

Prevalence and Risk Factors of Musculoskeletal Disorders in School Teachers During the Pre-Covid And Pandemic Phases in Dakshina Kannada District, Karnataka: A Cross-Sectional Study

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Abstract

Background:

School teachers represent an occupational group among which there is a high risk of musculoskeletal disorders. Even though the main causes of the work related musculoskeletal disorders is not known during the period of lockdown and working from home, the main perspective of the study was to compare between the musculoskeletal disorders before and during the pandemic

Objective:

To find the number of musculoskeletal disorders reported among school teachers to correlate associated factors with pre- covid related musculoskeletal issues to pandemic

Methodology:

Sample of data comprised of 254 secondary and pre university teachers. Questionnaire method was used for collecting the sample.

Results:

Prevalence of musculoskeletal disorders was present in teachers working from home during the pandemic/ lockdown of Covid-19 when compared to musculoskeletal disorders before the pandemic/ pre- covid where days worked per week, hours of work per day, duration of rest taken per day, posture while using books, laptops and phone, working activities and physical exercises without supervision caused musculoskeletal disorders. The result also signifies that working environment does not affect musculoskeletal disorders.

Conclusion: Prevalence and risk factors of musculoskeletal disorders in school teachers during pre-covid and pandemic phases.

Keywords: Pandemic, Covid-19, Musculoskeletal disorders, Lockdown

Introduction

Musculoskeletal disorders (MSDs) represent one of the most important and common occupational health

problems in working populations, being responsible for a substantial impact on the quality of life and incurring a major economic burden in compensation cost and lost wages.¹

With social production highly mechanized, work-related musculoskeletal disorders (WMSDs) are becoming a major health problem encountered by professionals. The prevalence of WMSDs linearly correlates with age and length of service.²

School teachers represent an occupational group among which there appears to be a high prevalence of MSDs with the prevalence rates of between 40% and 95%. MSD decreases the productivity at work due to sick leave, absenteeism, and early retirement.¹

Some studies reported that physical factors such as prolonged standing, sitting and uncomfortable posture are known to be associated with increased prevalence of MSD.³

The work tasks of school teachers often involve significant use of a 'head down' posture, such as frequent reading, marking of assignments, and writing on a blackboard.⁴

A pandemic is the worldwide spread of a new disease.⁵ A pandemic is a disease outbreak that spreads across countries or continents. It affects more people.

The coronavirus disease 2019 (Covid-19) originated in Wuhan, China at the end of December 2019. It was recognized as a pandemic on 11 March 2020

by the World Health Organization and it has been continuing to spread out throughout the world.⁵

India was declared to be in complete lockdown from March 24th 2020 by Prime Minister Narendra Modi as a precautionary measure to prevent from spread of the virus.

Social isolation, physical inactivity or sedentary lifestyle, although are inter-relate, are individual entities. Owing to the present social isolation where the public interaction is restricted, the above can interplay and interfere in health status of the person as a whole and we believe it will have effects on musculoskeletal pain.⁷

Alteration of musculoskeletal conditions and pain may also increase due to physical inactivity and severity of psychological disorders, reduction in sleep quality, and development of phobias and may additionally occur.⁶

Work-related tasks are widely considered to be a major cause of LBP among teachers. It is postulated that awkward posture, prolonged sitting when working on students' work and when preparing for lessons, and inappropriate furniture is contributing factors for LBP among teachers.⁸

Aim

The aim of the study is to find out the prevalence of work related musculoskeletal disorders in school teachers working from home during the pandemic of Covid-19

Review of literature

Nirav P Vaghela et al (2017), conducted a cross sectional study on prevalence of musculoskeletal disorders in school teachers. The study was done in Gujrat, India. The study was conducted under 314 school teachers, in order to investigate the musculoskeletal disorders, they were interviewed using modified Nordic Questionnaire. They included all primary and secondary school teachers and excluded teachers with any musculoskeletal or neurological conditions and teachers who are not a part of any ongoing research. The investigation had teachers within the age group of 22-59 with the mean of 40.5 ± 9.88 , where the result showed total prevalence of musculoskeletal disorder of 71.95%, in which females were more

affected with 72% than the males with 28%, which concluded that teachers had high prevalence of musculoskeletal pain in shoulder, knee and back.

Shui et al (2014), performed a self-controlled longitudinal study with pre or post design used to evaluate the effects of intervention among school teachers in Shantou, China. A cluster random sampling method was used to collect data. Evaluation was done on both pre and post intervention (participatory ergonomic training and occupational health education) with the help of a questionnaire. The follow up rate was 93.7% (328/350) at six months after intervention, the intervention resulted to lowering of work related musculoskeletal disorders for neck, shoulder, upper and lower back pain or discomfort. However, it further concluded that interventions based on occupational health education lectures, on- site ergonomics training, publicity brochures and posters showed a positive effect on prevention and control of the occurrence of work-related musculoskeletal disorders in teachers. Improvement in awareness, behaviour and attitude changes, and prevalence were found at both six and 12 months' post-intervention, confirming that the effectiveness of the program can be sustained.

Maria Teresa et al (2017), evaluated using a cross sectional study on prevalence of musculoskeletal disorder among school teachers from urban and rural areas in Chuquisaca, Bolivia. The study was done in randomly 60 selected schools in which total 1062 teachers participated. A Spanish version of standardized Nordic questionnaire was used assessing the 12 months and 7 days' prevalence of musculoskeletal disorders. The results showed prevalence of musculoskeletal disorders in any part of the body was 86% during the last 12 months 63% during the last 7 days. The results concluded that the prevalence of musculoskeletal disorders is high in school teachers, even more in school teachers working in rural areas and that it is needed to identify the risk factors of musculoskeletal disorders in order to propose appropriate strategies to control and reduce it.

Patience N Erick et al (2014), performed a cross sectional study on low back pain among school teachers in Botswana, South Africa prevalence and risk factors. The study was conducted among teachers in Botswana using self- administered questionnaire which were distributed to 3100 randomly selected school teachers and collected after five-month period between July and November the questionnaire included low back pain information, demographic data, lifestyle, work related characteristics and psychosocial factors. A total of 1747 teachers responded to the questionnaire with a response rate of 56.3% the 12-month prevalence of lower back pain was 55.7% with 67.1% of them reporting minimal disability. The logistic regression analysis revealed that female gender and previous back injury were positively correlated to low back pain, awkward arm position and high psychological job demands were also related to lower back pain. This concluded the prevalence of low back pain appears to be high in school teachers in Botswana and a wide variety of risk factors were identified in this study. In order to reduce the prevalence, progression and burden on lower back among Botswana teachers, a greater emphasis should be placed to ergonomics education, regular physical exercise and occupational stress.

Seyda Toprak Celenay et al (2020), Conducted a case controlled study on coronaphobia, musculoskeletal pain and sleep quality in stay at home and continued working persons during the 3 month Covid- 19 pandemic lockdown in Ankara, Turkey. For data on musculoskeletal disorders Nordic Musculoskeletal questionnaire was used and for coronaphobia Covid-19 phobia scale was used. The results showed that during the 3 month Covid-19 lockdown, lower back pain was highest in stay at home group than continued working. Rates of the neck, upper-back, shoulder, and hip/thigh pain were lower, and rate of low back pain was higher in the SH group while, rates of the neck, upper back, shoulder, and elbow pain were lower in the CW group during the Covid-19 pandemic lockdown than prelockdown values. This concluded that

individuals who stayed at home had more musculoskeletal complaints, including low back pain, and higher coronaphobia than those who continued working during the Covid-19 lockdown. Even though stay at-home is an effective way to prevent the transmission of Covid-19, it should be noted that it can also lead to negative consequences, especially for the lower back. Therefore, to prevent the negative consequences of the stay-at-home practice, precautions should be taken.

Shijo John Joseph et al (2020), investigated using a literature review on psychological concerns and musculoskeletal pain amidst the Covid-19 lockdown, it showed that during such situations, a person may suffer from severe psychological outcomes such as anger, depression, and post-traumatic stress disorders. Factors like the duration of stay at home, fear of infection, worry about ample supplies can trigger psychological disturbances. Social isolation, physical inactivity or sedentary lifestyle although are inter-relatable. Due to imposed restriction and outdoor activities an individual will eventually have twofold manifestation. It would affect an individual's pain threshold as evidenced by increased inflammation and pain, especially those who are suffering from chronic pain syndromes and hence concluded that the lack of physical activities due to the lockdown could lead to musculoskeletal pain especially upper and lower backache.

Patience N Erick et al (2011), performed a systematic review to investigate musculoskeletal disorders among school teachers. The review involved MEDLINE and EMBASE databases in 2011 from the year 1981 to 2011. All studies which reported on the prevalence and/or risk factors of musculoskeletal disorders. Following a thorough search of the databases, these studies concluded prevalence of musculoskeletal disorders among teachers. It suggested that the prevalence of self-reported musculoskeletal disorders ranges between 39% to 95% and reported that the most prevalent body sites appeared to be the back, neck, and upper limb. Factors such as age, gender length of employment and awkward posture has been associated with musculoskeletal disorders. Overall the study suggested that school teachers are at a higher risk of musculoskeletal disorders

Research design and methodology

This study was done to find out the prevalence of work related musculoskeletal disorders in school teachers working during the pandemic of covid-19. The data was collected using Nordic Standardised questionnaire in languages such as English and Kannada. The questionnaire also included sociodemographic characteristics, psychosocial, and work related questions (working hours per day, working days per week, rest hours and about the musculoskeletal disorders. All safety measures were taken during the collection of the data.

The study design and the subject sample are as follows. A detailed description of the tools and procedure used in the data collection is given below.

Study Design: A survey was done through a questionnaire by distributing the questionnaire in schools

Sampling: The sample included 254 teachers from different schools with more from different areas of Dakshina Kannada

Inclusion Criteria:

Teachers teaching in Secondary school and Pre-university
Both genders

Teachers within the age group of 25-50
All private schools
Teachers with minimum one year of experience
Teachers not been diagnosed with Covid-19

Exclusion Criteria:

Teachers with any recent fracture, trauma or any other musculoskeletal condition.
Teachers with any neurological condition.
Teachers who are not a part of any other ongoing research.
Female teachers, with history of pregnancy during pandemic
Teachers with known congenital deformity

Source: The teachers from private schools in Dakshina Kannada who were teaching from home during the pandemic of Covid-19 through a printed questionnaire in English and Kannada.

Data collection: To find out the prevalence of work related musculoskeletal disorders in school teachers a self-made questionnaire was used to extract information. The final design was spread-out through distributing the questionnaire personally.

Protocol adopted in data collection:

Along with the Nordic Standardised questionnaire another set of questions were formed and validated by 6 qualified professors, once the final outcome was achieved. The questionnaire was pre- tested with 17 teachers before the actual data collection to check the accuracy of responses, language clarity and appropriateness of the questionnaire. The aim and purpose of the study was explained to two student representatives and was given the responsibility of spreading the forms. The information provided by the subjects were highly kept in confidentiality.

Organization of data: The response was recorded from the participants who filled the entire form. The response was later converted in a tabular form and was considered for interpretation and statistical analysis.

Statistical analysis: Descriptive statistics was determined using mean and percentage.

Result

GENDER			
		Frequency	Percent
Valid	Female	184	72.4
	Male	70	27.6
	Total	254	100.0

TABLE NO.1

Table no.1 shows the distribution of Gender where 72.4% (n=184) are Females, 27.6% (n=70) are Males.

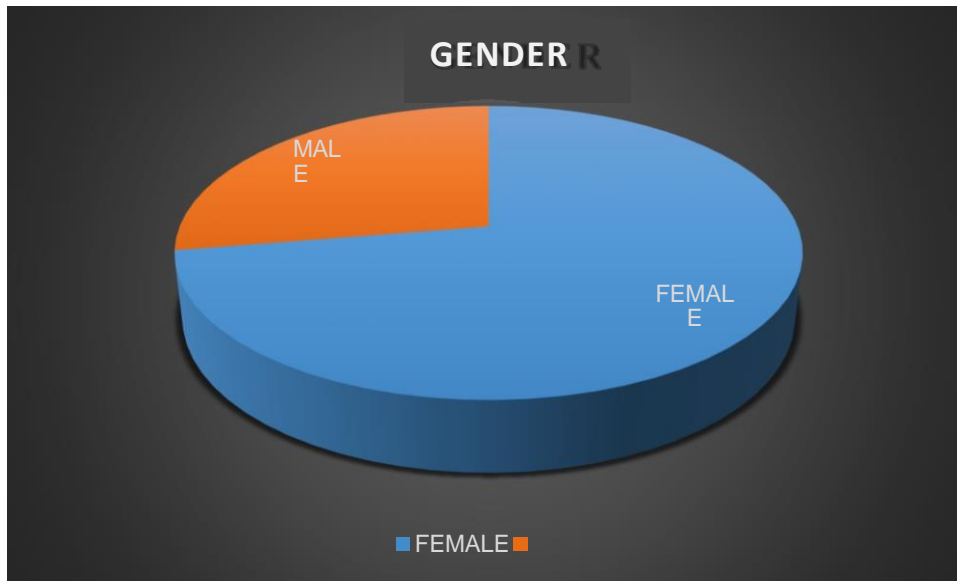


FIGURE NO. 1

DID YOU SUFFER FROM ANY TRAUMA/ ACCIDENT			
		Frequency	Percent
Valid	No	243	95.7
	Yes	11	4.3
	Total	254	100.0

TABLE NO. 2

Table no.2 shows distribution of teachers who suffered from any trauma/ accident where 95.7% (n=243) have no history of any trauma/ accident and 4.3% (n=11) have history of any trauma/ accident.



