

## Occupational Health Program for High Risk of Musculoskeletal Pain among Primary School Teachers

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### Abstract

The term “musculoskeletal pain” here refers to work-related injuries that lasted more than a day, affected daily activities, and happened during work hours. **Aim:** The present study aimed to evaluate the effect of occupational health program for high risk of musculoskeletal pain among primary school teachers. **Design:** A quasi-experimental design **Settings:** This study was conducted at four governmental preparatory schools, for boys and girls were located in the El Waily Zone at El - Abbassia District, Cairo Governorate. **Sample:** A purposive sample was used to conduct this study. The total sample size included 93 teachers (44 teachers from Esmail Elkabani, & El Salam school and 49 from Ghamra, & El Abbassia preparatory school), they were chosen according to inclusion & exclusive criteria. **Tools:** Four tools were used in the present study included a self administered questionnaire to assess teachers’ general characteristics, an observational checklist was used for assessing the body posture and workstation layout, teachers’ practices toward ergonomics exercises, Nordic Musculoskeletal Questionnaire (NMQ) and anthropometric measurement to assess body mass index. **Results:** The results shows that 44.6% of primary school teachers their age started from 30 and above with the mean  $\pm$ SD36.4 $\pm$ 2.6, 58.5% of them were male and 78.7% of the studied teachers were suffering from musculoskeletal pain. There was a highly statistically significant differences among primary school teachers according to their total satisfactory knowledge about skeletal pain. The same results indicates that there was a highly statistically significant differences between the study sample according to their total practices pre & post program at  $P < 0.001$  with positive relation between teachers total knowledge in relation to their total practices pre & post program implementation. **Conclusion:** The occupational health program had a statistically significant improvement in primary school teacher’s knowledge and practices at post program phases compared to pre program implementation. **Recommendations:** Increase the awareness of work-related musculoskeletal pain prevention and management among primary school teachers and apply ergonomics training program aiming to maintaining optimal posture and teach of them how to avoid/decrease MSDs while working at school through the role of school health nurse.

**Key words:** Occupational Health Program, Primary Schools Teachers, Musculoskeletal Pain.

### Introduction

Musculoskeletal pain (MP) is characterized by the presence of discomfort,

disability or persistent pain in the joints, muscles, tendons and other soft parts, caused or aggravated by repeated movements and prolonged awkward or forced body postures. The term “musculoskeletal disorders” refers to work-related injuries that lasted more than

a day, affected daily activities, and happened during work hours. Musculoskeletal disorders represent one of the most common and most costly occupational health problems in both developed and developing countries. With social production highly mechanized, work-related musculoskeletal disorders (WMSDs) are becoming a major health problem encountered by professionals **Cardoso et al.,(2015)**.

Musculoskeletal disorders (MSDs) are put into different categories according to pain location. One category is upper limb disorders which include any injury or disorder located from fingers to shoulder or the neck. Another category of musculoskeletal pain disorder is lower limb disorders which include injury and disorders from hips to toes **Samad et al., (2015)**. The common musculoskeletal disorders in school teachers are; neck, shoulder, knee problems& low back pain is a suspected musculoskeletal disorder and most common in both heavy and light manual working, especially with school teachers triggered by a combination of chronic over use psycho-social determinants, and other health general factors, which together culminate in varying degrees of pain and disability. Awkward postures such as kneeling or squatting are specific physical activities encountered in many occupations **Korkmaz et al.,( 2016)**.

The main occupational risk factors related to the workplace are lifting and handling of the teachers, uncomfortable and immobile postures, inadequate equipment, improper workplace design, heavy physical work, and inadequate work organization, also other factors such as physical activity, muscular weakness, smoking, obesity and psychological factors **WHO ,(2013)**.

School teachers in general, have been demonstrated relative to other occupational groups, to report a high prevalence of MP, with prevalence rates of between 40%and 95%. During the course of work, teachers may be subjected to conditions that cause

physical health problems (**Chiu and Lam, 2014**). The work of a teacher does not only involve teaching students, but also preparing lessons, students' work and being involved in extracurricular activities such as sports . These may cause teachers to suffer adverse mental and physical health issues due to the variety of job functions. 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 board. Poor posture and improper techniques of lifting or carrying are the two very randomly selected from a list of south Cairo educational common causes of low back pain. Meanwhile, lifting heavy loads which ranked as the main contributing factor involved materials such as books, overhead projectors and other equipment **Tessa, ( 2010)& (Maguire and Connell, 2012)**.

