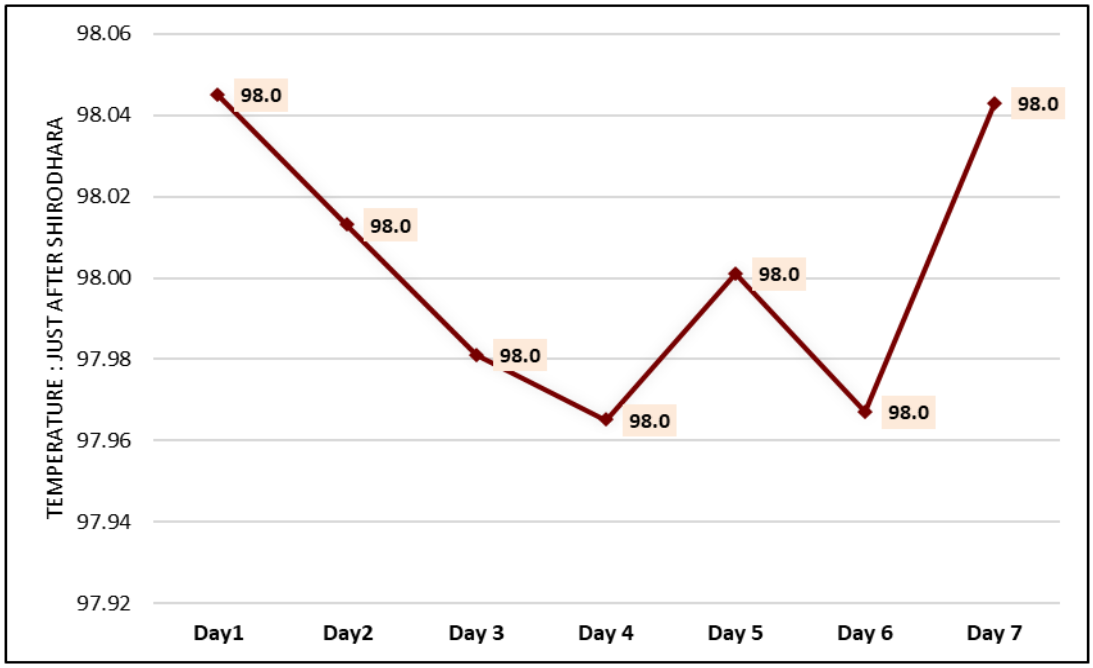
Before *Shirodhara*, the temperature measurements in degrees Fahrenheit showed variable changes across the seven days. From Day 1 to Day 2, the temperature decreased by -0.12°F, with a t-value of -2.57 and a p-value of 0.012, indicating a statistically significant reduction. However, from Day 2 to Day 3, the change was minimal at -0.03°F, and the t-value of -0.56

resulted in a non-significant p-value of 0.577. From Day 3 to Day 4, the temperature increased by 0.10°F, with a t-value of 1.79 and a p-value of 0.076, which is marginally close to statistical significance. From Day 4 to Day 5, the temperature decreased again by -0.05°F, with a t-value of -1.08 and a p-value of 0.282, showing no significant change. On Day 5 to Day 6, there was no change in temperature (0.00°F), with a t-value of 0.04 and a p-value of 0.970, indicating no significant difference. Finally, from Day 6 to Day 7, the temperature increased slightly by 0.05°F, with a t-value of 1.12 and a p-value of 0.265, which was not statistically significant. These results suggest that the temperature fluctuations during the period were generally small, with a significant drop observed only between Days 1 and 2.

Changes in Temperature from Day1 to Day 7 Just After *Shirodhara*.

Just After *Shirodhara*	Temperature (˚F)			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	98.05	0.53	-	-	-
Day2	98.01	0.62	-0.03	-0.52	0.604
Day 3	97.98	0.65	-0.06	-0.94	0.347
Day 4	97.97	0.59	-0.08	-1.25	0.214
Day 5	98.00	0.57	-0.04	-0.70	0.488
Day 6	97.97	0.60	-0.08	-1.54	0.127
Day 7	98.04	0.47	0.00	-0.05	0.963