FIGURE NO.2

DID YOU SUFFER FROM ANY MUSCULOSKELETAL DISORDER BEFORE THE PANDEMIC			
		Frequency	Percent
Valid	No	238	93.7
	Yes	16	6.3
	Total	254	100.0

TABLE NO. 3

Table no.3 shows the distribution of teachers who suffered from any musculoskeletal disorder before the pandemic where 93.7% (n=238) had No history of musculoskeletal disorders and 6.3% (n=16) had history of musculoskeletal disorders.

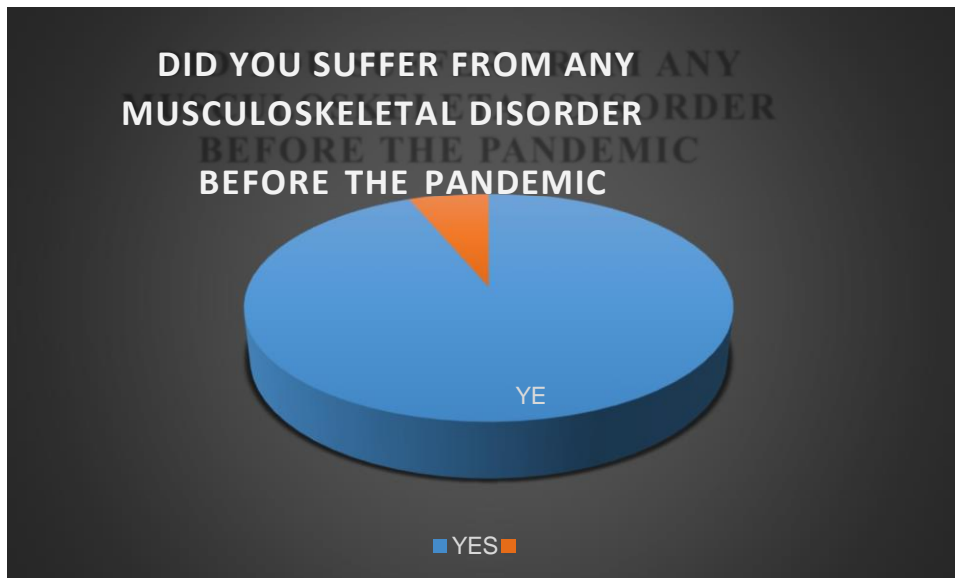


FIGURE NO.3

WERE YOU DIAGNOSED WITH COVID-19			
		Frequency	Percent
Valid	No	232	91.3
	Yes	22	8.7
	Total	254	100.0

TABLE NO. 4

Table no. 4 shows the distribution of teachers diagnosed with Covid-19 where 91.3% (n=232) were not diagnosed with Covid-19 and 8.7% (n=22) were diagnosed with Covid-19.

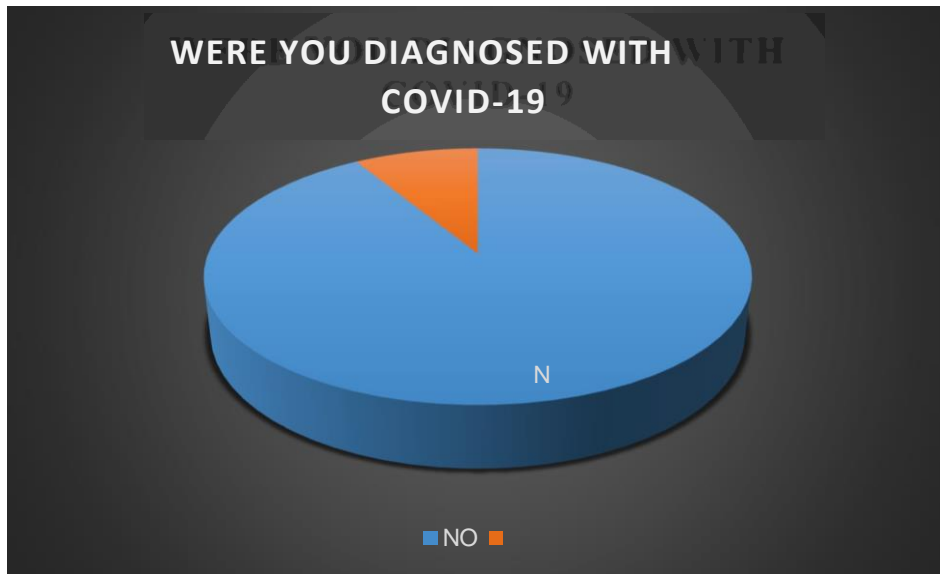


FIGURE NO. 4

AVERAGE DAYS WORKED PER WEEK (PRE- COVID)			
		Frequency	Percent
Valid	< 5 days	34	13.4
	> 5 days	220	86.6
	Total	254	100.0

TABLE NO. 5

Table no. 5 shows the distribution of average days worked per week (pre-covid) by the teachers where 13.4% (n=34) worked for < 5 days and 86.6% worked for > 5 days.

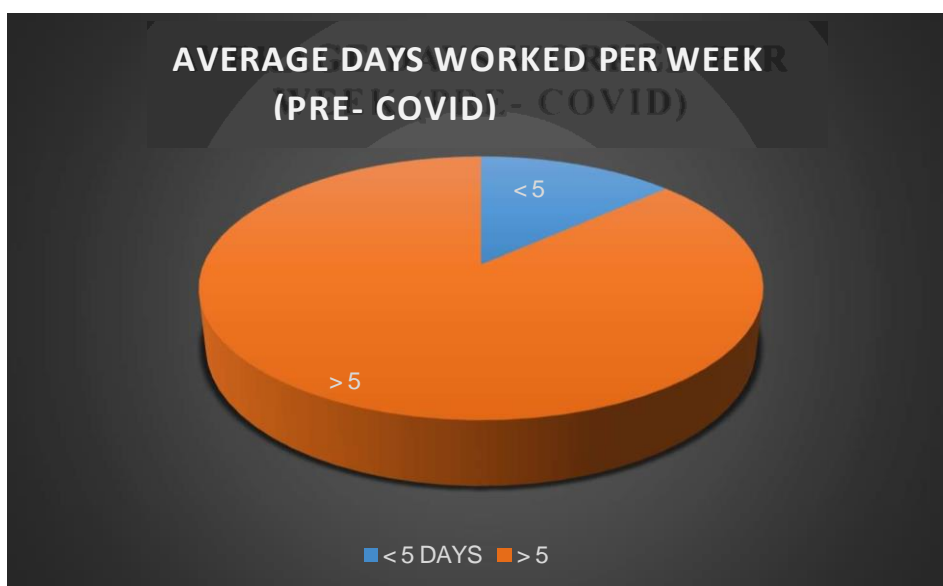


FIGURE NO. 5

AVERAGE DAYS WORKED PER WEEK (PANDEMIC)			
		Frequency	Percent
Valid	< 5 days	54	21.3
	> 5 days	200	78.7
	Total	254	100.0

TABLE NO. 6

Table no. 6 shows the distribution of average days worked per week (pandemic) by the teachers where 21.3% (n=54) worked for < 5 days and 78.7% (n=200) worked for > 5 days.

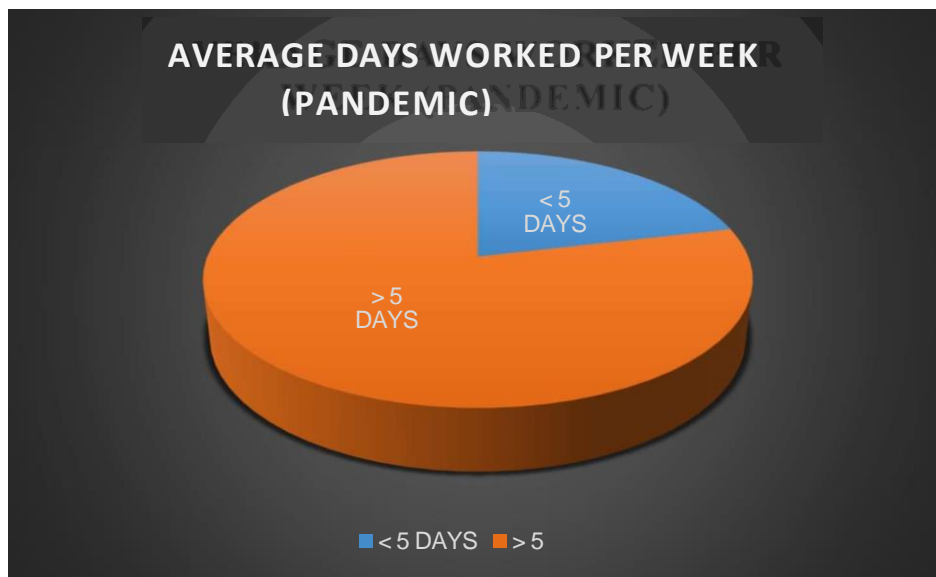


FIGURE NO. 6

AVERAGE HOURS OF WORK PER DAY (PRE- COVID)			
		Frequency	Percent
Valid	>5 hours	148	58.3
	1-3 hours	25	9.8
	3-5 hours	81	31.9
	Total	254	100.0

TABLE NO. 7

Table no. 7 shows the distribution of average hours of work per day (pre- covid) by the teachers where 58.3% (n=148) worked for > 5 hours per day, 9.8% (n=25) worked for 1-3 hours per day, 31.9% (n=81) worked for 3-5 hours per day.

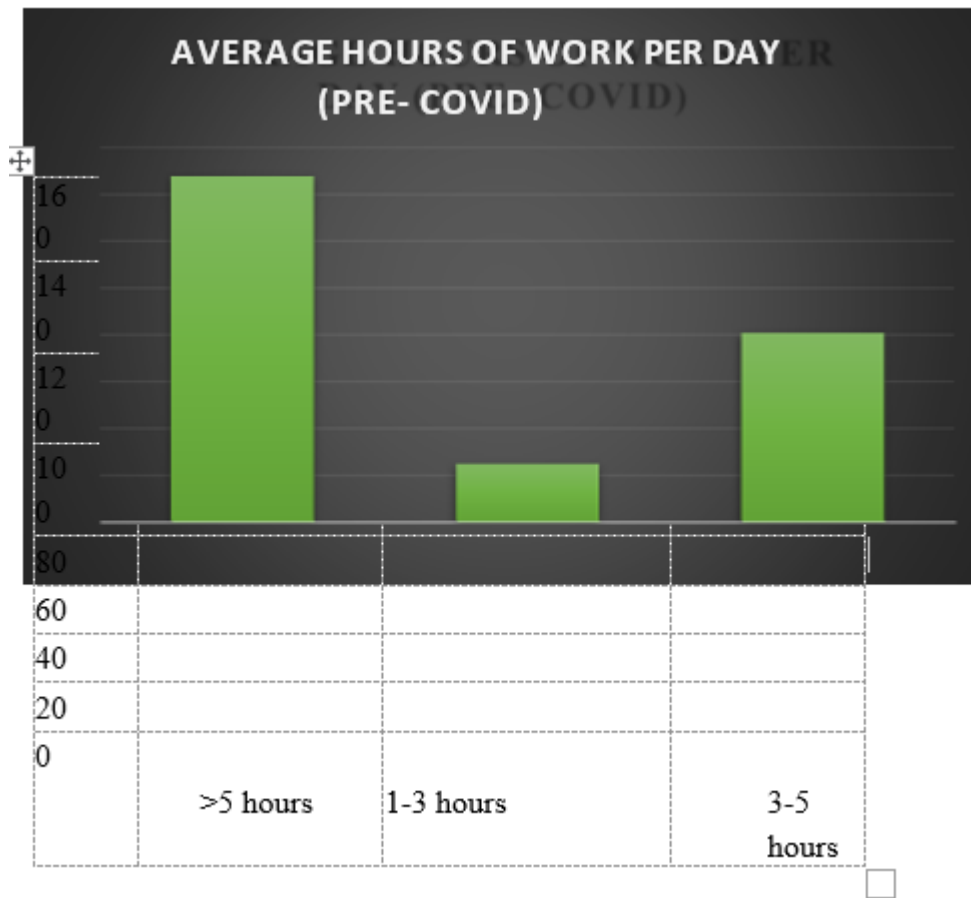


FIGURE NO. 7

AVERAGE HOURS OF WORK PER DAY (PANDEMIC)		
	Frequency	Percent
>5 hours	123	48.4
1-3 hours	45	17.7
3-5 hours	86	33.9
Total	254	100.0

TABLE NO. 8

Table no. 8 shows the distribution of average hours of work per day (pandemic) by the teachers where 48.4% (n=123) worked for > 5 hours per day, 17.7% (n=45) worked for 1-3 hours per day, 33.9% (n=86) worked for 3-5 hours per day.