The role of the occupational health service is to provide advice for primary school teachers for issues in which work has an impact on health. Occupational health will provide confidential and impartial advice and support relating to any issue affecting the health and well-being among primary school teachers .Thus, a better understanding of MP multiple causative factors will allow school health nurses to apply the available resources for prevention, early diagnosis and management in the school setting **Patience et al., (2011)**.

#### **Significance of the study:-**

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Teachers face intensive verbal communication, prolonged standing, high volume of workload .Teaching is carried out under unfavorable circumstances, in which teachers mobilize their physical, cognitive, and affective capacity to reach teaching production objectives, over demanding or generating over the effort of their psychophysiological functions. If there is not enough time for recovery the pain symptoms that account for the high level of absenteeism due to health condition in this group of workers are triggered or prompted. Thus, teaching

leads to stress, with consequences to physical and mental health and with an impact on professional performance **Al-Eisa et al.,(2014)**.

In Egypt there is a study about the occupational hazards facing the primary school teachers in Alexandria. The study included 106 teachers working in primary school in Alexandria. Their ages ranged from 20-30 years. This study reported that there was a significant increase of bone ache among primary school teachers in the presence of several jobs ( $X^2 = 27.09$ ,  $p < 0.05$ ). The study also revealed a significant increase of bone ache in teachers having psychological stress ( $X^2 = 35.34$ ,  $p < 0.05$ ) and teachers having job stress ( $X^2 = 28.36$ ,  $p < 0.05$ ) **Ibrahim et al.,(2014)**.

In considering implications of health problems for an individual's fitness to teach, it is important to recognize that some teaching duties involve exposure to potential health hazards. The risk arising from such hazards will vary according to the specific nature of the teaching duties and the environment in which the teacher is working. Teacher training providers and employing organizations have a statutory responsibility to safeguard the health, safety and welfare of teachers, to conduct risk assessments and take steps to address potential hazards and reduce the risk of adverse health effects (**Chong and Chan 2015**).

#### **Aim of the Study:**

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The aim of this study was to evaluate the effect of occupational health program for high risk of musculoskeletal pain among primary school teachers through:

1-Assessing primary school teacher's knowledge & practices related to occupational risk factors for musculoskeletal pain to detect their needs.

2-Developing and implementing the occupational health program for primary school teachers according to their needs.

3-Evaluating the effect of the occupational health program on improving teacher's knowledge, & practices related to WMSDs.

#### **Research hypotheses:**

Occupational health program will improve primary school teacher's knowledge and practices related to risk factors of musculoskeletal pain.

#### **Subjects and Methods:**

**Research design:** A quasi-experimental design was used in this study.

**Setting:** The study was conducted in four governmental preparatory schools, two for boys and two for girls were located in the El Waily Zone at El - A bbassia District. Two schools, namely Esmail El Kabani School and El Salam preparatory school were for Boys, while El Abbassia and Ghamra preparatory school were for Girls. The researcher selected El Waily Zone because it represents the Zone with the highest number of governmental preparatory schools and one of the researchers working as staff at Ain Shames University

**Sample:** A multistage random sampling technique was used to include a representative sample of the study population.

**First stage:** The sampling frame was a list of all governmental primary schools for boys and girls in (Al Abbssia district, Cairo Governorate) which included 11schools , was obtained through the Ministry of Education , four schools will choose randomly for this study (male and females schools) namely Esmail Elkabani, & El Salam school , Ghamra, & El Abbassia preparatory school .

**Second stage:** The numbers of teachers were represented in the previous settings included 44 teachers from Esmail Elkabani, & El Salam School and 49 from Ghamra, & El Abbassia preparatory school.

**Third stage:** A purposive sample of 93 teachers were chosen to participate according to the following inclusion criteria: School teachers with more than 2 years of experience in their current work settings, both males and females, their age ranged from 25 to 50 years old. Exclusion criteria for any recent trauma and injuries, and teachers with any musculoskeletal disorders or congenital anomalies. All participants signed an informed consent form and the study procedures were approved by the Ministry of Education in the districts where the schools were located.

#### **Tools for Data Collection:**

**Tool I:** Self-administered questionnaire was constructed among primary school teachers staff & included the following parts.

**Part A:** The demographic questionnaire included items like age, gender, level of education & years of teaching experience.

**Part B:** Concerned with specific characteristics of work strain to assess the severity & risk factors for musculoskeletal pain regarding teaching experience years, classes per day, No. of teaching hours per day & type of Shoes, way of going to school & comfortable furniture use at school, chronic diseases, smoking, & sleeping hours.

