# Prevalence of Obesity and Hypertension Among Rural Women of Dakshina Kannada District, Karnataka 

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## ABSTRACT

Introduction: It is well documented that obesity exist among urban affluent society in South India. The overall socioeconomic development in rural community the life style of the rural population is changing which makes the rural women more sedentary in their habits. This study brings out the prevalence of obesity, its relationship with blood pressure in rural women and estimates the risk of hypertension in obesity.

## Objectives:

To assess the problem of obesity and hypertension among rural women of DK
Establish the relationship of obesity and hypertension and estimation of risk.
Materials and Methods: The study was conducted in the adjacent villages of Mangalore taluk of DK district of Karnataka for a period of six months 200 women above the age of 20 years were free from any morbidity or non-pregnant during the course of the study were screened for obesity and hypertension. A pre-determined questionnaire was used to collect socio-demographic details. Blood pressure was recorded using a mercury sphygmomanometer. Anthropometric measurement like weight and height were recorded to assess the obesity prevalence.

Results: The obesity in women for different age groups was observed. The highest prevalence of obesity was observed in the age group between 40-49years. The overall obesity above 20 years of age was $54 \%$. As age advances from 30 years there was an increase in the prevalence of diastolic hypertension but not in a uniform way. The overall prevalence of hypertension was $26 \%$. The prevalence of obesity among hypertensive was found to be $83.9 \%$. The relative risk of obese women developing systolic hypertension was 4.5 times that of the non-obese women. The attributable risk was $78 \%$ and the odds ratio was 5.5.The prevalence of obesity among the diastolic hypertensive was $88.5 \%$.The relative risk of obese women developing diastolic hypertension was 6.5 times than that of the non-obese women. Attributable risk was $84.5 \%$ and the odds ratio was 10.6. The differences of these were statistically significant ( $P<0.001$ ). The correlation coefficient was found to be 0.417 and 0.253 for systolic and diastolic blood pressure respectively which was very highly significant. ( $P<0.001$ ). Conclusion: The maximum prevalence of obesity in women was seen among the age group of 40-49 years which may be attributed to the fact that women gain maximum weight between 40-49 years. It was also observed that greater degree of obesity were associated with higher level of blood pressure.

## KEYWORDS : obesity, hypertension and rural women.

Introduction It is well documented that obesity exist among urban affluent society in South India Very few studies have been conducted to bring about the existence of obesity among rural population. The overall socio-economic development in rural community the life style of the rural population is changing which makes the rural women more sedentary in their habits. The majority of the rural women in this region are presently engaged in sedentary occupations like beedi rolling and cashew factory work (Kennel, 1967), (Tyroler,Heyclen,Hamer1975) study proved that greater degree of obesity was associated with higher levels of blood pressure. (Fletcher 1994) has shown that the effect of weight reduction has dramatic effect on the reduction of blood pressure in obese women. This study brings out the prevalence of obesity, its relationship with blood pressure in rural women and estimates the risk of hypertension in obesity.

## Objectives:

1. To assess the problem of obesity and hypertension among rural women of DK
2. Establish the relationship between obesity and hypertension and estimation of risk.

Materials and Methods: The study was conducted in two adjacent villages of Mangalore taluk of DK district of Karnataka for a period of six months. Out of 800 women, only 200 women above the age of 20 years were free from any morbidity or non-pregnant during the course of the study. These 200 women were screened for obesity and hypertension. A pre-determined questionnaire was used to collect socio-demographic details. Blood pressure was recorded using a mercury sphygmomanometer; model value was taken from the three consecutive readings. Anthropometric measurement like weight and height were recorded to assess the obesity prevalence.

