



Prevalence of Postural Issues and Associated Risk Factors among House Officers: A Cross-sectional Study

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study aimed to investigate the association between common faulty postures and their risk factors among 147 house officers at Dow University of Health Sciences. Data were collected using a posture analysis form and analyzed with SPSS version 22 over six months. Informed consent

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was obtained prior to postural assessments, which included general physical evaluation and a plumb line test. Six common faulty postures were evaluated: forward head posture, lordosis, kyphosis, scoliosis, uneven shoulder height, and back muscle hump. The sample size was determined using Open Epi software. Forward head posture was the most prevalent faulty posture (76.9%), followed by lordosis (28.8%), while scoliosis was the least common (7%). The chi-square test was used to analyze the relationship between postures and working hours. Forward head posture ($p = 0.05$) and uneven shoulder height ($p = 0.002$) showed statistically significant associations with working hours. However, no significant associations were found for lordosis ($p = 0.85$), kyphosis ($p = 0.07$), or scoliosis ($p = 0.32$). These findings highlight the potential impact of working hours on specific postural deviations.

Keywords: Posture; scoliosis; kyphosis; lordosis.

1. INTRODUCTION

Good or proper posture is defined as proper alignment of body parts that involve less stress on the body, meaning forces from the surroundings are equally divided, and no excessive strain is applied to body parts (Griegel-Morris et al., 1992; Vaghela & Ganjiwale, 2014). Abnormal strain on the body occurs if the alignment of the body is not correct, and it is considered as bad or poor posture (Braun, 1991). According to Ching Yu Cho, in adolescents, faulty postures are common, and there are contentious relationships between faulty posture, psychological distress, and musculoskeletal disorders. About less than 5% to 16% of children are documented with idiopathic musculoskeletal pain in non-clinical settings, and 32% of children in pediatric rheumatology clinics (Goodman & McGrath, n.d.; Denardo et al., 1994; Finsen et al., 1998; Valachi & Valachi, 2003).

Good posture is the state of muscular and skeletal balance that protects the supporting structures of the body against any injury (Milhem et al., 2016). Poor posture is the faulty association of various parts of the body with tension and overuse, which increases tension on the supporting structures and disturbs biomechanics (Agbor et al., 2016; Gonzalez & Manns, 1996). There are many different types of faulty postures, such as kyphosis, which is the result of an exaggerated posterior curve of the thoracic spine (Fernández-de-las-Peñas et al., 2006). Scoliosis is side bending or a lateral curve of the spine, and it can occur in the cervical, thoracic, and lumbar spine; if it occurs only on one side, it is called a C-curve (Burt, 1950; Kendall et al., 2005). Higher rates of abnormal posture are seen in healthcare workers, which is due to bad habits and the ergonomically poor arrangement of healthcare setups (Subbarayalu,

2016; Vakili et al., 2016). In a recent study by National Cheng Kung University, a high prevalence of musculoskeletal symptoms was found in adolescents, mainly due to psychological distress and physical pressure (Bhandari et al., 2008). Faulty postures are the main reason behind neck, back, and shoulder pain (Bhandari et al., 2008; Leggat & Smith, 2006). It is not clear whether faulty posture is the main contributing element behind musculoskeletal symptoms, and poor posture among the adolescent population is still under research (Cho, 2008; Graham, 2002). In a recent study by Cheng Kung University, Taiwan, Ching Yu Cho found that high school students in Taiwan have scoliosis, kyphosis, and hyperlordosis due to maintaining one posture for extended periods (Szer, 1996; Poursadeghiyan et al., 2017, Yoo, 2013). Pain, soreness, and tingling are the results of these musculoskeletal symptoms, and abnormal posture also develops trigger points in many regions of the body, especially in the neck where the trapezius is most commonly affected (Bhandari et al., 2008; Hayes et al., 2009).

2. METHODOLOGY

2.1 Study Design and Study Setting

A cross sectional study were conducted from October 2018 on 147 house officers of Dow university of health sciences through this study we will observed faulty posture and their associated risk factor among house officers of DUHS. In this study we checked six common faulty postures in participants, including forward head posture, thoracic kyphosis, lumber lordosis, scoliosis, back muscles hump and uneven shoulder height. Faulty posture like lordosis, kyphosis and scoliosis we observed through plumb line. Uneven shoulders and back hump will have observed by asymmetry of shoulder height according to postural grid.