**Part C:** Pattern and effect of musculoskeletal pain of study teachers regarding current musculoskeletal pain, duration of pain, site of pain & days of absenteeism.

**Part D:** Concerned with knowledge of teachers regarding musculoskeletal pain such

as the structure of skeletal body parts, meaning of skeletal pain, causes, preventive measures they use, difference between acute and chronic back pain & measures used to relieve the pain (Pre & posttest format).

**Scoring:** A correct answer was scored one, and the incorrect was scored zero. These scores were summed-up and converted into a percent score from 0 - <60 referred to unsatisfactory knowledge while score from  $60 \leq 100$  referred to satisfactory knowledge.

**Part E:** Assess practices of the study teachers regarding physical exercise, position, keeping the optimal posture at work, correct posture, etc. (Pre & posttest format).

**Scoring system:** A Likert Scale was used as the following always used was scored two, sometimes used was scored one and never used was scored zero. These scores were summed-up and converted into a percent score: from 0 <75 referred to unsatisfactory practices, while score from  $75 - \leq 100$  referred to satisfactory practices.

**Tools II:** An observational checklist was used for assessing the body posture and workstation layout teachers' practices toward ergonomics exercises. Modified version of the ergonomic questionnaire **Delisle et al., (2006)**. It included exercises regarding, hand, elbow, shoulders, triceps while sitting or standing, Legs, neck, lower and upper (Pre & posttest format).

**Scoring system:** The item has scored (1) = correct done and the item has scored (zero) = incorrect done. From 0 <75 referred to unsatisfactory practices, while score from  $75 - \leq 100$  referred to satisfactory practices.

**Tool III:** Nordic Musculoskeletal Questionnaire (**NMQ**) to assess musculoskeletal pain levels as reported by study teachers regarding all parts of musculoskeletal system this covered nine

body regions, including neck, shoulder, upper back, elbow, hand/wrist, low back, hip/thigh, knee, and ankle/foot. The participants were required to locate a painful area on a body chart and rate their pain experience on a Visual Analogue Scale (VAS) (Jensen, 2004) of 0 – 100 mm in order to assess intensity of pain during the last twelve (12) months and last seven (7) days respectively.

**Scoring system for Visual Analogue Scale (VAS):** Four categories are identified for interpretation purposes of the VAS scale, namely 0 – 5mm indicates no pain; 6 – 45 mm = mild pain; 46 – 75 mm = moderate pain; 76 – 100 mm = severe pain. The higher the score on the VAS scale, the higher the intensity of the pain.

**Tool IV:** Anthropometric measurement, including height, weight and body mass index using the portable weighing scale and a Stature meter. **Height:** measurement of standing height was done by using a non-stretchable tape for measurement the teachers stands erect without shoes with weight equally distributed on both feet and heel together and touching the vertical board, while arm hang freely at the side of the trunk, with palm facing the thigh looking straight ahead. **Weight:** weight was measured using a bath-room scale. The teacher was in minimal clothing and without shoes. Standing with weight evenly distributed on both feet.

**BMI:** was calculated from the weight and height data according to the following equation:

**Scoring System:** It was assessing weight, height and calculate body mass index according to the following equation:  $BMI = \text{Weight (Kg)} / \text{Height (m)}^2$ . Body mass index was categorized as follows: Underweight 16- 18.4, normal weight 18.5 - 24.9, overweight 25 - 29.9 and obesity 30 and more.

**Tools Validity:** The validity of the tools was ascertained by a group of subject area experts, community nursing staff who reviewed the instruments for content accuracy. Also, they were asked to judge the items for completeness and clarity. Suggestions and modifications were considered.

**Tools Reliability:** The reliability of the development tools used was assessed through the internal consistency method. The tools reliability proved to be very good, with Cronbach alpha coefficient 0.86.

#### **Pilot Study:**

A pilot study was conducted on 10% from the total number of the sample equal 10 teachers to check understanding and clarity of the questionnaire & included in the study. Based on the results, some linguistic modifications of the questions were made to avoid confusion about questions and make easier understanding and interpretation by participants.

#### **Field work:-**

-Data collection for assessment was done by the researchers; three days/week (Mondays, Tuesdays & Wednesdays), in the mentioned schools from 9.00 a.m. – 1.00 pm. Weekly.

Questionnaires were distributed and collected over three months between Septembers till December 2016. Weight and height were obtained first, and then questionnaires were personally distributed to teachers during school break time or spare time classes. The researcher remained in the class during the completion of the questionnaires, which took an average of 30-45 minutes and collected all questionnaires when all participants had finished.

