



Musculoskeletal Discomfort In Gym Instructor By Using Cornell Musculoskeletal Discomfort Questionnaire - A Survey Study

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Abstract: Context: Musculoskeletal discomfort is an increasingly prevalent issue among gym instructors, reflecting the physical demands and high-intensity nature of their profession. Gym instructors, who play a crucial role in guiding individuals towards their fitness goals, often face a range of musculoskeletal challenges due to the repetitive and strenuous activities inherent in their job. Their daily routines involve demonstrating various exercises, adjusting client's postures, and frequently handling heavy equipment, all of which place considerable strain on their bodies.

Aims: The aim of this study was to find out the musculoskeletal discomfort among the gym instructor using Cornell Musculoskeletal Discomfort Questionnaire.

Methods and Material: The present cross-sectional study was conducted at South Mumbai regions (Byculla, curry road, chinchpokli, Dadar) on 160 Gym instructors. Data was collected by interview method using Cornell Musculoskeletal Discomfort Questionnaire.

Statistical analysis : Descriptive statistical data analysis was done using graphical method by Microsoft excel software.

Results: It was found that 95% of participants reported musculoskeletal discomfort and 5% had no discomfort. It was seen that 69% had lower back discomfort followed by shoulder area 16% , knee 14% , wrist and neck 10% each and lastly by foot contributing to 2% of discomfort in gym instructors.

Conclusions: The study conducted that musculoskeletal discomfort among gym instructors is found to be as high as 95% and hence it can be reduced by improving the ergonomics of gym instructors' posture and public awareness related to risk factors associated with improper posture gym training. Thus, low back pain followed by shoulder pain and knee pain are the most common sites of pain reported by gym instructors.

Index Terms – Musculoskeletal discomfort, Gym instructors, Cornell musculoskeletal discomfort Questionnaire

I. INTRODUCTION

Musculoskeletal discomfort is an increasingly prevalent issue among gym instructors, reflecting the physical demands and high-intensity nature of their profession. Gym instructors, who play a crucial role in guiding individuals towards their fitness goals, often face a range of musculoskeletal challenges due to the repetitive and strenuous activities inherent in their job. Their daily routines involve demonstrating various exercises, adjusting client's postures, and frequently handling heavy equipment, all of which place considerable strain on their bodies. Musculoskeletal pain is caused by the strain on the muscles, tendons and sprain the ligaments, it also can be the result of traumatic events due to jerky movements, falls, fracture or underlying musculoskeletal diseases. ⁽¹⁾

The physical nature of this work, combined with extended periods of standing, bending, lifting, and twisting, predisposes gym instructors to a range of musculoskeletal disorders. Common areas affected include the lower back, shoulders, knees, and wrists. These conditions can result from acute injuries, such as sprains and strains, or develop gradually over time due to repetitive stress. For instance, instructors may experience lower back pain from frequent bending and lifting or shoulder discomfort from overhead exercises and manual adjustments. Musculoskeletal pain is one of the most common and serious consequence of improper posture or work – related strain with symptoms of pain in one or more regions of the body. Gym instructor work with individual clients to design, explain, and demonstrate various exercises and routines, or they teach group classes where they organize and lead fitness lessons lasting 30– 90 minutes⁽³⁾ The implications of musculoskeletal discomfort extend beyond personal health, impacting professional performance and client safety. Persistent pain or discomfort can lead to decreased productivity, impaired ability to perform job duties effectively, and an increased risk of long-term disability.

