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### RESEARCH ARTICLE

#### DISADVANTAGES OF EXCESSIVE PHYSICAL ACTIVITIES IN STUDENTS OF PIMS-DU DURING COVID-19 PANDEMIC: A DESCRIPTIVE CROSS-SECTIONAL STUDY

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##### Manuscript History

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##### Key words:-

Overuse Injury, Overtraining, Exercise, Covid-19 Pandemic, Low Back Pain

#### Abstract

**Question:** What are the disadvantages of excessive physical activities in students of PIMS-DU during COVID-19 Pandemic?

**Design:** A Descriptive Cross-sectional Study.

**Participants:** Students who are physically active throughout the period of Covid-19 pandemic.

**Intervention:** Non-Interventional Study.

**Outcome measures:** OSTRC Injury Questionnaire (Pre- validated Questionnaire).

**Results:** There were very few subjects who faced difficulties due to knee pain or any other physical discomfort during physical activities in pandemic period 22.2%. Among the selected subjects 33.4% had pain and difficulties in Low Back due to physical activity in Covid-19 pandemic period. Among the selected subjects 18.5% had pain and difficulties in Shoulder due to physical activity in Covid-19 pandemic period.

**Conclusion:** The present study shows that, there are no specific adverse effects observed on musculoskeletal system due to excessive physical activity. Most of the subjects (33.4%) reported for having low back pain due to physical activity during COVID 19 pandemic.

**Trial registration:** PIMS/DR.APJAKCOPT/IEC/2020/22.

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#### Introduction:-

**“If you want to do something good for yourself, you don’t have to be Extreme”**

During Covid 19 pandemic world saw rise in fitness culture due to drawn attention of people in their fitness and health. Covid 19 forced the population to change their daily routine, people started engaging themselves in physical activities, this trend was on rise due to promotion of healthy self-image portrayed on social media platforms. This unusual Pandemic situation had physical, psychological, and behavioral consequences to all individuals.

Facing the pandemic, life got little difficult as everyone had to stay fit, safe & healthy as well as abode themselves to new Norms. Rise in healthy workout and fitness content on social media platforms, motivated people to indulge themselves in exercise. This sudden urge of people to start getting fit got pandemic led to excessive physical activity. Any movement of body produced by skeletal muscles on account of expending energy is called as physical activity. It includes jogging, walking, dancing, playing etc.

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Physical activities are classified into 4 categories which includes aerobics, muscle strengthening, bone strengthening and stretching.<sup>1</sup>

Performing physical activity with proper intensity also plays an important role it includes, low intensity activity level, moderate intensity activity level and vigorous intensity activity level. low and moderate intensity physical activity level both of them have advantageous effects on immune system like decreased blood pressure, maintenance of weight loss and increased high density lipoprotein cholesterol level. whereas, high intensity physical activities may weaken the immune system and increase the risk of inspiratory tract infections.

Physical activities performed too hard or too often without giving body to recover properly, may result to overuse injuries, it is a type of bone, muscle, tendon injury like tendinitis, stress Fractures, carpal tunnel syndrome, knee injuries, shoulder problems occurring due to repeated microtrauma and overuse. It usually occurs due to Training errors or Technique errors. Training errors includes performing same physical activity for prolonged duration with same intensity which may lead to overuse injury. Technique's error is performing physical activity without knowing proper technique, which may overload a certain group of muscle and can cause overuse injury leading to pain, tingling, numbness, stiffness and weakness of affected region. another cause for overuse injury is mostly lack of preparation before starting of any physical activity, warm up and cool down is must in order to avoid overuse injury.

Overtraining is classified into categories Sympathetic overtraining & parasympathetic overtraining<sup>3</sup>. Sympathetic overtraining is more found in athletes, as it requires activation of anaerobic system, it is characterized by reduction in performance, loss of Weight, accelerated heart rate, increased blood pressure and delay in recovery. whereas, Parasympathetic overtraining results by overstimulation, dominance of parasympathetic nervous system and exhaustion of neuroendocrine system. It is usually seen in athletes performing endurance type activities characterized by fatigue, decreased heart rate, decreased Blood pressure and good recovery capacity. In Women's, excess physical activity accompanied by undereating can cause amenorrhea, which results in higher risk for low bone mass, leading to weakened bone commonly called as Osteoporosis which increases the risk of fractures including stress fracture. Overtraining may suppress the immune system and increase rate of illness like upper respiratory tract infections, body aches etc. Excessive physical activities can also have a strong impact on appetite & the form in which body utilizes energy from food, body requires energy to overcome excessive physical activities, hormones and adrenaline during short burst of exercise rushes that stave of hunger but when over physical activity are put into overdrive that hunger loss might stick for long term which results in muscle and tissue damage as a result of excess physical activity and body's reaction to energies .Excess physical activities or exercise may lead to disorders like exercise bulimia, body dysmorphia and Anorexia athletica. Exercise yields a favorable health and mental impact when performed with moderate intensity. As Scientific evidence explains neurotransmitters dopamine & endorphin Plays an important role in " joy & Reward system " & thus induces euphoric feeling while relieving stress. However, excessive physical activity can be disadvantageous both physically and psychologically<sup>2</sup>.

The study gives the brief idea about impact of excessive physical activity seen in individuals and extent this physical activity has affected their lifestyle it also focuses on how an individual with sedentary lifestyle when suddenly Increases frequency, intensity and volume of physical activities are at higher risk of injuries as their body is not susceptible to repetitive stress.

### **Material & Methods:-**

1. **Study Setting:** – Pravara Institute of Medical Sciences, DU Loni
2. **Study Type:** - Descriptive Cross-sectional Study
3. **Sampling Method:** - Convenient sampling
4. **Same size:** - 176
5. **Participants:** - Students who are physically active throughout the period of Covid-19 pandemic
6. **Tools:** - Oslo Sports Trauma Research Centre (OSTRC) Overuse Injury Questionnaire.
7. **Materials:** - Google form
8. **Outcome measures:** - Questionnaire Responses
9. **Analysis:** - Percentage Analysis of scale and Graphical Presentation.
10. **Study Duration:** - 6 Months

### **Inclusion Criteria:**

1. Students of PIMS-DU available during study period for data collection

2. Students who are comfortable in communication with English language
3. Students who are physically active throughout the period of Covid-19 pandemic.

