



WAIST HIP RATIO AND RISK OF BREAST CANCER

KEYWORDS

Breast Cancer, Waist hip ratio, obesity, Breast Cancer

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ABSTRACT

Breast cancer is one of the most common cancer diagnosed among Indian women. One important factor proposed to contribute to the rising incidence is secular changes in lifestyle. Waist Hip Ratio has emerged as an important metameter for the association between adiposity and many obesity related diseases. The WHO Western Pacific Regional Office has defined obesity in Asian populations as WHR>0.85. This study aims to investigate the association between waist hip ratio and breast cancer. This is a case control study conducted at Government Medical College , Kozhikode with 100 cases of female patients (30-60 years) with cytology proven Stage I/II/III breast cancer and with 100 age matched controls. On evaluation it was found that WHR was significantly associated with female breast cancer. When the results were stratified by different menopausal status of the women, higher WHR is associated with increased risk of breast cancer in premenopausal patients whereas statically no association between higher WHR and breast cancer was found in postmenopausal. To conclude high WHR is significantly associated with breast cancer in the pre-menopausal group whereas no significant association was found in the post menopausal group.

Introduction

Breast cancer ranks second in global cancer incidence and is one of the most common cancer diagnosed among Indian women^{1,2}. While breast cancer incidence has been shown to have stabilized or to be decreasing in some Western countries, the breast cancer burden has steadily increased in many developing countries with traditionally low incidence rates³. Among factors proposed to contribute to the rising incidence in these societies are secular changes in lifestyle and reproductive factors. The influence of anthropometric measures on breast cancer risk has been the subject of many studies^{4,5}. The relation between body weight distribution and breast cancer risk is modified by menopausal status, with higher waist hip ratio (WHR) associated with increased risk for post-menopausal women. However, these findings were derived from studies conducted mainly in Western countries, where the prevalence of obesity is relatively high and attained height is not limited by nutritional status in childhood. The influence of body size on breast cancer risk in developing countries remains unclear.

In 1987, Bruning⁶ proposed that the distribution of body fat affects breast cancer risk by influencing sex hormone availability. Evidence supporting this hypothesis came from observations showing that women with a predominance of upper body or truncal fat have lower SHBG levels and increased percentage of free testosterone, independent of overall adiposity⁷. WHR is more commonly used than skin-fold thickness because it is considered a better predictor of type 2 diabetes, hypertension, and metabolic abnormalities⁸ and because it is more easily obtained in large epidemiological studies. Greater upper or central body fat distribution, perhaps because of its relation with visceral adiposity, is associated with multiple hormonal and metabolic changes, including insulin resistance and hyperinsulinemia, increased levels of free fatty acids, decrease in sex hormone-binding globulin levels, increases in androgen levels and the conversion of androgen to estrogen in adipose tissue, increased bioavailability of estradiol and each of these changes have been associated with an increased risk of premenopausal breast cancer.

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health⁹. There are different ways to measure obesity; WHR is the most commonly used and is calculated Waist circumference divided by hip circumference. The WHO Western Pacific Regional Office (WPRO) has proposed a definition of obesity in Asian populations with overweight defined as WHR≥ 0.85. The aim of this study is to study the association of Waist hip ratio with

risk of breast cancer.

MATERIALS AND METHODS

This is a Case control study conducted in Government medical college, Kozhikode. Hundred female patients with cytology proven breast cancer in age group 30-60 years attending OP of Department of Surgery, Government Medical College, Calicut was taken as cases and equal number of age matched individuals were taken as control. The study period was one year from March 2014 to March 2015.

In this study, all cases of breast cancer, regardless of previous history, seen at presentation and later confirmed histologically from Govt. Medical College, Calicut was selected after taking informed consent. WHR of all cases was recorded as per the guidelines set by WHO expert meeting 2008.

A woman was considered as postmenopausal if she had experienced a final menstrual period more than 12 months before the reference date (and had not used hormonal therapy (HT) before or during the 12 month interval after last menstrual period.

Results

WAIST HIP RATIO IN CASES AND CONTROL

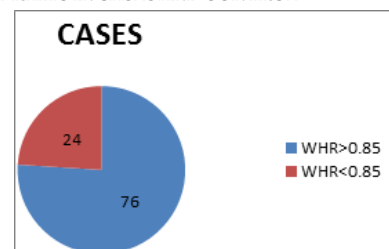


Figure -1 WAIST HIP RATIO IN CASES

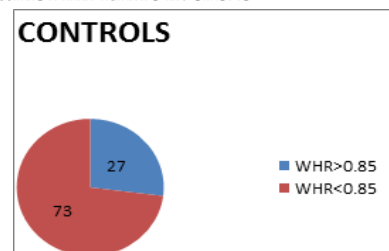


Figure - 2 WAIST HIP RATIO IN CONTROLS

Waist hip ratio was compared between the two groups. Chi-square value came as 48.14 and p value was 0.00. There was significant association between elevated Waist hip ratio and carcinoma breast.

PREMENOPAUSE AND WHR

Table 1 : WHR IN PREMENOPAUSAL CASES AND CONTROLS

	Cases	Controls
WHR>0.85	39	7
WHR<0.85	15	61
	54	68

There were 54 premenopausal patients among cases and 68 premenopausal patients among control. WHR was evaluated among these groups. Chi-square value came as 49.14 and p value came as 0.00. There was significant association between higher WHR and breast cancer among premenopausal age group

POST MENOPAUSE AND WHR

Table 2: WHR IN POSTMENOPAUSAL CASES AND CONTROLS

	Cases	Controls
WHR>25	38	21
WHR<25	8	11
	46	32

There were 46 postmenopausal patients among cases and 32 postmenopausal patients among control. WHR was evaluated among these groups. Chi-square value came as 2.95 and p value came as 0.08. There was no significant association between higher WHR and breast cancer among postmenopausal age group.