Furthermore, when instructors are incapacitated, it can disrupt the continuity of client programs and diminish the quality of fitness instruction provided. Addressing musculoskeletal discomfort in gym instructors requires a comprehensive approach. This includes adopting ergonomic practices, incorporating regular physical conditioning and stretching routines, and ensuring adequate recovery periods. Education on proper techniques and body mechanics is also crucial in minimizing the risk of injury. Additionally, fostering a supportive work environment that prioritizes the health and well-being of instructors can contribute to reducing the prevalence of these issues. Though there are numerous health related benefits of physical activity and exercise, a major disadvantage is the risk of injuries leading to pain causing discomfort.⁽¹⁾

In summary, musculoskeletal discomfort among gym instructors is a significant concern that merits attention due to its impact on both personal health and professional efficacy. By understanding the underlying causes and implementing effective preventive measures, the fitness industry can enhance the well-being of its instructors, thereby improving the overall quality of service provided to clients. Musculoskeletal discomfort and injuries among gym trainers can be quite common due to the physically demanding nature of their job. These injuries often result from:

- ❖ **Repetitive Strain:** Frequent demonstrations of exercises, lifting weights, and adjusting equipment can strain muscles and joints, leading to conditions like tendinitis or muscle fatigue.
- ❖ **Improper Body Mechanics:** Trainers who demonstrate exercises improperly or do not use correct lifting techniques might experience back, shoulder, or neck pain.
- ❖ **Overuse:** Extended hours on their feet and repetitive movements can lead to overuse injuries, such as stress fractures or joint issues.
- ❖ **Accidents and Falls:** Slips, trips, and falls in the gym environment can cause acute injuries like sprains, strains, or fractures.
- ❖ **Inadequate Recovery:** Not allowing sufficient time for recovery or failing to address minor injuries promptly can exacerbate musculoskeletal issues.

Preventive measures include using proper body mechanics, incorporating adequate rest and recovery, engaging in regular stretching and strengthening exercises, and using appropriate equipment to minimize strain. Knowledge of the prevalence of injuries and musculoskeletal pain among group fitness instructors in general is lacking. There are a few studies which has looked into the prevalence of musculoskeletal pain in gym instructor. As amount of research on musculoskeletal pain in gym instructor is less, a greater awareness is needed among people and the workforce about such common problems so that timely interventions will be provided.⁽⁴⁾

II. METHODOLOGY

Study design was a cross-sectional study using convenience type of sampling. This study was conducted in south Mumbai regions

(Byculla, curry road, chinchpokli, Dadar). The sample size was 160 Gym instructors.

Inclusion criteria :

- a) Minimum 3 year working experience as a gym instructor.
- b) Gym instructors between 25 to 45 years of age
- c) Individual with ability to understand purpose of study voluntary consent to participation
- d) Male gym instructor.

Exclusion criteria :

- a) Any participant with trauma, those with congenital deformity, serious neurological condition, limb injuries, recent surgeries, recent fractures.
- b) Yoga and Zumba instructors.

Instrumentation :

- 1) Consent form.
- 2) Information sheet.
- 3) Data collection sheet.
- 4) Cornell Musculoskeletal Discomfort Questionnaire.

III. PROCEDURE

The ethical clearance for research was obtained from the Institutional Ethics Committee of TMV's Lokmanya Tilak College of Physiotherapy, Kharghar for the study. One on one interview was done. Information was gathered by visiting gym in south Mumbai regions (Byculla, curry road, chinchpokli, Dadar). The purpose and the procedure of the study was clearly explained to the participants and the informed consent was taken.

Demographic data and general characteristics of the participants working as gym instructor was obtained and later the Cornell Musculoskeletal Discomfort Questionnaire was administered to the participants. Cornell Musculoskeletal Discomfort Questionnaire was used to investigate the symptoms occurs in any region of the body. Questionnaire was distributed amongst the population who were selected according to the inclusion criteria.

Participants marked the answers of the questions present in the questionnaire. This procedure took approximately 15 - 20 minutes. The CMD questionnaires collected was screened and converted into computer-based spreadsheets to exclude any incomplete questionnaire or participants who did not meet the inclusion criteria. So, this way we had gathered information about region of a body which causes pain in gym instructors

IV. DATA ANALYSIS AND RESULTS

Descriptive statistical analysis has been done by graphical method using the Microsoft excel software.

1) Gym instructors age group distribution : Four age group distribution between 25-45 years age i.e. 25-30 yrs., 31-35yrs, 36-40 yrs., 41-45 yrs.