**Exclusion criteria:**

1. Participants who are not willing to give informed written consent.
2. Participants who are not advised to perform physical activities by physician.

**Outcome measures:-**

Study was conducted to assess the effects of excessive physical activities on musculoskeletal system in students of PIMS-DU during COVID-19 Pandemic. Based on the responses of the participants (33.4%) had mild pain and difficulties in Low Back, (22.2%) had knee pain and (18.5%) had shoulder pain, according to OSTRC injury questionnaire. Hence, this study concluded that there was no significant adverse effect observed on the musculoskeletal system.

**Data analysis**

Figure 1 depicts the sample size was drawn from a sample pool of 176 students of PIMS-DU.

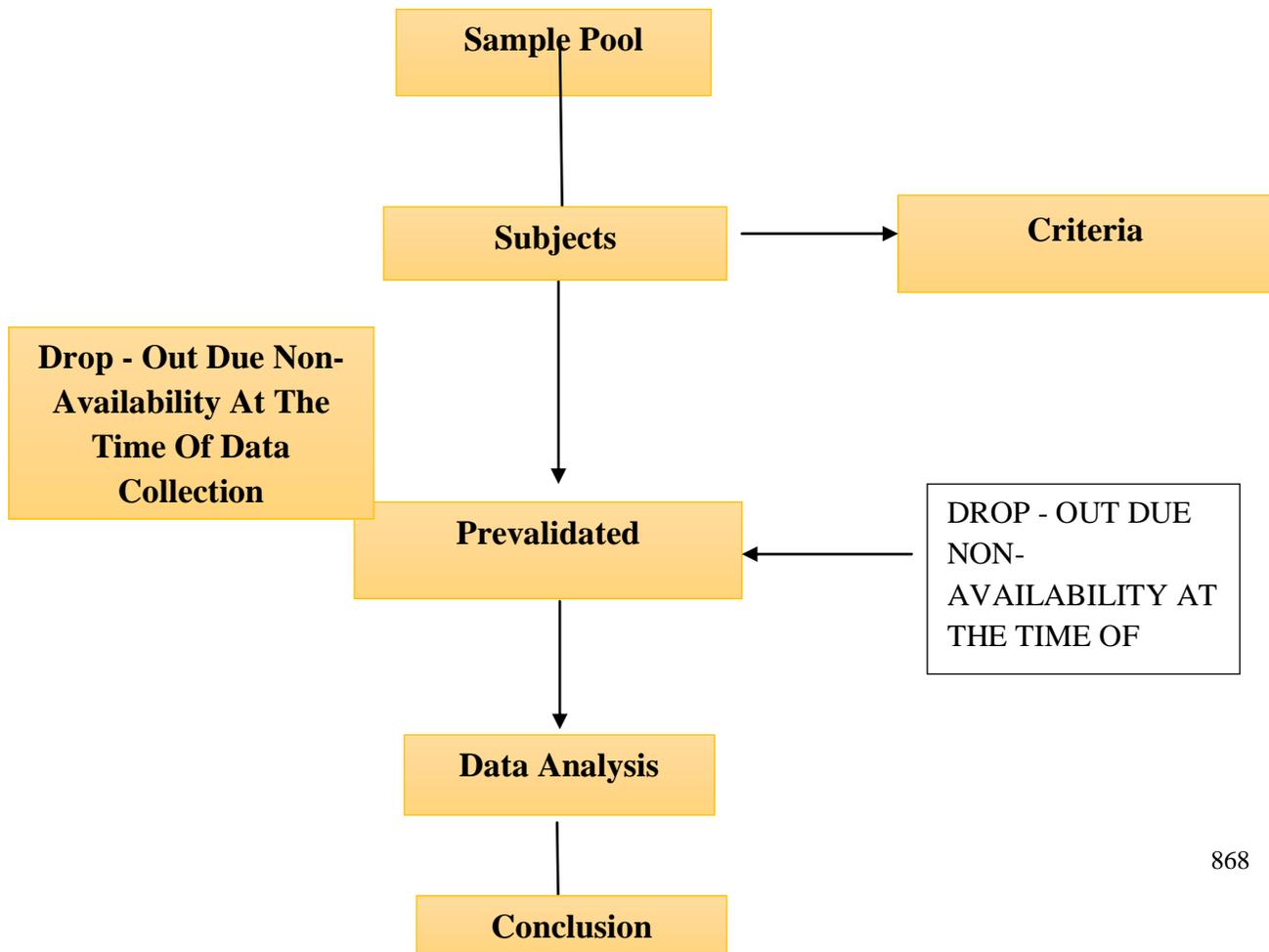
A Google online survey was conducted and a pre-validated questionnaire was selected which had three components of musculoskeletal system mainly Knee, Low back and Shoulder.

The data analysis summarized the collected data, analytical and logical reasoning by mean and standard deviation, which determined the patterns and interrelationships between the subjects, promoting derivation of conclusion.

**Procedure**

The procedure of data collection involves certain steps in which, after the study design is been decided the sample pool (designated sample size) is drawn, where the inclusion – exclusion criteria is applied, from which. the subjects are derived. An Informed Consent is taken from every subject before participation in the complete study.

**Figure 1:-** Flow Chart of Procedure of Data Analysis.



**Results:-**

Out of total 176 participants who responded to the survey, majority of them were females which accounts 57% of total respondents and remaining 43% were males. while comparing the physical activity level,76.7% individuals were active during pandemic as depicted in fig.3

