

Waist Hip Ratio as a Predictor of Diabetic Status in Reproductive Age Group Women in Urban and Rural Moradabad

Alankrata Jain¹, Anurag Srivastava^{2*}, Sadhana Singh³, Neha Priya⁴

¹PG Resident, ²Professor & Head, ³Associate Professor, ⁴Assistant Professor,
Department of Community Medicine,
Teerthanker Mahaveer Medical College & Research Centre, Moradabad, Uttar Pradesh, India.

ABSTRACT

Background: Diabetes Mellitus is a chronic metabolic disorder, and has become major cause of disease burden worldwide. Type 2 Diabetes is a preventable disease and its pre-screening can be of great help in preventing the disease.

Aims & Objectives: To find the prevalence of undiagnosed cases of type II Diabetes Mellitus in Reproductive age group females of Rural and Urban area of Moradabad District. To find the association of waist hip ratio and type II Diabetes Mellitus in Reproductive age group.

Materials and Methods: A cross-sectional study was conducted among 800 Reproductive age group females, in Urban and Rural Moradabad., over a period of 1 year. Study was conducted using a structured and pretested questionnaire. Statistical analysis was done using MS Excel sheets.

Results: Association of Waist hip ratio with diabetes: 13(25%) of diabetic female had waist hip ratio >0.85. followed by 75(76.54%) prediabetic female with waist hip ratio <0.85. waist hip ratio had very significant association with diabetes.

Conclusion: A significant number of female with High waist hip ratio were found diabetic and Pre diabetic, thus waist hip ratio is a good predictor of Diabetes Mellitus type 2.

Keywords: Reproductive Age Group, Waist Hip Ratio, Pre Diabetic, Diabetes.

*Correspondence to:

Dr. Anurag Srivastava,
Professor & Head,
Department of Community Medicine,
TMMC & RC, Moradabad, UP, India.

Article History:

Received: 28-09-2017, Revised: 20-10-2017, Accepted: 26-11-2017

Access this article online

Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2017.3.6.086	

INTRODUCTION

Physicians and scientist have been working on the chronic condition known as diabetes since ages. Since the very origin of this disease along with the research of various medicines, many researchers have played important role. In 1552 BC first symptom of diabetes was diagnosed.¹ When an Egyptian physician whose name was Hesy-Ra, first noticed urination and emaciation. Also at the same time, ancient scientist noted that ants were attracted to the person with sweet urine.

According to the latest data globally around 445 million people are suffering from diabetes. Prevalence of the diabetes is increasing rapidly as the people are progressing more towards sedentary lifestyle, according to the previous data of 2013 less number 330 million people were found suffering from diabetes. This number will rise by double by the year 2030. Globally 80-90% cases are of type 2 diabetes mellitus. There is a rapid risk in the cases of diabetes is seen due to the change in risk factors association of diabetes.² According to the report of Indian Heart Association in the year 2035 India will become the leading country with 109 million individuals with diabetes mellitus. Research by American association also proves the same. This rapid rise is due to dietary changes, increase in the intake of high calorie diet, low activity

lifestyle which is mainly found in the middle class of the Indian population.³

As the prevalence of Diabetes Mellitus is rising vary rapidly in India therefore we need an effective tool/predictor that can be used as prescreening tool for diagnosing the disease and for decreasing its burden from the community.⁴ In our study we are using Waist Hip Ratio as a predictor for type 2 Diabetes Mellitus which is found to be its important risk factor.

AIMS AND OBJECTIVES

- To find the prevalence of undiagnosed cases of type II Diabetes Mellitus in Reproductive age group females of Rural and Urban area of Moradabad District.
- To find the association between waist hip ratio and type II Diabetes Mellitus in Reproductive age group females.

MATERIALS AND METHODS

Study Type

The present study was a cross-sectional study conducted at Rural and Urban health centre of Teerthanker Mahaveer Medical College, Moradabad.

Study Area

The study was carried out in the Urban and Rural field practice area of Department of Community Medicine, Teerthanker Mahaveer Medical College and Research Centre Moradabad. The total number of villages in rural area is 29 with population of 30,278 and total number of households is 5506. In urban area the population is 24,006 distributed across 23 mohallah.

