# Prevalence of Hypertension and Its Determinants among Primary and Secondary School Teachers in Al-Karkh-1 in Baghdad

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## ABSTRACT

**Background:** Hypertension is a chronic non-communicable condition of concern due to its role in the etiology of coronary heart disease, stroke, and other vascular complications that posing a major public health challenge to a population in socioeconomic, demographic, and epidemiological transition.

**Objectives:** To estimate the prevalence of hypertension in a primary and secondary school teachers in Baghdad\ Al-Karkh-1 and to determine the contributing factors that lead to development of hypertension.

**Methods:** A descriptive, cross-sectional study, conducted among teachers in primary and secondary schools in Baghdad\ Karkh-1 for a period form 1st January 2016 to 30th May 2016. A random sample from 16 schools was selected and 435 teachers accepted to participate in the study. Ten pregnant females were excluded from the study. The study was done by interviewing the teachers with a special questionnaire followed by measuring their weight, height, and blood pressure. Collected data were entered to Minitab version 16 for statistical analysis ANOVA test and Chi square were used to find the significance in differences among means in quantitative variables.

**Results:** The prevalence of pre-hypertension in the study was 26.21% and the prevalence of hypertension was 23.68% among teachers. The prevalence of hypertension increased with age and teaching years of those who were > 55 years old was 30.92% and for those who serve ≥ 20 years is 33.07%, more common in males 37.41% than females 16.07% while prevalence of pre-hypertension in females was 31.42% and males was 16.77%. Prevalence of hypertension in married teachers was 23.21% while in singles was 31.34%. The mean of BMI in hypertensive teachers was 26.55%±6.3 SD this means that overweight was significant risk factor of hypertension. The prevalence of hypertension with other risk factor such: smoking (36.87%), unhealthy diet (33.3%), stress and sleep affection (40.90%, 31.18%), medication other than hypertension drug (38.94%) that are strong association factors in hypertension while no significant association was found between hypertension and other risk factors like chronic disease (31.37%), family history (32.30%), physical inactivity (28%).

**Conclusion:** The prevalence of hypertension increased with age, more in male, single, overweight and increased in employed year. The smoking and diet, drug history, stress and sleep affection were the strongest modifiable predictor of hypertension and pre-hypertension. So need implementation of national program for HT for population included schoolteachers through health promotion and health education.


**Keywords: Hypertension, Risk factors, National program for hypertension.**

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WHO definition of hypertension is a condition in which the blood vessels have persistently raised pressure, putting them under increased stress. When systolic blood pressure is equal to or above 140 mm Hg and/or a diastolic blood pressure equal to or above 90 mm Hg the blood pressure is considered to be raised or high.

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Most people with hypertension have no symptoms at all; this is why it is known as the “silent killer”. Sometimes hypertension causes symptoms such as headache, shortness of breath, dizziness, chest pain, palpitations of the heart and nose bleeds, but not always[1].

Hypertension is a chronic non-communicable condition of concern due to

its role in the causation of coronary heart disease, stroke, and other vascular complications[2].

About 90-95% of cases are categorized as primary hypertension, defined as high blood pressure with no obvious underlying cause. The remaining 5-10% of cases are categorized as secondary hypertension, defined as hypertension due to an identifiable cause, such as chronic kidney disease, or an endocrine disorder such as excess aldosterone[3]. Although the exact cause of primary hypertension is unknown, there are several risk factors that have been associated with the condition. These factors can be categorized into modifiable and non-modifiable risk factors. The non-modifiable risk factors are age, sex, race, family history, genetic composition, etc. On the other hand, modifiable risk factors of hypertension are obesity, excessive salt intake, inactivity or lack of exercise, high fat diet, tobacco use, alcohol consumption, etc.[4].

So lifestyle modification is indicated for all patients with hypertension, regardless of drug therapy, because it may reduce or even abolish the need for antihypertensive drugs In addition to the immediate goal of lowering blood pressure[5].

Overall, approximately 20% of the world's adults are estimated to have hypertension. In many countries, 50% of individuals older than 60 years have hypertension. Worldwide, approximately 1 billion people have hypertension, contributing to more than 7.1 million deaths per year[6].

Prevalence of hypertension varied around the world, with the lowest prevalence in rural India (3.4% in men and 6.8% in women) and the highest prevalence in Poland (68.9% in men and 72.5% in women)[7].

