

## **Prevalence of cervicogenic headache and forward head posture among clinical pathologists: An observational cross sectional study.**

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### **ABSTRACT:**

**Background:** Clinical pathologists are highly trained medical professionals who play an essential part in the diagnosis and treatment plan of malignancies and inflammatory diseases. Their work is associated with potential health hazards including injuries involving infectious human tissue, chemicals which are assumed to be carcinogenic in addition to long periods of microscope and computer work and assuming forward posture most of work time. These factors make them at risk of musculoskeletal disorders like forward head posture and cervicogenic headache. **The purpose:** of this study was to investigate the prevalence of forward head posture and cervicogenic headache among clinical pathologists. This study was the first study which investigate the prevalence of forward head posture and cervicogenic headache among clinical pathologists. **Methods:** There were 100 subjects in the study. Their age between 25 to 45 years. The Diagnostic criteria developed by Cervicogenic Headache International Study Group for diagnosis of cervicogenic headache, the photography was used to measure the craniovertebral angle (C.V.A.), the AutoCAD 2014 software program was used to analyze the photos and the CROM was used to measure range of motion. **Results:** The statistical analysis of this study revealed about (48%) among clinical pathologists had cervicogenic headache. While the remaining (52%) of clinical pathologists had no cervicogenic headache. The percent of *The Forward head posture* were (95%) of clinical pathologists had *Forward head posture*. While the remaining (5%) of clinical pathologists had normal *angle*. **Conclusion:** In this study most clinical pathologists had forward head posture 95% which is one of the most common musculoskeletal disorders and about half of them 48% had cervicogenic headache such high percent direct us to pay attention on ergonomic considerations during work .

**Keywords:** Cervicogenic headache, Clinical pathologists, Forward head posture.

### **Introduction:**

Healthcare professionals, including clinical pathologist, microbiologist, biochemist and technician are exposed to number of risk factors in the workplace for musculoskeletal disorders such as back and shoulder injuries and even other joints and muscles exertion, which are aggravated or prolonged by work conditions(1). Laboratory professionals are at risk of injury because of sitting rigidly at microscope most of the day and turning knobs again and again to move the stage and objectives while screening slides.(2) Poor posture and awkward positioning are the primary risk factors for musculoskeletal disorders (MSDs) that can affect full-time microscopists,

who often experience pain or injury to the neck, wrists, back, shoulders, and arms. Eyestrain, leg, and foot discomfort have also been documented with long-term microscope use. (3). One of the most common types of postural abnormality is Forward head posture (FHP), and it is generally described as an anterior position of the head in relation to the vertical line of the body's center of gravity (4). There are several factors including headache, neck pain, and musculoskeletal disorders such as temporomandibular disorders and rounded shoulders, are related to (FHP). Cervicogenic headache (CEH) is a type of secondary headache where the symptoms originate from a dysfunction in the cervical spine. This can include bony or soft tissue structures, specifically those innervated by cervical nerves C1-C3. (5) Forward head posture (FHP) has been previously related to other headache disorders (6). A common postural problem is forward head posture. This posture is seen in white-collar workers who perform highly repetitive tasks in the same position, which causes a static load on the muscles. (7) Forward head posture syndrome is also known as "forward head carriage". It is described as carrying the head forward of the center of the shoulder. As the head moves forward, the center of gravity shifts. To compensate for this shift in the center of gravity, upper body drifts backward and shoulders slump forward so that the head is placed anterior to the trunk. It is a posture disorder where the cervical spine sets off into an anterior position. (8). Up to our knowledge no studies investigated the prevalence of cervicogenic headache and forward head posture among clinical pathologists. So; the purpose of this study was to investigate the prevalence of cervicogenic headache and forward head posture among clinical pathologists

### **Material and methods:**

**Study design:** Observational cross sectional design. **Participants:** 100 of Egyptian clinical pathologists of both sexes, recruited from private laboratory clinics and general hospitals in Tanta, Egypt. Inclusion criteria were; Duration of microscope work  $\geq 4$  hours /day. Age of clinical pathologists was 23-45 years. The study was conducted between July 2017 and October 2018. Exclusion criteria are pregnancy, depression and chiropractic spinal manipulative therapy within the previous 12 months, whom receive any manual interventions by physiotherapists, osteopaths or other health professionals to treat musculoskeletal pain and disability, including massage therapy, joint mobilization and manipulation, Tumors, fractures, infections,

and rheumatoid arthritis of the upper cervical spine have not been validated formally as causes of headache. Cervical spondylosis and osteochondritis. (9).