**Occupational health program construction:** This program was conducted in three consecutive phases, assessing, developing, implementing and evaluating.

**Phase 1:** A pre-program assessment tool, using the previous self-administered questionnaire for data collection from primary school teachers. This phase aimed at identifying the teacher's needs for improving their knowledge & practices related to risk factors for musculoskeletal pain. The average time for the completion of each teacher interview was around (30-45 minutes). A number of interviewed teachers / week ranged from (16-18) teachers.

**Phase 2:** Developing and implementing the occupational health program for primary school teachers to meet the identified needs.

**The general objective of the program:** To improve teacher's knowledge and practices related to WMSDs.

The theoretical part of the program presented in two sessions as lectures / discussions followed by the second part which consisted of two subsequent reinforcement sessions for practice (demonstration and re demonstration by using the doll).

**Implementation phase:**

**Through group discussion, the researcher discusses with the teachers the following contents items:**

Simple anatomy and physiology of the musculoskeletal system, introducing musculoskeletal disorders, causes and risk factors of MP, and basic ergonomic principles, as well as emphasizing taking breaks and doing exercises while in the office, ergonomic training on how to improve their posture while working on the computer, including recommendations on how to minimize strain on forearms, upper back and neck by adjusting angles and work posture,

and practical instruction on how to modify their workstation by changing chair and desk height, backrest inclination, keyboard inclination and location, screen height, inclination and orientation, forearm supports and foot rests as needed.

These modifications are supported by the current literature on work space ergonomics. In addition, poster foldouts were printed and distributed to remind the school teachers to pay attention to maintaining the recommended correct work posture, taking breaks and doing exercises (a specially designed stretching and strengthening exercise program). The lectures and ergonomics training involved six weekly sessions for each school. Preventive measures of MP such as (Activity, exercises, nutrition, sleep and rest) and lifestyle modification, proper body mechanics, proper posture and pain relief measure. BMI was calculated as weight (In kg) divided by the square of height (In meters). BMI was classified into three categories as underweight <18.5, Normal/healthy weight 18.5-25, over weight > 25 and obesity > 30. At the end of the intervention, every teacher was provided with an Arabic copy of booklet for prevention and management of MP.

- Each session started by giving the objectives, taking into consideration using simple and clear Arabic language. Different methods were used such as lectures and interaction. Using effective media of conveying information as power point using a laptop, posters. A booklet was developed for teachers as a reference after an occupational health program implementation.

**Phase 3:** The evaluation phase emphasized the effect of the program on improving teacher's knowledge& and practices by using proper body mechanics, proper posture and pain relief measure.

**Ethical Considerations:**

A necessary approval from the administrative authority of the schools was taken after issuing an official letter from the Dean of Faculty of Nursing, Ain Shames University. An informed consent to participate in the current study was taken after the purpose of the study was clearly explained to each teacher confidentiality of obtained personal data, as well as the respect of participants' privacy was totally ensured. A summary of the program was explained to each teacher before volunteering to participate in the study and teachers were informed that they can withdraw from the study at any time.

**Statistical Design:**

Data were verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS version 2010) was used for that purpose, followed by data analysis and tabulation. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages). Test of significance (chi-square and independent t-test) were used to test the homogeneity of the outcome variables between the groups and to test the study hypothesis. Pearson correlation coefficients were used. A statistically significant difference was considered at p-value  $P \leq 0.05$ , and a highly statistically significant difference was considered at p-value  $\leq 0.001$ .

**Results****Table (1): Frequency Distribution of Primary School Teachers Characteristics (n=94)**

Items	No.	%
<b>Gender</b>		
Male	55	58.5
Female	39	41.5
<b>Age in years</b>		
25-	23	24.5
30-	42	44.6
40-	29	30.9
Mean $\pm$ SD 36.4 $\pm$ 2.6		
<b>Marital status</b>		
Single	25	26.6
Married	61	64.9
Divorced	6	6.4
Widow	2	2.1
<b>Educational level</b>		
Average education	4	4.3
University degree	90	95.7

