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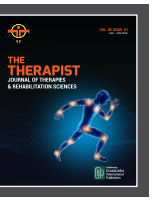

Systematic Review

Forward Head Posture in Young Adults: A Systematic Review

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ABSTRACT

A recent study shows that almost 78% of population have its neck in working position within 24 hours causing continuous stress on neck and shoulders which is forcing the neck in anterior or forward head posture. This may lead to upper back tightness and muscle spasm causing nagging to sharp pain. Hence, cervical pain and neck pain getting more attention. This study is designed to narratively review the prevalence of forward head posture in young adults. **Methods:** A structured search on literature was done through various electronic and print data bases such as: Pubmed, cinhal, google scholar, science direct, cochrane library and scopus. Those studies were included in which age ranged from 20 to 45 years. Young adults from any profession were included. Those studies were excluded in which forward head posture was reported due to any systemic issue. **Results:** A total of 120 studies had gone through in which 65 studies were short listed and on further review only 4 studies were included as they fit in proper methodology and hence, reviewed and reported. Studies reported a considerable variation in the prevalence with the clear greater incidence. **Conclusions:** Forward head posture is a commonly seen disorder among young adults. Investigations and interventions in time along with knowledge of postural correction can deal with this raising problem.

INTRODUCTION

Forward head posture is the positioning of cervical spine anteriorly causing the neck to roll forward which puts abnormal pressure on cervical spine leading to muscle imbalances. Forward head posture is actually reported when external auditory meatus goes forward to the coronal line. Muscles which are responsible for anterior placement of head are sternocleidomastoid, pectoralis, suboccipitals and posterior cervical muscles. Forward head posture is depicted as anterior positioning of cervical spine which is often called as 'Text neck'. The normal cervical angle should be between 20° to 40°. Forward displacement of tragus is leading to FHP-. Any increase in the aforementioned angle is the risk for forward head posture shown in the following diagram.

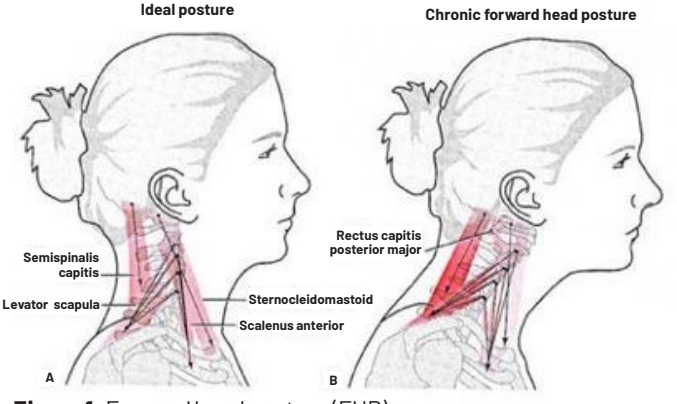

Figure 1: Forward head posture (FHP)

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FHP (forward head posture) causes increased external torque in flexion that results in change in vertebral alignment putting pressure on neck extensors and the surrounding connective tissues. FHP has an adverse effect on brain activity that it decreases the proprioception [5]. Now a days, young adults are more prone to technologies which can be in any form such as desktop computers, laptops and smart phone usage. This technological diversity is leading the population in constant anterior movement of neck putting pressure on muscles of upper back and hence causing forward head posture. FHP is common in young adults due to prolong usage of technologies without having appropriate gaps in between [5,6]. This muscular dearrangement is also called as poking chin because the neck along with chin pops out [7]. Anatomically, forward head posture sighs at the cervical apophyseal joints by applying compressive forces to it [8]. The short neck flexors and infrahyoids get lengthened due to prolong adaptation of abnormal posture. On the other hand, shortening of suprahyoids and neck extensors occurs. This may leads to the elevation of hyoid bone [5].FHP increases the pressure on the posterior aspects of cervical vertebrae and hence, increases strain and stretch on anterior tissues of neck and shortening of posterior tissues that eventually causes increased torque about C7 vertebrae and perpetuation of sub occipital trigger points [9]. Literature has reported a number of risk factors for prevalence of forward head posture in young adults in which constant neck pain is at the top of the list. Following the study, estimated 1 year incidence of neck pain has ranged 10.4% to 21.3% [10-12]. There are so many other disorders which are related to forward head posture such as sight and hearing problems because of the muscular imbalances in relation to auditory meatus, temporomandibular disorders (TMD) due to misalignment at coronal line enhancing mandible to move forward [13]. Migraine is also commonly seen in people having FHP[6]. In the upright posture, when the head is in neutral position and ears are aligned with center of shoulders, the weight of the head is 10-12 lb. approximately which is normal through muscles of neck[14]. But when the neck moves anteriorly, it simultaneously increases the weight of head on the muscles causing discomfort. If the head moves at least an inch, the head weighs six times more than the normal[2]. If FHP left untreated it may cause spinal degeneration, disc compression or herniation, flattening of the spinal curve, onset of early arthritis, nerve or muscle damage completely [3]. The sole purpose of this study is to review the prevalence of forward head posture among young adults. Those studies were involved in which subjects are either university going students or working in offices.

METHODS

All the literature was searched and sorted with the help of some specific key words such as 'prevalence', 'forward head posture', 'anterior displacement of cervical spine in young adults'. The literature was searched through different databases such as PubMed, CINHAL, Google Scholar, Science Direct, Cochrane library and SCOPUS etc. Studies included were published in peer reviewed journals and only those articles were included which were in English language. Those studies were included in which age ranged from 20 to 45 years. Young adults from any profession were included. Those studies were excluded in which forward head posture was reported due to any systemic issue. Studies in other languages, with copyright or permission issues were also excluded. The studies were reviewed according to PRISMA guidelines.