2.2 Study Duration

The following research was conducted in the time duration of 3 months after synopsis approval at university of Dow Medical Health sciences.

2.3 Study Population

Population choose for this survey research of faulty postures among house officers of Dow University of Health Sciences are young males and females who are allocated by convenient sampling technique and age between 20-32 years who are fit normal and healthy with no diseases or pathology house officers of both gender that have any cardiac or respiratory illness or endocrine disorder are dropped out from this research further more participants having any physical limitation, chronic disease or any medical illness are also excluded from this research. The house officers who participated in research are on volunteer basis and are healthy normal individuals that are assessed properly for all above mentioned conditions.

2.4 Including Criteria

- Both male and female
- Age group 22-32 years
- House officers of DUHS

2.5 Exclusion Criteria

- Any person with chronic diseases, disability
- Neurological disorder
- Any person with past medical surgery

2.6 Sample Size

The sample size is calculated by Open Epi calculator. The prevalence of faulty postures in forward head among Chinese adolescents was 25% [Ref #]. With 7% margin of error and 95% confidence level, the total sample size came out to be 147.

2.7 Sampling Technique

The study design being followed in this research is a cross sectional study. The sampling technique used is systematic probability sampling.

2.8 Data Collection

The study was carried out after taken permission from institutional ethical committee. Data were

collected through a structured questionnaire which will be pretested. Informed consent will be obtained from all study participants. Then all personal and occupational information of individual including age, gender, department, contact number, weight, and height will be obtained in demographic data. Then we evaluate the posture by physical examination, musculoskeletal questionnaire and plumb line test.

2.9 Statistical Analyses

Statistical Package for the Social Sciences (SPSS) version 16 were used for the purpose of data analysis quantitative variable like age weight height will be reported in term of mean and standard deviation. All categorical variable like house officers and final year student will reported on frequency and percentages cross tabulation will be done to see the effect of faulty posture in its associated factors with independent t-test will be applied p-value less than <0.05 will be taken on significant.

2.10 Research Instrument

To assess the postures, we use plumb line. Plumb line is basically the reference of alignment for the body when examine the postures.

2.11 Reliability of Plumbline Test

According to the authors Grunstein. E, Fortin.C, (Cho, 2008) plumb line method were used on 55 participants with idiopathic scoliosis to measure their trunk and in this study two calculation were taken, first with feet together and other with feet apart. Measurement through plumb line demonstrate high test and retest reliability and high inter trial reliability and conclusion of this study is that plumb line is reliable for both with feet together and feet apart (Rabiei et al., 2012).

3. RESULTS AND DISCUSSION

Data were stored and analyzed using SPSS 16.0, count and percentages were given to present summary of baseline study parameters of the study, different measures of screening and perception used in this study. Pie chart also used to give graphical presentation of the data.

One forty-seven (147) house officers of Dow University of health sciences, both male and female were included in this study. Participants were divided according to the department.

Among 147 participants 33 were MBBS house officers, 75 were DPT house officers, 32 were IMT house officers and 7 were BDS house officers. Eventually 147 house officers were involved in data analysis. The demographic features of the participants are represented in the Table 1. Frequency of faulty postures of different body parts are shown in the Table 2. The most frequently observed faulty postures was forward head postures (76.9%), followed by lordosis (28.8%) and most uncommon faulty posture was scoliosis (7%). To determine association between faulty postures and working hours we

used chi-square test. For forward head posture p-value is 0.05 which is not greater the alpha so, concluded that there is statistically significant association between forward head posture and working hours. Lordosis (0.85), kyphosis (0.07) and scoliosis (0.32) through these p-values were greater than alpha which mean there were no statistically significant association between working hours and these faulty postures and working hours. Uneven shoulder height p-value is 0.002 which show that there is significant association between uneven shoulder height and working hours.

