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**A descriptive study to assess the symptoms and risk factors of
carpal tunnel syndrome among the computer users in selected
workplaces of Udupi district, Karnataka**

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"ABSTRACT

A descriptive study to assess the symptoms and risk factors of carpal tunnel syndrome among the computer users in selected workplaces of Udupi district, Karnataka was conducted by Ms. Keerthi Naik in partial fulfilment of the requirement for the award of Master of Science in Medical Surgical Nursing at Manipal College of Nursing Manipal, Manipal Academy of Higher Education, Manipal.

The objectives of the study aimed to assess the symptoms of carpal tunnel syndrome, identify the risk factors of carpal tunnel syndrome, to find the association between demographic variables and symptoms of carpal tunnel syndrome and to find the association between risk factors and symptoms of carpal tunnel syndrome among computer users. The research variables were symptoms and risk factors of carpal tunnel syndrome. The demographic variables were age, gender, professional qualification, area of work, hours of work, years of experience, body mass index, type of computer use at work and home, hand dominance, input devices and current health problems related to computer users. The conceptual framework used for this study was based on modified Irwin, Rosenstock's Health Belief Model (1974).

The research approach used for the study was quantitative research and the design used was descriptive survey design. The computer users of Manipal Academy of Higher Education, Manipal and Kasturba Hospital, Manipal in selected workplaces of Udupi District, Karnataka were the study subjects. The sample size was 260 computer users. The data was obtained using Demographic proforma and Semi structured questionnaire to assess the symptoms and risk factors. The content validity of the developed tool was established by nine experts and necessary modifications

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were made as suggested by experts. The data on Semi-structured questionnaire to assess the symptoms of carpal tunnel syndrome was obtained by Karl Pearson correlation co-efficient method ($r=0.9$) and Semi-structured questionnaire to assess the risk factors of carpal tunnel syndrome was obtained by Karl person correlation coefficient method ($r=0.8$). The pilot study was conducted at Manipal Global Education Services Pvt. Ltd. to assess the feasibility, practicability and to confirm the plan for analysis of the study. The main study was conducted in Manipal Academy of Higher

Education, Manipal and Kasturba Hospital, Manipal.

The obtained data was analyzed based on the objectives and hypotheses using both descriptive and inferential statistics. Frequency and percentage was used to describe the sample characteristics, symptoms and risk factors. The Chi-Square and Fisher's Exact test was used for association between demographic variables and symptoms, and risk factors and symptoms of carpal tunnel syndrome. Binary Logistic Regression was computed for the variables with Pearson chi square value, $p > 0.05$ used for risk factors of carpal tunnel syndrome among computer users by using SPSS 16 version.

The findings of the present study revealed that, most of the samples 98 (37.7%) were between the age group of 21-30 years. Majority 189 (72.7%) of them were females 71 (27.3%). Most of the 193 (74.2%) had their professional qualification as B. Com, M. Com, BA, MBA and other post-graduation. Normal BMI was observed in 173 (66.5%) samples. Most of them 158 (60.8%) were working in different areas such as admission, administration, accounts, purchase, information technology, medical record, inventory, billing section etc. Majority of the samples 105 (40.4%) were using computer for 8 hours/day daily. Out of 260 samples, Majority of them 236 (90.8%)

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used desktop. Most of them 141 (54.2%) had work experience of between 1-10 years. Majority of them 235 (90.4%) were using keyboard and mouse as their input device. Majority of them 235 (90.4%) were right handed in using computer.

Among 260 computer users, 100 (38.5%) had reported symptoms of CTS. Out of 100, 27 (27%) computer users had reported symptoms like hand or wrist pain, numbness in hand 20 (20%), tingling sensation in hand 5 (5%), hand discomfort in the night 20 (20%), shaking hands to relieve hand discomfort 33 (33%), weakness in hand 73 (73%), stiffness in hand 16 (16%), coldness in hand 20 (20%) and muscle wasting in hand 2 (2%). Few of them experienced distribution of pain, numbness and tingling sensation from wrist to fingers lasting for 10-20 minutes since 1 year. Samples reported that these symptoms like pain 16 (16%) and numbness 12 (12%) were occurring during computer use at work than while resting hands.