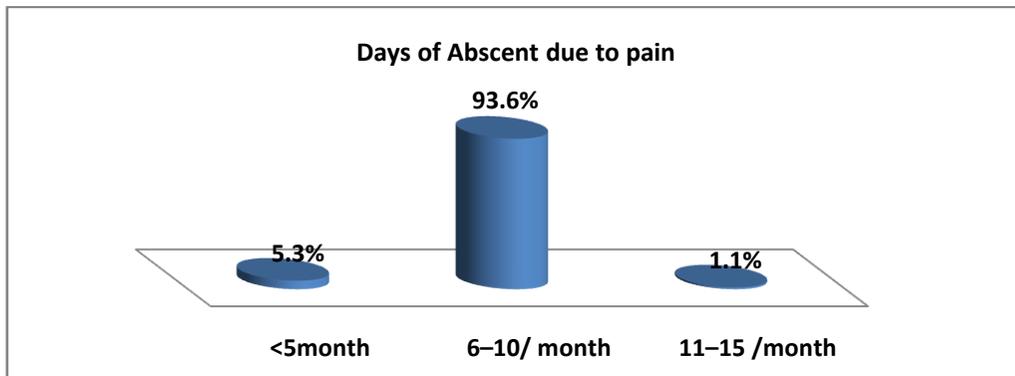
**Table (2): Frequency Distribution of Work Related Characteristics of Primary School Teachers (n=94)**

<b>Items</b>	<b>No</b>	<b>%</b>
<b>Teaching experience years</b>		
1-	21	22.3
6-	19	20.2
11-	23	24.5
16-	18	19.2
>20	13	13.8
<b>Classes per day</b>		
1-4	72	76.6
5-7	22	23.4
<b>Daily hours</b>		
3-6	11	11.7
7-9	83	88.3
<b>No. of hours teach per week</b>		
1- 10 hours	14	14.9
11-20 hours	62	66.0
> 20 hours	18	19.1
<b>Type of Shoes</b>		
Flat	60	63.8
With heel	34	36.2
<b>Method of going to school</b>		
Private transport	14	15.0
Walking	4	4.2
Bus	76	80.8
<b>Comfortable furniture use at school</b>	33	35.1
<b>Chronic diseases</b>	34	36.8
<b>Sleeping hours</b>		
4-	17	18.1
6-	47	50.0
8<15	30	31.9
<b>Smoking</b>	31	33.0
<b>Body mass index</b>		
Under weight	3	3.2
Normal weight	39	41.5
Over weight	43	45.7
Obese	9	9.6

**Table (3), Figure (1) : Frequency Distribution of Pattern and Effect of Musculoskeletal Pain of Primary School Teachers (n=94)**

Items	No	%
<b>Musculoskeletal pain</b>	74	78.7
<b>Duration of pain</b>		
No pain	19	20.2
< 3 months	12	12.8
3 <6 months	11	11.7
≥6 months	52	55.3
<b>Wakes up at night due to pain</b>	51	54.3
<b>Site of pain</b>		
Neck pain	41	43.6
Shoulder pain	38	40.4
Elbow pain	28	29.8
Wrist pain	23	24.4
Low back pain	49	52.2

Items are not mutually exclusive

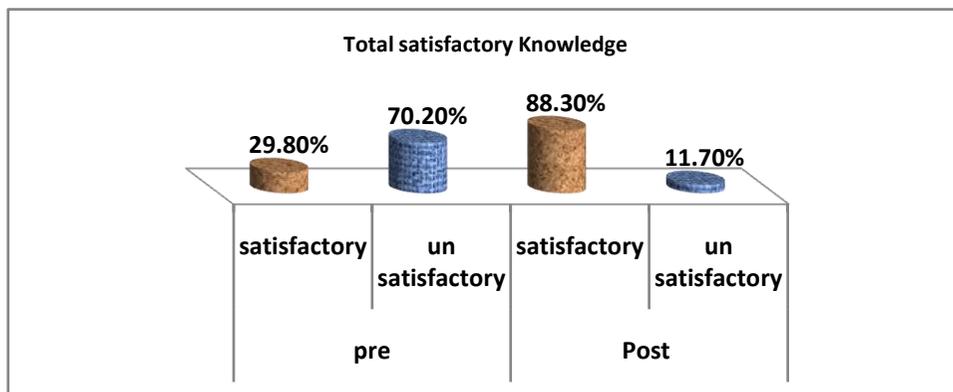


**Table (4) ,Figure (2) : Frequency Distribution of the Primary School Teachers According to their Satisfactory Knowledge about Skeletal Pain Pre &Post Program Implementation (n=94)**