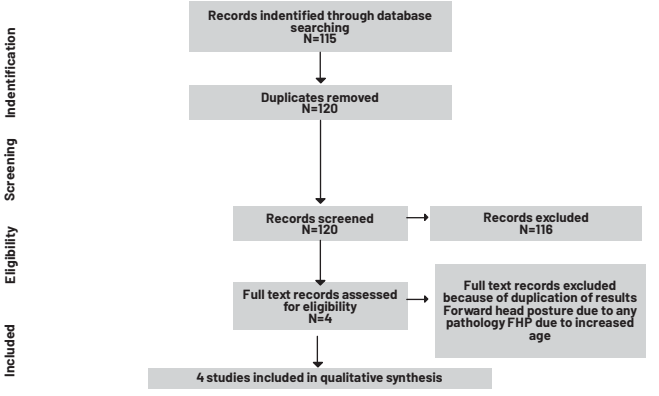

Figure 1: Eligibility Screening and identification

Narrative Review:

A total of 120 studies were reviewed initially which were, somewhat, found closely related to the topic. After thoughtful screening only 4 studies were included in the study as those were fulfilling the inclusion criteria to the most. There were some studies which were not exclusively done for prevalence of forward head posture but in the published research work we have found some relatable statistics for the review. In May 2020, a study was published by Kolhatkar A. *et. al.* in which their main objective was to find out the relation between myopia and forward head posture. But they also have given the prevalence of FHP, which was 58.95% [15]. They have also found out that FHP is more common in females than males with 73.21% in females and 26.79% in males. Wiguna NP *et al.*, published a study on smart phone usage and forward head posture in 2019, in which the point prevalence for FHP was 51.78%. This study has also the more female ratio as compared to the male young adults[11]. Naz A *et al.*, in April 2018 studied the prevalence of forward head posture among university students in which it was concluded that out of 197 subjects 126 were found active with forward head posture with the prevalence of 63.96% [16]. Tanveer F *et al.*, in 2018 studied

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the effects of FHP over stress and neck disability index in which they found out the prevalence of forward head posture as 56%. The male prominence was seen in the study[17].

Sample size	Cases	Prevalence rate	Male/Female ratio	Instrument used to measure FHP
95 [15]	56	58.95%	Female prominence	Photogrammetry
126 [11]	70	56%	Female prominence	Measuring craniovertebral angles
197 [16]	126	63.69%	No gender association	Plumb line
56 [17]	29	51.78%	Male prominence	A Mytrin's inclinometer/ goniometer

Table 1: Prevalence of forward head posture in different studies

RESULTS

Total 120 studies were short listed in which 4 studies were reviewed. Studies include both surveys, cross sectional and cohort studies. Studies reported a considerable incidence of forward head posture in young adults. Females found more prevalent to FHP.

DISCUSSION

Overall the prevalence rate of FHP in young adults in recent years till 2018 was 58.95% [15], 56% [11], 63.69% [16] and 51.78% [17] respectively, which indicated a relatively high prevalence. The prevalence of forward head posture among school going children was about 63% which was calculated in 2018 among the age group of 12-16 years old [18]. The prevalence ratio in Chinese adolescents was turned out to be 25% [19]. In one of the studies in 2015, the prevalence for forward head posture reported was 62.3%. In the survey, subjects included, claimed that while using computers or smartphones, their neck hurts [20]. This survey report is very close to the prevalence rates recorded in our review. Our study has claimed more female association over male association with forward head posture. In another study in 2015 showed the results with more male prominence with forward head posture among young adults from 17-33 years of age. This study was done to comprehend the gender differences over neck problems due to smart phone or compute usage [21]. There have been several researches which focus on particular populations in which FHP is clearly associated with gender, age or duration of technology usage [9,22]. Another study done in 2018 has showed more female prominence with 71.1%[18].Forward head posture is labelled when the sagittal distance from C7 to the nose or the angle between C7 and the ear increases and thus reflecting head and neck position with respect to the trunk[23]. In our review, one of the studies done by Kolhatkar A. et. Al, 2020 determined FHP by measuring craniovertebral angles, head title angle and head position angle using photogrammetry in which subjects were asked to stay in the routine posture as they used to be and they were clicked from the lateral side[15]. This CV angles method measures the forward facing angle at the base of neck ruled by a horizontal line and the other line which goes up to the ear[24]. In the 2nd study by Wiguna NP *et al.*, 2019, FHP was recorded by measuring craniovertebral angles by measuring the C7 angle to the tragus of ear and nose[11]. The smaller the angle, the more severe will be the forward head posture[23]. In the 3rd study by Naz A *et al.*, 2018, FHP was measured through plumb line in which assessment was done in sagittal plane. The tragus of the ear was considered as the reference point, if the plumb lines moves away from it, thus result marked positive with FHP[16]. In the 4th study included in the review, by Tanveer F *et al.*, 2018 measured the FHP by using A Myrin's inclinometer/goniometer was used [17]. In this method, body of goniometer placed at the lateral profile of C7 spinous process and the moving arm with the tragus of ear[25]. In other studies, FHP was measured by measuring craniovertebral angles using photogrammetry. The inter rater reliability and intra rater reliability of this method found good [22,26].

CONCLUSIONS

Forward head posture is a commonly seen disorder among young adults. Investigations and interventions in time along with knowledge of postural correction can deal with this raising problem.

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