Discussion

As economies have developed, living conditions have improved. However the structure of the diet has also changed, with more high fat food being eaten while at the same time the need for physical strength in work has diminished and these factors have resulted in a rising level of obesity with consequent morbidity and mortality. Usually WHR is used to evaluate generalized obesity. In this study 200 patients were included, 100 cases of breast cancer and 100 age matched control groups. The data were collected and analysed using SPSS software.

Many studies have indicated that WHR is an important index for evaluating the degree of obesity, and the association between obesity and breast cancer¹⁰, but confirmatory studies performed in Asian populations are lacking. In my study it was found that WHR was significantly associated with female breast cancer (p value came as 0.00).

In this case control study fat accumulation as measured by WHR was significantly related to breast cancer in pre-menopausal women, but not in postmenopausal women. There were 54 premenopausal patients among cases and 68 premenopausal patients among control. Comparing the WHR among these, 39 out of 54 cases have higher WHR and only 7 out of 68 controls have higher WHR. On computing p value came as 0.00. Thus higher WHR is associated with breast cancer among premenopausal patients.

WHR among postmenopausal cases and controls was evaluated. There were 46 postmenopausal patients among the cases and 32 postmenopausal patients among the control. Comparing the WHR among these, 38 out of 46 cases have higher WHR and 21 out of 32 among controls have higher WHR. P value came as 0.08. There was statistically no association between higher WHR and breast cancer in postmenopausal patients.

Previous studies of WHR and premenopausal breast cancer included a prospective cohort study,¹¹ which reported an appreciable effect on risk for WHR, and three case-control studies,¹²⁻¹⁴ which reported no effect. In the prospective study,¹¹ based on 56 premenopausal cases from the Netherlands, age-adjusted RR for breast cancer increased

with increasing WHR among premenopausal women under 45. In women over 45, there was an inverse association between breast cancer and WHR.

As for postmenopausal women, the results of previous studies of WHR and breast cancer were mixed. Four studies, two prospective cohort^{15,11} and two case-control,²⁸⁻²⁹ reported observations consistent with our finding of no association and three studies, one prospective cohort²¹ and two case-control,^{16,12} reported a positive association. Of three prospective cohort studies of breast cancer in postmenopausal women, only the Iowa Women's Health Study¹⁷ reported a significant association for WHR and breast cancer, particularly in older, heavier women. The other two prospective cohort studies^{18,11} did not report a significant association, but they were based on only 23 and 36 cases, respectively.

Four case-control studies examined WHR and breast cancer in postmenopausal women. Schapira et al.¹⁹ using a case group in which 80% of the 216 breast cancer cases were post-menopausal, reported a strong association of WHR and breast cancer. Bruning et al.¹² reported that WHR was significantly associated with postmenopausal breast cancer and that Quetelet index was not. The two remaining case-control studies, by den Tonkelaar et al.²⁰ and by Petrek et al.²¹ reported that breast cancer was not related to WHR in postmenopausal women. Two additional studies did not stratify on menopausal status, and thus were not directly comparable to our study. A cohort study in Sweden²² reported no link between WHR and breast cancer in²¹ pre- and postmenopausal cases. Likewise, a case-control study in Germany²³ (89 pre- and postmenopausal cases) reported no association between WHR and breast cancer, using age- and Quetelet index-matched controls.

WHR might influence breast cancer risk in premenopausal women through sex hormones, especially oestrogens and androgens, which have been implicated in breast cancer aetiology.²⁴⁻²⁶ An important hormonal factor that could be associated with WHR is reduced SHBG, which would increase the bioavailability of sex hormones. In the model proposed by Bruning,²⁷ upper body fat accumulation leads to increased triglycerides, which in turn lead to reduced SHBG and increased circulating unbound oestradiol. Excessive circulating androgens appear to be related to increased upper body fat. For example premenopausal women with increased androgenicity, as reflected by elevated free testosterone and decreased SHBG, have higher WHR, adjusted for body weight, than controls.²⁸ Women with hirsutism—a symptom of androgen excess—tend to have higher WHR than non-hirsute subjects, after adjustment for age and weight.²⁹ Kirschner et al.³⁰ in a study of morbidly obese premenopausal women, reported that testosterone, oestradiol, free testosterone and free oestradiol were elevated, and SHBG reduced, in women with upper body obesity, as compared to women with lower body obesity.

In conclusion, our study offers new evidence that upper body fat accumulation, as estimated by WHR, may be associated with breast cancer in premenopausal, but not in postmenopausal women.

Conclusion

To conclude waist hip ratio, the index of obesity is found to be significantly associated with female breast cancer. High Waist hip ratio is significantly associated with breast cancer in the premenopausal group where as no significant association was found in the post menopausal group. Thus for both public health and clinical practice, obesity should be considered as important risk factors for female breast cancer. As obesity, diet and exercise are potentially modifiable and the prevalence of obesity in developing and developed countries remains high and continues to increase, more research into understanding the underlying biological mechanisms and on improving the treatment of obese breast cancer patients diagnosed at any age is warranted.

ABBREVIATIONS

WHR- Waist Hip Ratio

CONFLICTS OF INTEREST : None declared

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