Fig.4 Depicts the level of participation in normal training due to knee problems in which 143 (81%) fully participated without any knee problem (21%) fully participated but with knee problems, whereas (4.5%) showed reduced participation due to knee problems and (2.2%) were not able to participate due to knee problems. Fig.5 Depicts reduction in training volume due to knee problems (73%) individuals showed no reduction in training volume, (17%) minor reduction whereas (5%) showed moderate reduction in training volume, (1.1%) was majorly affected due to knee problems and (2.2%) couldn't participate at all. Fig.6 Represents level of performance (78%) individuals had no affect on knee, (14%) individuals had knee problems to a minor extent, whereas (6%) were moderately affected and (0.5%) had major effect on performance due to knee problems. In fig.7 (76%) participants experienced no knee pain due to excessive physical activity, (21%) experienced mild pain and (3%) moderate pain.Fig.8 depicts (67%) participants fully participated without any low back problems, (21%) experienced mild pain and (3%) moderate pain. In fig.9 (67%) individuals had no reduction in training volume due to Low back problems, (24%) had minor extent reduction, (6%) moderate extent reduction and (1.7%) has major reduction in training volume due to low back problem. Fig.10 (65%) participants had to no affect on their performance due to low back problems, (27%) minor effect, (5%) moderate affect, whereas (1.0%) were majorly affected and (2%) couldn't participate at all. In fig.11 (66%) individuals experienced no pain , (4%)moderate pain,(2%) severe pain and (28%) experienced mild pain. Fig.12 Represents difficulty level participating in normal training and competition due to shoulder problems (84%) showed full participation without any shoulder problem, (10%) experienced shoulder problem, whereas (5%) showed reduced participation and 1% were not able to participate all. Fig.13 Depicts extent of training volume to shoulder problems, (14%) minor extent, (3%) moderate extent, (2%) major extent and (1%) couldn't participate at all. In fig.14 (13%) individuals had minor reduction, (2%) moderate, and (2%) had major effect on their performance and (2%) were not able to participate. Fig.15 (14%) participants experienced mild pain due to excessive physical activity, (3%) had moderate pain and (2%) severe pain. On comparison of all components (22%) of participants had knee problems, whereas (33.4%) were affected with low back problems and (18.5%) had shoulder problems.

**Table 1:-** Demographic profile of all participants.

Demographic Characteristics	
Age	17-25 years
Male	77
Female	99

**Table 2:-** Individual Questionnaire Response Scores.

KNEE			SHOULDER			LOW BACK		
Q1	RESPONSE	%	Q1	RESPONSE	%	Q1	RESPONSE	%
A	143	81%	A	144	84%	A	118	67%
B	21	11%	B	16	9.3%	B	48	27.2%
C	8	4.5%	C	9	5.2%	C	8	4.5%
D	4	2.2%	D	2	1.1%	D	3	1.7%
Q2			Q2			Q2		
A	129	73%	A	138	79.7%	A	117	67%
B	31	17%	B	24	13.8%	B	42	24%
C	9	5.1%	C	6	3.4%	C	11	6%
D	2	1.1%	D	3	1.7%	D	3	1.7%
E	4	2.2%	E	2	1.1%	Q3		
Q3			Q3			A	113	65%
A	138	78%	A	139	80%	B	46	26.5%
B	25	14%	B	23	13%	C	9	5%
C	11	6.2%	C	4	2.3%	D	2	1%
D	1	0.5%	D	3	1.7%	E	3	1.7%
E	1	0.5%	E	3	1.7%	Q4		

Q4			Q4			A	115	66%
A	133	76.4%	A	137	80.5%	B	48	27.7%
B	36	20.68%	B	24	14.1%	C	7	4%
C	5	2.87%	C	5	2.9%	D	3	1.7%
			D	4	2.3%			

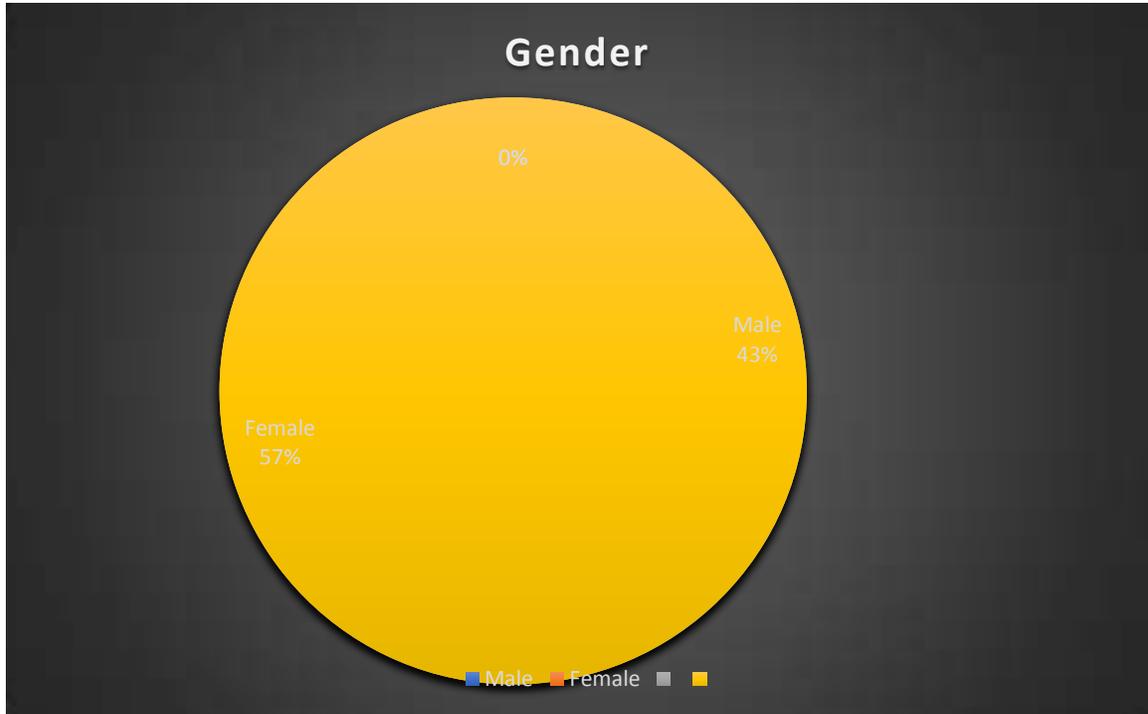


Figure.2:- The above diagram shows there were 176 participants in which 77 were males and 99 were females.