In Arab countries, the overall estimated prevalence of hypertension is 29.5%. Awareness of hypertension was reported for 46% of the studies and varied from 18% (Jordan) to 79.8% (Syria). The prevalence of hypertension was found to increase with age, occurring more frequently in Arab women[8].

In Iraq, the prevalence of high blood pressure among the adult population (25 years and above) and the use of medication to control it, was found to be 40% in 2008. Prevalence is higher among males than females. A global epidemic which necessitates greater and coordinated efforts by all stakeholders[9].

The aim of this study is to estimate the prevalence of hypertension in teachers of primary and secondary schools in Baghdad/ Al-karkh and to review risk factors for hypertension development.

## Methods

A descriptive cross-sectional study carried out on sample of primary and secondary schools in Kakh-1 were taken from Directorate General of Education Baghdad / Karkh-1 during the period from 1st of January 2016 to 30th of May 2016. There were 500 schools eligible in the study. A cluster sample of 8 areas in Baghdad / Karkh-1 was selected and from these areas 16 schools select randomly 6 of them primary and 10 secondary schools. The total number of teachers that presented at time of visit was 506, ten of them were excluded as pregnant woman and 61 of teachers refused to participate so only 435 enrolled in this study, 169 teachers from primary schools and 266 teachers from secondary schools.

The questionnaire form that is self-administrating by modification of multiple questionnaire of national and regional studies on hypertension that has been prepared.

The first part of questionnaire include measure height, weight, blood pressure which need repeated measure of blood pressure by using sphygmomanometer in 2 or 3 visits (1 week apart).

The second part of questionnaire include risk factors of hypertension that classified to non-modifiable risk factor (age, gender, marital state, employed years) and

modifiable risk factor (smoking, eating habit, physical activity, stress and sleep affection).

The third part include other factors like (chronic diseases, medication history other than anti-hypertensive drug, family history). The study sample was classified into three groups, no hypertensive, pre-hypertensive and hypertensive, according to their status of blood pressure. Prevalence mean number of presence case of disease (old and new cases) to the total population at giving period of time.

Collected data were entered to Minitab version 16 for statistical analysis. Tables, figures, frequencies and percentages were used as descriptive statistics. Chi square test was used for inferential statistics in qualitative variables analysis. ANOVA test was used to find the significance in differences among means in quantitative variables. P value less than 0.05 considered statistically significant.

## Results

The results of this study were based on the analysis of data from 435 teachers. The prevalence of hypertension (diagnosed previously or during the study) among the teachers were 23.68% (103 out of 435). The teachers with no hypertension were 218 (50.11%), while those labeled pre hypertension were 114 (26.21%), (Figure 1).

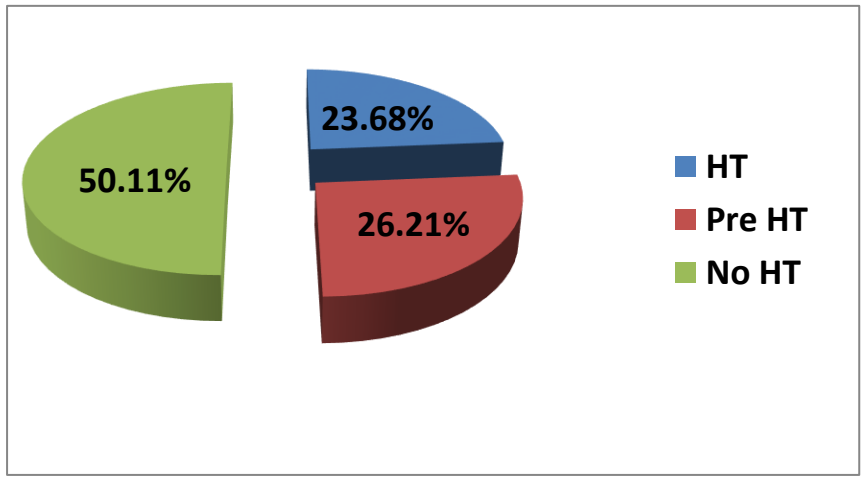


**Figure 1: The prevalence of hypertension status among teachers in study sample.**

The prevalence of HT status in teachers in relation to their gender, age, marital status and employed years are: (37.41%) of hypertensive teachers were males, while (15.9%) of hypertensive teachers were females. (16.78%) of males were in pre-HT stage, while (31.6%) of female were in pre-HT stage. Prevalence of HT was (30.92%) in age groups >55, (23.13%) were in age 46-55 and (20%) in age groups 30-45 and (21.62%) in age ≤ 35 years. In single teachers prevalence of HT were (31.34%) while (23.21%) of hypertensive teachers were married.