To assess the obesity, Broca's index (height (cm) minus 100=nor-
mal weight) was used(park K, 2011). There was a good agreement between classification of nutritional status based on Broca's index, weight for height percentage and body mass index (Rao viswaeswara, Balakrisna 1995). The recorded weight of the women was compared with the normal weight and classified as below normal (weight $\leq$ to Broca's index) and above normal (excess of recorded weight expressed in percentage of normal weight ). Broca's index more than $10 \%$ of the normal weight is considered as obesity (Park,2000). Systolic blood pressure of 140 mm of mercury and above and diastolic blood pressure of 90 mm of mercury and above is considered as hypertensive(. The prevalence of obesity and hypertension by age were estimated and association between them was analyzed using chisquare test. Correlation analysis was used. Relative risk, attributable risk and odds ratio were also estimated.

Results: The obesity in women for different age groups was observed. The highest prevalence of obesity was observed in the age group between 40-49years. The overall obesity above 20 years of age was $54 \%$. ( Table No 1) $3.4 \%$ of women in the age group of 20-29 had systolic hypertension while diastolic hypertension in the age group of 50-59 and above 60 years was $42.9 \%$ and $45.2 \%$ respectively. The overall prevalence of systolic hypertension was $15.5 \%$. As age advances from 30 years there was an increase in the prevalence of diastolic hypertension but not in a uniform way. The overall prevalence of hypertension was $26 \%$. The relationship between obesity and hypertension revealed that only $5.4 \%$ of the non-obese women had systolic hypertension as compared to $24.1 \%$ among obese women. The prevalence of obesity among hypertensive was found to be $83.9 \%$. The relative risk of obese women developing systolic hypertension was 4.5 times that of the non-obese women. The attributable risk was $78 \%$ and the odd's ratio was 5.5. A comparison of obesity and diastolic hypertension showed that only $6.5 \%$ ( of the 92) non-obese women had diastolic hypertension compared to $42.1 \%$ (of the 108) obese women. The
prevalence of obesity among the diastolic hypertensive's was $88.5 \%$. The relative risk of obese women developing diastolic hypertension 6.5 times than that of the non-obese women. The attributable risk was $84.5 \%$ and the odds ratio was 10.6. By using chi-square test, the significant differences of these were found ( $p<0.001$ ). The relationship between the different grades of obesity with that of systolic and diastolic blood pressure showed an increase in prevalence of hypertension with the grades of obesity. The correlation coefficient was found to be 0.417 and 0.253 for systolic and diastolic blood pressure respectively which was very highly significant.( $\mathrm{p}<0.001$ ).

Discussion: Obesity is one of the most common disorders of metabolism. Obesity is a health problem in majority of the developed countries and is emerging into a serious problem in the developing countries of the world (Bouchard 1992). It is estimated that 20-40\% of adults suffer from obesity in developed countries (Park 2011). In recent years, with the improving socio-economic status the overall energy expenditure is reduced. This has resulted in increased prevalence of obesity (El-Hazmi \& Warsy 1997). The prevalence of obesity reported from different countries has shown significant variability. The figures reported include: USA-1\% in males and $15 \%$ in females 20-64 years, UK $-8 \%$ and $9 \%$ in males and females respectively in 20-64 years, and Italy -9.9\% and 11.1\% in males and females 45-64 years old(Epstein \&Higgins 1992). Thus it is clearly shown that obesity is more common in women than in men. In the present study the maximum prevalence of obesity in women was seen among the age group of 40-49 years which may be attributed to the fact that women gain maximum weight between 40-49 years(Hubert,Fienleib\&Namara !983). It was also observed that greater degree of obesity were associated with higher level of blood pressure.

Conclusion: Obesity and hypertension are two closely associated conditions and obesity probably pre-disposes to hypertension. The prevalence of obesity increase with age and the overall prevalence of obesity was $54 \%$. The prevalence of systolic and diastolic hypertension was $15.5 \%$ and $20 \%$ respectively. Severity of obesity had direct relationship with increase prevalence of hypertension. The relative risk of obese women developing systolic and diastolic hypertension compared to non-obese women was 4.5 and 6.6 respectively. This shows that obesity associated with hypertension is an emerging health problem in the rural community of Dakshina Kannada

Table No: 1 Prevalence of Obesity by age.