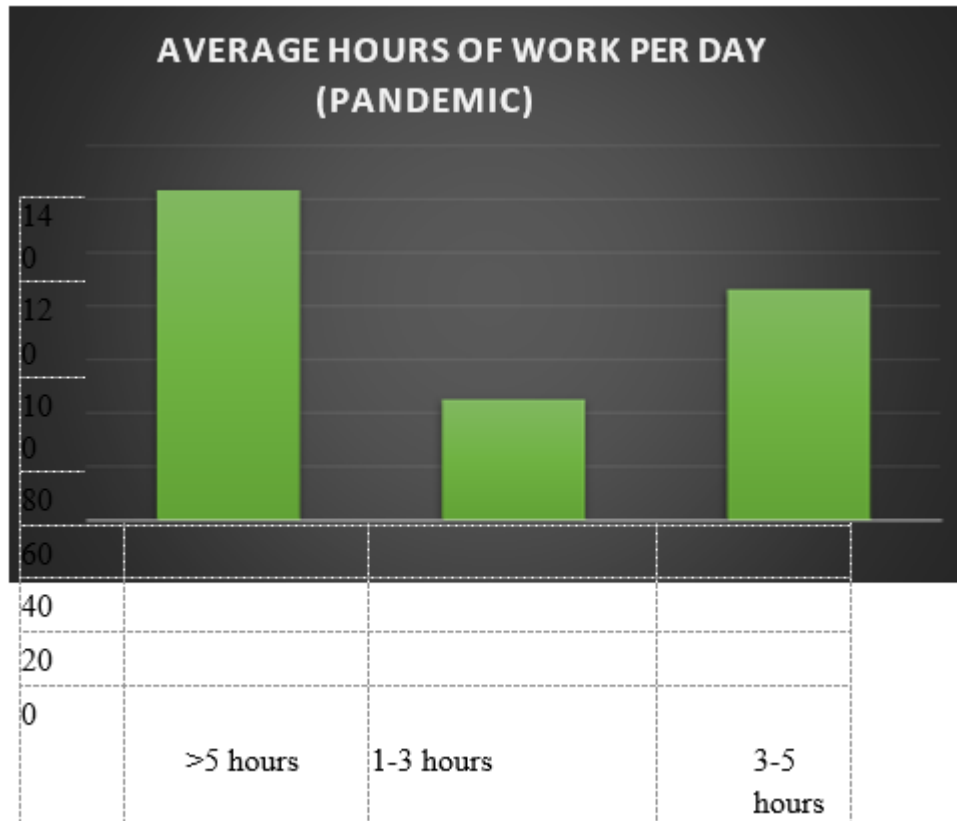


FIGURE NO. 8

AVERAGE DURATION OF REST PER DAY (PRE- COVID)			
		Frequency	Percent
Valid	>3 hours	74	29.1
	1-3 hours	147	57.9
	No rest	33	13.0
	Total	254	100.0

TABLE NO. 9

Table no. 9 shows the distribution of average duration of rest per day (pre- covid) by the teachers where 29.1% (n=74) took rest for >3 hours per day, 57.9% (n=147) took rest for 1-3 hours per day, 13% (n=33) took no rest per day.

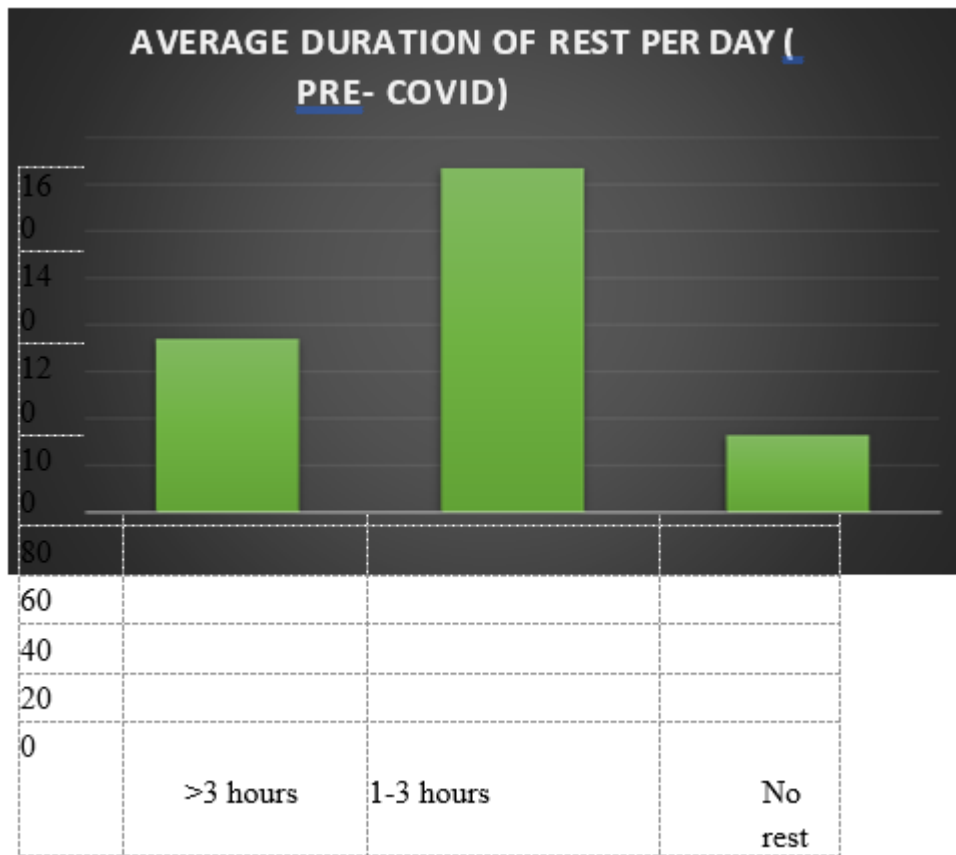


FIGURE NO. 9

AVERAGE DURATION OF REST PER DAY (PANDEMIC)		
	Frequency	Percent
Valid >3 hours	92	36.2
Valid 1-3 hours	137	53.9
Valid No rest	25	9.8
Total	254	100.0

TABLE NO. 10

Table no. 10 shows the distribution of average duration of rest per day (pandemic) by the teachers where 36.2% (n=92) took rest for >3 hours per day, 53.9% (n=137) took rest for 1-3 hours per day, 25% (n=25) took no rest per day.

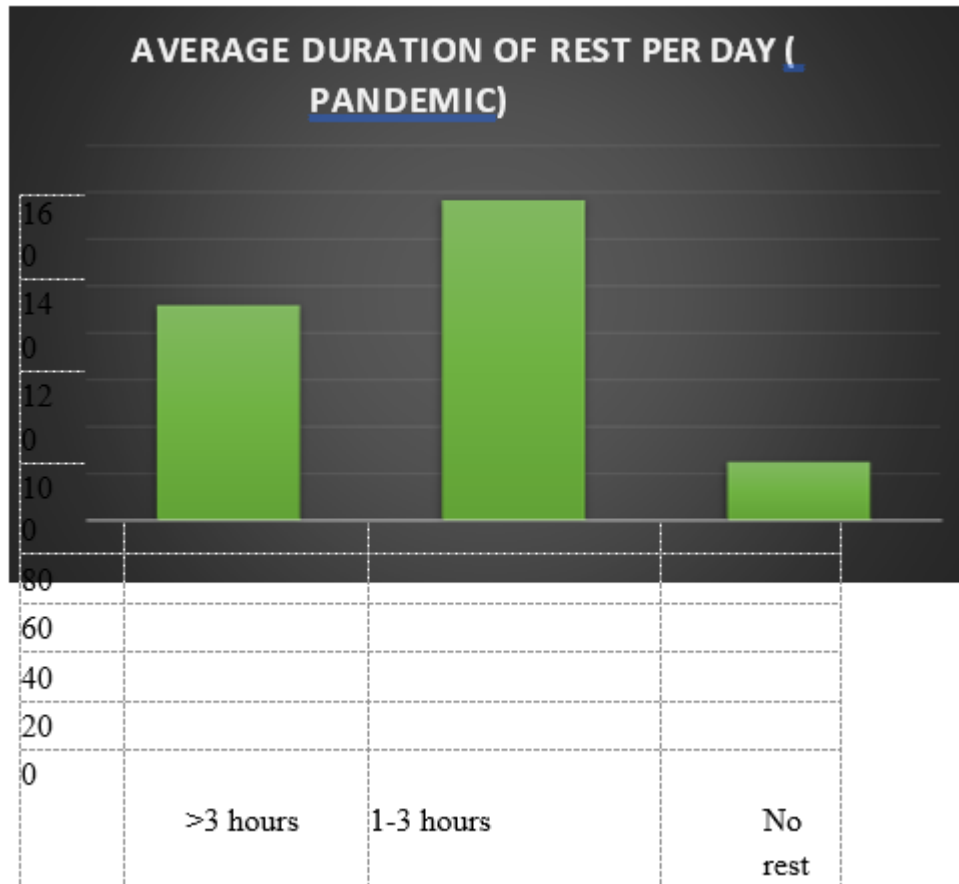


FIGURE NO. 10

WORKING POSTURE (PRE- COVID)			
		Frequency	Percent
Valid	Both	27	10.6
	Sitting	34	13.4
	Standing	193	76.0
	Total	254	100.0

TABLE NO. 11

Table no. 11 shows the distribution of working posture (pre- covid) of teachers where 10.6% (n=27) were both standing and sitting, 13.4% (n=34) were sitting and 76.0% (n=193) were standing.

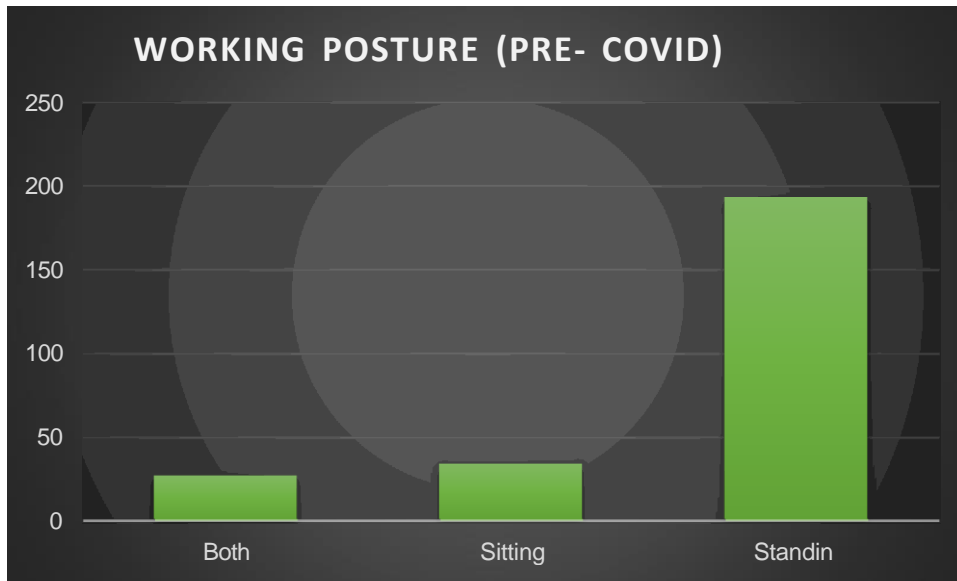


FIGURE NO. 11

WORKING POSTURE (PANDEMIC)			
		Frequency	Percent
Valid	Both	30	11.8
	Sitting	78	30.7
	Standing	146	57.5
	Total	254	100.0

TABLE NO. 12

Table no. 12 shows the distribution of working posture (pandemic) of teachers where 11.8% (n=30) were both standing and sitting, 30.7% (n=78) were sitting and 57.5% (n=146) were standing.

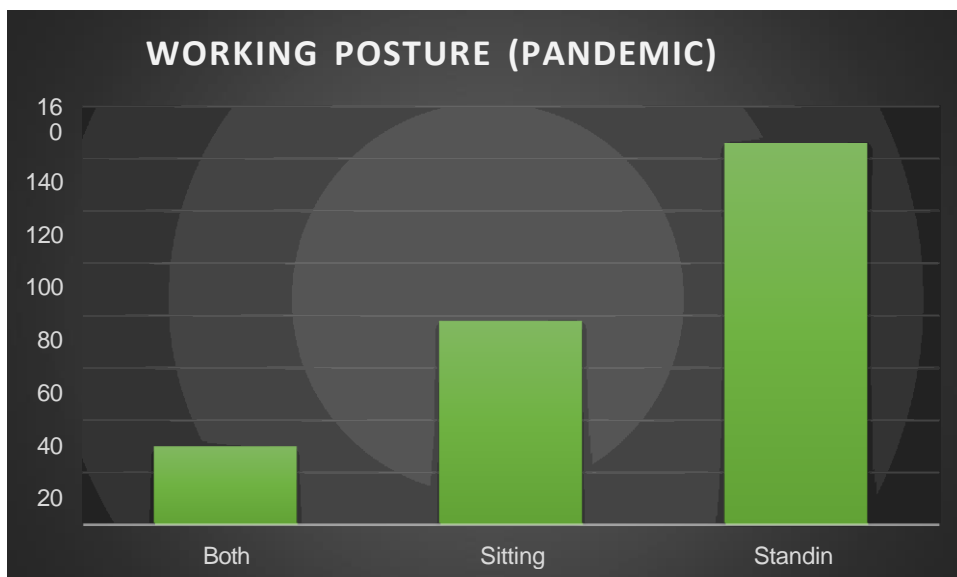


FIGURE NO. 12

IF LAPTOP, POSTURE USED (PRE- COVID)			
	Frequency	Percent	
Valid	Not using	44	17.3
	Sitting	197	77.6
	Sitting and prone lying	4	1.6
	Sitting and supine lying	6	2.4
	Sitting, supine lying and prone lying	3	1.2
	Total	254	100.0

TABLE NO. 13

Table no. 13 shows the distribution of posture used while using a laptop (pre- covid) by teachers where 17.3% (n=44) were not using laptop, 77.6% (n=197) were using sitting as their posture while using a laptop, 1.6% (n=4) were using sitting and prone lying as their posture while using a laptop, 2.4% (n=6) were using sitting and supine lying as their posture while using a laptop, 1.2% (n= 3) were using sitting, supine lying and prone lying as their posture while using a laptop.