Regarding employment years, teachers have ≥ 20 years. The prevalence of HT was (33.08%) versus 24%of hypertensive teachers with <10 years. All the previous variable, gender, age, marital status and employed years showed a significant statistical association with hypertension status, with P value: 0.0001, 0.033, 0.003, 0.004, respectively, (Table1).

The hypertensive group showed the highest mean in BMI comparison. The pre-HT and no HT groups were the second and third rank respectively where mean of BMI in HT teachers were 26.55 ± 4.35, in pre-HT

was 25.14 ±3.51, in no HT was 24.87± 2.59. The difference in the means of BMI among the groups was statistically significant, (Table 2).

Smoking status, physical activity and eating style are expressed in table 3. The results of this study showed that prevalence of HT in current smoker was (36.87%), (25.98%) in ex-smoker, (9.20%) in nonsmoker while (76.68%) of non-hypertension teachers were nonsmokers. Smoking status is significantly associated with hypertensive status.

Only 37 teachers out of 435 (8.50%) practiced physical exercise regularly and labeled as active that prevalence was (18.91%) of hypertensive teachers were practiced active exercise. Surprisingly physical activity not associated significantly with hypertension status.

The prevalence of hypertension in teachers with stressful feeling and sleep affection were 40.90%, 31.18%, respectively. The association of stressful feeling and sleep affection because of teaching practice were statistically significant with hypertensive status, (Table 4).

The prevalence of hypertension according to Presence of chronic diseases (other than hypertension), family history of hypertension, and taking medication for chronic diseases were found in (31.38), (32.30) and (38.94) respectively in the study sample. The only significant statistical association with hypertensive status was found with taking medication P value was( 0.0001), (Table 5).

**Table 1: The prevalence of hypertensive status of the study sample according to the socio-demographic characteristics.**

| Variable | Prevalence of hypertension status | | | Total | P value |
|---|---|---|---|---|---|
| | No HT (n=218) No. (%) | Pre HT (n=114) No. (%) | HT (n=103) No. (%) | | |
| **Gender** / Male | 71 (45.81) | 26 (16.78) | 58 (37.41) | 155 | 0.0001 |
| Female | 147 (52.5) | 88 ( 31.6) | 45 (15.9) | 280 | |
| **Age**/ >55 | 49 (50.52) | 18 ( 18.56) | 30 (30.92) | 97 | 0.033 |
| 46-55 | 68 (50.75) | 35 (26.12) | 31 (23.13) | 134 | |
| 35-45 | 67 (51.54) | 37 (28.46) | 26 (20) | 130 | |
| <35 | 34 (45.95) | 24 (32.43) | 16 (21.62) | 74 | |
| **Marital status** | | | | | 0.003 |
| Single | 21 (31.34) | 25 (37.32) | 21 ( 31.34) | 67 | |
| Married | 168 (52.02) | 80 (24.76) | 75 (23.22) | 323 | |
| Divorced | 10 (66.66) | 3 (20) | 2 (13.34) | 15 | |
| Widow | 19 ( 63.34) | 6 (20) | 5 (16.66) | 30 | |
| **Employed years** | | | | | 0.004 |
| <10 | 58 (58) | 18 (18) | 24 (24) | 100 | |
| 10-19 | 105 (50.49) | 66 (31.73) | 37 (17.78) | 208 | |
| ≥20 | 55 (43.36) | 30 ( 23.56) | 42 (33.08) | 127 | |

**Table 2: Means and SD of BMI distribution according to hypertensive status.**

| BMI | Hypertension status | | | Statistics |
|---|---|---|---|---|
| | No HT | Pre HT | HT | |
| Mean | 24.87 | 25.14 | 26.55 | F- test =3.14 |
| SD | 2.59 | 3.51 | 4.35 | P=0.044 |

