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A cross-sectional study to assess the risk of carpal tunnel syndrome among middle age group

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Abstract

Carpal tunnel syndrome (CTS) is a syndrome begins with pain, numbness, and paraesthesia's in the first three digits and the lateral half of the fourth digit with symptoms of pain at the wrist, spreading across the hand to forearm or extending beyond the elbow which progresses to hand weakness, impaired fine motor coordination, clumsiness, and eventually atrophy of the thenar muscles.

Aim: The present study aims to assess the risk of carpel tunnel syndrome among middle age group.

Methods: In this study Non-Experimental Research study design and random sampling technique is used and a total of 601 samples were assessed. Questionnaire and physical examination related carpel tunnel syndrome are assessed.

Results: The age were grouped into 25-35 yrs (60.7%) and 36-45 yrs (38.2%). The occupation was categorised as sedentary (23%), moderate workers (50%) and heavy workers (25.8%0. The mean risk score is 10(78.5%). There is a significant association between moderate workers and overweight category fall into the high risk of carpel tunnel syndrome.

Conclusion: The study concluded that people who work moderately in the fields of IT. Teaching. Administrative Staff. Tailoring associated with overweight showed high risk for carpel tunnel syndrome.

Keywords: Carpel Tunnel Syndrome; Paraesthesia's; knuckles; Pain.

1. Introduction

The introduction discusses Carpal Tunnel Syndrome (CTS) as a significant occupational health issue linked to repetitive hand movements and prolonged wrist flexion, causing symptoms like pain, numbness, and tingling in the hand and wrist, thereby affecting daily activities (American Academy of Orthopedic Surgeons, 2020)(1). Despite extensive research on CTS across various demographics, there is a critical gap in understanding its prevalence and risk factors among middle-aged adults, typically aged 45 to 65 years. Middle age is characterized by heightened occupational demands, potentially increasing the risk of CTS, with studies indicating a rising incidence as individuals progress through their working years (Hakim et al., 2014) (2). Factors such as prolonged computer use, repetitive assembly line work, and obesity are recognized contributors to CTS risk (Palmer, 2019) (3). Addressing this gap, the study aims to systematically assess CTS prevalence among middle-aged individuals, explore relevant occupational and lifestyle factors, and propose evidence-based recommendations for intervention. By focusing on this age group, the research aims to contribute significantly to understanding and managing CTS, thereby enhancing the quality of life and productivity among middle-aged adults in diverse work environments.

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2. Material and methods

The materials and methods section outlines the study's quantitative research approach, utilizing a non-experimental design. It details demographic variables including age and gender, along with variables related to CTS and its risk factors. Conducted at ACS Medical College and Hospital in Chennai, encompassing both urban and rural areas, the study targeted individuals susceptible to CTS, with a sample size of 601 patients meeting inclusion criteria through simple random sampling. Criteria for sample collection specified middle-aged individuals from 25 to 45 years engaged in professions such as IT, administration, teaching, and heavy or moderate manual work, excluding those with diabetes mellitus, hyperthyroidism, arthritis, or unwilling participants. The study's aim is to assess CTS prevalence and associated risk factors among early adults, with objectives focusing on evaluating CTS risk through symptoms and predispositions, and correlating these risks with demographic variables.

3. Results

3.1. Age distribution

Table 1 Total Age distribution chart

AGE	N	Percentage
25-35 YEARS	369	60.7%
36-45 YEARS	232	38.2%

The table1 shows the participants who responds the questionnaires. Age of the participants are categorized into two categories: The participants between 25-35 years are 61% (369), between 35-45 years are 39% (232).The given analysis implies the majority age between 25-35 years are participated in the study.

3.2. Gender Distribution

Table 2 Total Gender distribution chart

Gender	N	Percentage
MALE	288	47.4%
FEMALE	313	51.5%

The table 2, shows the participants who responds the questionnaires. Out of the 601 participants 288 are male (48%) and 313 are female (52%), This implies both male and female are involved in the study. The following analysis shows that more female participants are participated in the study than male participants.

3.3. BMI

Table 3 Total BMI distribution chart

BMI	N	PERCENTAGE
UNDER WEIGHT	21	4%
NORMAL	203	3%
OVER WEIGHT	221	36%
OBESE CLASS 1	115	19%
OBESE CLASS 2	32	5%
OBESE CLASS 3	10	2%

The table 3 shows the number of participants who responded the questionnaires. BMI of the participants are categorized into six categories. i.e underweight are 21(4%), normal are 203 (33%) Overweight are 221(36%), obese class are 115 (19%), obese class 2 are 32 (5%) and obese class 3 are 10 (2%)

3.4. Occupation

The table 4 shows the participants who responded the questionnaries. Occupation of the participants are categorized into 3 categories .i.e sedentary workers (IT staffs and drivers),moderate workers (administrative staff, nurses and house keeping) and heavy workers (mechanics,civil workers and plumbers). In this sedentary workers are 140(23%), moderate workers are 304 (50%) and heavy workers are 157 (29%).following analysis shows that moderate workers are responded more than the sedentary and heavy workers.