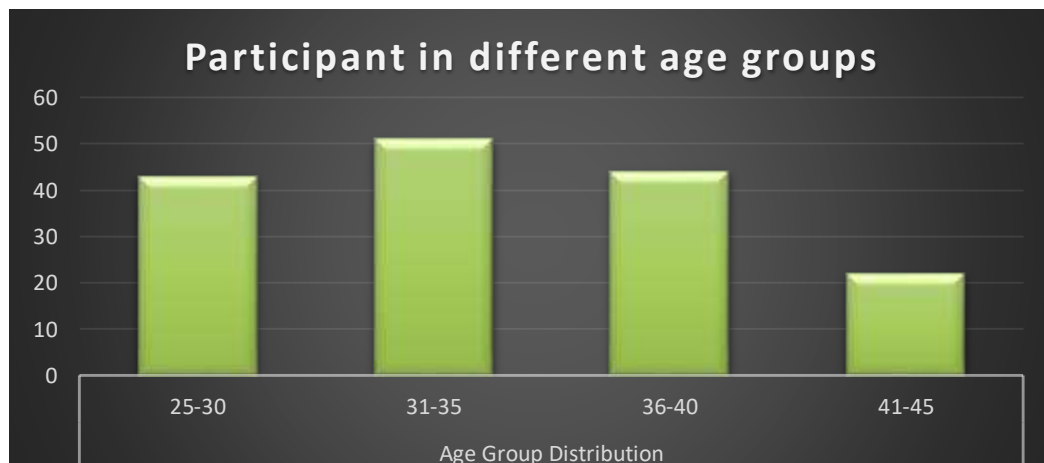


Figure 1: Representing graphical presentation of participant gym instructors in age group categories.

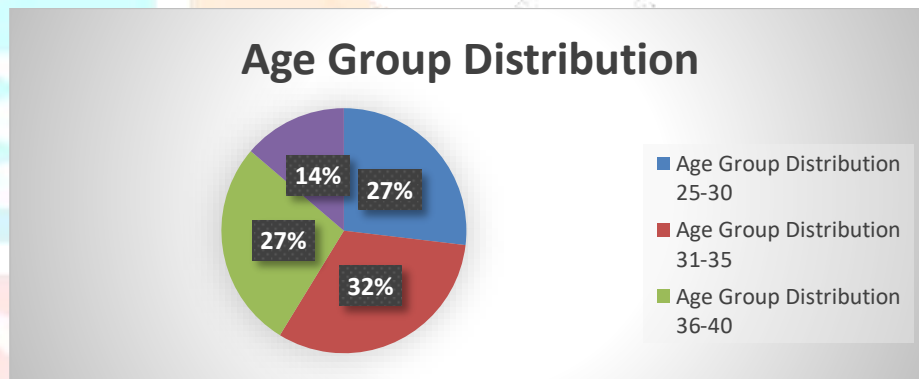


Figure 2: Gym instructors in four age group categories in percentage.

In fig.2 it is observed that 27% participants of total participants belong to age group 25-30 yrs., 32% participants of total participants belong to age group 31-35 yrs., 27% participants of total participants belong to age group 36-40 yrs. and 14% participants of total participants belongs to age group 41-45 yrs.

2) Musculoskeletal discomfort profile:-

Discomfort	Frequency	Percentage
Yes	152	95
No	8	5
Total	160	100



Figure 3: A pie chart representing musculoskeletal discomfort in gym instructor

In fig.3 it is observed that 95% of participant reported musculoskeletal discomfort and 5% had no discomfort.