**Table 3: Prevalence of hypertension status according to the smoking, sport and eating style distribution among study sample.**

| Variable | Prevalence of Hypertension Status | | | | | | Total | P value |
|---|---|---|---|---|---|---|---|---|
| | No HT (n=218) | | Pre HT (n=114) | | HT (n=103) | | | |
| | No. | (%) | No. | (%) | No. | (%) | | |
| Smoking status | | | | | | | | |
| Never | 125 | (76.68) | 23 | (14.11) | 15 | (9.20) | 163 | 0.0001 |
| Ex-smoker | 45 | (40.17) | 38 | (33.92) | 29 | (25.98) | 112 | |
| Current smoker | 48 | ( 30) | 53 | (33.12) | 59 | (36.87) | 160 | |
| physical activity | | | | | | | | |
| Active | 21 | (56.75) | 9 | (24.32) | 7 | (18.91) | 37 | 0.262 |
| Partly active | 168 | (52.01) | 80 | (24.76) | 75 | (23.21) | 323 | |
| Sedentary | 29 | (38.66) | 25 | (33.33) | 21 | (28) | 75 | |

**Table 4: Prevalence of hypertensive status among study sample in related to stressful feeling and sleeping affection.**

| Variable | Prevalence of Hypertension Status | | | | | | Total | P value |
|---|---|---|---|---|---|---|---|---|
| | No HT (n=218) | | Pre HT (n=114) | | HT (n=103) | | | |
| | No. | (%) | No. | (%) | No. | (%) | | |
| Teaching stress | | | | | | | | |
| Yes | 75 | (42.62) | 29 | (16.48) | 72 | (40.90) | 176 | 0.0001 |
| No | 143 | (55.22) | 85 | (32.82) | 31 | (11.96) | 259 | |
| Sleeping affection | | | | | | | | |
| Yes | 74 | (39.78) | 54 | (29.04) | 58 | (31.18) | 186 | 0.0001 |
| No | 144 | (57.83) | 60 | (24.09) | 45 | (18.08) | 249 | |

**Table 5: Distribution of chronic diseases (other than hypertension), family history of hypertension, and taking medication regarding to prevalence of hypertensive status.**

| Variable | Prevalence of Hypertension Status | | | | | | Total | P value |
|---|---|---|---|---|---|---|---|---|
| | No HT (n=218) | | Pre HT (n=114) | | HT (n=103) | | | |
| | No. | (%) | No. | (%) | No. | (%) | | |
| Chronic disease | | | | | | | | |
| Yes | 20 | (39.21) | 15 | (29.41) | 16 | (31.38) | 51 | 0.219 |
| No | 198 | (51.56) | 99 | (25.79) | 87 | (22.65) | 384 | |
| Family history | | | | | | | | |
| Yes | 25 | (38.47) | 19 | (29.23) | 21 | (32.30) | 65 | 0.093 |
| No | 193 | (52.16) | 95 | (25.67) | 82 | (22.17) | 370 | |
| Take medication | | | | | | | | |
| Yes | 33 | (34.74) | 25 | (26.32) | 37 | (38.94) | 95 | 0.0001 |
| No | 185 | (54.41) | 89 | (26.17) | 66 | (19.42) | 340 | |

## Discussion

Hypertension is a challenge for public health bodies all over the world[10]. The prevalence of hypertension among teachers in this study was 23.68%. The same result were found by Nahla KR Ibrahim et al in Jeddah in 2007 in which overall prevalence of HT was 25.2%[11]. And in study by Gulay Yilmazel et al In Çorum, Turkey 2013, reported prevalence of hypertension 21.4%[12]. Also, the same result were found by David Guwatudde et al. In sub-saharan research 2012, found the prevalence of hypertension among teachers in South Africa and Tanzania were 23.2%, 23.1%, respectively[13]. While the

result of study by Azza SH Greiw et al in Benghazi, Libya in 2009, found that prevalence of HT in teachers had (15.1%)[14] and, Moushira et al in Egypt study in 2012, show prevalence of HT was 16.84%[15]. The probable reason for the differences could be attributed to difference in sample size, living style.

The current study show prevalence of pre-hypertension was 26.21%. The same result were found by David et al in sub-saharan research in 2012, found the prevalence of pre-hypertension among school teachers in South Africa and Tanzania were 26.0%, 7.5 %, respectively[13]. While in study by Nahla KR Ibrahim et al in Jeddah 2007, found the prevalence of pre-hypertension was 43%[11]. The reason for the differences in prevalence were most of teachers consider this reading as normal range of BP so they did not care.