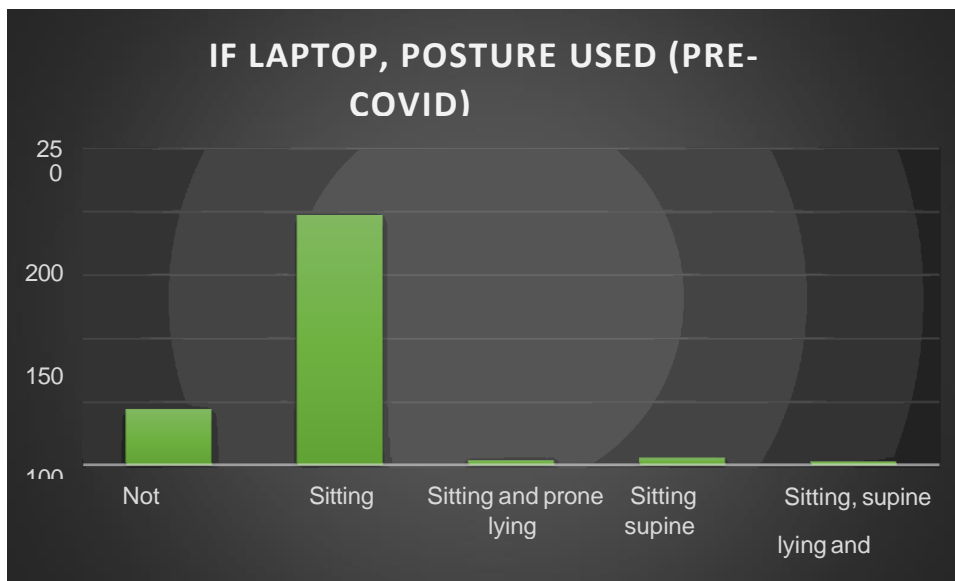


FIGURE NO.13

IF LAPTOP, POSTURE USED (PANDEMIC)			
	Frequency	Percent	
Valid	Not using	44	17.3
	Sitting	196	77.2
	Sitting and prone lying	4	1.6
	Sitting and supine lying	6	2.4
	Sitting, supine lying and prone lying	4	1.6
	Total	254	100.0

TABLE NO. 14

Table no. 14 shows the distribution of posture used while using a laptop (pandemic) by teachers where 17.3% (n=44) were not using laptop, 77.2% (n=196) were using sitting as their posture while using a laptop, 1.6% (n=4) were using sitting and prone lying as their posture while using a laptop, 2.4% (n=6) were using sitting and supine lying as their posture while using a laptop, 1.6% (n= 4) were using sitting, supine lying and prone lying as their posture while using a laptop.

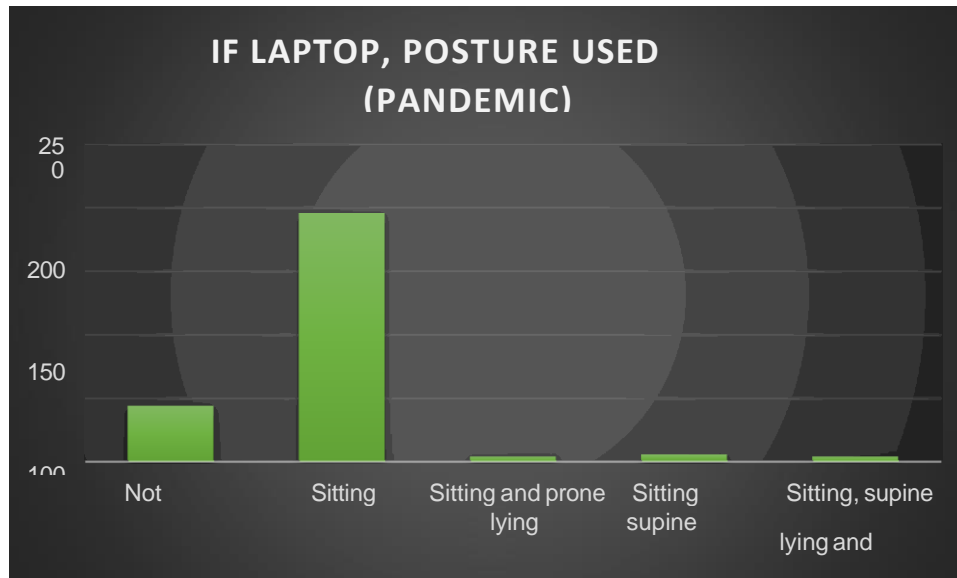


FIGURE NO. 14

IF BOOKS, POSTURE USED (PRE- COVID)			
	Frequency	Percent	
Valid	Not using	4	1.6
	Prone lying	1	0.4
	Sitting	230	90.6
	Sitting and prone lying	5	2.0
	Sitting and supine lying	5	2.0
	Sitting, supine lying and prone lying	5	2.0
	Supine and prone lying	1	0.4
	Supine lying	3	1.2
	Total	254	100.0

TABLE NO. 15

Table no. 15 shows the distribution of posture used while using books (pre- covid) 1.6% (n=4) were not using books, 0.4% (n=1) were using prone lying as their posture while using books, 90.6% (n=230) were using sitting as their posture while using books, 2.0% (n=5) were using sitting and prone lying as their posture while using books, 2.0% (n=5) were using sitting and supine lying as their posture while using books, 2.0 (n=5) were using sitting, supine and prone lying as their posture while using books, 0.4% (n=1) were using supine and prone lying as their posture while using books, 1.2% (n= 3) were using supine lying as their posture while using books.

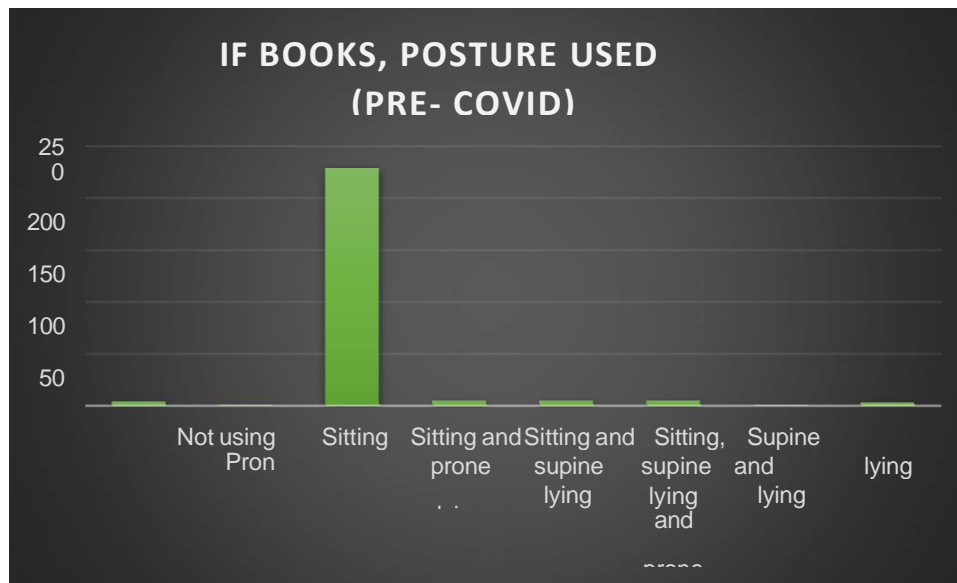


FIGURE NO. 15

IF BOOKS, POSTURE USED (PANDEMIC)		
	Frequency	Percent
Valid		
Not using	4	1.6
Prone lying	1	0.4
Sitting	231	90.9
Sitting and prone lying	7	2.8
Sitting and supine lying	3	1.2
Sitting, supine lying and prone lying	6	2.4
Supine lying	2	0.8
Total	254	100.0

TABLE NO. 16

Table no. 16 shows the distribution of posture used while using books (pandemic) 1.6% (n=4) were not using books, 0.4% (n=1) were using prone lying as their posture while using books, 90.9% (n=231) were using sitting as their posture while using books, 2.8% (n=7) were using sitting and prone lying as their posture while using books, 1.2% (n=3) were using sitting and supine lying as their posture while using books, 2.4 (n=6) were using sitting, supine and prone lying as their posture while using books, 0.8% (n=2) were using supine lying as their posture while using books.

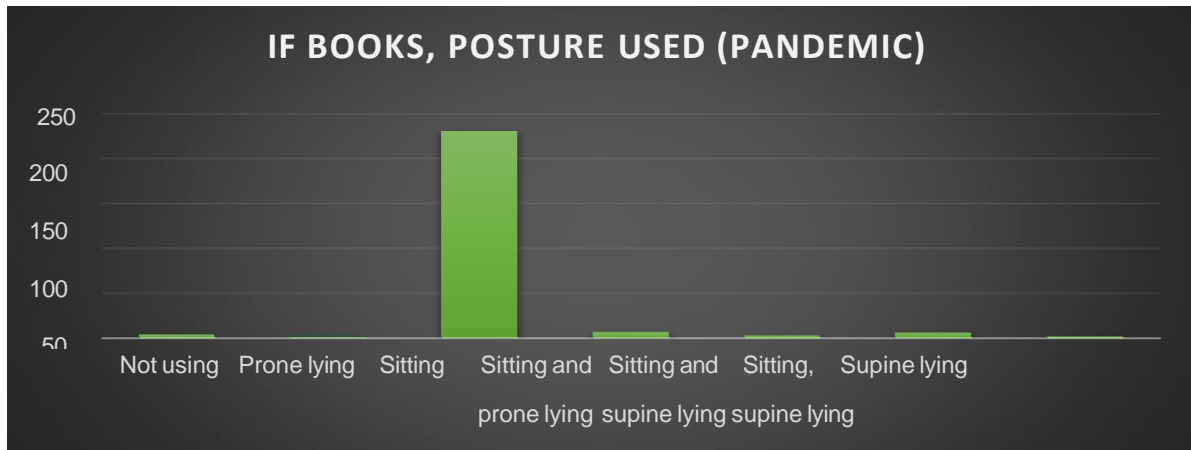


FIGURE NO. 16

IF PHONE POSTURE USED (PRE- COVID)		
	Frequency	Percent
Valid		
Not using	2	0.8
Prone lying	1	0.4
Sitting	201	79.1
Sitting and prone lying	2	0.8
Sitting and supine lying	20	7.9
Sitting, supine lying and prone lying	26	10.2
Supine lying	2	0.8
Total	254	100.0

TABLE NO. 17

Table no. 17 shows the distribution of posture used while using phone (pre- covid) by the teachers where 0.8% (n=2) were not using phones, 0.4% (n=1) were using prone lying as their posture while using phone, 79.1% (n=201) were using sitting as their posture while using phone, 0.8% (n=2) were using sitting and prone lying as their posture while using phone, 7.9% (n=20) were using sitting and supine lying as their posture while using phone, 10.2% (n=26) were using sitting, supine lying and prone lying as their posture while using phone, 0.8% (n=2) were using supine lying as their posture while using phone.

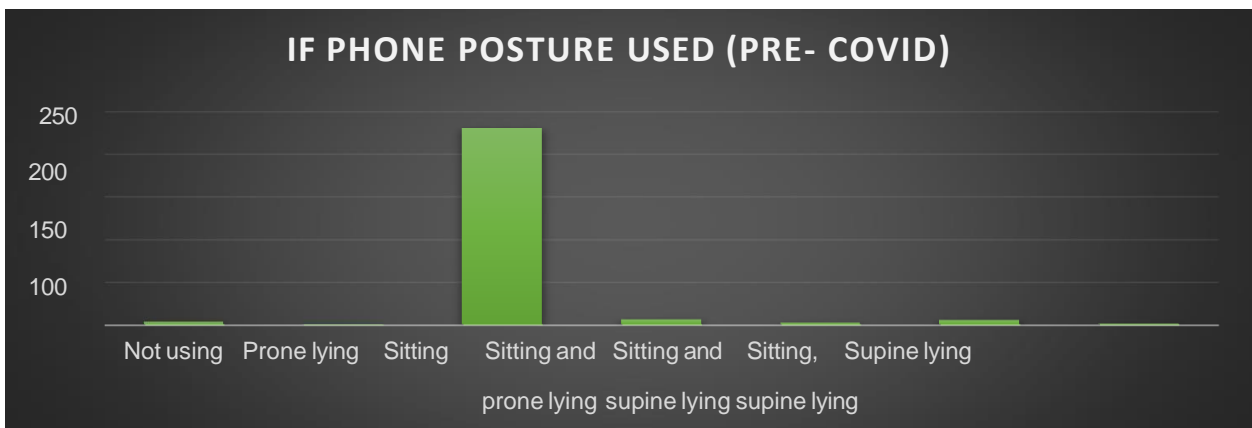


FIGURE NO.17

IF PHONE POSTURE USED (PANDEMIC)			
	Frequency	Percent	
Valid	Not using	1	0.4
	Sitting	199	78.3
	Sitting and prone lying	3	1.2
	Sitting and supine lying	20	7.9
	Sitting, supine lying and prone lying	26	10.2
	Supine and prone lying	1	0.4
	Supine lying	4	1.6
	Total	254	100.0

TABLE NO. 18

Table no. 18 shows the distribution of posture used but the teachers using phone (pandemic) where 0.4% (n=1) were not using phones, 78.3% (n=199) were using sitting as their posture while using phone, 1.2% (n=3) were using sitting and prone lying as their posture while using phone, 7.9% (n=20) were using sitting and supine lying as their posture while using phone, 10.2% (n=26) were using sitting, supine lying and prone lying as their posture while using phone, 0.4% (n=1) were using supine lying and prone lying as their posture while using phone, 1.6% (n=4) were using supine lying as their posture while using a phone.

