# BLOOD PRESSURE PATTERN AMONG COMPUTER AND MOBILE PHONE USERS IN POPULATION AGED 13 YEARS AND ABOVE IN URBAN KANPUR

Richa Tandon*, JP Srivastava**, SC Saxena***, VK Srivastava***, Seema Nigam****

*Postgraduate Student, **Professor & Head, *** Professor, **** Asst. Professor

**Department of Community Medicine, G.S.V.M. Medical College, Kanpur (U.P.)**

ABSTRACT :

*Background: Hypertension has been identified as an established attribute in causation of cardiac problems. In light of certain reports, indicating induced mental stress by long-term computer use and chest - pocket placement of mobile phone interfering with pace makers and cardiac functions, the possible influence of such exposures on blood pressure opens a potential area of study.*

*Objective : To study the influence of varying degrees of exposure to computer and mobile phone use on blood pressure among adolescent and adult population of Urban Kanpur.*

*Methodology : Study group of people aged 13 years and above from Urban Kanpur was obtained by multistage sampling and community based data were collected by cross-sectional study on pre-designed and pre-tested schedule of interview and examination. A total of 2014 persons were obtained for study.*

*Results : 38.89% of study population was exposed to computer use. Almost 75% of the users, representing age group 13-30 and more than 50 years, did show higher mean blood pressure levels increasing in proportion to longer continuous hours of daily use. 42.35% of study population was using mobile phones. Out of the 261 male users, who kept mobile phones in chest pocket, 63% showed apparently higher mean blood pressure levels than those not keeping in chest pocket.*

## Introduction :

In India, proportionate deaths due to cardiac causes contribute about 29.1% to all cause mortality. Hypertension is a established attribute in causation of cardiac problems and lifestyle an important determinant of hypertension. In recent years, varying degrees of exposure to computers and mobile phone among adolescents and adults has acquired a significant dimension in their lifestyle. In light of certain reports indicating induced mental stress by long-term computer use (Sharma et al, 2006) and chest-pocket placement of mobile phone interfering with pace-makers and cardiac functions (WHO, 2000), the possible influence of such exposures on blood pressure open a potential area of study.

## Objective :

To study the influence of varying degrees of exposure to computer and mobile phone use on blood pressure among adolescent and adult population of Urban Kanpur.

## Methodology :

Study group of people aged 13 years and above from Urban Kanpur was obtained by multistage random sampling. All the wards of Kanpur Nagar were divided into four groups of wards, one group in each of the four directions, i.e. north, east, south and west. At the first stage, one ward was selected randomly from each group. At the second stage, one mohalla was selected randomly from the each of the four selected wards. House to house survey was carried out in the selected mohallas, starting

from the first house on the left. All members of the families, who voluntarily agreed to participate, in the age of 13 years and above, were interviewed and examined on pre-designed and pre-tested schedule to obtain the required information. .A total of 2014 persons were obtained for study. Data were analyzed using the software Microsoft Excel and SPSS 14.0 for Windows. Total period of study was about a year and a half, from February 2005 to November 2006, including development of study tools, collection of data, analysis and presentation of findings.

**Results & Discussion :**

Table - 1

### DISTRIBUTION PROFILE OF COMPUTER AND MOBILE PHONE USERS IN THE STUDY POPULATION

| Computer Use | Men | | Women | | Total (%) |
|---|---|---|---|---|---|
| | No. (%) | % | No. (%) | % | |
| Present | 502 (51.65) | 64.11 | 281 (26.97) | 35.89 | 783 (38.89) |
| Absent | 470 (48.35) | 38.18 | 761 (73.03) | 61.82 | 1231 (61.11) |
| Total | 972 (100) | 48.26 . | 1042 (100) | 51.74 | 2014 (100) |
| **Mobile phone use** | | | | | |
| Present | 583 (59.98) | 68.35 | 270 (25.91) | 31.65 | 853 (42.35) |
| Absent | 389 (40.02) | 33.55 | 772 (74.09) | 66.45 | 1161 (57.65) |
| Total | 972 (100) | 48.26 | 1042 (100) | 51.74 | 2014 (100) |

Of the 2014 study subjects, 783 i.e. 38.89% were found to be using computers. Among the users, approximately 64% were males and 36% were females. 42.35% (853) of the study population was using mobile phones. Among the users, approximately 68% were men and 32% were women.