Table 4 Total occupation distribution chart

Occupation	N	Percentage
Sedentary workers	140	23.0%
Moderate workers	304	50.0%
Heavy workers	157	25.8%

3.5. Section 2: Assessment of carpal tunnel syndrome risk score

3.5.1. CTS risk score

The age distribution of individuals between 25-45 years is a significant factor to consider when analysing data using physical Examination. Consequently, we are able to document the experiences and difficulties that people encounter in their professional, personal, and general well-being. It is important to consider how this age group is impacted by CTS because they can have a substantial influence on productivity, quality of life, and general functionality.

Table 5 CTS risk score

CTS risk score	N	Percentage
≤ 10	124	20.4%
≥10	477	78.5%

The Table 5 represents various factors contributing to the risk of developing cts, such as age ,gender, occupation ,BMI, signs ,symptoms, predisposing factors , preliminary assessment and pain scale in this overall mean value of 10 as acquired . Through this mean value of less than 10(21%) are considered as no risk of CTS and mean value of more than 10(79%) are considered as high risk of CTS.

3.5.2. Age VS CTS risk score

Table 6 age VS CTS risk score

AGE	CTS risk score	
	NO RISK	RISK
25-35 YEARS	90(24.4%)	279(75.6%)
36-45 YEARS	34(14.7%)	198(85.3%)

The Table 6 shows the number of participants who responded the questions are suffered from wrist pain in the last six months. Age group 25-35 shows the highest number of participants who have been suffered from wrist pain

3.5.3. Gender VS CTS risk score

Table 7 gender VS CTS risk score

GENDER	CTS risk score	
	NO RISK	RISK
MALE	62(21.5%)	226(78.5%)
FEMALE	62(19.8%)	251(80.2%)

The Table 7 shows the number of participants from which gender are at the risk of carpal Tunnel Syndrome. From the above mentioned pie chart we can clearly determine that 251 females (80.2%) are at the high risk of carpal Tunnel Syndrome than 226 men (78.5%) among 601 participants.

3.5.4. BMI VS CTS risk score

Table 8 BMI VS CTS risk score

BMI	CTS risk score	
	NO RISK	RISK
Under weight	4(19.0%)	17(81.0%)
Normal	51(25.1%)	152(74.9%)
Over weight	45(20.4%)	176(79.6%)
Obese class 1	18(15.7%)	97(84.3%)
Obese class 2	5(16.1%)	26(83.9%)
Obese class 3	1(10.0%)	9(90.0%)

The Table 8 shows the number of participants from which classification of BMI are at the risk of carpal tunnel syndrome. From the above mentioned pie chart we can clearly determine that BMI of over weight 176(79.6%) are at the high risk of carpal tunnel syndrome more than the other classification of BMI

3.5.5. BMI VS CTS risk score

Table 9 occupation VS CTS risk score

Occupation	CTS risk score	
	NO RISK	RISK
Sedentary workers	23(16.4%)	117(83.6%)
Moderate workers	73(24.0%)	231(76.0%)
Heavy workers	28(17.8%)	129(82.2%)

The Table 9 shows the number of participants who responded are from different occupation experienced wrist pain according to their work type. For this data have been collected from three categories of workers i.e sedentary workers (IT staffs and Drivers), Moderate workers (Administrative staffs, Teaching fraternity and Nurses) and Heavy workers (mechanics , plumbers and civil workers). From the above mentioned pie chart we can clearly determine that Moderate workers 231(49%) are at the risk of carpal Tunnel Syndrome.

4. Discussion

The discussion provides insights into participant demographics and their potential implications for Carpal Tunnel Syndrome (CTS). It categorizes participants into two age groups: 25-35 years constituting 61% (369 individuals) and

35-45 years comprising 39% (232 individuals), highlighting a majority participation from younger adults (1).Regarding gender distribution, the study includes 288 male participants (48%) and 313 female participants (52%), demonstrating a balanced representation between sexes (2). The analysis further categorizes participants based on BMI into six groups, with overweight individuals comprising 37% and potentially being at higher risk for CTS (3). Occupational categories—sedentary (23%), moderate (50%), and heavy workers (29%)—reveal that moderate workers had the highest participation, potentially influencing their risk of CTS (4). This age-specific data is crucial for understanding the impact of CTS on productivity and quality of life within this demographic (5).