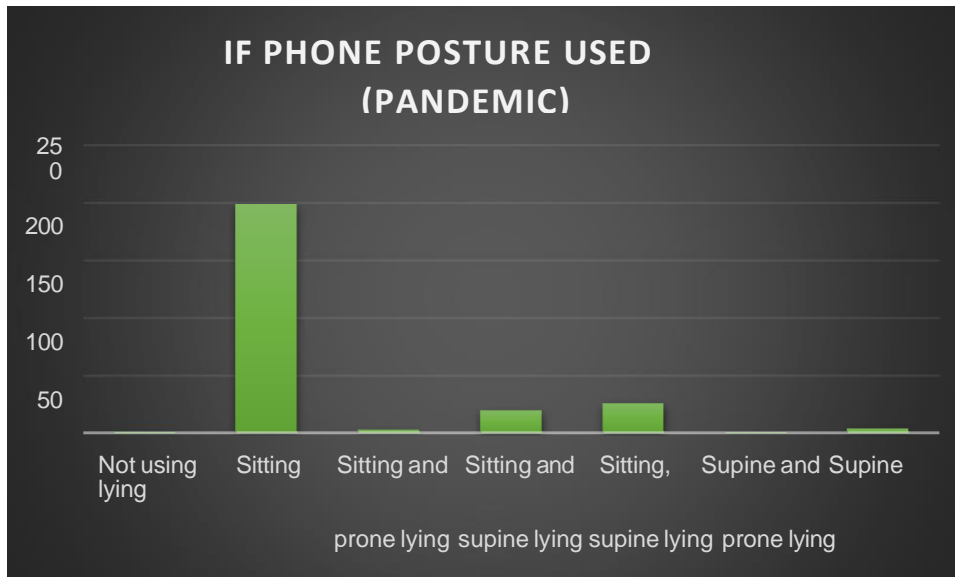


FIGURE NO. 18

WORKING ACTIVITIES (PRE- COVID)			
	Frequency	Percent	
Valid	Intense physical exertion	12	4.7
	Paper correction or sitting	40	15.7
	Writing on board	84	33.1
	Writing on board and paper correction or	103	40.6

sitting		
Writing on board, paper correction or sitting and intense physical exertion	15	5.9
Total	254	100.0

TABLE NO. 19

Table no. 19 shows the distribution of working activities of teachers(pre-covid) where 4.7% (n=12) were doing intense physical exertion, 15.7% (n=40) were doing paper correction or sitting, 33.1% (n=84) were writing on board, 40.6% (n=103) were writing on board and paper correction or sitting, 5.9% (n=15) were writing on board, paper correction or sitting and intense physical exertion.

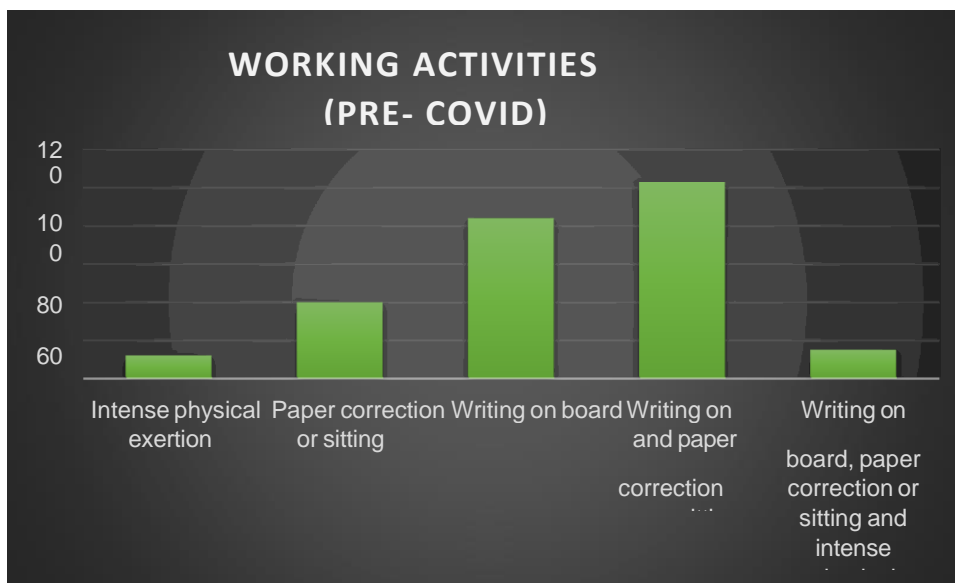


FIGURE NO.19

WORKING ACTIVITIES (PANDEMIC)		
	Frequency	Percent
Valid		
Using a laptop	46	18.1
Using a laptop along with a board	48	18.9
Using a laptop and using a laptop along with board	14	5.5
Using a laptop and using a phone	41	16.1
Using a laptop and using a phone and using a laptop along with a board	11	4.3
Using a phone	94	37.0
Total	254	100.0

TABLE NO. 20

Table no. 20 shows the distribution of working postures used by teachers (pandemic) where 18.1% (n=46) were using a laptop, 18.9% (n=48) were using a laptop along with a board, 5.5% (n=14) were using a laptop and using a laptop along with board, 16.1% (n=41) were using a laptop and using a phone, 4.3%

(n=11) were using a laptop and using a phone and using a laptop along with a board, 37.0% (n=94) were using a phone.

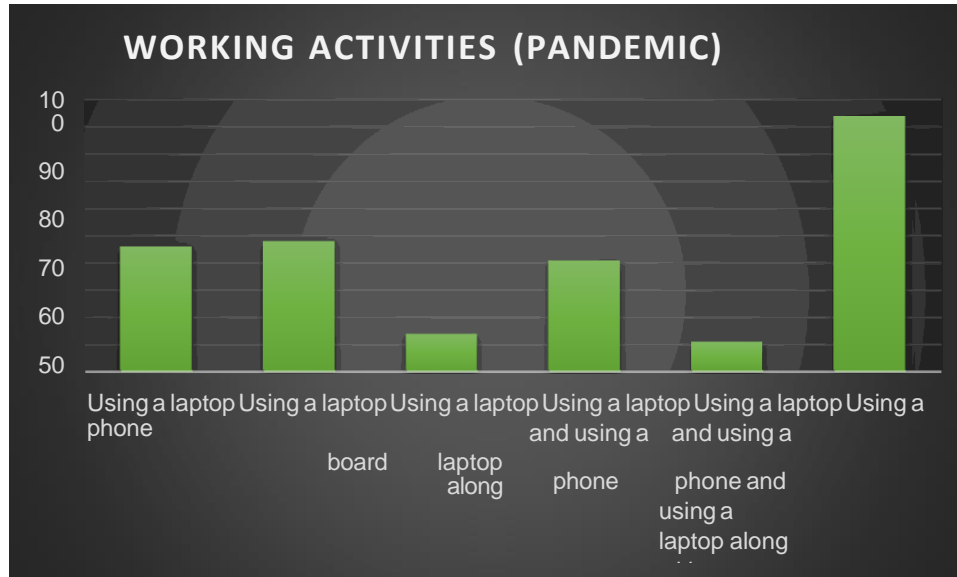


FIGURE NO. 20

PREPARATION OF THE CLASS DONE BY (PRE- COVID)		
	Frequency	Percent
Books	122	48.0
Books and phone	53	20.9
Laptop	2	.8
Laptop and books	25	9.8
Laptop and phone	3	1.2
Laptop books and phone	37	14.6
Phone	12	4.7
Total	254	100.0

TABLE NO. 21

Table no. 21 shows the distribution of preparation of the class done by the teachers (pre- covid) where 48.0% (n=122) were using books, 20.9% (n=53) were using books and phone, 0.8% (n=2) were using laptop, 9.8% (n=25) were using laptop and books, 1.2% (n=3) were using laptop books and phone, 4.7% (n=12) were using phone.

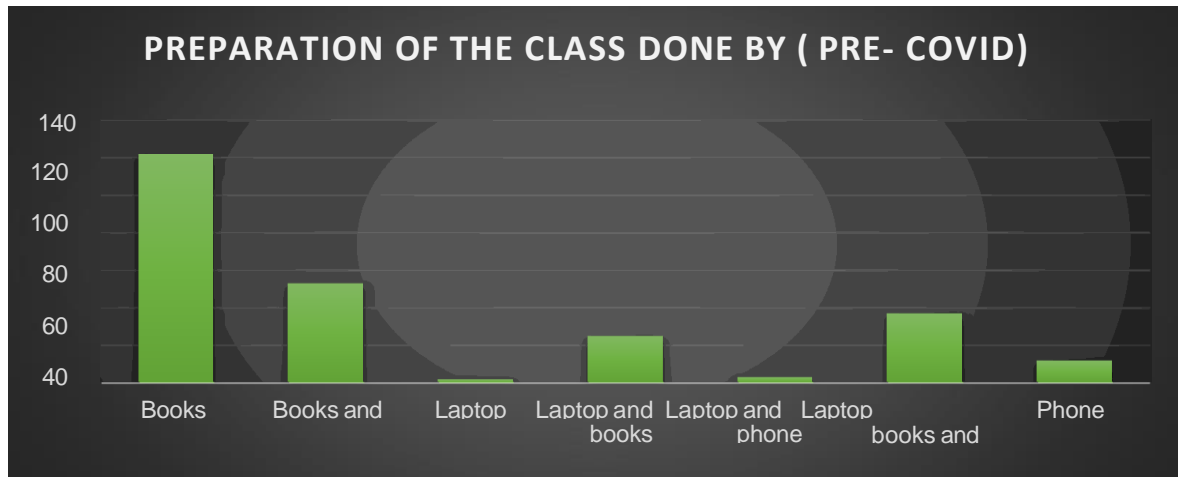


FIGURE NO. 21

PREPARATION OF THE CLASS DONE BY (PANDEMIC)		
	Frequency	Percent
Books	66	26.0
Books and phone	53	20.9
Laptop	13	5.1
Laptop and books	16	6.3
Laptop and books and phone	56	22.0
Laptop and phone	12	4.7
Phone	38	15.0
Total	254	100.0

TABLE NO. 22

Table no. 22 shows the distribution of preparation of the class done by the teachers (pandemic) where 26.0% (n=66) were using books, 20.9% (n=53) were using books and phone, 5.1% (n=13) were using laptop, 6.3% (n=16) were using laptop and books, 22.0% (n=56) were using laptop books and phone, 4.7% (n=12) were using laptop and phone, 15.0% (n=38) were using phone.

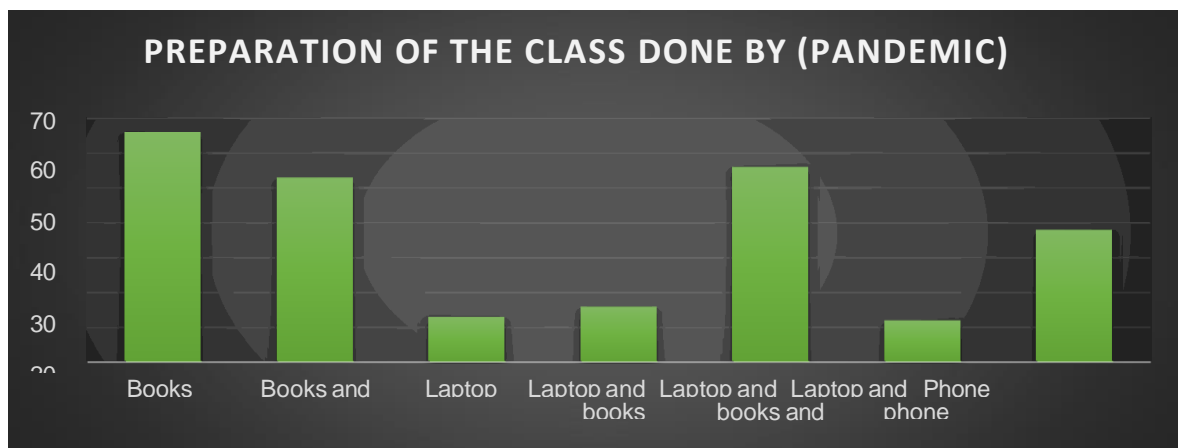


FIGURE NO. 22

ARE YOU COMFORTABLE WITH YOUR WORKING POSTURE (PRE-COVID)			
		Frequency	Percent
Valid	No	12	4.7
	Yes	242	95.3
	Total	254	100.0

TABLE NO.23

Table no. 23 shows the distribution of the teachers if they were comfortable with their working posture (pre-covid) where 4.7% (n=12) were not comfortable with their working posture, 95.3% (n=242) were comfortable with their working posture.



FIGURE NO. 23

ARE YOU COMFORTABLE WITH YOUR WORKING POSTURE (PANDEMIC)			
		Frequency	Percent
Valid	No	36	14.2
	Yes	218	85.8
	Total	254	100.0

TABLE NO. 24

Table no.24 shows the distribution of the teachers if they were comfortable with their working posture (pandemic) where 14.2% (n=36) were not comfortable with their working posture, 85.8% (n=218) were comfortable with their working posture.