The personal risk factors among 260 computer users revealed that current

smokers and consuming alcohol i.e 1 (0.4%) and 4 (1.5%) respectively. Only (18.5%) performed exercise for hand, wrist and fingers . Only samples 35 (13.6%) are involved in indoor and outdoor sports activity such as carom, volleyball , throwball, badminton, cricket etc., 17 (6.50%) were on treatment for diabetes and hypertension, 14 (5.40%) were having family history of medical condition such as hypertension and 4 (1.50%) had trauma or injury to wrist among computer users.

The work related factors among 260 computer users showed that majority of them 231 (88.8%) had desk at suitable height at work, 226 (86.9%) adjusting chair to their height , 199 (76.5%) position of chair arm at elbow is 900 and 210 (80.8%) were resting arms comfortably at sides. 61 (23.5%) keyboard platform area positively tilted, neutrally tilted 61 (23.5%) and 18 (6.9%) negatively tilted. Most of the samples 179

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(68.6%) were able to adjust their keyboard platform area. Majority of them 224 (86.2%) had separate mouse or pointing device area. Most of them 177 (68.1%) had separate mouse at keyboard level and few 88 (33.8%) had below keyboard level. 89 (34.2%) arm was supported while keeping wrist on edge of desktop or laptop. Most of the samples 139 (53.5%) frequently leaned forward to reach out items (phone, documents) more than an arm's length and 83 (31.9%) did not keep wrist at neutral position while typing. Majority of the samples 225 (86.5%) used proper mouse or pointing device which fits comfortably on their palm. 111(42.7%) remained in same position for more than one hour in work and 46 (17.7%) were clicking mouse or tapping over mouse pad which required maximum force. 93 (35.8%) used to bend or extend wrist for longer duration while using computer. 86 (33.1%) were taking breaks from the keyboard for 5 minutes, 10 minutes 32 (12.3%), 15 minutes 62 (23.8%) and more 69 (26.5%). Most of the samples 191 (73.5%) were not performing hand stretching exercises while at work. Majority of the samples 228 (87.7%) worked in cold temperature (AC). The psychological risk factors is in which 129(49.6) were working under pressure to complete tasks by a fixed time in a day and 31(11.9) were working overtime regularly.

There was association between age ($p=.000$, $df=3$, $X^2=17.994$), years of experience using computer ($p=.014$, $df=3$, 10.360) and weakness among computer

users. It is interpreted as odds of having CTS is 1.066 times more in keeping wrist in neutral position than people who don't keep in neutral position (odds ratio=1.066, C.I=1.906, .596). Odds of having CTS is 1.057 times more in not performing hand stretching exercise at work than who perform hand stretching exercise at work (odds ratio=1.057, C.I=1.922, .582). Odds of having CTS is .820 times more in position of

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chair arm at elbow is 90 degree than in improper position of chair (odds ratio=.820, C.I=1.594, .422). Odds of having CTS is .925 times more in leaning forward to reach out items than those who don't lean forward to reach out items (odds ratio=.925, C.I =1.605, .533). Odds of CTS is 1.179 times more in not performing hand exercise to wrist/hand and finger than who perform hand exercise to wrist /hand and finger (odds ratio=1.179, C.I=2.230, .623). But, the association of risk factors are not statistically significant in odds ratio ($p>0.05$).

Some of the CTS symptoms were experienced by the computer users. The CTS symptoms are mostly seen in computer users with position of chair sufficient to keep elbow at 90 degree, wrist in neutral position, not performing hand stretching exercise at work, frequently leaning forward to reach out items, not performing exercise to hand, finger and wrist. Thus, providing a leaflet about prevention of CTS may help the computer users in reducing the risk of CTS."