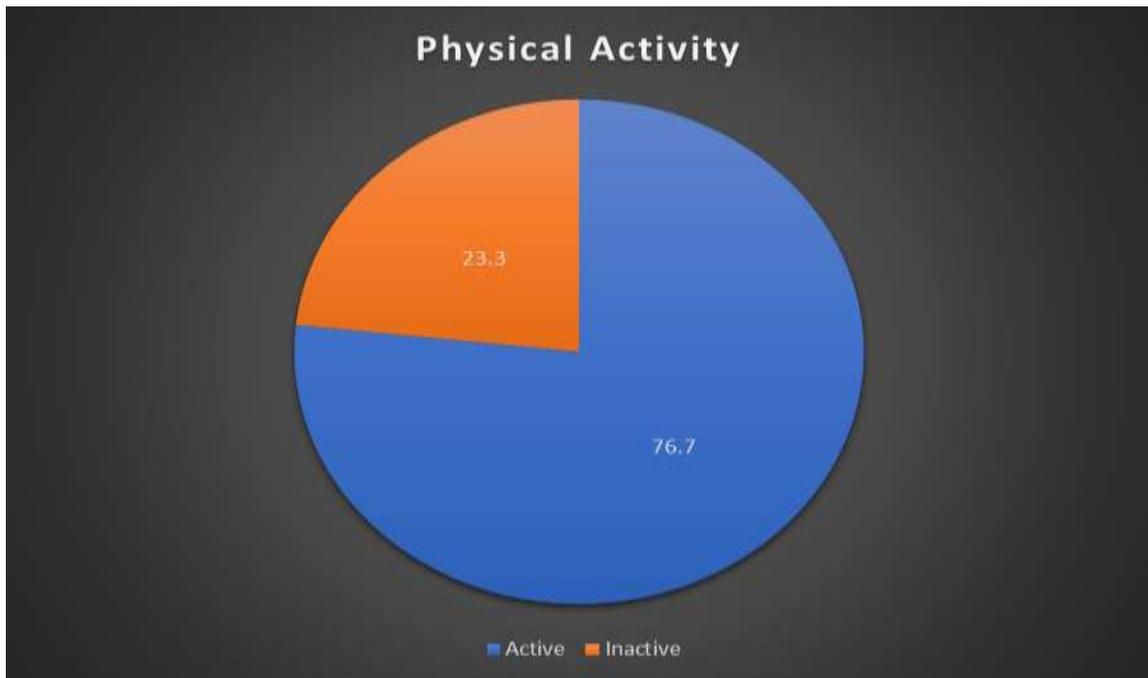


Figure.3:- The above diagram of this study shows that, 76.7% of the subjects were physically active during pandemic period

Component 1: KNEE



Figure 4:- Level of Participation due to knee problems.

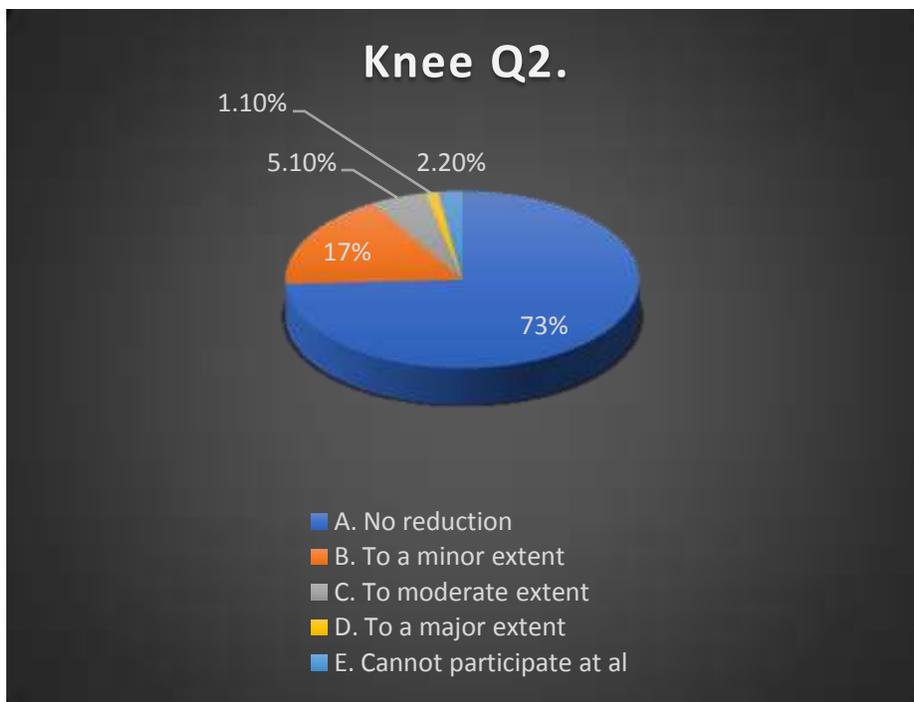
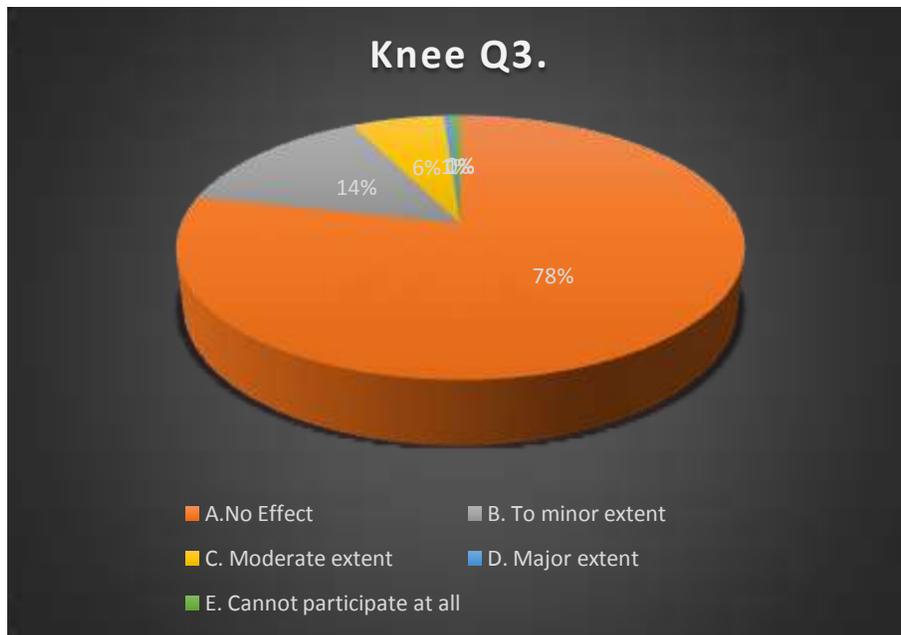
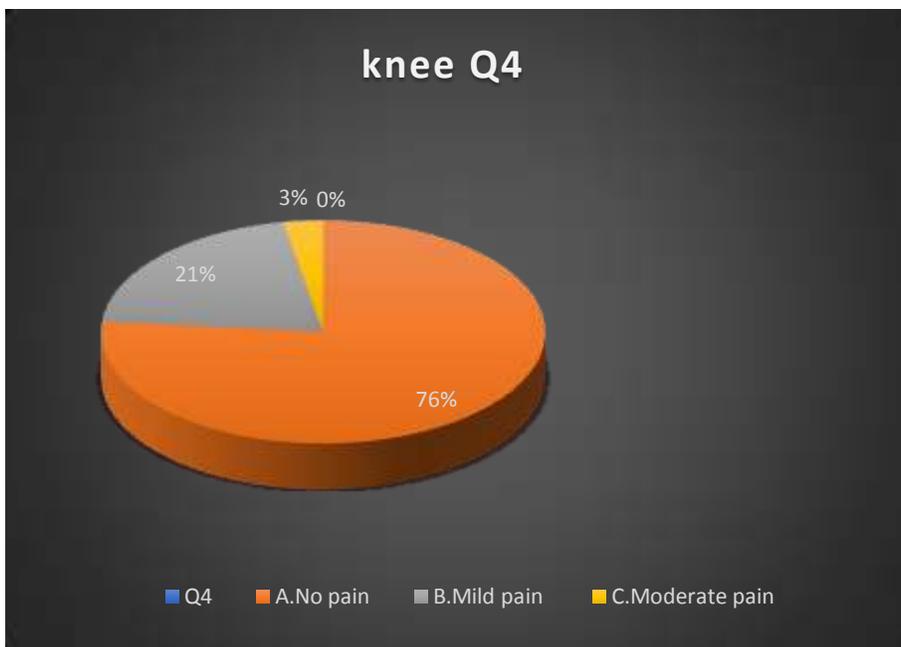