Items	Pre				Post				X <sup>2</sup>	P
	satisfactory		un satisfactory		satisfactory		un satisfactory			
	No	%	No	%	No	%	No	%		
Parts of skeletal system	31	33.0	63	67.0	81	64.9	13	35.1	4.73	0.001
Meaning of skeletal pain	25	26.6	69	73.4	89	44.7	5	5.3	5.94	0.001
Causes of skeletal pain	30	31.9	64	68.1	94	100.0	0	00.0	4.35	0.001
Preventive measures for pain	17	18.1	77	81.9	86	91.5	8	8.5	8.51	0.001
Acute and chronic pain	9	9.6	85	90.4	86	91.5	8	8.5	8.99	0.001
Relieve of skeletal pain	53	56.4	41	43.6	94	100.0	0	0.0	4.54	0.001

P value :< 0.001

Significance: HS



**Table (5): Percentage Distribution of the Primary School Teachers According to their Total Satisfactory Practices Pre & Post Program Implementation (n=94)**

Items	Pre			Post			X <sup>2</sup>	P
	Always	Sometimes	Rarely	Always	Sometimes	Rarely		
	%	%	%	%	%	%		
Physical exercise	24.1	16.1	59.8	87.9	12.1	0.0	6.99	0.00
Doing stretching exercises during work	13.0	20.0	67.0	43.1	40.9	17.0	6.29	0.00
Taking enough breaks during working hours	23.0	19.3	57.7	71.3	15.3	14.4	161.585	0.00
Working in the same position	52.8	12.1	35.1	96.3	3.7	0.0	52.8	0.00
Keeping the optimal posture at work	30.1	9.7	60.2	80.2	19.8	0.0	98.155	0.00
Twisting back in awkward way	77.1	6.1	16.8	0.0	20.5	79.5	68.830	0.00
Leaving space, when working in a sitting position	30.9	6.1	69.1	17.9	11.0	72.1	68.830	0.00
Using correct posture for working at desk	10.0	0.0	90.0	100.0	0.0	0.0	118.925	0.00
Adjusting the height of the office chair to make more comfortable	12.1	40.0	47.9	0.0	25.3	74.7	172.343	0.00
Using correct posture for the computer	9.6	4.9	85.5	74.7	25.3	0.0	163.703	0.00
Using elbow angle for typing at a computer	40.9	37.4	21.7	7.2	18.1	74.7	68.830	0.00
Raising pillow during sleep with neck symptoms	21.2	20.0	59.8	28.2	10.0	62.0	140.268	0.00
<b>Total practices</b>	7.2	4.9	87.9	59.1	31.3	9.6	10.205	0.001

**P value :< 0.001**

**Significance: HS**

**Table (6): Frequency Distribution of the Primary School Teachers According to their Practices toward Ergonomics Exercises Pre & Post Program Implementation (n=94)**

Ergonomics exercises	Pre				Post				X <sup>2</sup>	P
	Correct done		Incorrect done		Correct done		Incorrect done			
	No	%	No	%	No	%	No	%		
<b>Upper exercises</b>										
Neck	12	12.8	82	87.2	68	72.3	26	27.7	5.57	0.02
Wrist/hand	3	3.2	91	96.8	80	85.1	14	14.9	6.47	0.01
Elbow	2	2.1	92	97.9	84	89.4	10	10.6	4.36	0.03
Shoulder	9	9.6	85	90.4	72	76.6	22	23.4	5.56	0.02
<b>Lower exercises</b>										
Triceps	14	14.9	80	85.1	67	71.3	27	28.7	4.49	0.03
Sitting & standing	15	16.0	79	84.0	65	69.1	29	30.2	5.02	0.02
Hip/thigh	0	0.00	94	100.0	87	92.6	7	7.4	5.34	0.02
Knee	7	7.4	87	92.6	72	76.6	22	23.4	7.99	0.00
Ankle/foot	8	8.5	86	91.5	73	77.7	21	22.3	5.87	0.01
<b>Total</b>	11	11.7	83.0	88.3	87	92.6	7	7.4	157.8	00.01

P value :< 0.001

Significance: HS

**Table (7): Correlation between Teachers Total Knowledge in Relation to their Total Practices Pre & Post Program.**

Items	Pre			Post			Paired t-test	
	Mean	±	SD	Mean	±	SD	t-test	P-value
<b>Total knowledge</b>	2.751	±	1.030	9.512	±	3.490	25.310	<0.001*
<b>Total practices</b>	9.330	±	2.671	34.125	±	2.811	30.544	<0.001*

P value :< 0.001

**Results:**

**Table (1):** illustrated that 58.5% of the studied sample were males and 44.6% of them their age started from 30 and above but below 40 with the Mean ±SD36.4±2 36.4±2.6, also 64.9% of them were married while 95.7% of them have to the university degree .

