*RESEARCH ARTICLE*

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# Determination of the Prevalence of Middle Crossed Syndrome Among Beauticians Working in Kolhapur

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## Abstract

**Background:** "Middle Crossed Syndrome", characterized by a transverse plane muscle imbalance, unlike his primarily sagittal plane-focused descriptions. This syndrome may particularly affect professionals like beauticians, whose work often entails prolonged static postures or repetitive motions, increasing their susceptibility to musculoskeletal disorders. In understanding and addressing these syndromes, clinicians and professionals in related fields can mitigate the risk of injury and improve overall musculoskeletal health, particularly in high-risk occupations such as beauticians. **Objectives**: The objective of this study was to investigate prevalence of Middle Crossed Syndrome in Beauticians. **Materials**: Subject were selected from Kolhapur city and assessed using Gait analysis, active straight leg raise, posterior and anterior oblique sling assessment. Inclusion and exclusion criteria were considered, and subject willing to participates were included after receiving an explanation of the study's nature. **Result:** The study encompasses various demographic and clinical parameters to assess the prevalence of middle crossed syndrome among beauticians. Gait analysis and active straight leg raise tests further support these findings, indicating that the majority of participants demonstrate positive results, aligning with the prevalence of middle crossed syndrome. Overall, these observations underscore the multifactorial nature of middle crossed syndrome, influenced by age, hand dominance, work experience, workload, and biomechanical factors. **Conclusion:** The present study concluded that, 68% of beauticians (39 out of 57 beauticians) reported having muscle imbalance. Middle crossed syndrome was maximum seen in the beauticians those who have experience of more than 10 years.

**Major findings:** The prevalence rate of middle crossed syndrome among beauticians working in Kolhapur is higher in rate. This may lead to futuristic musculoskeletal problems in those individuals. The study concludes that the higher increase in rate of middle crossed syndrome may lead to major problems.

**Keywords:** Assessment, Beauticians, Long-Term Outcomes, Middle Crossed Syndrome, Prevalence

## 1. Introduction

The Janda's (1979) nomenclature for the muscle imbalance syndrome, a novel description of what might be called "Middle Crossed Syndrome" is provided[1]. The middle-crossed syndrome term refers to an imbalance in transverse plane musculature whereas, Janda's descriptions mostly focused on the sagittal plane[2]. There are further variants of crossed syndrome in addition to middle crossed syndrome: Upper crossed syndrome, lower crossed syndrome[3]. Upper crossed syndrome: The dysfunctional tone of muscle in the shoulder girdle

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and cervicothoracic region of the body is described by a common postural dysfunctional pattern[3,4]. Upper Crossed Syndrome (UCS) is a common musculoskeletal condition that is defined by tightness and weakening of the muscles of the neck, shoulders, and upper back[5]. It is a musculoskeletal disorder that connects the dorsal and ventral sides of the body through unusual patterns of muscle weakness (abdominis and gluteus maximus) and tightening (iliopsoas and spinal extensors)[6]. Middle crossed syndrome: Clinically, in middle crossed syndrome it is frequently noticed that slings connecting the dominant leg to the non- dominant hand are weaker[7]. This pattern in issue would often be seen in a left-handed or footed person, with the weaker sling travelling from the left hip to the right shoulder[8].

Using the trunk sling systems Matt Wallden first coined the term Middle Crossed Syndrome (MCS) which describes an imbalance in the transverse plane musculature[9].

Middle crossed syndrome may be seen in individuals who tend to work in a slump posture or a posture which involves longer periods of static posture, like workingwith protracted shoulder, flexion attitude of neck, upper back and middle back[10]. Muscle imbalance: The study of muscle imbalance physiology has been a very helpful tool in understanding the emphasis on the joint in manual therapies like osteopathy and chiropractic for *e.g.*, How a joint may become "tight" and how a joint's axis of rotation might be disrupted as a result of such imbalance and the potential long-term effects[11].