a) Classification based on the area of discomfort between age group 25-45

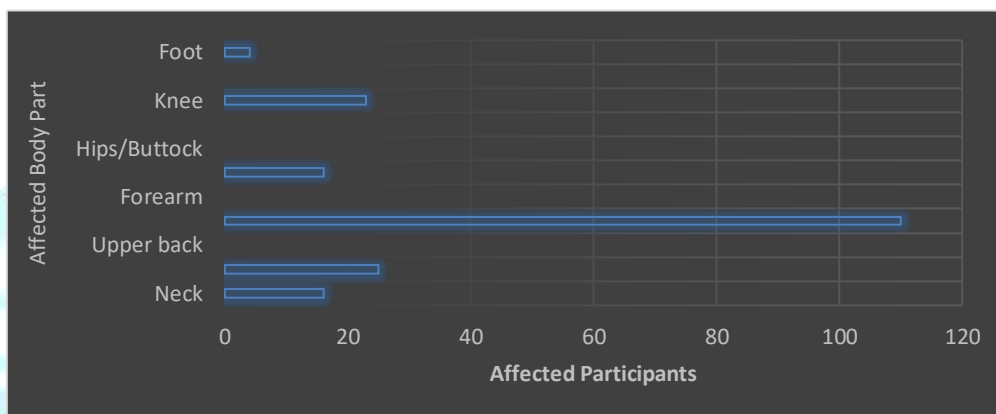


Figure 4: Bar graph representing classification based on area of discomfort

In fig.4 it is observed that bar graph is presenting discomfort body area in gym instructors, in which lower back is affected the most in gym instructor followed by shoulder, wrist, neck and lastly by foot contributing of discomfort in gym instructors.

Table A. Representing descriptive classification based on area of discomfort

Valid	Frequency	Percent
Neck	16	10
Shoulder	25	16
Upper back	0	0
Lower back	110	69
Forearm	0	0
Wrist	16	10
Hip / Buttock	0	0
Thigh	0	0
Knee	23	14
Lower leg	0	0
Foot	4	2

Table A : Descriptive classification is presenting discomfort body area in gym instructors, in which lower back is affect the most in gym instructor i.e. 69% followed by shoulder area 16% then knee 14% then wrist and neck 10% each and lastly by foot contributing to 2% of discomfort in gym instructors.

b) Classification based on the severity of area of discomfort

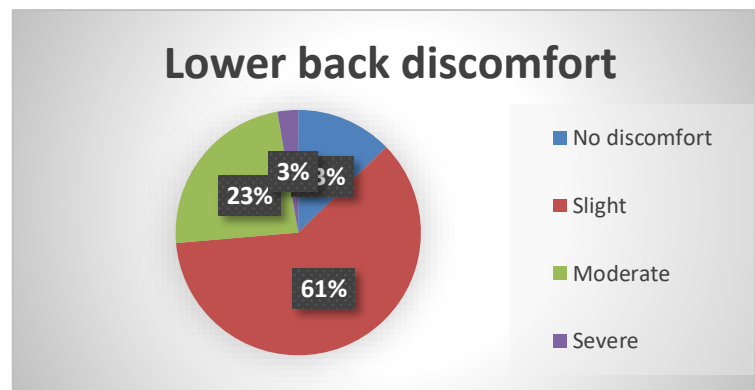
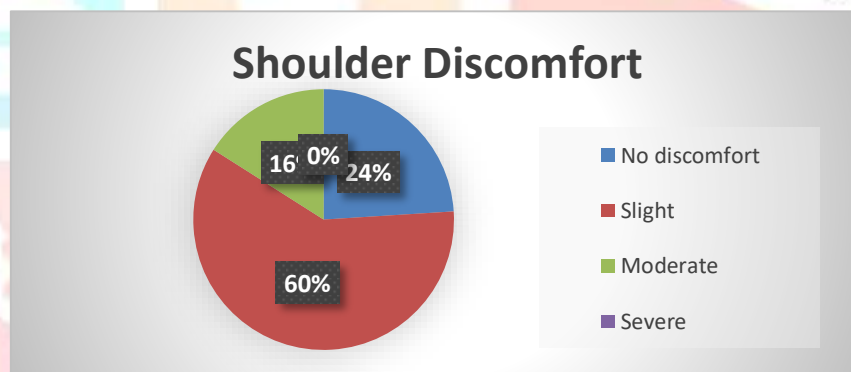


Figure 5: Pie chart representing severity of discomfort in lower back region in gym instructor.