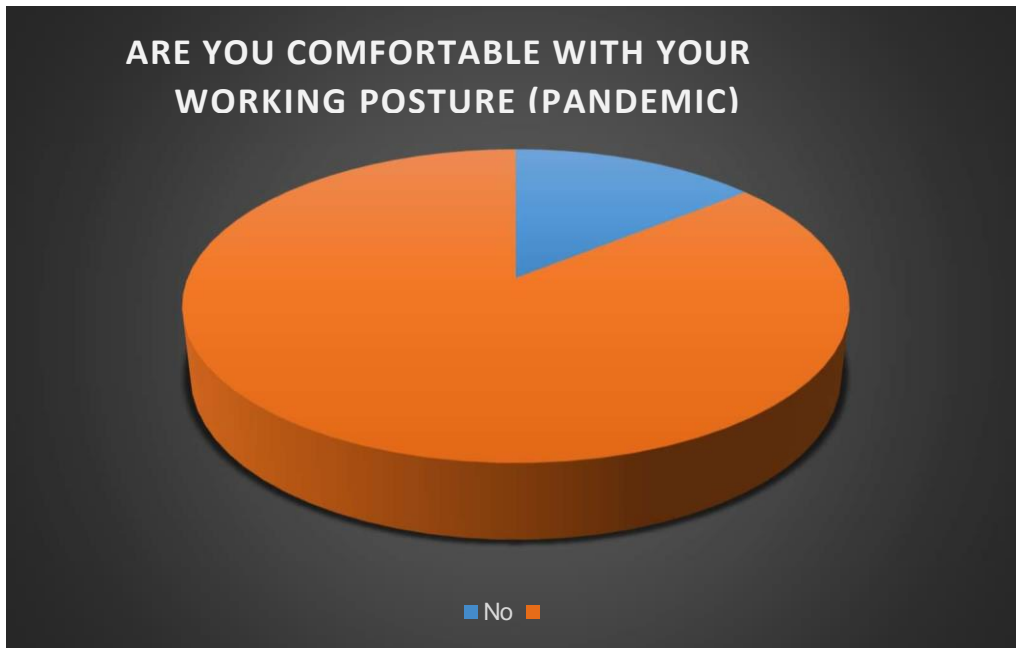


FIGURE NO. 24

ANY PHYSICAL EXERCISE (PRE-COVID)			
		Frequency	Percent
Valid	No	100	39.4
	Yes	154	60.6
	Total	254	100.0

TABLE NO. 25

Table no. 25 shows the distribution of teachers doing physical exercise (pre- covid) where 39.4% (n=100) were not doing any physical exercise, 60.6% (n=154) were doing physical exercise.



FIGURE NO. 25

ANY PHYSICAL EXERCISE (PANDEMIC)			
		Frequency	Percent
Valid	No	109	42.9
	Yes	145	57.1
	Total	254	100.0

TABLE NO. 26

Table no. 26 shows the distribution of teachers doing physical exercise (pandemic) where 42.9% (n=109) were not doing any physical exercise, 57.1% (n=145) were doing physical exercise.

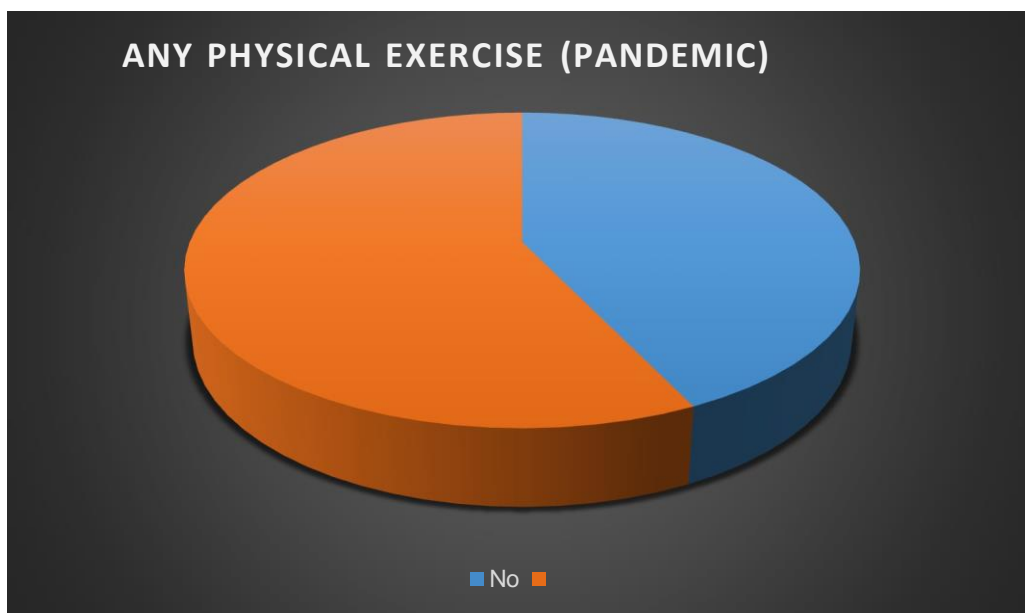


FIGURE NO. 26

PHYSICAL EXERCISE UNDER SUPERVISION (PRE-COVID)			
		Frequency	Percent
Valid	Not Applicable	96	37.8
	No	76	29.9
	Yes	82	32.3
	Total	254	100.0

TABLE NO. 27

Table no. 27 shows the distribution of teachers doing physical exercise with supervision (pre-covid), where 37.8% (n=96) were not applicable as they were not doing any physical exercise (pre- covid), 29.9% (n=76) were not doing physical exercise under supervision, 32.3% (n=82) were doing physical exercise under supervision.

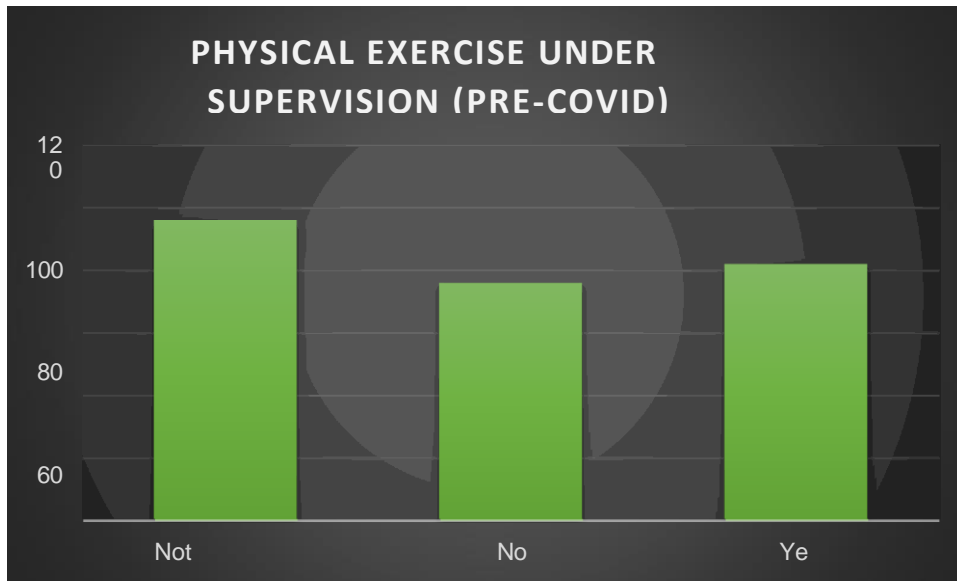


FIGURE NO. 27

PHYSICAL EXERCISE UNDER SUPERVISION (PANDEMIC)			
		Frequency	Percent
Valid	Not Applicable	97	38.2
	No	86	33.9
	Yes	71	28.0
	Total	254	100.0

TABLE NO. 28

Table no. 28 shows the distribution of teachers doing physical exercise with supervision (pandemic), where 38.2% (n=97) were not applicable as they were not doing any physical exercise (pandemic), 33.9% (n=86) were not doing physical exercise under supervision, 28.0% (n=71) were doing physical exercise under supervision.

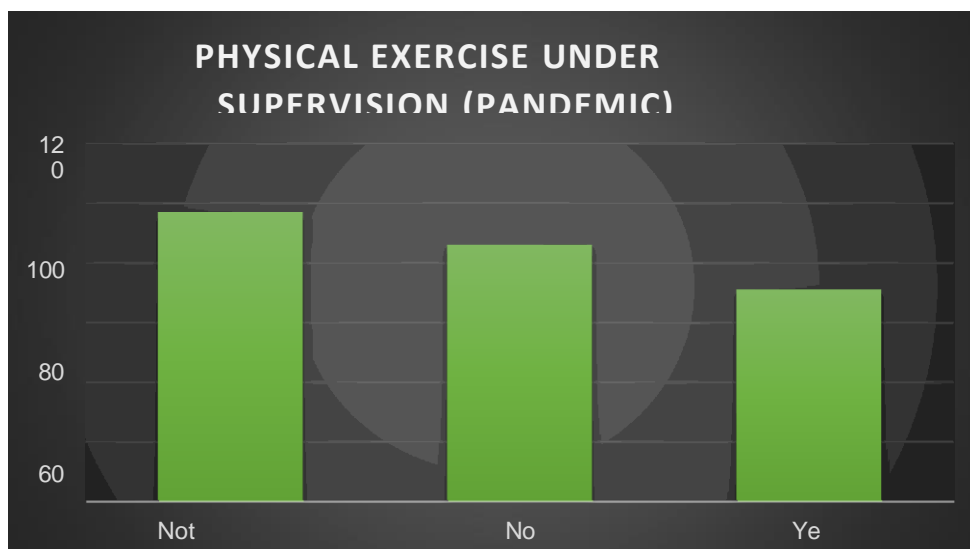


FIGURE NO. 28

NO. OF HOURS EXERCISED PER DAY (PRE- COVID)		
	Frequency	Percent
1 to 2 hours	15	5.9
30 min to 1 hour	46	18.1
Less than 30 min	98	38.6
Not Applicable	95	37.4
Valid Total	254	100.0

TABLE NO. 29

Table no. 29 shows the distribution of no. of hours exercised by teachers per day (pre-covid) where 5.9% (n=15) were doing physical exercise for 1 hour to 2 hours per day, 18.1% (n=46) were doing physical exercise for 30 minutes to 1 hour per day, 38.6% (n=98) were doing physical exercise for less than 30 minutes per day, 37.4% (n=95) were not applicable as they were not doing any physical exercise (pre-covid).

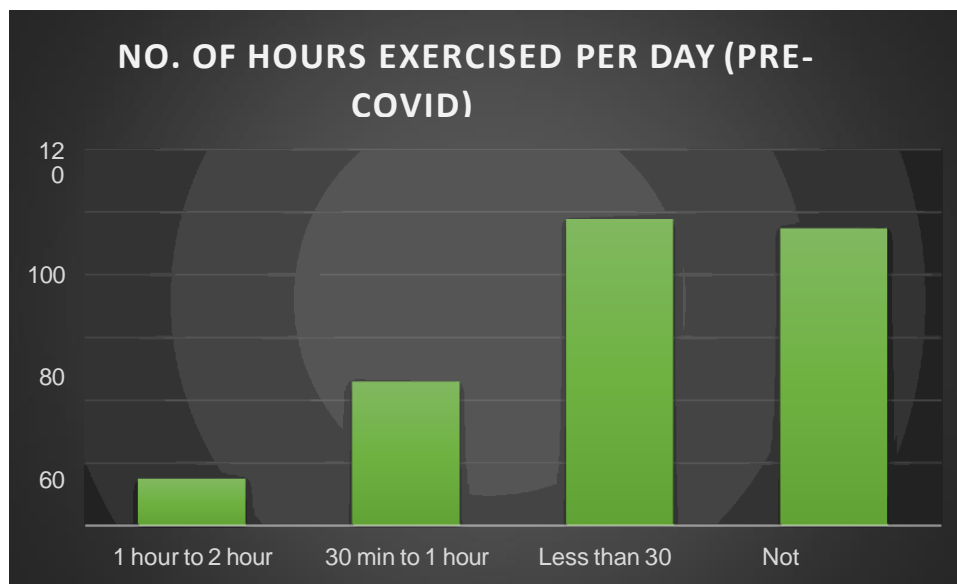


FIGURE NO. 29

NO. OF HOURS EXERCISED PER DAY (PANDEMIC)		
	Frequency	Percent
1 hour to 2 hour	11	4.3
30 min to 1 hour	47	18.5
Less than 30 min	97	38.2
Not Applicable	99	39.0
Valid Total	254	100.0

TABLE NO. 30

Table no. 30 shows the distribution of no. of hours exercised by teachers per day (pandemic) where 4.3% (n=11) were doing physical exercise for 1 hour to 2 hours per day, 18.5% (n=47) were doing physical

exercise for 30 minutes to 1 hour per day, 38.2% (n=97) were doing physical exercise for less than 30 minutes per day, 39.0% (n=99) were not applicable as they were not doing any physical exercise (pandemic).

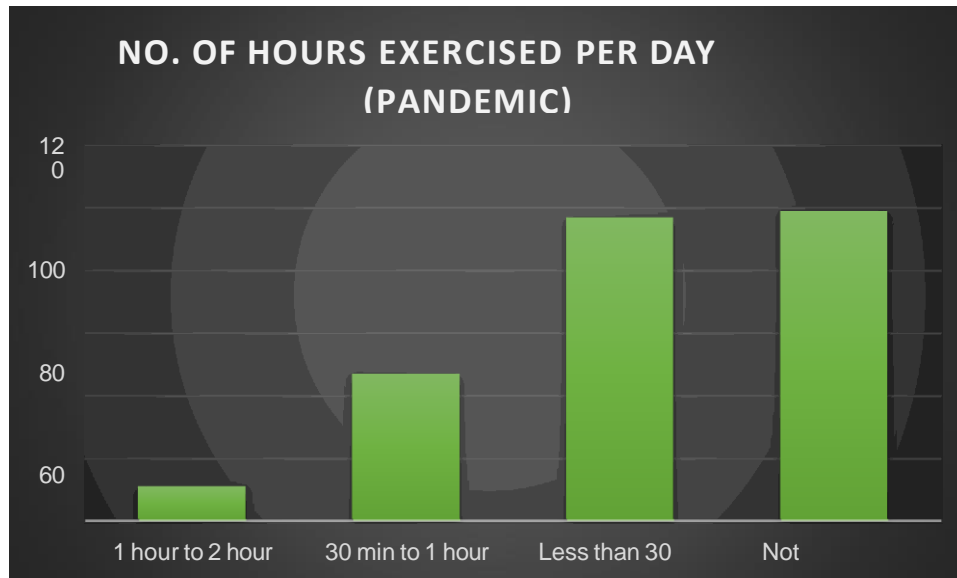


FIGURE NO. 30

NO. OF DAYS EXERCISED PER WEEK (PRE- COVID)		
	Frequency	Percent
Valid	1-3 day	69
	4-5 days	47
	6 – 7 days	43
	Not Applicable	95
	Total	254
		27.2
		18.5
		16.9
		37.4
		100.0

TABLE NO. 31

Table no. 31 shows the distribution of no. of days exercised per week by the teachers (pre- covid) where 27.2% (n=69) were doing exercise for 1-3 days per week, 18.5% (n=47) were doing exercise for 4-5 days per week, 16.9% (n=43) were doing exercise for 6-7 days per week, 37.4% (n=95) were not applicable as they were not doing exercise (pre-covid).