Figure 5 : Extent of training Volume due to knee pain



**Figure 6:-** Performance Level due to knee problems.



**Figure 7:-** level of knee pain due to physical activity.

Component 2: Low Back

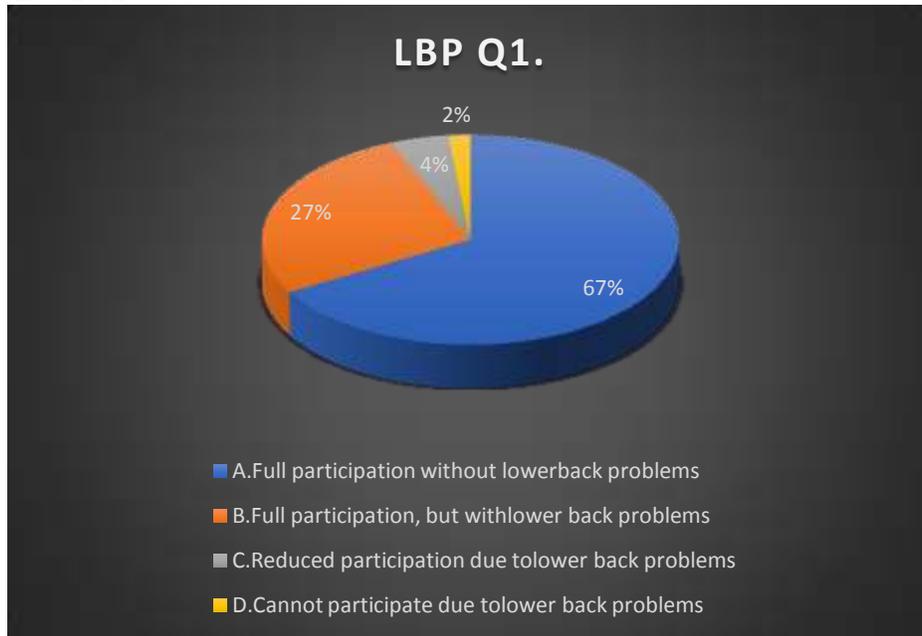


Figure 8:- Participation level due to low back pain.

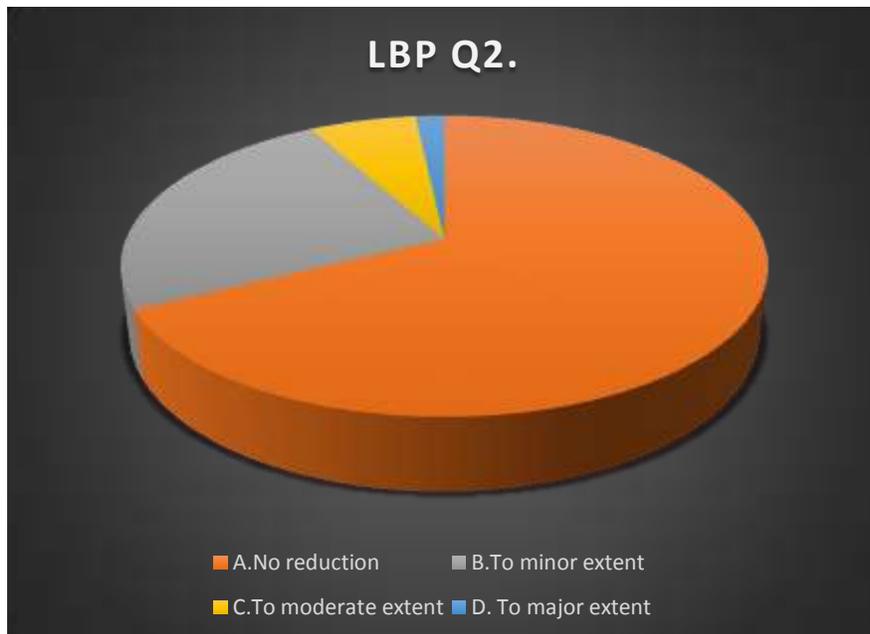


Figure 9: Extent of training volume due to low back pain.