| Ageín yrars | Non-olicese | Obere | Total | Prevalence \% |
| :---: | :---: | :---: | :---: | :---: |
| 20-29 | 42 | 16 | 58 | 27.6 |
| 30-39 | 19 | 27 | 46 | 58.7 |
| 40-49 | 5 | 25 | 30 | 83.3 |
| 50-59 | 16 | 19 | 35 | 54.3 |
| $60-$ | 10 | 21 | 31 | 67.7 |
| Total | 92 | 108 | 200 | 54 |

Table No 2
Prevalence of systolic hypertension

| Age in years | Systolic <br> $B^{*} \subset 140$ <br> mmor Hg | Systolic <br> $\mathrm{BP}^{*}>140$ <br> min or He | Tomal | Prevalanay \% | Mean BP |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 20-29 | 56 | 2 | 58 | 3.4 | 118.5 |
| 30-39 | 46 | 0 | 46 | 0 | 121.5 |
| $40-49$ | 30 | 0 | 30 | 0 | 115.5 |
| 50-59 | 20 | 15 | 35 | 42.9 | 135.1 |
| $60+$ | 17 | 14 | 31 | 45.2 | 142.2 |
| Total | 169 | 31 | 200 | 15.5 | 125.3 |


| Table No. 3 Prevalence of Diastolic BP |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Age in years | Diastolic $\mathrm{BP}<90$ <br> mm of $\mathrm{Hg}$ | Diastolic BP $\begin{gathered} \\ 90\end{gathered}$ mm of Hg | Total | Prevalence <br> \% | Mean BP |
| $\begin{aligned} & 20- \\ & 29 \end{aligned}$ | 46 | 12 | 58 | 20.7 | 74.9 |
| $\begin{aligned} & 30- \\ & 39 \end{aligned}$ | 43 | 3 | 46 | 6.5 | 82.8 |
| $\begin{aligned} & 40- \\ & 49 \end{aligned}$ | 26 | 4 | 30 | 13.5 | 80.5 |
| $\begin{aligned} & 50- \\ & 59 \end{aligned}$ | 26 | 9 | 35 | 25.7 | 83.1 |
| $60+$ | 7 | 24 | 31 | 77.4 | 98.7 |
| Total | 148 | 52 | 200 | 26.0 | 82.7 |


| Table <br> No 4 obesity/ <br> Systolic and diastolic blood pressure |  |  |  |
| :--- | :--- | :--- | :--- |
| Obesity | Normotensive | Hypertensive | Total |
| Non obese | 87 | 5 | 92 |
| Obese | 82 | 26 | 108 |
| Total | 169 | 31 | 200 |
| Diastolic blood pressure |  |  |  |
| Non obese | 86 | $6(6.5 \%)$ | 92 |
| Obese | 62 | $46(42.1 \%)$ | 108 |
| Total | 148 | 52 | 200 |


| Table No 5 Correlation of obesity grade / Systolic and diastolic blood pressure |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Obesity grade | Systolic BP* < 140 mm of Hg | Systolic $\mathrm{BP}^{*}>=$ 140 mm of Hg | Total | Prevalence \% | Mean BP |
| Normal | 87 | 5 | 92 | 5.4 | 120.6 |
| 5-10\% | 34 | 0 | 34 | 0 | 118.0 |
| 11-15\% | 36 | 18 | 54 | 33.3 | 133.8 |
| 16-20\% | 12 | 8 | 20 | 40 | 125.3 |
| $r=0.417, p<0.0001$, Very Highly Significant |  |  |  |  |  |
| Obesity grade | Diastolic BP $<90$ mm of Hg | Diastolic BP 『90 mm of Hg | Total | Prevalence <br> \% | Mean BP |
| Normal | 86 | 6 | 92 | 6.5 | 81.5 |
| 5-10\% | 19 | 15 | 34 | 44.1 | 85.1 |
| 11-15\% | 34 | 20 | 54 | 37.0 | 86.5 |
| 16-20\% | 9 | 11 | 20 | 55.0 | 93.0 |
| Total | 148 | 52 | 200 | 26 | 82.7 |
| $r=0.253, p<0.001$, Very Highly Significant |  |  |  |  |  |

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