**Outcome measures:**

1) (C.V.A.) **Craniovertebral angle represents the (Forward head posture):** measured by photography.

2) **Cervicogenic Headache diagnosis:** measured by guide of the Vågå study (10) through enumeration of the mentioned criteria guided by the International Study Group): Checklist 1<sup>st</sup> edition (11) & 2<sup>nd</sup> edition modified form 2013.

3) **(ROM):** measured by (CROM)

**Measurement procedures: Lateral photography for Forward head posture assessment;** The area between the head and shoulder was exposed adequately and most prominent process (C6 and C7) will be palpated at the base of the cervical spine. The tragus of the subject's ear will be marked and the seventh cervical vertebra were found and marked by finding its bony landmark. This is done by asking the subject to flex and extend his head 3 times and then finding the seventh spinous process of the vertebra. The (FHP) will be calculated between the line connecting the tragus of the ear to seventh cervical vertebra and the horizontal plane. A digital camera (Canon 20 MP, Japan) will be placed at a distance of 1.5 meter on a fixed base without rotation or tilt. The Height of the camera will be adjusted to the level of the subject's shoulder. The digitized photos caught by the camera will be analyzed using the software program to measure the craniovertebral angle (C.V.A.) and a self-balanced position was chosen to standardize the head and neck posture of subjects (12).

The reliability of (CVA) measurement procedure is reported as high (ICC=0.88). The necessity of maintaining a natural position before the photography was explained to the subjects (13).

In order to measure the (CVA), the angle between the horizontal line passing through (C7) and a line extending from the tragus of the ear to (C7) was calculated. The (CVA) was measured using AutoCAD 2014 software. A smaller (CVA) indicated a greater (FHP) and a (CVA) less than 48°–50° is defined as (FHP) (6). The cut-off point

for the (CVA) in this study was 48° (CAV); the subjects with a (CVA) below 48° were defined as (FHP) and those with a (CVA) above 48° were defined as healthy. (14)

**AutoCAD:** was used to analyze the photos taken by the camera to measure (CVA); The lateral photographs were processed by using the AutoCAD 2014 software (Autodesk, San Rafael, CA, USA) in order to calculate the angles that are representative of the FHP. Four representative methods of assessing the (FHP) were used (7). The first method included calculation of the (CVA), which is the angle between the horizontal line and the line extending from (C7) to the tragus of the ear (15).

Cervicogenic headache (CEH) diagnosis was invariably made according to the (CHISG) criteria. A quantitative diagnostic system was also introduced (I–VI), enabling comparison between Subjects: (I) Unilaterality / unilateral preponderance of pain. Non-symptomatic side co-involvement during intense headache was allowed. (II) Reduction, range of motion (ROM) in the neck. Movements in all directions were tested; only rotation reduction will be reported. Positivity indicates  $\geq 10$  deficit, on at least one side. (16).

(III / IV) Pain / discomfort in the ipsilateral shoulder (III) and arm (IV), either of a radicular or of a more vague nature. (V) Precipitation of attacks / exacerbations from sensitive spots in the neck, i.e. groove behind the mastoid process or tendon insertions in the occiput. (VI) Precipitation of attacks / exacerbations by awkward positions of the neck. (16).

If all six criteria were present, the case would be characterized as a genuine (CEH) case. Anaesthetic blockades could not be carried out in this setting. One diagnostic criterion would accordingly automatically be lacking. However, blockades were no obligatory part of the 1990 CHISG version and the Vågå subjects presenting with  $< 6$  criteria and  $\geq 4$  criteria were grouped together; varying criteria combinations were considered as acceptable evidence for (CEH), but unilaterality would still be a demand. (16) Vågå study offered a quantitative method to diagnose (CGH); which was used in our study.

