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ASSOCIATION OF NECK PAIN & DISABILITY WITH HAND GRIP STRENGTH OF DENTISTS; A CROSS SECTIONAL SURVEY

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ABSTRACT

Objective: To find the association between neck pain & disability with hand grip strength among dentists of Rawalpindi and Islamabad.

Materials and Methods: This descriptive observational study was conducted after the approval from the ethical review committee of University of Lahore Islamabad Campus. A 379 sample size was calculated by using open Epi-tool calculator and sample was raised through non-probability convenient sampling technique. Data collection tools included semi-structured questionnaire and Urdu version of Neck Bournemouth Questionnaire to assess neck pain and Camry Electronic Dynamometer to measure grip strength of right and left hand. Data was analyzed by SPSS version 27. Subjects who satisfied the inclusion criteria volunteered to participate in the study.

Results: The Pearson's correlation coefficient was used. The results of this study shows that there was weak negative correlation between the hand grip strength of left hand (r= -

0.17) and right hand (r= -0.12) with neck pain and a significant value of <0.01.
Conclusion: This study shows weak negative correlation between the neck pain and hand grip strength. So increase in neck pain leads to decrease in hand grip strength.

INTRODUCTION

Dentistry is a physical demanding profession. Dental specialists are more inclined to redundant musculoskeletal disorders and these frequencies have expanded over years. Various rates of musculoskeletal (MSK) related with dental specialists gone from 64% to 78%. MSK issue causes the yearly deficiency of 41 million US Dollars to dental specialists(1). Concentrates on detailed that prevalence of shoulder, neck, arm and back pain in dental specialists is essentially as high as 81%(2). Researchers have shown the predominance of neck pain to be most elevated among dental specialists marking it to be the second most common MSDs in dental specialists(3).

Neck pain is stiffness or uneasiness in physical region between occiput and third thoracic vertebra and along the side between center edge of scapula(4). Pain in neck is viewed as chronic if it persists over 90 days. Study revealed that 62% of the dentists in Faisalabad suffered from neck pain (5)almost half of population of dentists have neck related issues and they are living with it (6). As indicated by the American Dental Association, neck pain might be brought about by repetitions, force, mechanical stresses, prolong poor posture, vibratory equipment, cold temperature, extrinsic stress, and predisposing factors (7). less rest breaks are important contributory factor in developing neck pain among the dentist population (8).

Study reveal that 62.6 % dentist adjusted sitting stance to practice while 37.4% adjusted standing posture for training (6). The principal working posture of dental specialist is in sitting, with neck flexion, shoulder elevation and abduction (9) the MSDs are additionally being reported by Italian dental experts revealed a blend of wrist and hand pain alongside neck pain (10) repetitive movements exerts stress and cause overuse of muscles as it leads to exhaustion of these muscles.

The dental specialist's work depends on function of the hand, which is utilized for firm holding of instruments (11). hand grip is define as How much static power that hand can press around dynamometer (12). which is use to assess strength of entire arm and its functional status .Grip strength may be impacted by orientation (male> female), age (peaked at 40s), prevailing more than non-dominant hand (13). Many investigations that show decrease of handgrip, 20-30% less on painful side.

Dentist has to work at narrow oral cavity require precise work and neck posture that compress cervical spinal nerves. When dentists work with their wrists or forearms against the edge of a surface, the muscles and tendons are impinged, which creates mechanical stresses, the risk of injury increases, and the presence of symptoms also increases(14). Aim of our study is to check association of neck pain & disability with hand grip strength in dentist of Rawalpindi and Islamabad and it will add Valuable information regarding this crucial dilemma faced by majority of the target population.

METHODOLOGY

A cross-sectional observational study was conducted and the sample size was calculated by Epi Tool, with confidence level of 95 %

and margin of error 5% (6) Prevalence of neck pain among dentist in Rawalpindi and Islamabad is 44.7% so the sample size is 379. Non-Probability convenience sampling technique was considered to collect the sample. Those participants who met the inclusion criteria and gave consent were included in this study and others were exempted. The duration of this study was four months from May 2024 to August 2024 .After the Ethical approval was taken from Ethical Review Committee of the University of Lahore Islamabad campus with Ref.#UOL/UIPT/Research Letter/003. Dentists both male and female between 20-40 years of age, with At least 1 year of working experience and having neck pain for more than 3 months were included. Participants with history of either orthopedic or neurologic diseases causing functional defect of the hand strength like: Recent Fracture, Diagnosed neuropathy, Burn, Surgery of upper limb or hand, Carpal Tunnel syndrome, De Qurvain's syndrome or Diabetes mellitus and having no neck pain were excluded from the study(14). Consent was taken from all the participants. The hand grip strength of participants was assessed by Camry Electronic Hand Dynamometer while the intensity of neck pain and disability was assessed by using Neck Bournemouth Questionnaire translated in Urdu (15). The written consent was taken; the participation was completely voluntary. Data was analyzed through IBM SPSS STATISTICS VERSION 27. The normality of data was evaluated by using Kolmogorov-smirnov test. Descriptive Statistics used to summarize the data and the association between neck pain & disability with hand grip strength was be analyzed using Pearson correlation.