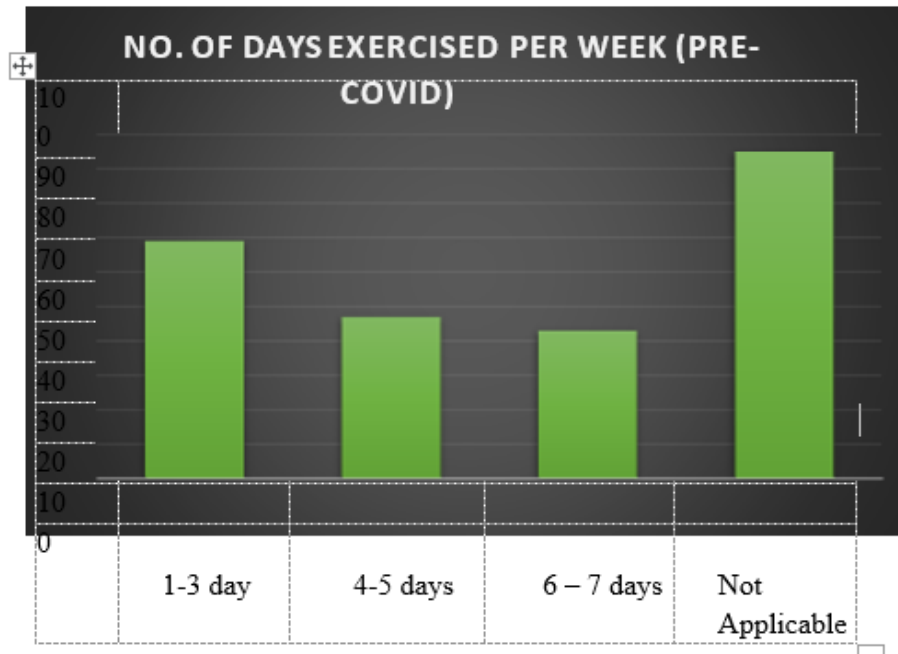


FIGURE NO. 31

NO. OF DAYS EXERCISED PER WEEK (PANDEMIC)			
		Frequency	Percent
Valid	1-3 day	65	25.6
	4-5 days	53	20.9
	6-7 days	40	15.7
	NA	96	37.8
	Total	254	100.0

TABLE NO.32

Table no. 32 shows the distribution of no. of days exercised per week by the teachers (pandemic) where 25.6% (n=65) were doing exercise for 1-3 days per week, 20.9% (n=53) were doing exercise for 4-5 days per week, 15.7% (n=40) were doing exercise for 6-7 days per week, 37.8% (n=96) were not applicable as they were not doing exercise (pandemic).

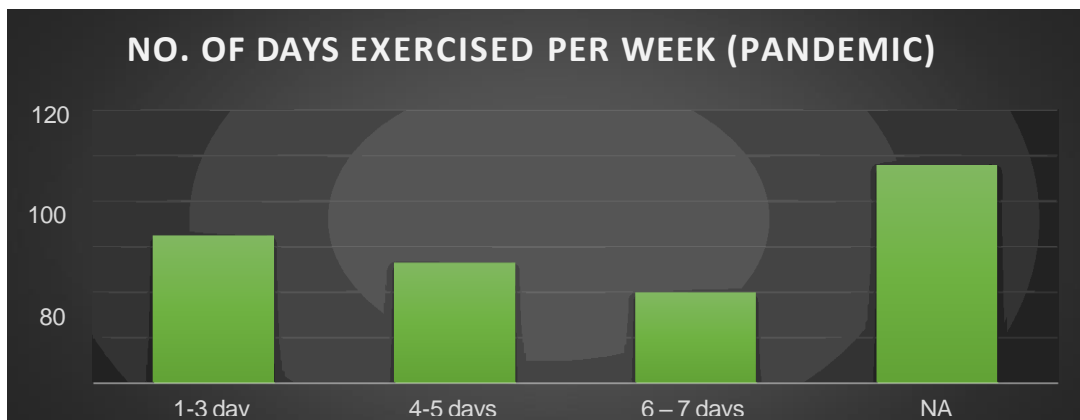


FIGURE NO.32

MUSCULOSKELETAL PAIN (PRE- COVID)	
	Frequency
Neck	20
Shoulder	29
Upper back	24
Elbow	11
Wrist and hand	15
Lower back	49
Hips or thigh	12
Knee	40
Ankle or feet	36

TABLE NO.33

Table no. 33 shows the distribution of musculoskeletal pain (pre- covid) in teachers where 20 teachers had neck pain, 29 teachers had shoulder pain, 24 teachers had upper back pain, 11 teachers had elbow pain, 15 teachers had wrist and hand pain, 49 teachers had lower back pain, 12 teachers had hips or thigh pain, 40 teachers had knee pain, 36 teachers had ankle pain.

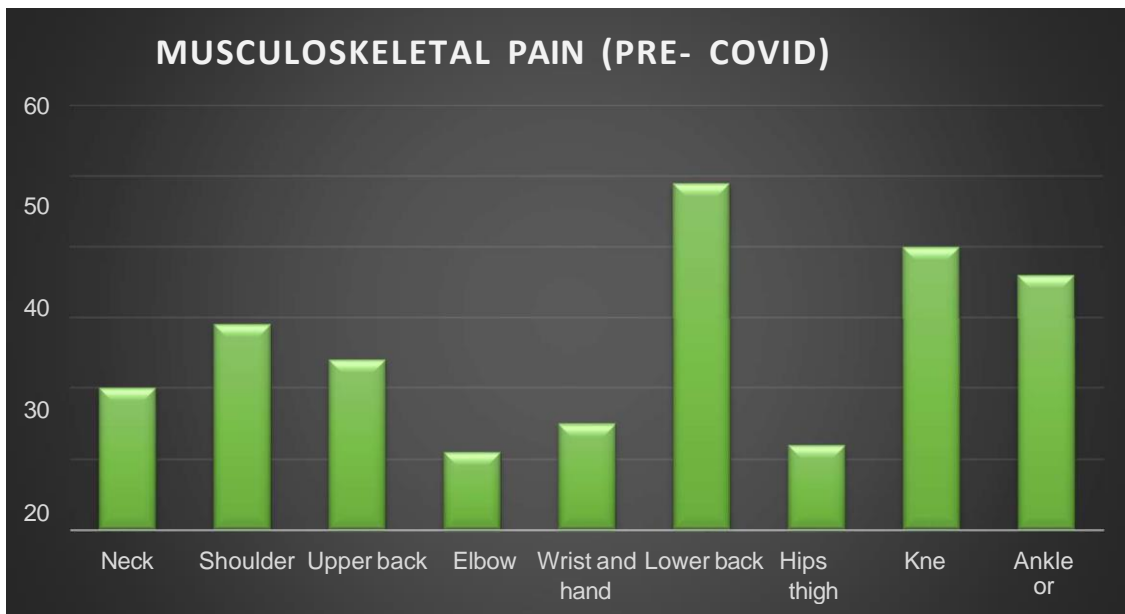


FIGURE NO. 33

MUSCULOSKELETAL PAIN (PANDEMIC)	
	Frequency
Neck	33
Shoulder	36
Upper back	31
Elbow	14
Wrist and hand	18
Lower back	55

Hips or thigh	20
Knee	40
Ankle or feet	31

TABLE NO. 34

Table no. 34 shows the distribution of musculoskeletal pain (pandemic) in teachers where 33 teachers had neck pain, 36 teachers had shoulder pain, 31 teachers had upper back pain, 14 teachers had elbow pain, 18 teachers had wrist and hand pain, 55 teachers had lower back pain, 20 teachers had hips or thigh pain, 40 teachers had knee pain, 31 teachers had ankle pain.

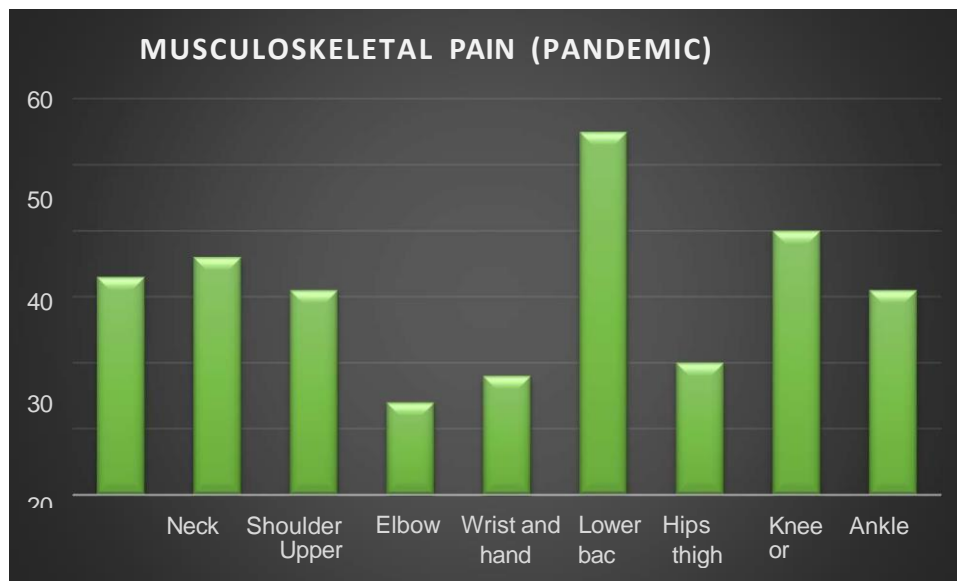


FIGURE NO. 34

MUSCULOSKELETAL PAIN		
Frequency		
	Pre-covid	Pandemic
Neck	20	33
Shoulder	29	36
Upper back	24	31
Elbow	11	14
Wrist and hand	15	18
Lower back	49	55
Hips or thigh	12	20
Knee	40	40
Ankle or feet	36	31

TABLE NO. 35

Table no.35 shows the distribution of musculoskeletal pain in teachers (pre-covid vs pandemic) where 20 vs 30 suffering from neck pain, 29 vs 36 suffering from shoulder pain, 24 vs 31 suffering from upper back pain, 11 vs 14 suffering from elbow pain, 15 vs 18 suffering from wrist and hand pain, 49 vs 55 suffering from lower back pain, 12 vs 20 suffering from hips or thigh pain, 40 vs 40 suffering from knee pain, 36 vs 31 suffering from ankle or feet pain.

from lower back pain, 12 vs 20 suffering from hips or thigh pain, 40 vs 40 suffering from knee pain, 36 vs 31 suffering from ankle or feet pain.

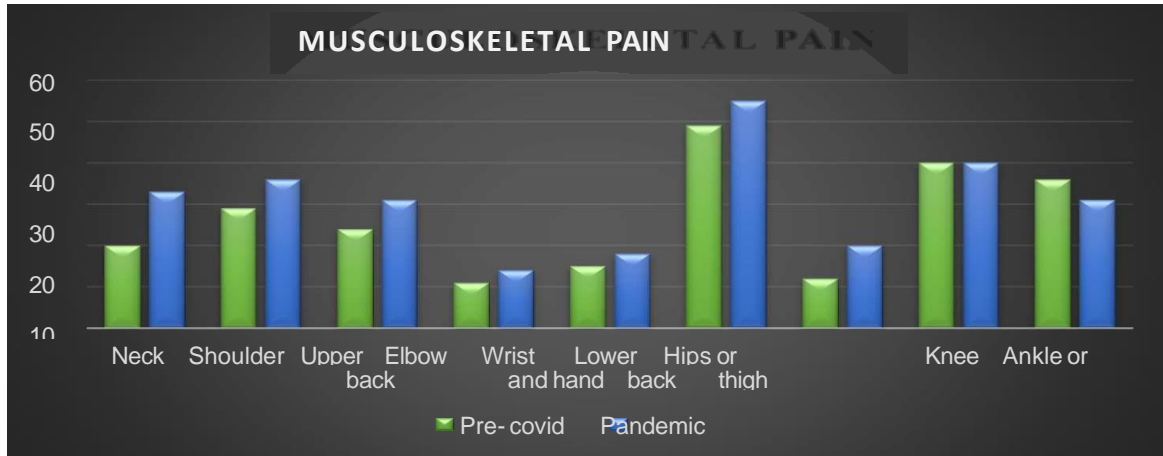


FIGURE NO. 35

HAVE YOU TAKEN ANY TREATMENT FOR YOUR MUSCULOSKELETAL PAIN			
		Frequency	Percent
Valid	No	244	96.1
	Yes	10	3.9
	Total	254	100.0

TABLE NO. 36

Table no. 36 shows the distribution of teachers if they have taken any treatment for musculoskeletal pain where 96.1% (n=244) did not take any treatment, 3.9% (n=10) took treatment.