**CROM:** To measure the cervical range of motion in different directions. (17) For each cervical movement, there is a magnetic yoke around neck to avoid error reading, the

standard protocol for placement of the subject's head and neck in the anatomically neutral position was first performed. For flexion, extension, and lateral flexion, the relevant inclinometer was read (starting position), and the value was recorded. At the end of each movement, the inclinometer was read again (ending position), and the value again was recorded. Then the amount of movement (ending position minus starting position) was calculated and the value recorded. For rotation, the dial of the magnetic inclinometer was manually set to zero prior to the movement, and the end position value directly reflected the amount of motion. With any of the cervical movements, if a subject did not follow the tester's instructions correctly, the measurement was not taken, instructions were repeated, and the movement was repeated. Following the reading of each measurement, the tester had the subject move back to the starting position before performing the next measurement. (18)

## Results:

### *1. Distribution of Cervicogenic headache among clinical pathologist:*

Cervicogenic Headache International Study Group (CEH) criteria were fulfilled by 100 Egyptian clinical pathologist. The percent of frequency distribution of Cervicogenic headache showed that there were 48 clinical pathologists (48%) had cervicogenic headache. While there 52 clinical pathologists (52%) had no cervicogenic headache (table 1)

**Table (1): Prevalence of Cervicogenic headache among Egyptian clinical pathologist at different regions.**

	<b>Frequency (N)</b>	<b>Percent (%)</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
<b>Negative</b>	<b>52</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>
<b>Positive</b>	<b>48</b>	<b>48.0</b>	<b>48.0</b>	<b>100.0</b>
<b>Total</b>	<b>100</b>	<b>100.0</b>	<b>100.0</b>	

## **2. Distribution of Forward head posture among clinical pathologist**

*Crainiovertebral angle that determine the Forward head posture* were measured for 100 Egyptian clinical pathologist. The percent of frequency distribution of *Crainiovertebral angle* showed that there were 95 clinical pathologists (95%) had Forward *head posture*. While there 5 clinical pathologists(5%) had normal *angle*(table2).

**Table (2):The Percent of frequency distribution of craniovertebal angle among Egyptian clinical pathologist at different regions.**

	<b>Frequency (N)</b>	<b>Percent (%)</b>	<b>Valid Percent</b>	<b>Cumulative percent</b>
<b>Forward head</b>	<b>95</b>	<b>95</b>	<b>95</b>	<b>95</b>
<b>Normal angle</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>100.0</b>
<b>Total</b>	<b>100</b>	<b>100.0</b>	<b>100.0</b>	

### **Discussion:**

This study is the first study which investigate the prevalence of forward head posture and cervicogenic headache among clinical pathologists.

The present study revealed that the percent of frequency distribution of Cervicogenic headache showed that there were 48 clinical pathologists (48%) had cervicogenic headache. While there 52 clinical pathologists (52%) had no cervicogenic headache.

The prevalence of (CEH) varies in the general population depending on the diagnostic criteria, i.e. 1.0 % applying six positive criteria of the cervicogenic Headache International Study Group (CHISG) and 4.6 % when only five criteria were used, while it was 2.5 % applying the International Headache Society (IHS) criteria

The present study agree with a recent epidemiological survey by (19) found that the prevalence was 0.13 % in men and 0.21 % in women applying three or more major (CHISG) criteria. The prevalence in (Vågå study,2008) , based on direct examination technique, was at 4.1%. These findings may give support to the view that (CEH) is

one of the major, recurrent headaches, possibly secondary only to migraine and tension type headache.

This study also agree with study by (20) found that the prevalence of musculoskeletal problems among microscope users was high (62%).The most common locations of musculoskeletal problems in our study were neck and back, similar to a study by (21)on musculoskeletal complaints among microscope workers.

The head-forward position also increases the risk of intervertebral disc damage. In the head-forward position, the center of gravity of the head is about 3 in. forward and the cervical vertebrae are in a more curved position compared to the stretched neck with the normal cervical curve (8).

The high prevalence of forward head posture among clinical pathologists 95%. Agree with a case-control study comparing the prevalence of neck pain between dentists and office workers in Iran, neck pain was as prevalent as 24.5% among office workers Agree also with study by(22) among 101 office worker who worked with computer revealed that 61.3 % had forward head posture.

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