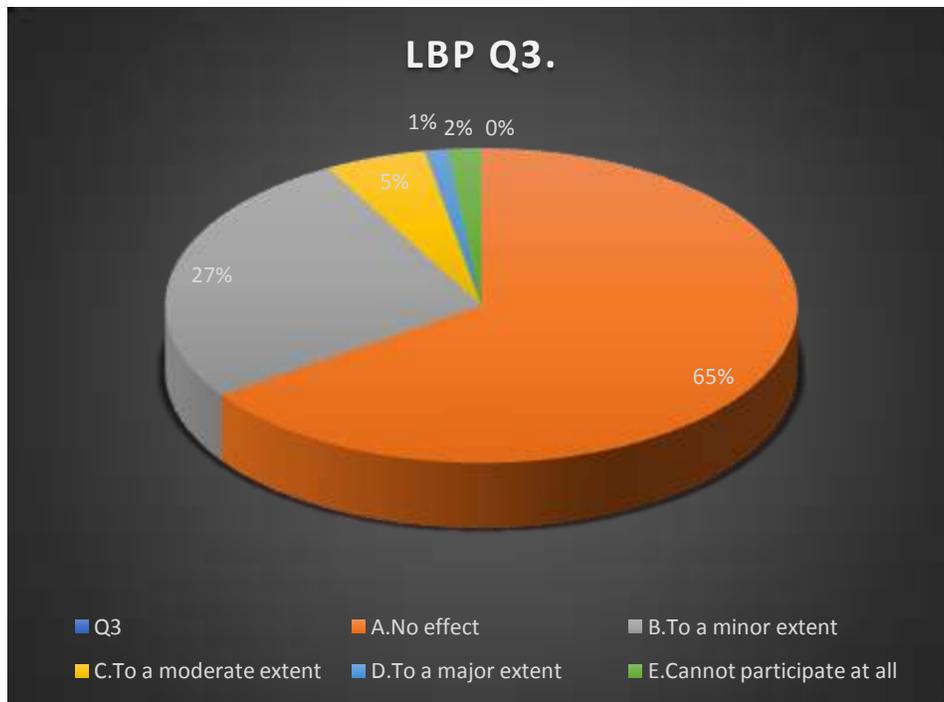


Figure 10:- Performance level due to low back pain.

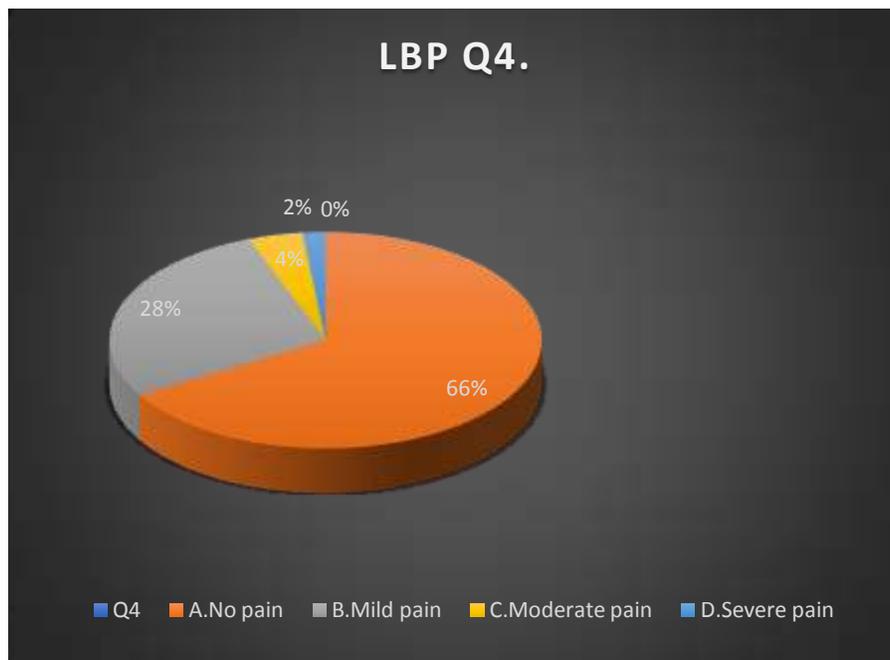


Figure 11:- Extent of low back pain due to physical activity.

Component 3: Shoulder

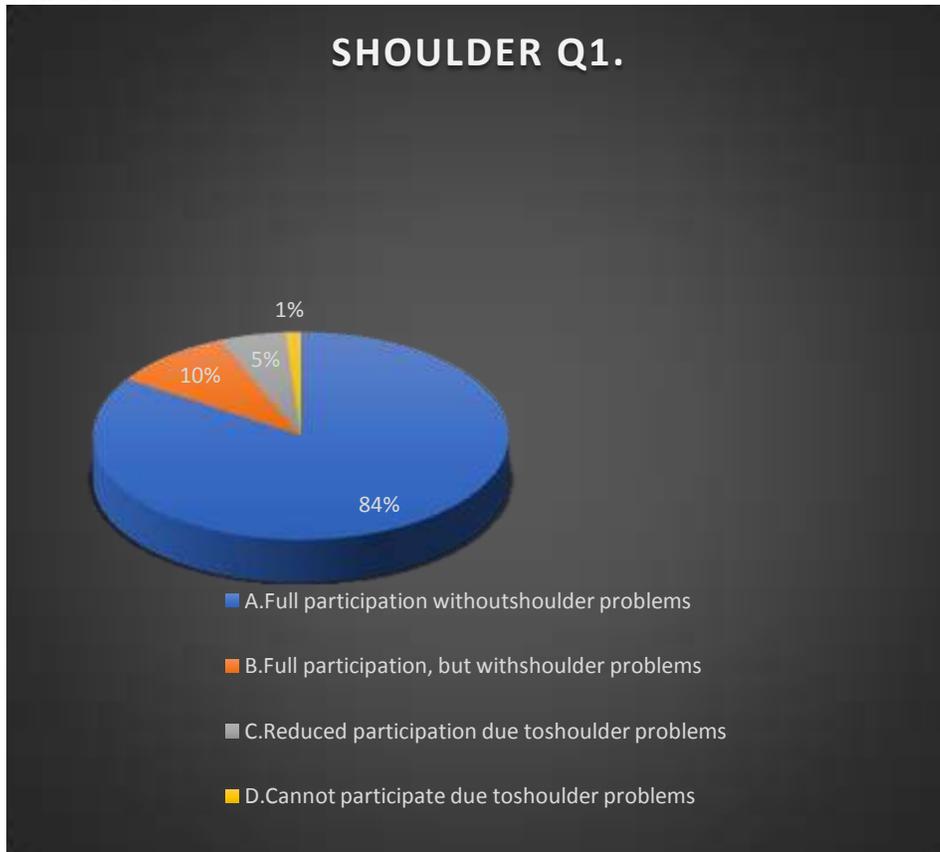


Figure 12:- Participation level due to shoulder problems.