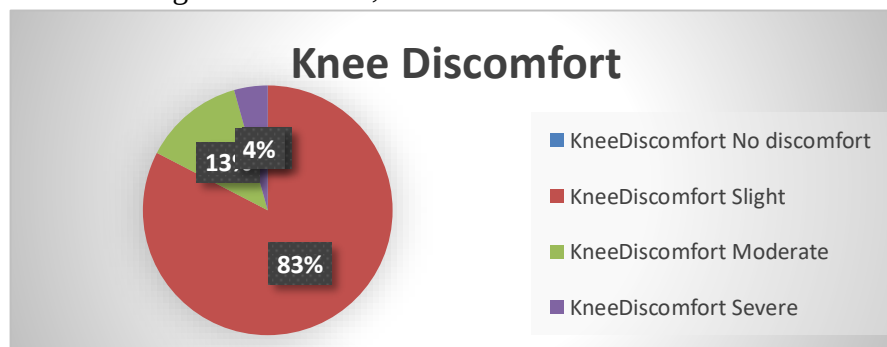
In Fig.5 it is observed that among the total participant gym instructor 13% of the gym instructor have no discomfortness, 61% have slight discomfort, 23% have moderate discomfort and 3% have severe



discomfortness.

Figure 6: Pie chart representing severity of discomfort in shoulder region in gym instructor.

In Fig.6 it is observed that among the total participant gym instructor 24% of the gym instructor have no discomfortness, 60% have slight discomfort, 16% have moderate discomfort and 0% have severe



discomfortness.

Figure 7: Pie chart representing severity of discomfort in Knee region in gym instructor.

In Fig.7 it is observed that among the total participant gym instructor 0% of the gym instructor have no discomfortness, 83% have slight discomfort, 13% have moderate discomfort and 4% have severe discomfortness.

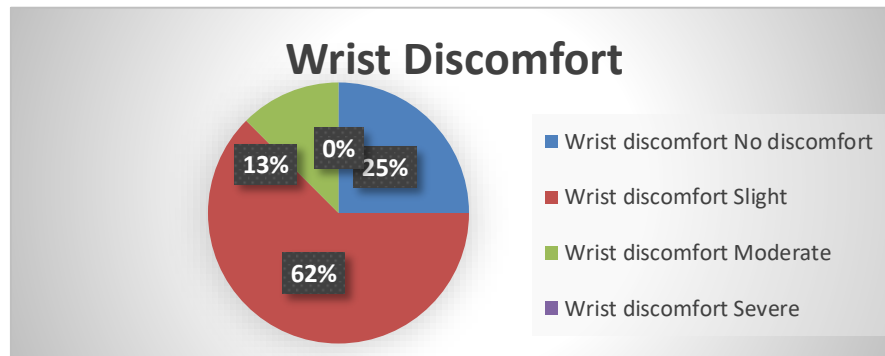
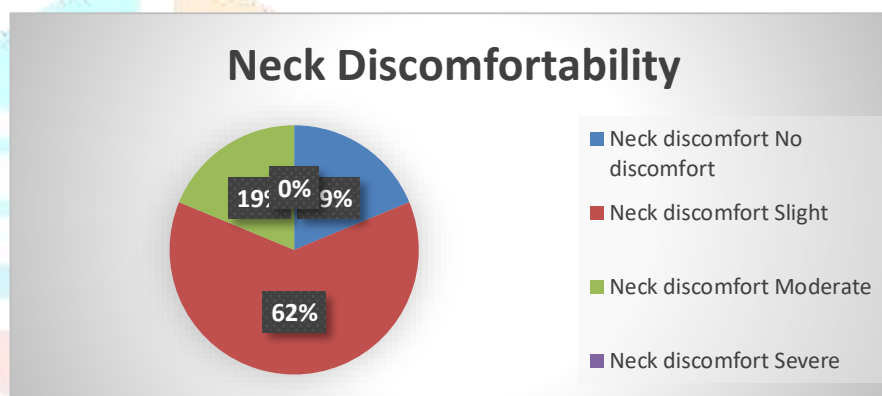


Figure 8: Pie chart representing severity of discomfort in Wrist region in gym instructor.