Just after *Shirodhara*, temperature measurements (in degrees Fahrenheit) showed minor fluctuations over the seven days. On Day 1, the temperature was recorded at 98.05°F. From Day 1 to Day 2, the temperature decreased slightly by -0.03°F, with a t-value of -0.52 and a p-value of 0.604, indicating no significant change. Similarly, from Day 2 to Day 3, the temperature dropped by -0.06°F, with a t-value of -0.94 and a p-value of 0.347, which was also not statistically significant. The temperature further decreased by -0.08°F from Day 3 to Day 4, with a t-value of -1.25 and a p-value of 0.214, showing no significant change. From Day 4 to Day 5, the temperature decreased by -0.04°F, with a t-value of -0.70 and a p-value of 0.488, again indicating no significant difference. The trend continued with a -0.08°F drop from Day 5 to Day 6, with a t-value of -1.54 and a p-value of 0.127, which is not statistically significant. Finally, from Day 6 to Day 7, the temperature remained unchanged at 98.04°F, with a t-value of -0.05 and a p-value of 0.963, confirming no significant difference. Overall, the temperature fluctuations observed just after *Shirodhara* were minimal and not statistically significant throughout the week.



Day wise Changes in Temperature from Day1 to Day 7 Just After *Shirodhara*.

Just After *Shirodhara*	Temperature (˚F)		
	Mean change	t-value	p-value
Day 1 to Day 2	-0.03	-0.52	0.604
Day 2 to Day 3	-0.03	-0.54	0.593
Day 3 to Day 4	-0.02	-0.28	0.778
Day 4 to Day 5	0.04	0.76	0.446
Day 5 to Day 6	-0.03	-0.56	0.575
Day 6 to Day 7	0.08	1.52	0.131

Just after *Shirodhara*, temperature (in degrees Fahrenheit) changes were generally small and did not show significant variation. From Day 1 to Day 2, the temperature decreased by -0.03°F, with a t-value of -0.52 and a p-value of 0.604, indicating no significant difference. Similarly, from Day 2 to Day 3, the temperature dropped by another -0.03°F, with a t-value of -0.54 and a p-value of 0.593, showing no statistically significant change. From Day 3 to Day 4, the temperature decreased slightly by -0.02°F, with a t-value of -0.28 and a p-value of 0.778, which also did not reach statistical significance. From Day 4 to Day 5, the temperature increased by 0.04°F, with a t-value of 0.76 and a p-value of 0.446, indicating no significant change. The trend continued with a -0.03°F decrease from Day 5 to Day 6, with a t-value of -0.56 and a p-value of 0.575, again showing no significant difference. Finally, from Day 6 to Day 7, the temperature increased by 0.08°F, with a t-value of 1.52 and a p-value of 0.131, which is still not statistically significant. Overall, the temperature variations just after *Shirodhara* remained minor and did not show significant changes.

Changes in Temperature from Day1 to Day 7 15min After *Shirodhara*.

15 Mins After *Shirodhara*	Temperature (˚F)			paired t test	
	Mean	SD	Mean change	t-value	p-value
Day1	97.93	0.59	-	-	-
Day2	98.00	0.51	0.07	1.42	0.158
Day 3	97.90	0.59	-0.02	-0.48	0.633
Day 4	97.92	0.56	0.00	-0.02	0.985
Day 5	98.02	0.60	0.09	1.84	0.069
Day 6	98.01	0.56	0.08	1.49	0.139
Day 7	97.99	0.55	0.07	1.21	0.228

Fifteen minutes after *Shirodhara*, the temperature (in degrees Fahrenheit) showed minimal changes across the days. From Day 1 to Day 2, the temperature increased by 0.07°F, with a t-value of 1.42 and a p-value of 0.158, indicating no significant change. On Day 2 to Day 3, the temperature decreased by -0.02°F, with a t-value of -0.48 and a p-value of 0.633, which was not statistically significant. From Day 3 to Day 4, there was no change in temperature, with a t-value of -0.02 and a p-value of 0.985, further supporting no significant difference. On Day 4 to Day 5, the temperature increased by 0.09°F, with a t-value of 1.84 and a p-value of 0.069, which is marginally not significant. The temperature remained stable from Day 5 to Day 6, with an increase of 0.08°F, showing a t-value of 1.49 and a p-value of 0.139, also not statistically significant. Finally, from Day 6 to Day 7, the temperature increased by 0.07°F, with a t-value of 1.21 and a p-value of 0.228, which again did not show any significant variation. Overall, the temperature changes were minor and did not reach statistical significance in the 15 minutes after *Shirodhara*.