Table 1. Demographic data of participants (n=147)

Variables	Mean	SD
Age	24.40	1.18
Height	1.60	0.09
Weight	54.12	10.08
BMI	21.27	4.39
	N	%
Department		
MBB	33	22.4
DPT	75	51.0
IMT	32	21.8
BDS	7	4.8
Working Hours		
6-8	69	46.9
8-12	78	53.1

Table 2. Frequency of faulty postures in different body parts (n=147) %=100

Faulty Postures	Frequency	Percentage%
Forward Head Posture		
• YES	113	76.9
• NO	34	23.1
Lordosis		
• YES	35	23.8
• NO	112	76.2
USH		
• YES	34	23.1
• NO	113	76.2
Kyphosis		
• YES	13	8.8
• NO	134	91.2
HUMP		
• YES	40	27.2
• NO	107	72.8
Scioliosis		
• YES	1	0.7
• NO	146	99.3

Table 3. Association between working hours and faulty postures

Postures	6-8 hours	8-12 hours	p-values
FHP			
YES	58 51.3%	55 48.7%	0.05
NO	11 32.4%	23 67.6%	
LORDOSIS			
YES	17 48.6 %	18 51.4%	0.82
NO	52 46.4%	60 53.6%	
USH			
YES	8 23.5%	26 76.5%	0.002
NO	61 54.0%	52 46.0%	
KYPHOSIS			
YES	5 38.5%	8 61.5%	0.52
NO	64 47.8%	70 52.2%	
HUMP			
YES	14 35.0%	26 65.0%	0.07
NO	55 51.4%	52 48.6%	
SCIOLIOSIS			
YES	0 0	1 100.0%	0.34
NO	69 47.3%	77 52.7%	

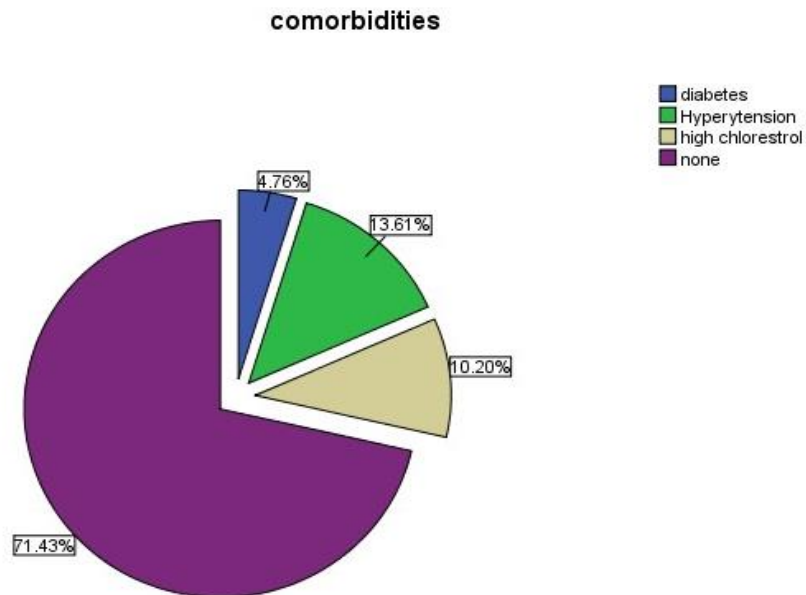


Fig. 1. Comorbidities among sample population

According to this pie chart we have 71.43% house officers didn't have any co-morbidities, 13.61% are hypertensive, 10.20% are high cholesterol and 4.76% are diabetic.

According to this result, we found that there is high prevalence of faulty postures in this sample, especially forward head posture (76.9 %). Here occurrence of faulty pastures is associated with the working hours of House officers. Hence, found that 23.1% were uneven shoulder, 23.8% were lordosis, 8.8% were kyphosis, 27.2% were humped and least found was scoliosis that is 0.7%. Six faulty postures were chosen to examine in the current study because we can easily detect them through observation in front plumb line. And there is significant association between forward head posture and uneven shoulder with working hours because there p-values (0.05 and 0.002) are not greater than alpha.

Based on Kendall and McCreary's criteria for normal posture study by Patricia Grlegel Morris in his article "Incidence of Common Postural Abnormalities in the Cervical, Shoulder, and Thoracic Regions and Their Association with Pain in Two Age Groups of Healthy Subjects" shows that the majority of the sample had some degree of postural abnormality in the Thoraco-cervical shoulder region, with the greatest percentage being in the moderate category for forward-head position and right and left rounded shoulders. The incidence of postural abnormality in the TCS region was as follows: forward head = 66%, kyphosis=38%, right rounded shoulder=73%, and left rounded shoulder=66%. Hence if we relate this study with our result we find that the most common postural abnormalities normally found are forward head postures and rounder or uneven shoulders (Griegel-Morris et al., 1992).