Table - 2

### EFFECT OF CHRONICITY OF COMPUTER EXPOSURE ON MEAN BLOOD PRESSURE LEVEL OF USERS (n=783)

| Age (yrs) | Exposure (years) | No. | SBP(mmHg) | | DBP(mmHg) | | p-value | |
|---|---|---|---|---|---|---|---|---|
| | | | Mean | SD | Mean | SD | SBP | DBP |
| <20 | Long term | 29 | 105.45 | 6.33 | 64.62 | 5.57 | 0.153 | 0.343 |
| | Medium | 229 | 105.26 | 5.34 | 65.82 | 5.59 | | |
| | Short term | 34 | 107.26 | 6.68 | 66.74 | 6.61 | | |
| Total | | 292 | | | | | | |

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| Age | Exposure term | No. | SBP Mean | SBP SD | DBP Mean | DBP SD | p-value SBP | p-value DBP |
|---|---|---|---|---|---|---|---|---|
| 20-30 | Long term | 30 | 114.40 | 5.88 | 72.73 | 5.13 | 0.144 | 0.056 |
| | Medium | 177 | 112.56 | 6.16 | 72.08 | 6.45 | | |
| | Short term | 29 | 111.21 | 7.17 | 69.03 | 5.72 | | |
| Total | | 236 | | | | | | |
| 30-40 | Long term | 30 | 118.10 | 6.02 | 78.03 | 4.12 | 0.421 | 0.676 |
| | Medium | 46 | 120.30 | 8.03 | 78.80 | 4.88 | | |
| | Short term | 4 | 118.75 | 1.89 | 77.25 | 4.86 | | |
| Total | | 80 | | | | | | |
| 40-50 | Long term | 27 | 122.00 | 6.18 | 78.96 | 3.60 | 0.323 | 0.425 |
| | Medium | 69 | 123.64 | 9.59 | 79.16 | 6.53 | | |
| | Short term | 16 | 120.13 | 9.43 | 77.00 | 6.55 | | |
| Total | | 112 | | | | | | |
| 50-60 | Long term | 18 | 125.22 | 9.31 | 83.11 | 4.95 | 0.975 | 0.101 |
| | Medium | 25 | 124.80 | 6.70 | 79.80 | 5.49 | | |
| | Short term | 10 | 124.60 | 6.98 | 80.40 | 3.73 | | |
| Total | | 53 | | | | | | |
| >60 | Long term | 2 | 132.00 | 0.26 | 80.00 | 0.00 | 0.348 | 0.418 |
| | Medium | 6 | 119.67 | 11.69 | 75.00 | 5.48 | | |
| | Short term | 2 | 120.00 | 0.00 | 78.00 | 0.28 | | |
| Total | | 10 | | | | | | |

Chronicity of computer exposure in terms of years of use, was classified as long term (>5 years), medium (1-5 years) and shortterm (< 1 year). It was observed that there was no significant difference in the mean blood pressure levels among the long term, medium and short term users in amy age froup (p>0.05).

Table - 3
### EFFECT OF VARYING GRADES OF DAILY CONTINUOUS COMPUTER EXPOSURE ON MEAN BLOOD PRESSURE LEVELS OF USERS (n=783)

| Age (yrs) | Exposure (hrs/day) | No. | SBP(mmHg) | | DBP(mmHg) | | p-value | |
|---|---|---|---|---|---|---|---|---|
| | | | Mean | SD | Mean | SD | SBP | DBP |
| <20 | Heavy | 4 | 109.00 | 5.77 | 69.00 | 5.77 | 0.000 | 0.000 |
| | Moderate | 41 | 109.10 | 5.18 | 69.37 | 6.07 | | |
| | Light | 247 | 104.86 | 5.47 | 65.17 | 5.44 | | |
| Total | | 292 | | | | | | |
| 20-30 | Heavy | 23 | 116.17 | 5.24 | 73.70 | 6.31 | 0.011 | 0.043 |
| | Moderate | 135 | 112.53 | 6.45 | 72.23 | 6.64 | | |
| | Light | 78 | 111.74 | 5.99 | 70.46 | 5.38 | | |
| Total | | 236 | | | | | | |
| 30-40 | Heavy | 16 | 116.44 | 7.98 | 76.44 | 5.19 | 0.171 | 0.148 |
| | Moderate | 53 | 120.28 | 7.47 | 78.92 | 4.56 | | |
| | Light | 11 | 119.45 | 1.21 | 79.00 | 3.00 | | |
| Total | | 80 | | | | | | |