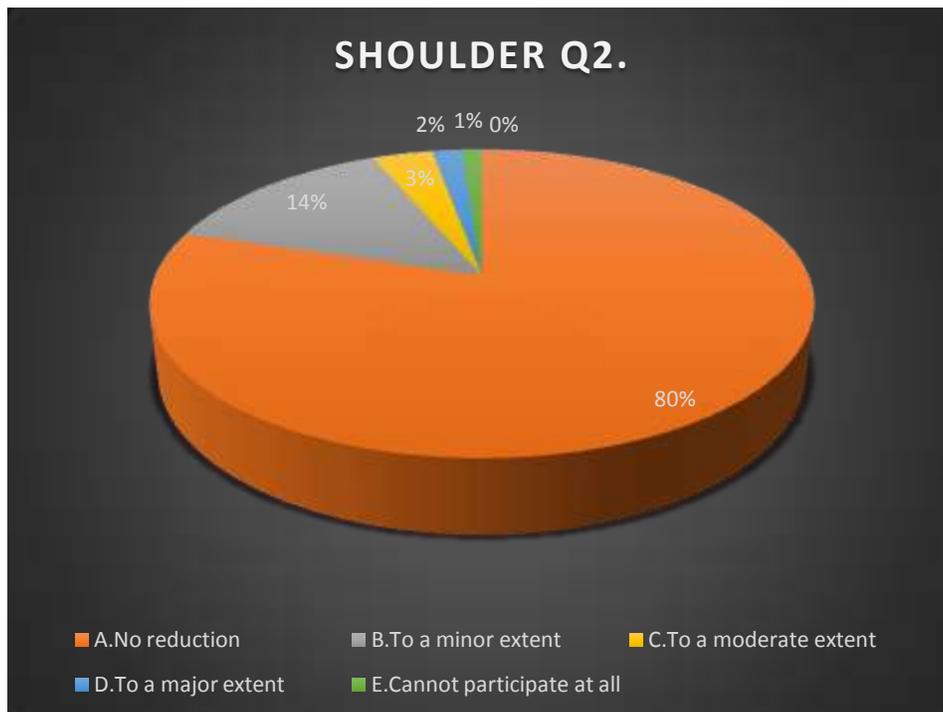
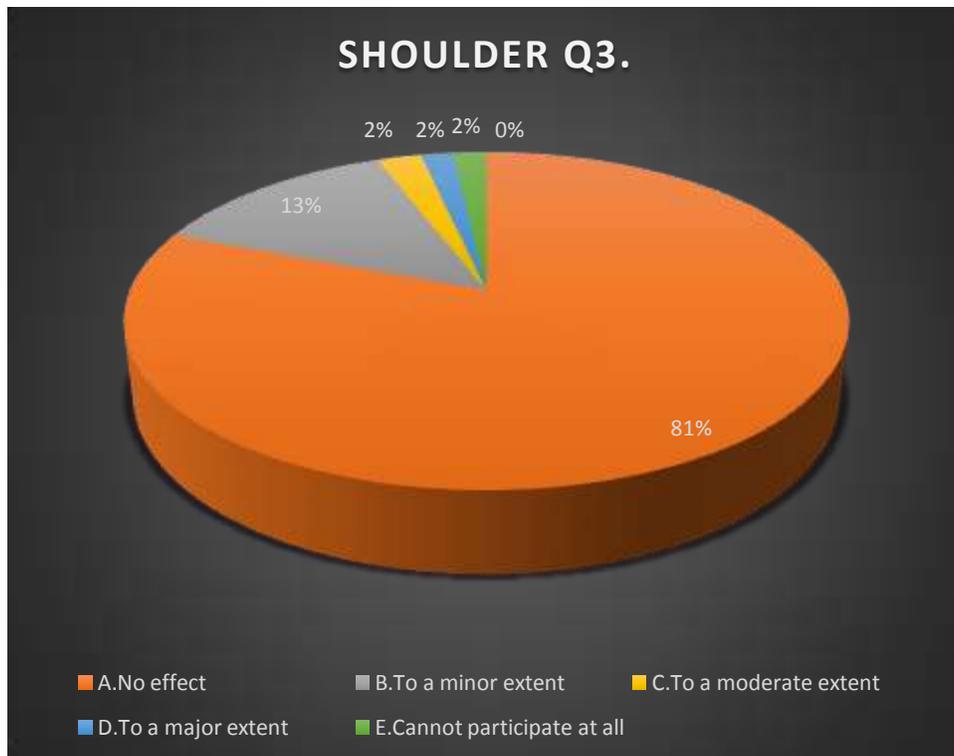
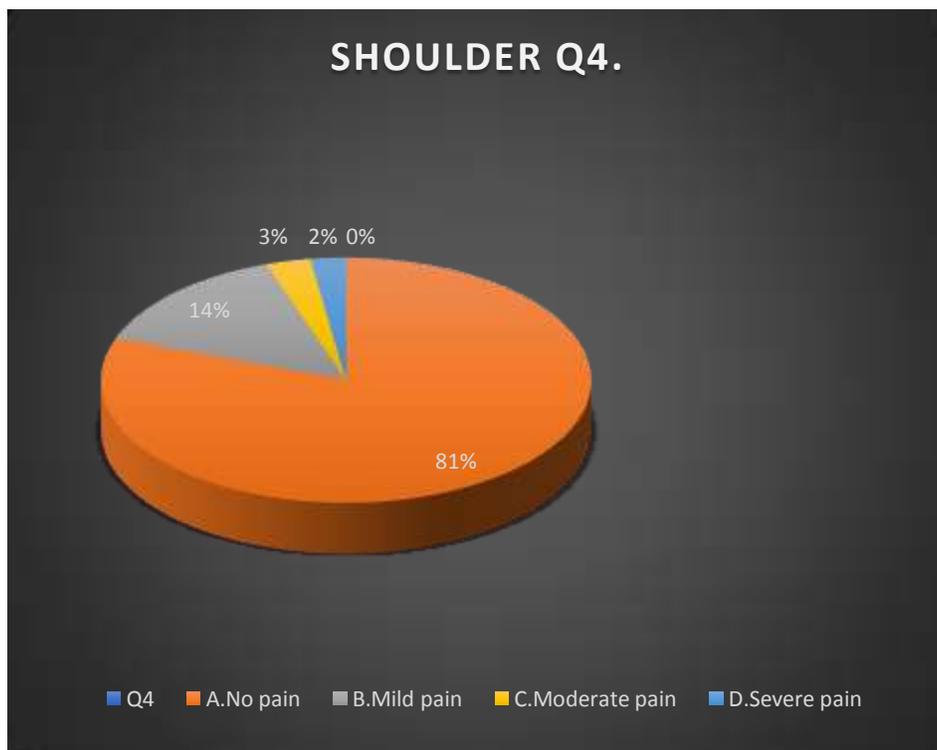