Study Duration

The study has been conducted from Jan 2016 to July 2017. The data collection from field was done from January 2016 to December 2016. Subsequently the collected information was compiled, analyzed and thesis prepared by July 2017.

Sample Size

This sample of 800 women of 15-49 year age group will be taken from the mohallas and villages of urban and rural areas coming under the respective training centers of the Department of Community Medicine, Teerthanker Mahaveer Medical College and Research Centre, Moradabad. The sample was collected from each area according to PPS (Population Proportionate to Size) technique and random sampling.

Inclusion Criteria: Reproductive age group female from age 15 - 49years not diagnosed or treated for diabetes mellitus type II earlier.

Exclusion Criteria: Female not in the reproductive age group, female who did not gave consent, female diagnosed with diabetes mellitus earlier or taking treatment for Diabetes mellitus.

Sampling Technique

A multistage sampling design with random approach has been used.

First Stage: Selection of Primary Sampling Units (PSUs): All villages and mohallas in the field practice area constitutes as PSU. The urban PSU comprised of 23 mohallas and rural PSU comprised of 29 Villages. The population of each of the selected PSU was obtained from the annual census maintained in the Community Medicine department of Teerthanker Mahaveer Medical College and Research Centre, Moradabad. Based on the population size using probability proportional to population size (PPS) technique the required number of households from PSU to be included in the study was calculated.

Second Stage: Selection of Households: The department maintains a list of all households in the field practice area. Each household has been designated a serial number. The required numbers of household from each PSU were selected using simple random technique. The serial numbers of the houses were allotted random numbers generated online. These random numbers were then selected randomly till the required sample size was reached from each primary sampling unit.

Third Stage: Selection of Population Sample: After selection of household it was verified whether the household has a reproductive age group female (15-49yrs). If any such female was found then after obtaining informed consent the structured questionnaire was administered. If more than one such female was found one female was selected randomly. If no such female was found, then the investigator moved to the next pre-selected household. This process was continued till the required sample size was fulfilled.

Ethical Approval

The study was examined and cleared by Institutional Review Board and Institutional Ethical Committee.

Data Collection Procedure

Reproductive age group female from each selected household was interviewed using pre-tested schedule on a one to one basis. Each individual reproductive age group female was examined for random blood sugar (RBS) using Glucometer (Accu-Chek). After recording RBS, individuals were divided in 2 categories- 1. Non diabetic group 2. Pre- Diabetic group or Diabetic (not diagnosed with Diabetes Previously) Based on the result the subjects and were further divided into Pre- Diabetic and Diabetic group. Then the Waist Hip Ratio of the study subjects was measured using the standard technique.

Data Analysis

Data was analyzed with the help of statistical software for social sciences (SPSS) V20.0 and presented using descriptive statistics means, proportion, and percentages), chi-square test.. The strength of association was estimated by calculating the odds ratio (OR) with the 95% CI. P value of <0.005 was considered statically significant and data was presented in the form of tables, and figures wherever necessary.

RESULTS

The Socio Demographic Details of the Study Participants

Total 800 reproductive age group females of age group 15-45 years (mean age =25.35) years, standard deviation of age =3.51 were taken in the study. Maximum number of female belong to 26-35 yrs of age 346 (43.25%), followed by 284 (35.5%) females from 15-25yrs of age group. Majority of females belong to Gen/OBC category 653 (81.62%), with 511 (63.87%) belonging to Hindu religion, and most of the study subjects (46.5%) are educated up to intermediate. On the basis of occupation majority of the females 371 (46.37%) are housewives and only 38 (4.75%) are Professional/Teachers. Out of total reproductive age group females only 2.63% had family history of Diabetes in both parents.

Waist Hip Ratio and Diabetes.