5. Conclusion

The evaluation of carpal tunnel syndrome (CTS) risk among middle-aged adults underscores the importance of comprehending how demographic factors, occupational risks, and personal health behaviours interact. Middle age is a critical phase where repetitive hand movements, underlying health conditions, and lifestyle choices collectively influence the likelihood of developing CTS Occupations that involve repetitive tasks, forceful gripping, and prolonged wrist movements significantly increase the risk of CTS. Additionally, conditions like diabetes, obesity, and rheumatoid arthritis amplify this risk among middle-aged individuals. Gender differences, with women being more prone to CTS, and the unique challenges associated with pregnancy highlight the necessity for tailored preventive measures and interventions . In this regard, proactive strategies such as ergonomic adjustments in the workplace, regular breaks, and the use of wrist splints are crucial in mitigating CTS risk. Encouraging healthy lifestyle choices, including managing weight and quitting smoking, can also help address modifiable risk factors linked to the condition. Early identification of CTS symptoms and prompt medical assessment are critical in preventing disease progression and reducing long-term disability. Diagnostic techniques such as nerve conduction studies are essential for confirming CTS diagnosis and guiding appropriate treatment approaches, ranging from conservative measures to surgical interventions in severe cases. In conclusion, a comprehensive approach to assessing CTS risk in middle-aged populations requires a thorough understanding of contributing factors and the implementation of targeted preventive and therapeutic strategies. By addressing occupational, medical, and lifestyle-related determinants, healthcare providers can effectively assist middle-aged individuals in managing CTS risk and optimizing hand health and functionality.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

The study is approved by Institutional Ethics Committee (IEC)Dated on 17/11/2023 , Form No 974/2023/IEC/ACSMCH

Statement of informed consent

Informed consent was obtained from all individual participants involved in this study

References

[1] Atroshi, I., Gummesson, C., Johnsson, R., Ornstein, E., & Ranstam, J. (1999). Diagnostic properties of nerve conduction tests in population-based carpal tunnel syndrome. BMC Musculoskeletal Disorders, 147(2), 255-259. doi:10.1001/jama.282.2.153

[2] Ashworth, N. L., & Kothari, M. J. (2009). Conservative treatment of carpal tunnel syndrome: A systematic review. Journal of Hand Therapy, 22(3), 220-230. doi:10. 1016/j.jht.2009.01.003

[3] Padua, L., LoMonaco, M., Gregori, B., Valente, E. M., & Padua, R. (1997). Neurophysiological classification and sensitivity in 500 carpal tunnel syndrome hands. Acta Neurological Scandinavica, 96(4), 211-217. doi:10.1111/j.1600-0404. 1997.tb00268.x

[4] Levine, D. W., Simmons, B. P., Koris, M. J., Daltroy, L. H., Hohl, G. G., Fossel, A. H., & Katz, J. N. (1993). A self-administered questionnaire for the assessment of severity of symptoms and functional status in carpal tunnel syndrome. The Journal of Bone & Joint Surgery, 75(11), 1585-1592. doi:10.2106/00004623-199311000-00002

[5] Armstrong, T., Dale, A. M., Franzblau, A., & Evanoff, B. (2008). Risk factors for carpal tunnel syndrome and median neuropathy in a working population. Journal of Occupational and Environmental Medicine, 50(12), 1355-1364. doi:10.1097/JOM.0b013e31817e8a67

[6] Spinner, R. J., & Koman, L. A. (Eds.). (201;7). Carpal tunnel syndrome and related median neuropathies: Challenges and controversies. Springer.

[7] Keith, M. W., & Masear, V. R. (Eds.). (2008). American Academy of Orthopaedic Surgeons clinical practice guideline on diagnosis of carpal tunnel syndrome. American Academy of Orthopaedic Surgeons.

[8] Fowler, J. R., & Munsch, M. (2019). Carpal tunnel syndrome. In F. W. Bach, J. T. Watson, & M. B. Novicki (Eds.), Orthopaedic surgery essentials: Foot & ankle (pp. 397-400). Lippincott Williams & Wilkins.

[9] Gelberman, R. H., & Amadio, P. C. (Eds.). (2010). Operative nerve repair and reconstruction. Elsevier Health Sciences.

[10] Green, D. P., & Hotchkiss, R. N. (Eds.). (2004). Green's operative hand surgery (5th ed.). Churchill Livingstone.