In this study, 34% of the hypertensive teachers were diagnosed previously and received treatment, 66% were newly diagnosed, in study by Gulay Yilmazel et al in Turkey 2013, they found previous diagnosed hypertension represent 15.6% and newly diagnosed HT was 5.8%[12]. The cause for different values depend on health education and screening programs for each country.

Prevalence of hypertension increased with increasing age as shown in this study 23.13% in age 46-55 and 30.92% in age > 55 years that is statistical significant (p value 0.033). This agree with Nahla KR Ibrahim et al in Jeddah 2007 study prevalence of HT in age group 40-60 were 38.9%[11] and study by Bener A et al in Qatari nationals in 2004, report prevalence of HT was 32.1% in age group ≥ 55 years[16].

When person get older he became less active, arteries become harder, kidney function decrease that is he had more liable to get HT. So when teachers get older mean increase in experience or more year in teaching and more stress work which another factor for increase prevalence of hypertension.

Influence of gender on hypertension prevalence has been observed among men (37.41%) who showed higher prevalence than females (16.07%) highly statistically significant (p value 0.0001). The same result were found by Al Nozha et al in Saudi Arabia 2007, that prevalence of HT in male and female (28.6% and 23.9% respectively)[17]. Also, study by Payam Peymani et al in Fars Province in Iran 2012, found prevalence of hypertension in men (33.8%) was significantly higher than women (21.1%)[18].

This study shows that prevalence of pre-hypertension in females was 31.42%, while in male prevalence of pre-hypertension was 16.77%. This agrees with study by Rahman, et al in Bangladesh in 2011, that found prevalence of pre-hypertension were 32% in females and in males were 29%[19]. Also, study by Subash V Ijaya Kumar et al in Warangal, and HraPradesh India 2013, found prevalence of pre-hypertensive were 19% in males and 26% in females[20] . While disagree with Nahla KR Ibrahim et al in Jeddah 2007 study where they found prevalence of pre hypertension in men were 50.7% and 34.4% in female[11]. Study by Alok K Gupta et al in USA in 2010, shown males had a higher prevalence of pre-hypertension compared to females in which prevalence of pre-hypertension were 44.8 % in males, 27.3% in females[21]. The variation between both sexes among these studies and current study that most of females in the study are married and may be taking drug specially hormonal therapy (contraceptive pills) which consider a factor for hypertension in the future.

Due to small sample size, the study shows prevalence of HT in single teachers were 31.34%; in married teachers were 23.21% which is highly statistical significant (p value 0.003) disagree with the study of Gulay Yilmazel et al in Turkey 2013 that married teachers were 7.8%, single were 10.8%[12].

The study shows that mean of BMI was significant factor in hypertension group which is 26.55±4.35 p value (0.044). This agrees with Ifeomal et al in Nigerian study 2011, 26.05±5.03[22]; agrees with Azza SH Greiw et al in Benghazi Libya in 2009[14] and with Asiyeh Pirzadeh, et al study in Esfahan in 2010, Iran shown mean BMI was 25.08 ± 3.20 kg/m$^2$ [23]. This mean that increase in BMI (overweight) leads to high cholesterol (dyslipidemia), atherosclerosis, and pre-diabetes, which predict to increase blood pressure.

The smoking is highly associated with HT that seen in present study were prevalence of hypertension in teachers who are current smoker were 36.9% compared with non smoker 9.20%, (p value 0.0001). This agrees with David Guwatudde et al, in sub-sahran study 2012 were found prevalence of hypertension in smokers were 34.8%[13] and with Ifeoma I. Ulasi et al in Enugu, Nigeria 2011. They found the prevalence 35.6% among smokers[22]. While opposite to studies that smoking is not significant factor for hypertension like in the study by Charbel El Bcheraoui et al in the Kingdom of Saudi Arabia, 2013. Prevalence was 46.19%[24] and with Asiyeh Pirzadeh et al in Esfahan in 2010, Iran study were 43.8%[23]. The cause of high prevalence of smokers in our country was related to unawareness of harmful effect of smoking and not respond early to programs of smoking cessation.