Beauticians nature of work**:** Growth of beauty had increased dramatically in modern era, with the advancement of modern lifestyles, appreciation of beauty is rising quickly. It is also becoming increasingly common for those who work in beauty parlour to have occupational health problems[12]. Nowadays, the field of beauticians is booming not just in terms of financial gain but also in terms of young people's passion for their employment. In order to enhance a client's personality, hair dressing techniques include cutting, style, colouring, straightening, and dressing hair[13,14]. Beauticians who are subjected to physical labour work in unique positions, have restricted postures or conduct repetitive work are experiencing an increase in occupation related musculoskeletal alignments, Because of most beauticians spent their days in standing (awkward posture required for cutting and colouring hair)[15,16]. Workplaces with poor design, challenging work environments, and ergonomically inadequate instruments may have an adverse effect on beauticians health[17,18]. Beauticians run at risk of suffering injuries to their feet, arms, wrists, shoulders, and lower back[19,20]. The potentially harmful tasks and aspects of hairdresser include styling and blow-drying whose arms are elevated and the use of some force required and cutting hair which requires precise grasps in scissors and combs[20]. Beauticians are more prone for above mention syndrome, or there are chances that middle crossed syndrome seen in them[20].

# 2. Materials and Methods

## 2.1 Methodology

- **Study Type:** Observational study
- **Study Design:** Crosssectional study
- **Sampling Method:** Simple random sampling method
- **Study Duration:** 6 months
- **Study Place:** Kolhapur
- **Sample Size:** 57

The sample size is calculated by using prevalence:

Prevalence of beauticians (suffering from musculo-skeletal discomforts) is 82%. Back being the most affected region followed by neck, wrist or hand, shoulder and knee.

Margin of error is 10 %.

The sample size was calculated by using the following formula:

$$n = \frac{(Z\text{-}\alpha/2)^2\, p(1\text{-}p)}{(d)^2}$$

where $Z_{1-\alpha/2}$ is the critical value of the normal distribution at α (*e.g.* for a confidence level of 95%), α is 0.05 and the critical value is 1.96, p is the expected prevalence = 82 % =0.82 and d is the margin of error =10% = 0.1 .

Taking, p = 0.82 and d = 0.1

$$n = \frac{(1.96)^2 \times 0.82 \times (1 - 0.82)}{(0.1)^2}$$

$$n = 57$$

The minimum sample size is 57.

## 2.2 Materials

- Informed consent form
- Data collection sheet
- Permission letter

#### 2.2.1 Inclusion Criteria

- 30 to 45 age group females.
- Experience of more than 5 years as a beautician.
- Willing to participate in study.
- Working hours should be 6 or more.
- Working for minimum of 5 days a week.

#### 2.2.2 Exclusion Criteria

- Beauticians with history of any specific spinal conditions.
- History of spinal trauma or surgery in the past 6 months.
- Recent history of abdominal surgery.

## 3. Outcome Measures

### 3.1 Gait Analysis

- Gait analysis.

In our study according to Kinematic Chain Assessment, out of 57 participants 38(67%) participants tested positive and remaining 19(33%) were negative.

Inference: The findings demonstrate that maximum beauticians have high prevalence of positive kinetic chain assessment.

- Active straight leg raise.

Out of 57 participants participating in the study, 40(70%) participants tested positive and remaining 17(30%) don't show any symptoms regarding active straight leg raise test.

Inference: The finding demonstrates that a percentage of active straight leg raise test.

- Anterior and posterior oblique sling assessment.

Out of 57 participants, participating in our study 35(61%) participants tight and weak posterior and anterior sling and 22(39%) participants have intact posterior and anterior sling.

Inference: The percentage of prevalence of middle crossed syndrome is high in participants with positive anterior and posterior oblique sling assessment.

### 3.2 Statistical Analysis

#### 3.2.1 Age

The age of the participant in this study ranged from 30 to 45 years, with an average of 39.07 ± 4.13. The minimum age of the participant was 30 and the maximum age was 45 years.

Inference: The percentage of prevalence of middle crossed syndromeis also high in 30-45 years of age group.

#### 3.2.2 Hand Dominance

The hand dominance of participants in this study is 52 (91%) right and 5 (9%) left. The maximum participants have right hand dominance and minimum have left hand dominance.

Inference: The percentage of prevalence of middle crossed syndrome is high in dominant hand participants.

#### 3.2.3 Number of Years of Experience

In our study we included the participants having experience of more than 5 years as a beautician. The mean number of years of experience is 11.19±2.91.

Inference: The percentage of prevalence of middle crossed syndrome is high in beauticians with maximum number of work experience.

#### 3.2.4 Number of Working Hours Per Day

In our study we included the participant working hours per day should be more than 6 hours. Mean of working hours per day is 6.42±0.49.

Inference: The percentage of prevalence of middle crossed syndrome is high in beauticians who work for maximum hours per day.