From our research, we conclude that the ratio of FHP was higher in both participants (male and female) which might relate to the 6-12 working hours of house officers. In previous study which was conducted in 2007 by chung chu on survey of faulty postures and associated factors among Chinese adolescents was conclude that the ratio of FHP was 25 % which might be due to using computer and watching television for long periods. The ratio of uneven shoulder height was 23.1% in our research which was due to hand dominance or carrying a bag in one hand. While the incidence of uneven shoulder was higher in CHingyucho study which was about 36%.

Furthermore, the frequency of kyphosis and lordosis was quiet low in adolescence because researchers assumed that these faulty postures were correctable at this age group. In another study LEE. PS, CHEN JM scoliosis, the prevalence of idiopathic scoliosis was two- four % but in our research the frequency of scoliosis in house officers was rare (.7%) (Cho, 2008).

4. CONCLUSION

The results of this study showed that the occurrence of faulty posture was high among House officers of Dow University. A Subjects' awareness about being assessed might decrease the incidence for some of the faulty postures. Future studies need to monitor postures during their daily activities or provide questionnaires to record faulty postures, which may be better ways to detect these faulty postures. The number of faulty postures is not strongly related to the total number of musculoskeletal symptoms. However, house officers having more working hours experience more faulty pastures as compared to those with fewer working hours. We suggest that there are multiple factors that might contribute to musculoskeletal symptoms. Working hours could be one, but not necessarily the most important, factor that causes symptoms.

The dose-response relationship between the number of hours spent performing mobilization and manipulation techniques and the prevalence of thumb symptoms has not previously been documented and suggests that causality is probable. Further study is needed to establish a more precise relationship and to determine what proportion of work time can be safely spent using these types of techniques. Objective criteria for measuring exposure are needed to enable the specific risk factor to be identified. The increased prevalence of symptoms among younger physical therapists in particular underlines the need for them to have at their disposal a range of strategies to reduce risks posed by their work and avoid injury. Most importantly, there is a need for further research to identify aspects of physical therapy practice that place therapists at greatest risk and to develop methods of reducing that risk.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image

generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

1. DEMOGRAPHIC DATA

NAME: -----	SERIAL NO: -----
--------------------	-------------------------

GENDER: -----	CONTACT NO: -----
AGE: ----- --	HEIGHT: -----
WEIGHT: -----	BMI: -----

2. DEPARTMENT:

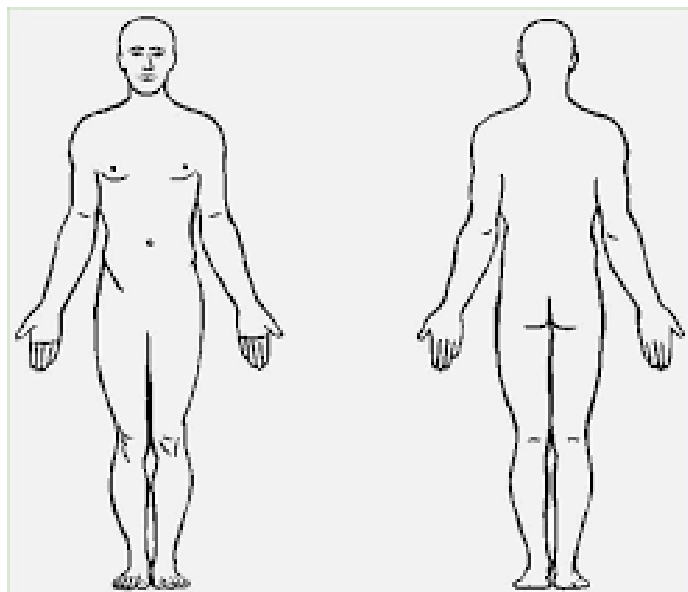
- MBBS
- BDS
- DPT
- IMT

3. ON EXAMINATION-----

- FORWARD POSTURE
- SCOLIOSIS
- KYPHOSIS
- LORDOSIS
- UNEVEN SHOULDER HEIGHT
- HUMP

4. WORKING HOURS:

- 6-8 HOURS
- 8-12 HOURS
- 12-20 HOURS



5. ANY COMORBITES:

- DIABETES
- HYPERTENTESION
- OTHERS

7. ANY PAST MEDICAL HISTORY: -----

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