Daywise Changes in Temperature from Day1 to Day 7 15min After *Shirodhara*

15 Mins After *Shirodhara*	Temperature (˚F)		
	Mean change	t-value	p-value
Day 1 to Day 2	0.07	1.42	0.158
Day 2 to Day 3	-0.09	-1.93	0.056
Day 3 to Day 4	0.02	0.42	0.678
Day 4 to Day 5	0.10	1.74	0.085
Day 5 to Day 6	-0.01	-0.16	0.872
Day 6 to Day 7	-0.02	-0.28	0.780

Fifteen minutes after *Shirodhara*, the temperature (in degrees Fahrenheit) exhibited minimal fluctuations across the days. From Day 1 to Day 2, there was a slight increase of 0.07°F, with a t-value of 1.42 and a p-value of 0.158, which was not statistically significant. On Day 2 to

Day 3, the temperature decreased by -0.09°F, with a t-value of -1.93 and a p-value of 0.056, which was marginally not significant. Between Day 3 and Day 4, there was a negligible increase of 0.02°F, with a t-value of 0.42 and a p-value of 0.678, indicating no significant change. On Day 4 to Day 5, the temperature increased by 0.10°F, with a t-value of 1.74 and a p-value of 0.085, which was also marginally non-significant. From Day 5 to Day 6, there was a slight decrease of -0.01°F, with a t-value of -0.16 and a p-value of 0.872, showing no significant change. Finally, between Day 6 and Day 7, the temperature decreased by -0.02°F, with a t-value of -0.28 and a p-value of 0.780, indicating no meaningful fluctuation. Overall, the temperature changes were minimal, and none of them were statistically significant in the 15 minutes after *Shirodhara*.

DISCUSSION

The findings of this observational study strongly support the traditional understanding of *Shirodhara* as a deeply relaxing and physiologically balancing therapeutic procedure. Statistically significant reductions were observed in all three primary vital parameters—pulse rate, systolic blood pressure (SBP), and diastolic blood pressure (DBP)—immediately following the intervention. The mean pulse rate decreased from 83.51 bpm to 74.43 bpm, indicating a substantial drop in sympathetic activity and activation of the parasympathetic system. This aligns with the Ayurvedic perspective of *Shirodhara* promoting a state of calming, which correlates in modern terms with autonomic nervous system regulation.

The observed reduction in systolic and diastolic blood pressure further supports the therapy's potential influence on cardiovascular homeostasis. A decrease of approximately 5 mmHg in both SBP and DBP may seem modest, but from a clinical standpoint, even such small reductions can significantly impact long-term cardiovascular risk, especially in individuals prone to stress-induced hypertension. These changes may be attributed to the continuous, gentle stimulation of the forehead and the thermal and tactile effects of the medicated liquid, which together may influence central nervous system centers including the hypothalamus and pineal gland. Ayurvedically, the stimulation of the *Agnya Chakra*—the center of intuition and psychosomatic control—is said to bring about equilibrium in bodily systems, a notion that finds support in modern neurophysiological explanations involving alpha brain wave generation and reduced sympathetic outflow.

Furthermore, the tranquilizing effect of the rhythmic oil flow and warm temperature likely contributes to vasodilation and reduced peripheral resistance, aiding in the reduction of blood

pressure. These effects were achieved irrespective of the underlying disease condition or the specific medicated liquid used, indicating a generalized physiological response rather than a condition-specific outcome. While the immediate effects are well-documented in this study, it also opens up new dimensions for exploring the long-term psychophysiological benefits of *Shirodhara*. However, the absence of a control group and lack of long-term follow-up limit the generalizability of the findings.

CONCLUSION

This study concludes that *Shirodhara* has a statistically and clinically significant calming effect on vital physiological parameters, particularly pulse rate, systolic blood pressure, and diastolic blood pressure. These findings validate *Shirodhara* not only as a classical Ayurvedic procedure for mind-body relaxation but also as a potential adjunct in the management of stress-related cardiovascular dysfunctions. The results warrant further exploration through randomized controlled trials and long-term studies to assess its sustained impact and therapeutic applications across broader patient populations.

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