## 4. Result

**Table 1.** Shows prevalence of gait analysis in beauticians

| Gait Analysis | Number of Participants |
|---|---|
| Positive | 38 |
| Negative | 19 |
| Total | 57 |

**Table 2.** Shows prevalence of active SLR in beauticians

| Active Straight Leg Raise | Number of Participants |
|---|---|
| Positive | 40 |
| Negative | 17 |
| Total | 57 |

**Table 3.** Shows prevalence of anterior and posterior oblique sling assessment

| Anterior and Posterior Oblique Sling Assessment | Number of Participants |
|---|---|
| Positive | 35 |
| Negative | 22 |
| Total | 57 |

**Table 4.** Shows prevalence of middle crossed syndrome in beauticians

| Middle Crossed Syndrome in Beauticians | Number of Participants |
|---|---|
| Positive | 39 |
| Negative | 18 |
| Total | 57 |

**Table 5.** Shows age group distribution

| Age Group | Number of Participants |
|---|---|
| <31 | 2 |
| 31- 35 | 11 |
| 36- 40 | 23 |
| 41- 45 | 21 |
| Total | 57 |

**Table 6.** Shows distribution according to hand dominance

| Hand Dominance | Number of Participants |
|---|---|
| Right | 52 |
| Left | 5 |
| Total | 57 |

**Table 7.** Shows distribution according to year of experience

| Years of Experience | Number of Participants |
|---|---|
| 5-10 | 26 |
| 11-15 | 28 |
| 16-20 | 3 |

# 5. Discussion

## 5.1 Age

The age of the participant in this study ranged from 30 to 45 years, with an average of 39.07±4.13. The minimum age of the participant was 30 and the maximum age was 45 years.

Inference: The percentage of prevalence of middle crossed syndromeis also high in 30 - 45 years of age group.

## 5.2 Hand Dominance

The hand dominance of participants in this study is 52 (91%) right and 5 (9%) left. The maximum participants have right hand dominance and minimum have left hand dominance.

Inference: The percentage of prevalence of middle crossed syndrome is high in dominant hand participants.

## 5.3 Number of Years of Experience

In our study we included the participants having experience of more than 5 years as a beautician. The mean number of years of experience is 11.19±2.91.

Inference: The percentage of prevalence of middle crossed syndrome is high in beauticians with maximum number of work experience.

## 5.4 Number of Working Hours Per Day

In our study we included the participant working hours per day should be more than 6 hours. Mean of working hours per day is 6.42±0.49.

Inference: The percentage of prevalence of middle crossed syndrome is high in beauticians who work for maximum hours per day.

## 5.5 Gait Analysis

In our study according to Kinematic Chain Assessment, out of 57 participants 38(67%) participants tested positive and remaining 19(33%) were negative.

Inference: The findings demonstrate that maximum beauticians have high prevalence of positive kinetic chain assessment.

## 5.6 Active Straight Leg Raise

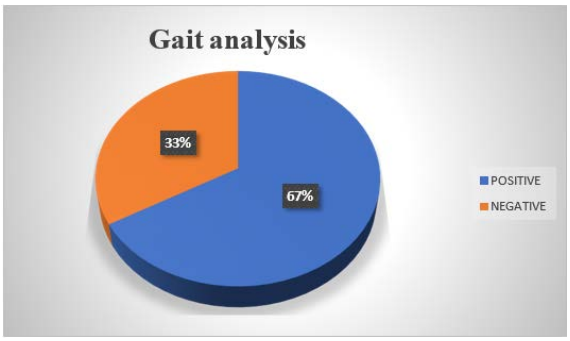
Out of 57 participants participating in the study, 40(70%) participants tested positive and remaining 17(30%) don't show any symptoms regarding active straight leg raise test.

Inference: The finding demonstrates that a percentage of active straight leg raise test.