**Table (2):** demonstrated that 24.5% of the studied teachers had teaching experience between 11-15 years, 76.6% of them were teach for 1-4 class per day. In relation to the number of daily working hours shows 66.0% of them teach from 11-20 hours per week and 63.8% of them wear flat shoes, 80.8% of them used a bus to go to school and only 35.1% had reported that they use comfortable

furniture use at school. Regarding chronic diseases the same table shows 36.8% suffer from chronic disease50.0% of them were sleep between 6-7 hours per day and 45.7% of them were overweight.

**Table (3, fig.1):** reveals that 78.7% of the studied teachers were suffering from musculoskeletal pain, 55.3% of them were suffering musculoskeletal pain, for more than six months, 54.3% of them were waking up at night due to pain and 93.6% of them had days of absenteeism between 6 –10 days. Regarding site of pain this table shows that, 52.2%, 43.6% and 40.4% of the studied sample were suffering from low back, neck pain & shoulder pain respectively.

According to the research hypotheses, the occupational health program will improve primary school teacher’s knowledge and

practices related to risk factors for musculoskeletal pain (table4- 7).

**Table (4,fig.2):** Shows that there were highly statistically significant differences among primary school teachers according to their total satisfactory knowledge about skeletal pain pre & post program implementation at  $P < (0.001)$ .

**Table (5):** Illustrates that there were highly statistically significant differences among primary school teachers according to their total practices pre & post program implementation  $P < (0.001)$ .

**Table (6):** reveals that there were highly statistically significant differences among primary school teachers according to their total practices regarding ergonomics exercises pre & post program implementation  $P < (0.001)$ .

**Table (7):** shows that there was a statistical significant difference among primary school teachers regarding their total level of knowledge & practice post program compared to pre implementation phase

### **Discussion:**

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Musculoskeletal pain (MP) has a substantial impact on primary school teachers', functional impairment, absenteeism, early retirement and is also costly in terms of treatment. The aim of this study is to evaluate the effect of the occupational health program to reduce the occupational high risk for musculoskeletal pain among primary school teacher.

Concerning the demographic characteristics of the studied, teachers more than half of them were males, with a mean age  $36.4 \pm 2.6$ , and about two thirds of them were married. In relation to educational level, the table shows that, the majority of them have university level. These results were supported by the study of **Yue et al., (2012)**

whose study neck/shoulder pain & low back pain among school teachers in China, regarding prevalence & risk factors as they mentioned that, in their population studied, there was a predominance of women with a mean age above 40 years, with complete college education and married.

The present study clarified that around one quarter of the studied sample had teaching experience between 11-15 years, and more than three quarters of them were teaching from 1-4 class per day and two third of them were teaching from 10-20 class per week. In relation to daily working hours, the table shows that the majority of them were working between 7-9 hours per day. These study results were in accordance with **Abdulmonem et al., (2014)**, whose study the prevalence of musculoskeletal pain & its associated factors among female Saudi school teachers as they found that, more than half of the respondents were in service for more than 10 years. These findings confirmed previous observation made by (**Darwish and Al-Zuhair 2013**) in their study as they mentioned that, the number of teaching years was mainly from 1–9 years ,also their sample group has 3–5 classes/day while most of them have 10 to 19 classes/week with the majority of the study group range between 7 and 9 hours.

Also, about two thirds of the studied sample wears flat shoes, the majority of them used bus while going to school and two thirds of them reported uncomfortable furniture used at the school. This study was supported by **Korkmaz et al., (2016)**, who recently studied musculoskeletal pain associated with risk factors in school teachers as they mentioned that, wearing shoes with high heel for long time due to musculoskeletal pain disorders. This may be due to disrupting gait and posture for the entire body causing severe load on muscles and ligaments.

The current study revealed that about two thirds of the studied sample hadn't chronic diseases; near to half of them were

overweight. This finding disagree with **Erick & Smith, (2011)** , on the study about factors associated with low back pain who found that less than one third of participants were suffering from hypertension with an increase in prevalence of diabetes and hypertension by age. Next most frequent site of musculoskeletal pain reported after back pain was shoulder pain and neck pain. In a more recent Chinese study by( **Chong and Chan 2015**), whose entitled subjective health complaints of teachers from primary and secondary schools school teachers reported a high neck pain prevalence rate of 68.9%,also agree with studies by **Attarchi et al., (2014)** whose entitled association between teachers working and musculoskeletal symptom in primary school shows that 42.5% of school teachers having experienced neck pain, 28.7% of them had experienced pain in the shoulder area and this may impaction teachers who spend considerable time the school teacher spent correcting students 'work and preparing for lessons. While the highest shoulder pain prevalence was reported by school teachers. The high prevalence of back pain may be due to poor ergonomic exercise practices that may lead to cumulative trauma, unhealthy posture, fixed position for extended period of time and/ or lacking for performing simple physical exercise to improve blood circulation, & the lack of rest.