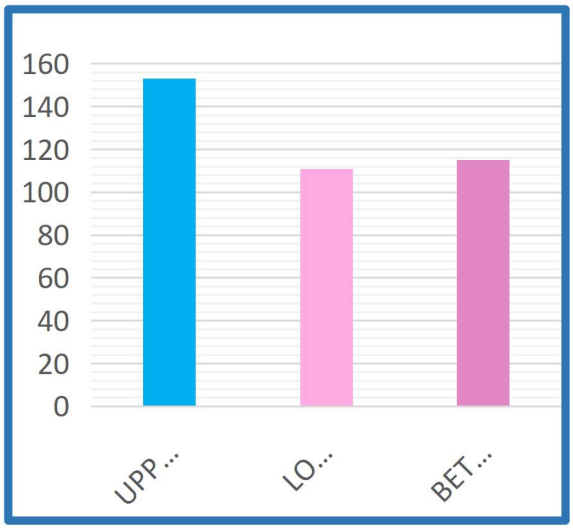
RESULTS

The individuals' mean and standard deviation for Age were 28.64±4.26, Weight were 66.28±12.76, while the Height were166.67±8.80, and BMI were 23.85±4.19.

Table: 1 Demographic data of the study participants

Variables	Mean ± SD
Age	28.64±4.26
Weight	66.28±12.76
Height	166.67±8.80
BMI	23.85±4.19

Out of 379, 220 (58%) were females while 159 (42%) were males. The most common site of pain in participants was noted to be 'upper cervical pain'40.4% followed by 'Pain between Shoulder Blades' 30.3% and the least common site was reported to be 'Lower Cervical Pain' 29.3%.



Graph: 1 Site of Pain among the Participants

The data result indicates Mean and SD of BQN-Total was 28.06±12.13, while Handgrip Strength of Right Hand was 29.84±11.06 whereas Handgrip Strength of left hand was 27.7±10.79.

Tables: 2 Descriptive Statistics of Bournemouth Questionnaire score and Bilateral Hand Grip Strength

Variables	Mean ± SD
BQN-TOTAL	28.06±12.13
Strength of R-Hand	29.84±11.06
Strength of L-Hand	27.7±10.79

Pearson correlation suggest there is a negative statistical significant relationship between Neck Pain and Disability with Handgrip Strength among the dentists as the results of this study shows that there was weak negative correlation between the hand grip strength of left hand (r= -0.17) and right hand (r= -0.12) with neck pain and a significant value (p value) of <0.01..

Table: 3 Association of Neck Pain & Disability with Hand Grip Strength of Dentists

	GRIP STRENGTH	r- value	p- value
BQN	R-HAND	-0.12	<0.01
	L-HAND	-0.17	<0.01

Discussion

In our study the most reported region of pain include upper cervical region 40.4 % followed by pain between shoulder blades 30.3% and the least common area reported was pain in lower cervical region 29.3. A study by Babar et al., showed 44.4% of professionals reported pain in upper cervical region followed by lower cervical region 22.9%(17). However, our study showed a slightly higher prevalence of mid-thoracic (interscapular) pain, which could indicate varying postural demands or ergonomic practices in the population studied. The present study extended this line of inquiry by exploring the functional consequences of neck pain through its association with hand grip strength.

In support of results of the present study showed significant negative correlation between neck pain and hand grip strength. A negative correlation means that as neck pain increases, hand grip strength tends to decrease. However, the magnitude of this relationship is small. This result is consistent with previous studies, such as study conducted by Kohli and Thukral**,** who investigated the relationship between neck pain and grip strength in dentists aged 23–26 years using the Visual Analog Scale (VAS) and a hand dynamometer. Their study also found a statistically significant negative correlation, supporting the idea that neck pain can impair upper limb function(11). However, they used a unidimensional pain scale, unlike our study, which employed a multidimensional tool assessing physical, psychological, and social domains of neck-related disability. This difference in assessment tools may explain the variability in the strength of correlations.

Similarly Vanita Ramdati and Neelasoni, found a weak negative correlation between neck pain and grip strength in a general adult population(18). The current study specifically focused dentist aged 20 to 40 years within city of Rawalpindi and Islamabad, whereas the reference study did not specify such

demographic constraint. Furthermore, this study employed the Urdu version of neck Bournemouth questionnaire which enhances cultural and linguistic relevance for Pakistani population.

CONCLUSION

This study found a statistically significant negative correlation between neck pain and disability with hand grip strength among dentists in Rawalpindi and Islamabad. These findings suggest that increased neck pain may be associated with reduced hand function, potentially impacting the clinical performance and quality of life of dental professionals.

LIMITATION

Further longitudinal and interventional studies are recommended to explore causal relationships and to assess the effectiveness of targeted physiotherapy and ergonomic interventions in this population.

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