In Fig.8 it is observed that among the total participant gym instructor 25% of the gym instructor have no discomfortness, 62% have slight discomfort, 13% have moderate discomfort and 0% have severe discomfortness.



discomfortness.

Figure 9: Pie chart representing severity of discomfort in Neck region in gym instructor.

In Fig.9 it is observed that among the total participant gym instructor 19% of the gym instructor have no discomfortness, 62% have slight discomfort, 19% have moderate discomfort and 0% have severe discomfortness.

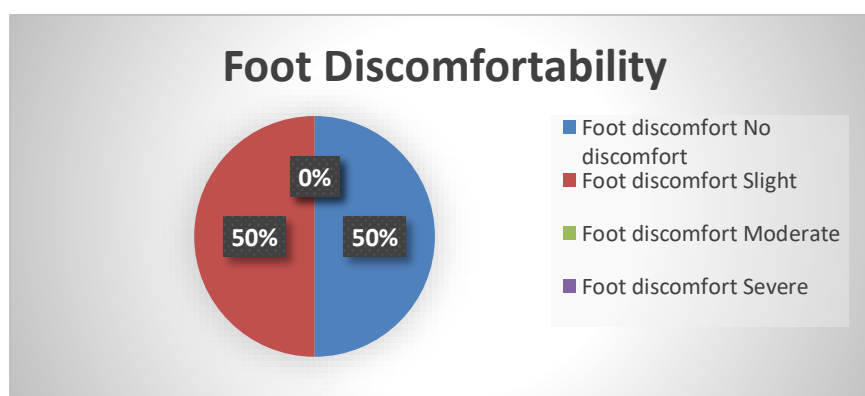


Figure 10: Pie chart representing severity of discomfort in Foot region in gym instructor.

In Fig.10 it is observed that among the total participant gym instructor 50% of the gym instructor have no discomfortness, 50% have slight discomfort, 0% have moderate discomfort and 0% have severe discomfortness.

V. DISCUSSION

In the present study, 95% of gym instructors had discomfort. The severity of discomfort in gym instructors was more between slight to moderate. Some of the reasons can be because maximum gym instructors undergo high intensity workout training with light, moderate to heavy weight loading due to which there is an increase impact on the body weight, causing the joints, ligaments or tendons to strain causing discomfort.⁽¹⁾ Considering the affected site of the body in this study, the most affected regions are low-back followed by the shoulder, then knee, wrist, neck and foot (fig.4). In a study, researchers concluded that high intensity workout along with heavy weight lifting performed from past years had large effect on the lower-back. The common injuries in Gym instructors while instructing can be sprain, strain and tendinitis. Strain on muscle is caused by the improper posture of gym instructor along with improper core stability while supporting the trainee during heavy weight lifting session.⁽¹⁾

Few researchers conducted a study to find out about the posture attained during the low-back targeted exercises like squats and deadlifts in which the first system of operation comprises of muscle undergoing hypertonia, stretching of lumbar sections such as back extensors like erector spinae, multifidus, and shortening of the hip flexors such as iliopsoas, rectus femoris and the second system of operation muscles tending to weakens e.g. muscle belonging to abdominal muscles group like rectus abdominus, transversus abdominus. Due to this changes along with heavy weight lifting the COG shifts forward compensating the muscular balance leading to strain on the muscle, joints and intervertebral disc causing to low back pain.^(2,11) This changes causes neuromuscular alteration which gives frequent sensation of pain.⁽¹²⁾ Some reasons like the decreasing of the intervertebral gap, and dislocations in smaller joints, muscle imbalance and the deconditioned state of the muscles also causes low back pain.⁽⁵⁾ Lack of awareness about recovery from muscle injury in gym instructor can be the main reason of discomfortness & pain.