According to the current study findings, the majority of the school teachers had days of absentees between 6 –10 every term. These study findings were supported by a very recent study **Abdul monem et al., (2014)** whose entitled the prevalence of musculoskeletal pain & its associated factors among female Saudi school teachers mentioned that the days of absentees have been positively associated with higher "Orebro musculoskeletal pain score. Also as the study done in Natal, Brazil, by **Porto et al., (2014)** who shows that the musculoskeletal pain was the main cause of absenteeism in school teachers of Nata. Finally the days of absenteeism have been

positively associated with higher musculoskeletal pain score.

The finding of this study indicated that, more than half of school teachers were suffering from low back pain , more than one third had neck pain and less than one half had shoulder pain . These study findings were supported by those of the very recent study of **Antonelli et al., (2014)**, whose entitled prevalence of cervicobrachial discomforts in elementary school teachers , mentioned that, the prevalence of low back pain (mild, moderate & severe) is two thirds. It has even surpassed the prevalence of neck more than half and shoulder pain two thirds respectively in terms of frequency. **Mengestu et al., (2014)**, reported that, low back pain and associated factors among teachers in Gondar Town, North Gondar, and Amara Region, Ethiopia found the same results, with a low back pain prevalence of more than half of the studied sample. This may impact on teachers who spend considerable time correcting students' work and preparing for lessons.

According to the study hypothesis the current study findings that, there were highly statistically significant differences among primary school teachers according to their knowledge about skeletal pain pre & post program implementation. This study result was disagree with **Salah, et al., (2012)** entitled the effect of educational program on performance of school teachers to decrement the low back pain found that less than one quarter of the studied teachers had satisfactory Knowledge regard back pain, also the current study result clarified that there were highly statistically significant differences among primary school teachers according to their practices toward ergonomic exercises pre & post program implementation. These study findings were in accordance with **Wongthanakit, et al., (2015)** entitled factors related to low back pain preventive behaviors among teachers in Governmental school and found that there was a statistically significant relationship

between ergonomic exercise of back muscle, daily life posture and presence of back pain.

Regarding the relation between total ergonomic exercise practices & total knowledge the results indicates, there were statistically significant differences among primary school teachers according to their practices toward ergonomics exercises pre & post program occupational health program implementation . This study finding was highly supported by the study of, **Cardoso et al., (2015)**, who carried out a feasibility study of psychosocial work related factors & musculoskeletal pain among schoolteachers. Concerning the relation between teachers knowledge and practices the findings reveals that there was a positive correlation between teachers knowledge in relation to their practices preprogram with highly statistical significance deference among teachers knowledge in relation to their practices preprogram compared to post program implementation which prove the current research hypothesis . Also this study result was supported by **Abdul Samad et al., (2013)**, who carried out a feasibility study of prevalence of low back pain and its risk factors among school teachers who found that there was a statistically significant relationship toward ergonomic exercise of back muscle, and their knowledge pre program compared to post occupational health program program implementation

### **Conclusion:**

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Based on the results of the current study, and the research hypothesis the following can be concluded that, more than half of the primary school teachers were male and more than one third of them their age started from 30 and above with the mean  $\pm$ SD36.4 $\pm$ 2, also more than two third of the them were suffering from musculoskeletal pain. This study also shows that there were highly statistically significant differences between primary school teachers according to their total satisfactory knowledge about skeletal pain pre & post program P

<0.001 and there were highly statistically significant differences between the study sample according to their total practices pre & post program implementation at P <0.001 which prove the current research hypothesis with positive correlation between teachers total knowledge in relation to their total practices pre program compared to post program implementation.

### **Recommendations:**

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Based on the results of the present study, and research hypothesis, the following recommendations are suggested:

Increase the awareness of work-related musculoskeletal pain prevention and management among primary school teachers.

Apply ergonomics training program aiming at maintaining optimal posture and teach of them how to avoid/decrease MSDs while working at school through the role of school health nurse.

Measures to decrease high prevalence of MSDs among teachers should be implemented to improve their status and avoid harmful and poor impact on their personal and work productivity.

Further researches to measures at school level, for example, proportional reduction of workload for aging teachers, optimizing working hours per day, planning exercise sessions and ergonomic classes to teach how to avoid/decrease MSDs.

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