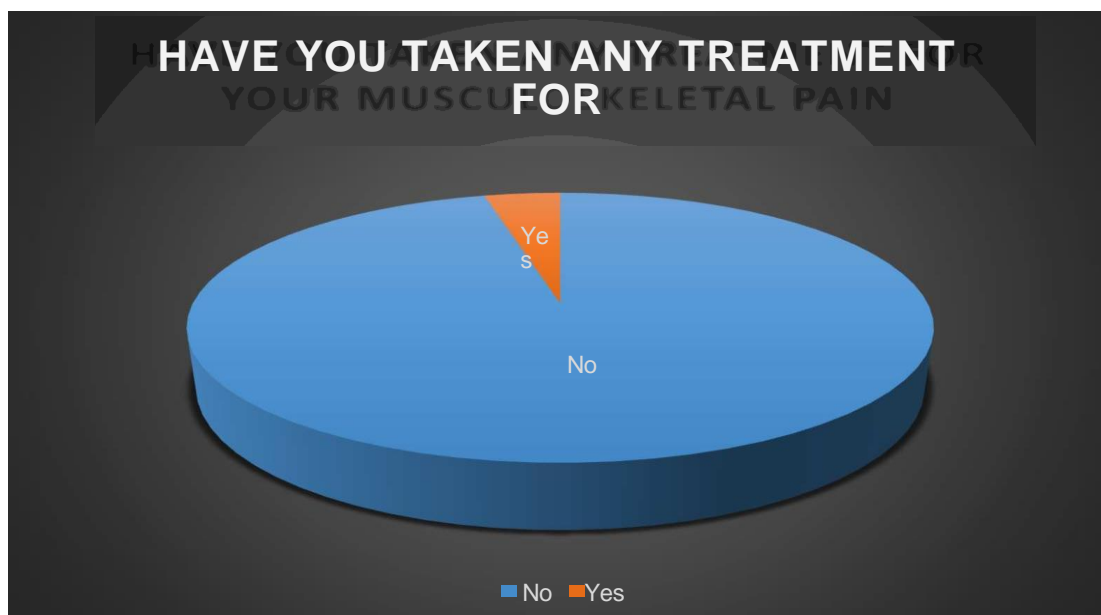


FIGURE NO. 36

MUSCULOSKELETAL PAIN PRE COVID				
RISK FACTORS	PRE COVID		PANDEMIC	
	ODDS RATIO (95% CI)	EXPOSURE	ODDS RATIO (95% CI)	EXPOSURE
Average days worked (< 5 days)	0.806	Less Likelihood	1.289	High Likelihood
Average days worked (> 5 days)	0	Less Likelihood	0	Less Likelihood
Average hours of work per day (>5 hours)	1.322	High Likelihood	1.593	High Likelihood
Average hours of work per day (1-3 hours)	0.1	Less Likelihood	2.444	High Likelihood
Average hours of work per day (3-5 hours)	0	Less Likelihood	0	Less Likelihood
Average duration of rest taken per day (> 3 hours)	1.586	High Likelihood	2.291	High Likelihood
Average duration of rest taken per day (1 - 3 hours)	0.463	Less Likelihood	1.764	High Likelihood
Average duration of rest taken per day (No rest)	0	Less Likelihood	0	Less Likelihood
Working posture (sitting and standing)	0.54	Less Likelihood	0.846	Less Likelihood
Working posture (sitting)	0.159	Less Likelihood	0.796	Less Likelihood
Working posture (standing)	0	Less Likelihood	0	Less Likelihood
Laptop used in sitting	0.00001413	Less Likelihood	1535246703	High Likelihood
Laptop used in sitting and prone lying	24.061	High Likelihood	149443971.9	High Likelihood

MUSCULOSKELETAL PAIN PRE COVID		
	PRE COVID	PANDEMIC

RISK FACTORS	ODDS RATIO (95% CI)	EXPOSURE	ODDS RATIO (95% CI)	EXPOSURE
Laptop used in sitting and supine lying	10.439	High Likelihood	4661901069	High Likelihood
Laptop used in sitting, supine lying and prone lying	0	Less Likelihood	0	Less Likelihood
Books used in Prone lying	0.000007464	Less Likelihood	121396380.4	High Likelihood
Books used in sitting	0.000001991	Less Likelihood	0.035	Less Likelihood
Books used in sitting and prone lying	0.000000000000001053	Less Likelihood	0.831	Less Likelihood
Books used in sitting and supine lying	0.0000001427	Less Likelihood	0.0000000004042	Less Likelihood
Books used in sitting, supine lying and prone lying	0.49	Less Likelihood	4443799.213	High Likelihood
Books used in supine lying and prone lying	0.00000002207	Less Likelihood	0	Less Likelihood
Books used in supine lying	0	Less Likelihood	0	Less Likelihood
Phone used in prone lying	0	Less Likelihood	0	Less Likelihood
Phone used in sitting	0.00002483	Less Likelihood	30.321	High Likelihood
Phone used in sitting and prone lying	516599892.9	High Likelihood	0.666	Less Likelihood

MUSCULOSKELETAL PAIN PRE COVID				
RISK FACTORS	PRE COVID		PANDEMIC	
	ODDS RATIO (95% CI)	EXPOSURE	ODDS RATIO (95% CI)	EXPOSURE
Phone used in sitting and supine	0.00001942	Less Likelihood	3.718	High Likelihood

lying				
Phone used in sitting, supine lying and prone lying	0.000001454	Less Likelihood	64.590	High Likelihood
Phone used in supine lying	0	Less Likelihood	0	Less Likelihood
Phone used in supine lying and prone lying	0	Less Likelihood	17672235980	High Likelihood
Working activities (intense physical exertion)	2560098.484	High Likelihood	0	Less Likelihood
Working activities (using a laptop)	0	Less Likelihood	90804131.33	High Likelihood
Working activities (using a laptop along with board)	0	Less Likelihood	1.678	High Likelihood
Working activities (using a laptop and using a laptop along with board)	0	Less Likelihood	0.534	Less Likelihood
Working activities (using a laptop, using a phone and using a laptop along with board)	0	Less Likelihood	0.469	Less Likelihood
Working activities (using a phone)	0	Less Likelihood	0	Less Likelihood
Working activities (paper correction or sitting)	1.543	High Likelihood	0	Less Likelihood

MUSCULOSKELETAL PAIN PRE COVID				
RISK FACTORS	PRE COVID		PANDEMIC	
	ODDS RATIO (95% CI)	EXPOSURE	ODDS RATIO (95% CI)	EXPOSURE
Working activities (writing on board)	3.047	High Likelihood	0	Less Likelihood
Working activities (writing on board or paper correction or sitting)	1.126	High Likelihood	0	Less Likelihood
Working activities (writing on board and paper correction or sitting and intense physical exertion)	0	Less Likelihood	0	Less Likelihood
Preparation of the class done by (books)	1.226	High Likelihood	1.472	High Likelihood
Preparation of the class done by (books and phone)	1.333	High Likelihood	1.127	High Likelihood
Preparation of the class done by (Laptop)	659544.234	High Likelihood	0.244	Less Likelihood
Preparation of the class done by (laptop and books)	6575570841	High Likelihood	0.636	Less Likelihood
Preparation of the class done by (laptop and phone)	8661518.785	High Likelihood	0.144	Less Likelihood
Preparation of the class done by (laptop, books and phone)	2.925	High Likelihood	0.374	Less Likelihood
Preparation of the class done by (phone)	0	Less Likelihood	0	Less Likelihood

MUSCULOSKELETAL PAIN PRE COVID				
RISK FACTORS	PRE COVID		PANDEMIC	
	ODDS RATIO (95% CI)	EXPOSURE	ODDS RATIO (95% CI)	EXPOSURE

Are you comfortable with your working environment (no)	0.161	Less Likelihood	0.914	Less Likelihood
Are you comfortable with your working environment (yes)	0	Less Likelihood	0	Less Likelihood
Any physical exercise (no)	734305.757	High Likelihood	0.668	Less Likelihood
Any physical exercise (yes)	0	Less Likelihood	0	Less Likelihood
Supervision (no)	0.484	Less Likelihood	1.992	High Likelihood
Supervision (yes)	0	Less Likelihood	0	Less Likelihood
No. of hours exercised per day (1 hour to 2 hour)	724569.755	High Likelihood	544600000000	High Likelihood
No. of hours exercised per day (30 min to 1 hour)	2401298.237	High Likelihood	4.328	High Likelihood
No. of hours exercised per day (Less than 30 min)	459824.825	High Likelihood	4.571	High Likelihood
No. of days exercised per week (1-3 day)	1.751	High Likelihood	0.139	Less Likelihood
No. of days exercised per week (4-5 days)	14.024	High Likelihood	0.243	Less Likelihood
No. of days exercised per week (6 – 7 days)	0	Less Likelihood	0.293	Less Likelihood

TABLE NO. 37

Table no.37 shows the distribution of significance of risk factors influencing the musculoskeletal pain before the pandemic and during the pandemic.

MUSCULOSKELETAL PAIN HIGHLY LIKELY DUE TO	
PRE- COVID	PANDEMIC
Phone used in sitting and prone lying	Average days worked per week (<5 days)
Working activities (intense physical exertion)	Average hours of work per day (1-3 hours)

Working activities (paper correction or sitting)	Average duration of rest taken per day (1-3 hours)
Writing activities (writing on board)	Laptop using in sitting
Preparation of class done by (laptop)	Books used in prone lying
Preparation of class done by (laptop and books)	Books used in sitting, supine lying and prone lying
Preparation of class done by (laptop, books and phone)	Phone used in sitting
No physical exercise	Phone used in supine lying and sitting
No. of days exercised per week (1-3 days)	Phone used in sitting, supine lying and prone lying
No. of days exercised per week (4-5 days)	Phone used in supine lying and prone lying
	Working activities (using a laptop)
	Using a laptop along with board
	Physical exercise without supervision

TABLE NO. 38

Table no. 38 shows the distribution of musculoskeletal pain was highly likely to be seen during the pre-covid and the pandemic phase where the risk factors differed from the pre-covid and the pandemic phase.

MUSCULOSKELETAL PAIN HIGHLY LIKELY DUE TO (PRE- COVID AND PANDEMIC)
Average hours of work per days (>5days)
Average hours of rest taken per day (>3 hours)
Laptop used in sitting and prone lying
Laptop using in sitting and supine lying
Preparation of the class done by (books)
Preparation of the class done by (books and phone)
No. of hours exercised per day (30 minutes to 1 hour)
No. of hours exercised per day (less than 30 minutes)

TABLE NO. 39

Table no. 39 shows the distribution of musculoskeletal pain that was highly likely to be seen in both pre-covid and pandemic phase.

- Any working posture did not cause any effect on musculoskeletal pain.
- Working environment did not cause any effect on musculoskeletal pain

Discussion

The primary aim of the study was to find the prevalence of musculoskeletal disorders in school teachers during the pandemic of Covid-19 while working from home, based on which a survey was conducted on

254 teachers.

The previous researches on work related musculoskeletal disorders in school teachers showed the presence of pain and discomfort in regions such as neck, shoulder, lower back and knee.

During the pandemic there were changes in the teaching patterns and the setup of the class leading to numerous issues. Due to such a long break during the pandemic there are chances that the pre-existing musculoskeletal issues might have subsided due to adequate rest. As people were trying to adapt to the lockdown some of them started with some new hobbies which might also have caused to increase the pre-existing condition or might lead to a new one.

In school teachers the working posture differs from person to person and also from the type of posture they use. Teachers taking classes online do not have necessary ergonomic arrangement at home for jobs involving sitting for multiple hours causing musculoskeletal disorders. Sitting for long hours without adequate ergonomics might have led to increasing the severity of the condition or arising of a new one. Standing for long hours without adequate rest and changes in the working environment also leads to musculoskeletal disorders.

The studies before the pandemic showed that the most common regions of musculoskeletal pain or disorders were the neck, shoulder, lower back and knee.

Teachers not taking treatment for any musculoskeletal disorders due to inadequate time or knowledge about necessary treatment required for that particular pain leads to aggravation of pain. Pain in a particular region can cause in arising of pain in other regions due to alteration or compensation of using that particular area.

Physical exercise without any supervision causes musculoskeletal disorders as the teachers perform exercise without any knowledge of a particular exercise or activity that they are performing causing in injury or pain in the certain regions.

Our study showed the prevalence and risk factors in musculoskeletal disorders in areas such as lower back, knee, ankle and foot and shoulders, where the pre-covid and the pandemic phase did affect the pain as there was an increase in the number of school teachers affected with musculoskeletal disorders during the pandemic. Criteria's such as days worked per week, hours of work per day, duration of rest, posture used while using a laptop, phone or a book, working activities, and physical activities without supervision.

Further recommendations can be done to find out the risk factors in school teachers and also the effectiveness of ergonomics in school teachers or to find the effect of health education and promotion programs aiming to encourage maintaining ideal weights and wearing flat medical shoes to reduce the MSD in school teachers. To find the effect of planning exercise sessions and ergonomic classes to teach how to avoid/decrease Musculoskeletal disorders. To create awareness about work related musculoskeletal disorders.

Conclusion

From the present study, we conclude the prevalence and risk factors of musculoskeletal disorders in school teachers during pre-covid and pandemic phases in Dakshina Kannada District, Karnataka and hence, they are more prone to musculoskeletal disorders due to their profession of school teaching.

Limitation

The sample size was limited as questionnaire method was adopted, bias pertaining non response or wrong response were present. The study was based completely on the questionnaire, so whatever the participants

felt understood according to that the results are concluded. The main limitation of the present study was that it was cross-sectional design and all risk factors assumed as being important were predictive and seen as exploratory rather than an examination of pain and causal factors.

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