The study shows that prevalence of hypertension in teachers who practiced exercise actively (30 min. in 5 days or more) were (18.91%) compared with (28%) not active exercise. This agrees with the study by Charbel El Bcheraoui et al, in the Kingdom of Saudi Arabia, 2013 were reported the prevalence of hypertension in active exercises were 22.85%[24]. But differs from that reported by Awosan KJ, et al in Sokoto Nigeria in 2013, that prevalence were 7.7%[25]. Which are significant factor for hypertension is may be due to the difficulties in estimating the physical activity depending on self-reporting. This result does not deny the beneficial effect of physical exercise in decreasing blood pressure.

The main causes of this high pressure aside from age and gender and job experience have been stress and sleep affect, which have been considered as a severe risk for teachers in all studies conducted. Therefore, eliminating emotional and environmental stress is of a great importance to treat blood pressure. Which show in this study prevalence were 40.90% and 31.18%, respectively, where highly association with HT (p value 0.0001), the same significant factor seen by Jatin Chhaya et al in Ahmedabad City, Gujarat, in Indian study 2015 the prevalence of hypertension related to stress were 25%[26], and by Asiyeh Pirzadeh et al in Iran 2010, found that prevalence of hypertension related to stress and sleep affect were 21.9%[23].

Family history is an important non-modifiable risk factor for hypertension. In this study, the family history and chronic disease that teacher suffering either before teaching or after that represented 32.30%, 31.37%, respectively. Which agree with Nooshin Mohammad Zadeh et al in Iran in 2011 found the family history and chronic disease were 29.1%, 22.3%, respectively[27]. While disagree with Azza SH Greiw et al in Benghazi Libya in 2009 were13.4%, 15.6%, respectively[14]. Differences could be attributed to several factors, including sample size, method of obtained data may be different in these studies.

In current study shows strong association between hypertension and medication (mainly non-steroidal anti-inflammatory drugs) prevalence of hypertension 38.94% ;( p value 0.0001) this agree with Nooshin Mohammad Zadeh et al in Iran in 2011, the prevalence of hypertension was 31.4%. Which significant factor for hypertension[27] this due to these drugs increase blood pressure via their anti-prostaglandin effects on the kidney.

In conclusion: The prevalence of hypertension increased with age, more in

male, single, overweight and increased in employed year. The smoking and diet, drug history, stress and sleep affection were the strongest modifiable predictor of hypertension and pre-hypertension. So need implementation of national program for HT for population included schoolteachers through health promotion and health education.

## References


1.WHO | Q & amp; As on hypertension. WHO [Internet]. 2015 [cited 2018 Apr 20]; Available from: http://www.who.int/features/qa/82/en/.

2. Abdulsalam S, Olugbenga-Bello A, Olarewaju O, Abdus-Salam I. Sociodemographic correlates of modifiable risk factors for hypertension in a rural local government area of Oyo state South West Nigeria. Int J Hypertension [Internet]. 2014;2014:842028.

3. Carretero OA, Oparil S. Essential Hypertension : Part I: Definition and Etiology. Circulation [Internet]. 2000; 101(3): 329-35.

4. Ibekwe R. Modifiable risk factors of hypertension and socio-demographic profile in Oghara, Delta State; Prevalence and Correlates. Ann Med Health Sci Res [Internet]. 2015;5(1):71–7.

5. Nancy Huang, Karen Duggan, Jenni Harman, lifestyle management of hypertension. Australian Prescriber 2008; 31(6): 150.

6. WHO. The world health report 2002. Reducing Risks, Promoting Healthy Life. WHO [Internet]. 2013.

7. Kearney PM, Whelton M, Reynolds K, Whelton PK, He J. Worldwide prevalence of hypertension: a systematic review. J Hypertension [Internet]. 2004; 22(1):11-9.

8. Tailakh A, Evangelista LS, Mentes JC, Pike NA, Phillips LR, Morisky DE. Hypertension prevalence, awareness, and control in Arab countries: A systematic review. Nurs Health Sci [Internet]. 2014;16(1):126-30.

9. WHO EMRO | Iraq celebrates World Health Day under the theme of hypertension | Iraq-events | Iraq [Internet]. [cited 2018 Apr 20].

10. Al-Rukban MO, Al-Sughair AM, Al-Bader BO, Al-Tolaihi BA. Management of hypertensive patients in primary health care setting, auditing the practice. Saudi Med J [Internet]. 2007;28(1): 85-90.

11. Ibrahim NK, Hijazi NA, Al-Bar AA. Prevalence and determinants of pre hypertension and hypertension among preparatory and secondary school teachers in Jeddah. J Egypt Public Health Assoc [Internet]. 2008;83(34):183-203.