As gym trainers help in lifting heavy weights, supporting the trainee's body while performing the exercises, maintaining body posture the shoulder of trainer is constantly engaged in flexion, abduction, extension position putting strain on shoulder muscles. Shoulder joint provides mobility over stability, so if rotator cuff muscles i.e. supraspinatus, infraspinatus, subscapularis and teres minor are not properly trained there is strain on the muscles and ligaments while performing exercises and there are high chances of shoulder injuries.⁽¹⁾ In some research it is confirmed that the most frequent site of pain during heavy weight training was shoulder and neck region.⁽⁶⁾ When supporting the trainee during overhead, flexion, abduction exercises of shoulder there is stress on the rotator cuff muscles and they are prone to get injured by getting strain and microtear causing pain or discomfort.⁽²⁾

During high loading squatting, deadlift exercises the instructor have to bend form both his lower back as well as knee to properly support the trainee causing conditions like spasm of thigh muscle, ligament sprains, increased tightness of hamstring and quadriceps muscles causing excessive loading at the patellofemoral joint which lead to retro-patellar pain. These risk factors which causes pain are caused due to lack of warm-up, stretching and proper hydration.^(8,11) While giving heavy loading training session in exercises like squatting, deadlift along with low back and knee the ankle and foot are affected as well. The ground reaction force acting on the foot can cause injury of foot and ankle.⁽¹¹⁾ In research on rehabilitation of ankle and foot injuries it is mentioned that foot and ankle are common site of injuries in athletes and are prone for both acute and chronic injuries.⁽⁹⁾

In exercise like overhead press the wrist position can be extended or neutral, trying to maintain the same position throughout the exercise along with constantly holding weights can cause wrist injury. Risk factors like lack of warm-up, stretching can cause tightness of wrist muscles, microtear of wrist flexors and extensors. In study on cardio kickboxer the wrist is involved in common injury site without having past traumatic history.⁽⁸⁾ In research conducted in Norwegian gym instructor neck is one of the most common sites of injuries prone to both acute and chronic injuries. As neck muscles tend to get strain, the extensors are under pressure. The first

system of muscles gets stretched, hypertonic like neck flexors and second system gets shortened, and weak causing strain on muscles.^(2,6)

In the current study the severity of the discomfort is measured by CMDQ, where the findings are mostly falling in category of mild to moderate severity of discomfort, affecting mostly lower back then shoulder followed by knee, wrist neck and lastly foot.

FUTURE SCOPE : Further studies can be carried out by assessing how gym instructor posture during supporting client affect and influence the body mechanics and leads to discomfort or injuries. The findings can be used to support the future study related to factors impacting musculoskeletal problems in gym instructors.

VI. CONCLUSION

The study conducted that musculoskeletal discomfort among gym instructors is found to be as high as 95% and hence it can be reduced by improving the ergonomics of gym instructors' posture and public awareness related to risk factors associated with improper posture gym training. Thus, low back pain followed by shoulder pain and knee pain are the most common sites of pain reported by gym instructors.

Therefore, present study results strongly indicate the need for education awareness on ergonomic advice and other precautions for prevention of musculoskeletal discomfort in gym instructors should be made mandatory in order to decrease the risk of musculoskeletal discomfort which may help in improving their quality of life.

VII. LIMITATIONS

Some gym instructors were not willing to disclose their true problem as to continue to do their job they need fitness. So, the data may not be reliable. All the data is self-reported; therefore, data could be subjected to method bias. As it is a survey study so the effect and cause of pain are not well defined so the result of the study is subjected to limitation.

While the current study presented the incidence of musculoskeletal discomfort in gym instructors, the risk factor associated with MSP were not studied which could be a limitation in study. The study only measured musculoskeletal symptom i.e. pain and musculoskeletal discomfort but did not include other aspect such as psychological health and job satisfaction.

VIII. ACKNOWLEDGEMENT

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