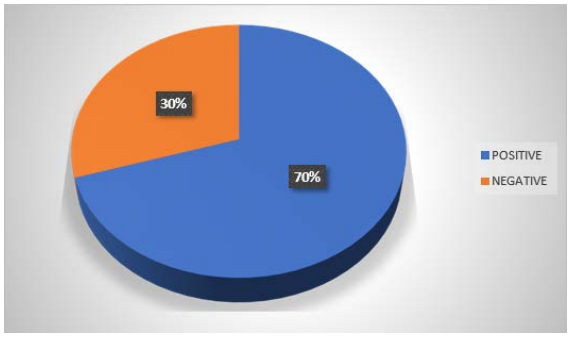
## 5.7 Anterior and Posterior Oblique Sling Assessment

Out of 57 participants, participating in our study 35(61%) participants tight and weak posterior and anterior sling

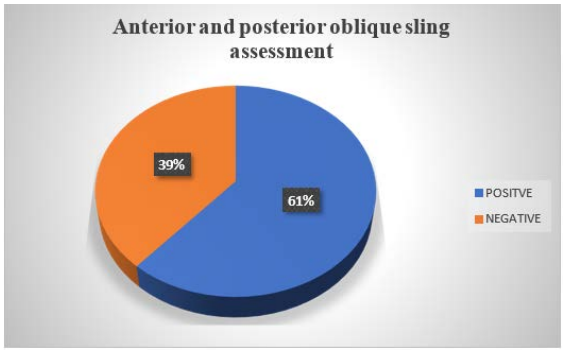
## Graphical Annexure



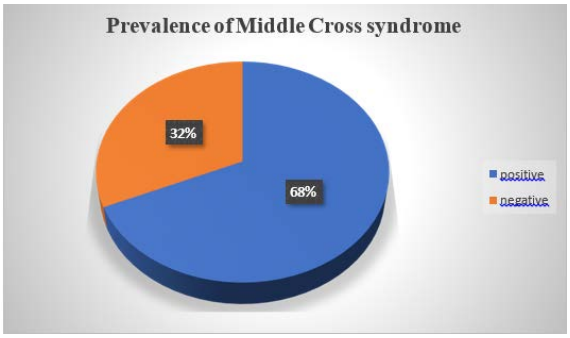

**Graph 1.** Shows prevalence of gait analysis in beauticians.



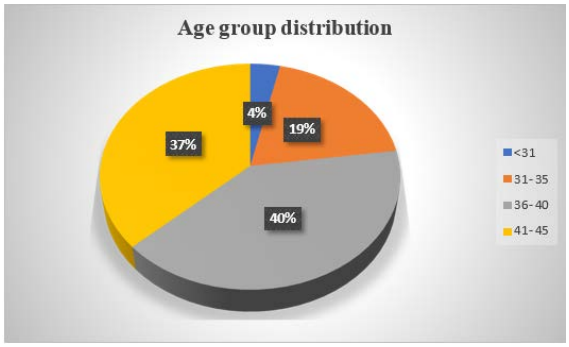

**Graph 2.** Shows prevalence of active SLR in beauticians.



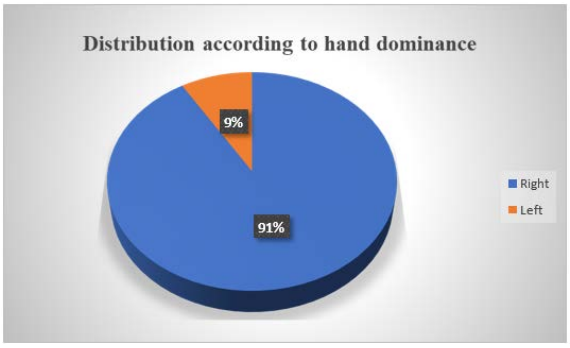

**Graph 3.** Shows prevalence of anterior and posterior oblique sling assessment.



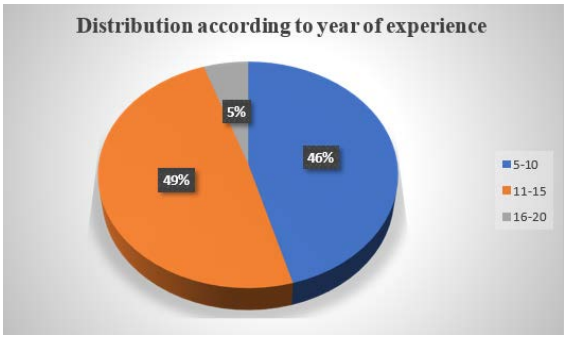

**Graph 4.** Shows prevalence of middle cross syndrome in beauticians.




**Graph 5.** Shows age group distribution.




**Graph 6.** Shows distribution according to hand dominance.




**Graph 7.** Shows distribution according to year of experience.

and 22(39%) participants have intact posterior and anterior sling.

Inference: The percentage of prevalence of middle crossed syndrome is high in participants with positive anterior and posterior oblique sling assessment.

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