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| Age | Exposure | No. | SBP | SD | DBP | SD | p-value SBP | p-value DBP |
|---|---|---|---|---|---|---|---|---|
| **40-50** | Heavy | 13 | 123.00 | 9.33 | 78.62 | 5.85 | | |
| | Moderate | 66 | 122.02 | 7.38 | 79.44 | 5.56 | 0.547 | 0.492 |
| | Light | 33 | 124.09 | 10.02 | 77.92 | 6.56 | | |
| **Total** | | 112 | | | | | | |
| **50-60** | Heavy | 6 | 130.33 | 5.00 | 86.50 | 2.31 | | |
| | Moderate | 30 | 124.87 | 6.99 | 81.34 | 4.71 | 0.008 | 0.003 |
| | Light | 17 | 123.06 | 7.29 | 78.88 | 4.60 | | |
| **Total** | | 53 | | | | | | |
| **>60** | Heavy | 0 | - | - | - | - | | |
| | Moderate | 8 | 122.75 | 11.41 | 76.25 | 5.17 | 0.753 | 0.660 |
| | Light | 2 | 120.00 | 0.00 | 77.50 | 0.08 | | |
| **Total** | | 10 | | | | | | |

Daily continuous exposure was graded as heavy (>5 hours/day) , moderate (1-5 hour/day) and light (<1 hour/day ). It was observed that in users of age groups <20 years, 20-30 years and 50-60 years, who constituted approximately 74% of the total users, the mean blood pressure levels increased with increasing grade of use, the difference being significant statistically (p<0.05). Sharma AK et al (2006) observed that mental stress was perceived by 35% of the computer users and it increased significantly in those who were working 5 hour or more per day on computer. Since mental stress has an established association with high blood pressure, the finding of the present study are perfectly coherent with that Sharma et al (2006). This area requires a deeper, methodical research, as computer use is now a part of lifestyle of people.

Table - 4

## EFFECT OF CHRONICITY OF MOBILE PHONE USE ON MEAN BLOOD PRESSURE LEVELS OF USERS (n=853)

| Age (yrs) | Exposure (hrs/day) | No. | SBP(mmHg) Mean | SBP(mmHg) SD | DBP(mmHg) Mean | DBP(mmHg) SD | p-value SBP | p-value DBP |
|---|---|---|---|---|---|---|---|---|
| **<20** | Long term | 6 | 112.67 | 2.07 | 74.00 | 4.73 | | |
| | Medium | 34 | 110.14 | 6.14 | 69.47 | 6.32 | 0.359 | 0.177 |
| | Short term | 20 | 112.00 | 4.65 | 69.60 | 4.00 | | |
| **Total** | | 60 | | | | | | |
| **20-30** | Long term | 17 | 115.71 | 5.05 | 73.41 | 6.72 | | |
| | Medium | 233 | 111.80 | 6.20 | 70.93 | 5.93 | 0.022 | 0.218 |
| | Short term | 56 | 113.23 | 6.82 | 71.82 | 7.53 | | |
| **Total** | | 306 | | | | | | |
| **30-40** | Long term | 74 | 121.95 | 4.25 | 81.05 | 2.72 | | |
| | Medium | 39 | 118.68 | 7.72 | 77.27 | 5.40 | 0.043 | 0.000 |
| | Short term | 8 | 118.38 | 5.90 | 75.75 | 5.37 | | |
| **Total** | | 121 | | | | | | |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **40-50** | Long term | 55 | 126.13 | 7.42 | 81.84 | 5.33 | 0.001 | 0.001 |
| | Medium | 98 | 120.87 | 7.78 | 78.22 | 5.41 | | |
| | Short term | 39 | 124.26 | 11.33 | 80.28 | 5.94 | | |
| **Total** | | 192 | | | | | | |
| **50-60** | Long term | 31 | 124.06 | 9.13 | 80.58 | 5.40 | 0.476 | 0.465 |
| | Medium | 82 | 125.90 | 6.47 | 81.57 | 4.49 | | |
| | Short term | 26 | 124.62 | 9.8 | 80.77 | 8.49 | | |
| **Total** | | 139 | | | | | | |
| **>60** | Long term | 10 | 128.00 | 3.27 | 80.40 | 6.17 | 0.061 | 0.657 |
| | Medium | 19 | 120.74 | 7.59 | 78.58 | 9.41 | | |
| | Short term | 6 | 130.67 | 15.13 | 82.00 | 8.17 | | |
| **Total** | | 35 | | | | | | |

Chronicity of mobile phone use was classified as long term (>5 years), medium (1-5 years) and short term (<1 year). It was observed that in age groups <30 years, and > 50 years, who constituted approximately 63% of the user group, there no significant difference in mean blood pressure levels among the three categories of users, (p>0.05). However, in age group 30-50 years, significant differences were observed in the blood pressure levels of the three grades of users, (p<0.05). although no specific pattern could be elucidated.