12. Gulay Yilmazel, Fevziye cetinkaya. Pre-hypertension and hypertension among primary-secondary school teachers in Çorum: Results from a Turkish cross-sectional study. Medicine Science International Medical Journal 2016; 05: 845-56.

13.Guwatudde D, Nankya-Mutyoba J, Kalyesubula R, Laurence C, Adebamowo C, Ajayi I, et al. The burden of hypertension in sub-Saharan Africa: a four-country cross sectional study. BMC Public Health [Internet]. 2015;15(1):1211.

14. Azza SH Greiw, Zahira Gad, Ahmed Mandil, Mervat Wagdi, Ali Elneihoum. Risk factors for cardiovascular diseases among schoolteachers in Benghazi, Libya. Ibnosina Journal of Medicine and Biomedical Sciences 2010; 2(4): 168-77.

15. Sarry El-Din AM, Erfan M, Kandeel WA, Kamal S, Abd R, Banna E-S El, et al. Prevalence of pre-hypertension and hypertension in a sample of Egyptian adults and its relation to obesity. Aust J Basic Appl Sci. 2012;6(13):481-9.

16. Bener A, Al-Suwaidi J, Al-Jaber K, Al-Marri S, Dagash MH, Elbagi I-EA. The prevalence of hypertension and its associated risk factors in a newly developed country. Saudi Med J 2004;25(7):918-22.

17. Al-Nozha MM, Abdullah M, Arafah MR, Khalil MZ, Khan NB, Al-Mazrou YY, et al. Hypertension in Saudi Arabia. Saudi Med J 2007; 28(1): 77-84.

18. Payam Peymani; Seyed Taghi Heydari; Seyed Mehdi Ahmadi; Yaser Sarikhani; Hassan Joulaei; Mohsen Moghadami; et al, The prevalence of high blood pressure and its relationship with anthropometric indicators; a population based study in Fars province, Iran. International Cardiovascular Research Journal 2012; 6(2): 405.

19. Rahman, Muntasirur; Williams, Gail; Al Mamun, Abdullah. Gender differences in risk factors for pre- hypertension and hypertension in Bangladeshi adults: findings from a large nationwide survey in 2011. Journal of Hypertension 2015; 33(e-suppl 2): e1-e44.

20. Subash Vijaya Kumar, ANR Laxmi, Sreenivas Pasula, Kavya Adepu. Mahamood Ali. Prevalence, awareness, and control of hypertension in school teachers in Warangal, and Hra Pradesh, India. International Journal of Biological Medical Research 2013; 4(2): 3247-9.

21.Gupta AK, McGlone M, Greenway FL, Johnson WD. Pre-hypertension in disease-free adults: a marker for an adverse cardio metabolic risk profile. Hypertension Res [Internet]. 2010;33(9):905-10.

22. Ulasi II, Ijoma CK, Onwubere BJC, Arodiwe E, Onodugo O, Okafor C. High prevalence and low awareness of hypertension in a market population in Enugu, Nigeria. Int J Hypertension [Internet]. 2011; 27: 869-75.

23.Pirzadeh A, Sharifirad G, Kamran A. Healthy lifestyle in teachers. J Educ Health Promote [Internet]. 2012; 1: 46.

24.El Bcheraoui C, Memish ZA, Tuffaha M, Daoud F, Robinson M, Jaber S, et al. Hypertension and its associated risk factors in the Kingdom of Saudi Arabia, 2013: A national survey. Int J Hypertension 2014; 2014: 564679.

25.Awosan KJ, Ibrahim MTO, Sabir AA, Ejimodu P. Awareness and prevalence of risk factors of coronary heart disease among teachers and

bankers in Sokoto, Nigeria. J Med Med Sci 2013; 4(9): 335-42.

26. Chhaya J, Devalia J, Kedia G. Prevalence of risk factors and its association with non-communicable disease among the faculty members of teaching institute of Ahmed Abad City, Gujarat: A cross-sectional study. Int J Sci Study [Internet]. 2015 ;3(8).

27. Zadeh NM, Fakhri LS. Primary School Teachers and Occupational Health: Blood Pressure, Voice Hoarseness, Allergy. [cited 2018 Apr 21]; Available from : https://pdfs.semanticscholar.org/83f1/2edc7c1f9c3b373e9e05d2347d080bc7ec85.pdf.

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