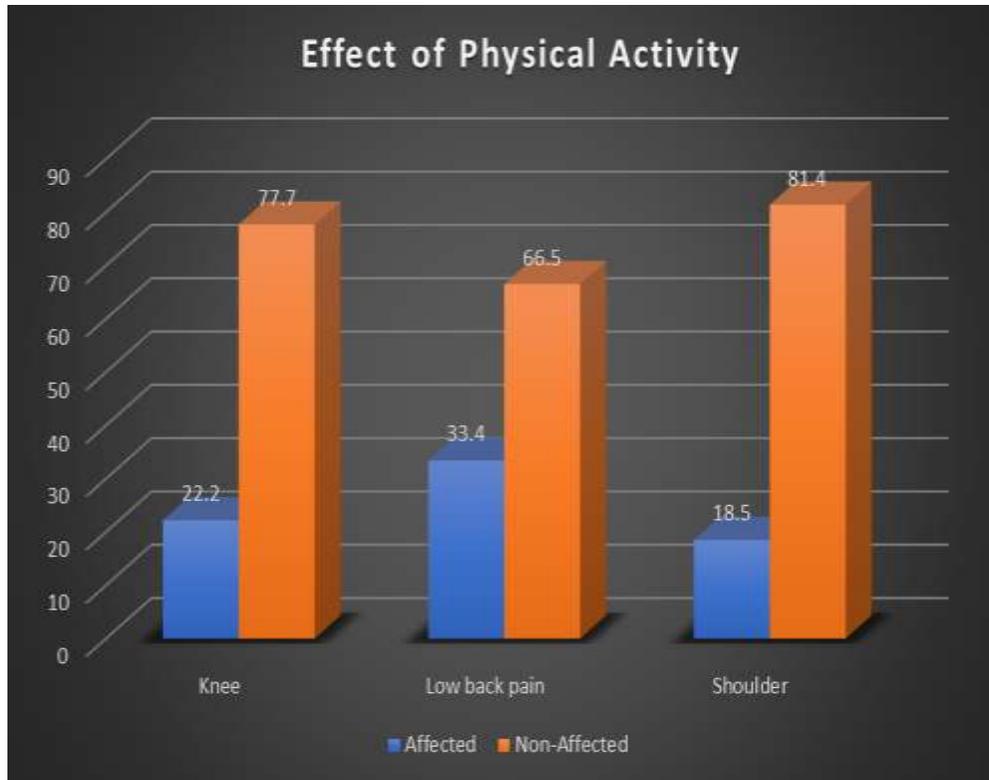
Figure 13:- Extent of training volume due to shoulder pain.



**Figure pain14:-** Extent of performance due to shoulder problems.



**Figure 15:-** Extent of shoulder pain due to any physical activity.



**Fig.16:-** The above diagram shows effect of physical activity on knee, Low back and shoulder.

### Discussion:-

The present study aims at finding the number of subjects that were doing excessive physical activity during the Covid-19 pandemic and the adverse effect that was prompted because of it on the musculoskeletal system of the individual.

The Result of the study showed that most of the subjects were physically active during COVID 19 pandemic. Out of all subjects' females were more physically active than males. It is pertinent. to observe that only 33.4% of the subjects had low back pain rest 66.5% had no difficulties. On the other hand, only 22.2% of the subjects had mild knee problems and 18.5% had pain and difficulties in Shoulder due to excessive physical activity in Covid-19 pandemic period. Based on the statistics and the results it was observed that there are no specific adverse effects observed on musculoskeletal system due to excessive physical activity during the lockdown.

In our knowledge a similar study, "Physical Activities of Students During Lockdown: An Exploratory Survey" conducted to see frequency of exercise done by the students during the lockdown and was observed that 80.4% of the students have undertaken at least some amount of exercise in which 18.8% have done 1 to 2 hours of exercise, 17.7% have done 45 minutes of exercise and 21.2% have done 10-30 Minutes a Day from this, it is concluded that no excessive physical activity was done during the lockdown it was also observed that only 13.5% of the students were doing Weight training during the Lockdown which further proves that this can also be the reason for lessen risk of overuse injuries in the population during the lockdown<sup>1</sup>.

Based on the results of this current study it was explored that injuries were less in the physically active subjects possibly due to the selected population which involved medical students and they might be aware about the warm up and cool down phase which can reduce the chances of overuse injuries. They also more likely have the knowledge about the adverse effect of excessive physical activities. The lockdown also caused the shutdown of gymnasium and training centers due to which people did not have access to heavy weight equipment's which forced them to take up other alternatives such as cycling, yoga, running, Zumba and flexibility training these alternatives prevented them to overuse one set of muscles and prevented them from working out incorrectly.

There are numerous benefits of physical activity and that of complete wellbeing too, however due to wrong techniques, overstress on joints and repetitive movements can increase risk of injury

Repeating the same muscle movements frequently can lead to overuse and repetitive use of injuries such as muscle pull and strain, tendinitis, shin splint, shoulder injuries and knee injuries etc.

This study also showed that female participants were more physically active than the male participants which can be due to availability of more spare time which they get during the lockdown or else it maybe because of the effect of social media platform which my influenced them and have encouraged to do exercise. On every platform, you can find thousands of results and hashtags relating to before-and-after weight loss photos, body selfies and endless vague motivational quotes and captions which in many ways inspire and sets those goals itself<sup>13</sup>.

However, this study showed that it does not add up to the physical aspect of the population and it hardly affects the component of musculoskeletal system during the lockdown.

### **Conclusions:-**

Participants (33.4%) had mild pain and difficulties in Low Back, (22.2%) had knee pain and (18.5%) had shoulder pain, according to OSTRC injury questionnaire. Hence, this study concluded that there was no significant adverse effect observed on the musculoskeletal system.

### **Conflicts of interest –**

Nil.

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