## Table - 5

## EFFECT OF CHEST POCKET PLACEMENT OF MOBILE PHONE ON MEAN BLOOD PRESSURE LEVELS AMONG MALE USERS (n=583)

| Age (yrs) | Placement of phone | No. | SBP(mmHg) | | DBP(mmHg) | | p-value | |
|---|---|---|---|---|---|---|---|---|
| | | | Mean | SD | Mean | SD | SBP | DBP |
| **<20** | Chest poc | 8 | 115.75 | 1.58 | 72.75 | 3.49 | 0.011 | 0.843 |
| | Others | 31 | 113.39 | 3.70 | 72.45 | 4.50 | | |
| **Total (%)** | | 39 (6.69) | | | | | | |
| **20-30** | Chest poc | 50 | 117.84 | 2.65 | 76.30 | 3.97 | 0.000 | 0.003 |
| | Others | 110 | 115.72 | 4.39 | 74.11 | 4.87 | | |
| **Total (%)** | | 160 (27.44) | | | | | | |
| **30-40** | Chest poc | 48 | 121.82 | 6.48 | 79.67 | 4.85 | 0.637 | 0.654 |
| | Others | 47 | 121.26 | 4.83 | 79.26 | 4.04 | | |
| **Total (%)** | | 95 (16.30) | | | | | | |
| **40-50** | Chest poc | 83 | 125.65 | 9.14 | 81.73 | 4.74 | 0.044 | 0.008 |
| | Others | 67 | 123.06 | 6.53 | 79.55 | 5.10 | | |
| **Total (%)** | | 150 (25.73) | | | | | | |

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| 50-60 | Chest poc | 62 | 125.10 | 7.69 | 82.31 | 3.91 | 0.119 | 0.604 |
|-------|-----------|----|--------|------|-------|------|-------|-------|
|       | Others    | 48 | 127.28 | 6.71 | 81.70 | 5.92 |       |       |
| Total (%) |       | 110 (18.87) |  |  |  |  |  |  |
| >60   | Chest poc | 10 | 129.50 | 11.81 | 78.40 | 11.54 | 0.156 | 0.941 |
|       | Others    | 19 | 123.26 | 7.89 | 78.11 | 5.78 |       |       |
| Total (%) |       | 29 (4.97) |  |  |  |  |  |  |
| Grand Total (%) |  | 583 (100) |  |  |  |  |  |  |

Out of the 583 male mobile phone users, 261 (44.77%) kept their phones in their chest pocket. It was observed that in age groups >20 years, 20-30 years and 40-50 years, which harbored approximately 60% of the mobile phone users, chest pocket placers of mobile phone had significantly higher mean blood pressure levels than the non-placers, (p<0.05). This area is in urgent need of meticulous research so that the health risks of mobile phone use can be established and appropriate preventive measures taken.

### Conclusion & Recommendations:

Computers use even for years together, per se, was not found to have any influence on blood pressure levels, provided daily continuous use was limited to lesser hours. Mobile phone use even for years together was not found to have any significant impact on blood pressure levels, in general, provided it was not kept in chest-pocket.

Precise and appropriately designed studies, aimed at eliciting the effect of computers and mobile phones which are now a part and parcel of our lives, on blood pressure, should be undertaken.

**Bibliography:**

1.    **Singh RB, Singh V, Kulshreshtha SK, Singh S, Gupta P** : Social class and all-cause mortality in an urban population of North India. Acta Cardiol, 60 (6), 2005, pp 611-17.

2.    **Sharma AK, Khera S, Khandekar J** : Computer related health problems among information technology professionals in Delhi. IJCM, 31 (1), 2006, pp 36-38.

3.    **WHO** : Electromagnetic fields and public health : mobile telephones and their base stations. WHO fact sheet No. 193, June 2000.

4.    **WHO Expert committee on hypertension control** : Definition and classification of hypertension. Tech Rpt Ser, 862, 1996, pp 3-15.

5.    **Deswal BS, Satyamoorthy TS, Dutta PK, Ganguly SS** : An epidemiological study of hypertension among residents in Pune. IJCM, 16 (1), 1991, pp 21-28.

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