Association of Waist hip ratio with diabetes: 13 (25%) of diabetic female had waist hip ratio >0.85 followed by 23(23.46%) were prediabetic. Waist hip ratio has very significant association with diabetes. On analyzing the variation of waist hip ratio of our study subjects with their blood sugar status it was observed that, 25% of Diabetic female had a high Waist Hip ratio (>0.85). While 94.16% of females with low Waist Hip ratio had no Diabetes. Waist hip ratio, were also found with significant association with diabetes but had lesser odds. Their odds were observed to be, 0.12, 0.48, 0.76, 1.35, 3.75 respectively.

DISCUSSION

Age

The respondents in the age group 15 to 49 yrs of age were included the study. The population of females in different age groups age group in our study from 15-25 yrs of age are (35.5%), and 26-35 yrs of age female are (43.25%). Our study findings are similar to the findings of Brambhatt et al⁵ with female of 15-25 yrs age (30%). In another study by Zaman et al⁶ similar findings regarding age group 26-35, (40%) females are found. In study by Gupta et al⁷ (24%) female in the younger age were found. In study by Taksande et al⁸ female in reproductive age were (20%). In Patel et al⁹ female of younger age group were (20%). In the study by Patil et al¹⁰ female of reproductive age group are lesser as compare to our study (48.3%). (Table 1)

Table1: Distribution of Reproductive age group female according to socio demographic variables (N=800)

Socio-demographic variables	Frequency	Percentage(%)
Age		
15-25	284	35.5
26-35	346	43.25
36-45	170	21.25
Caste		
ST/SC	147	18.38
Gen/OBC	653	81.62
Religion		
Hindu	511	63.87
Muslim/Others	289	36.13
Education		
Illiterate/Just literate	49	6.13
High school/Middle school	294	36.75
Intermediate	372	46.5
Gra/P.G.	85	10.62
Occupation		
Professional		
Semiprofessional	38	4.75
Semi skilled	174	21.75
Students	217	27.13
Housewife	371	46.37
SLI		
<9	96	12
9-19	665	83.13
>19	39	4.87
Family history		
No Parent Diabetic	716	89.5
One Parent Diabetic	63	7.87
Both Parent Diabetic	21	2.63

Table 2: Association between Waist Hip ratio and Diabetes.

Waist Hip ratio	Diabetic	Pre diabetic	No Diabetic	Total	Chi square	P value	Odds ratio	CI
>0.85	13(25)	23(23.46)	38(5.84)	74(9.25%)	47.94	0.00001	3.75	1.9-
<0.85	39(75)	75(76.54)	612(94.16)	7261(90.75%)				7.41
Total	52(100%)	98(100%)	650(100%)	800				

Table3: Diabetic Status in Reproductive age group of Urban and rural area.

Area	Diabetes	Pre-Diabetes	Non Diabetes
Urban	30	55	299
Rural	22	43	351
Total	52	98	650

Caste

In the present study (18.38%) reproductive age group female belong to ST/SC category and (81.62%) female belong to Gen/OBC category. Other studies also reported similar findings (80.1%) in Gen/OBC category females by Gupta et al⁷ and 85% by Mary et al¹¹. (Table 2)

Religion

In our study majority of the reproductive age group female (63.87%) belong to Hindu religion. Our study findings are similar to Gupta et al⁷ in which (62.5%) female belong to Hindu religion. In another study by Rao et al¹² (85%) female belong to Hindu religion. (Table 3)

Education

Regarding education (10.62%) reproductive age group female are educated up to Graduate and above, (46.5%) female are educated up to intermediate. In another study by Ismial et al¹³ findings regarding education are quiet similar to our study as (41.7%) females are educated up to secondary education. Whereas in a study by Sheri et al¹⁴ results are different from our study (30.5%) participants were illiterate and (21%) were just literate.

Occupation

In our study (46.37%) female of reproductive age group are housewives, (4.75%) are professional/Teaches. In the study by

Ismial et al¹³ findings are different from our study as only (29.9%) females are housewives. Another study findings are similar to our study as in this study by Sheri et al¹⁴ found (62.5%) nonworking females were housewives.

SLI

According to our study 4.87% participants were belonging to SLI >19. Similarly in Vardhan et al¹⁵ 5.9% study participants were with SLI >19.

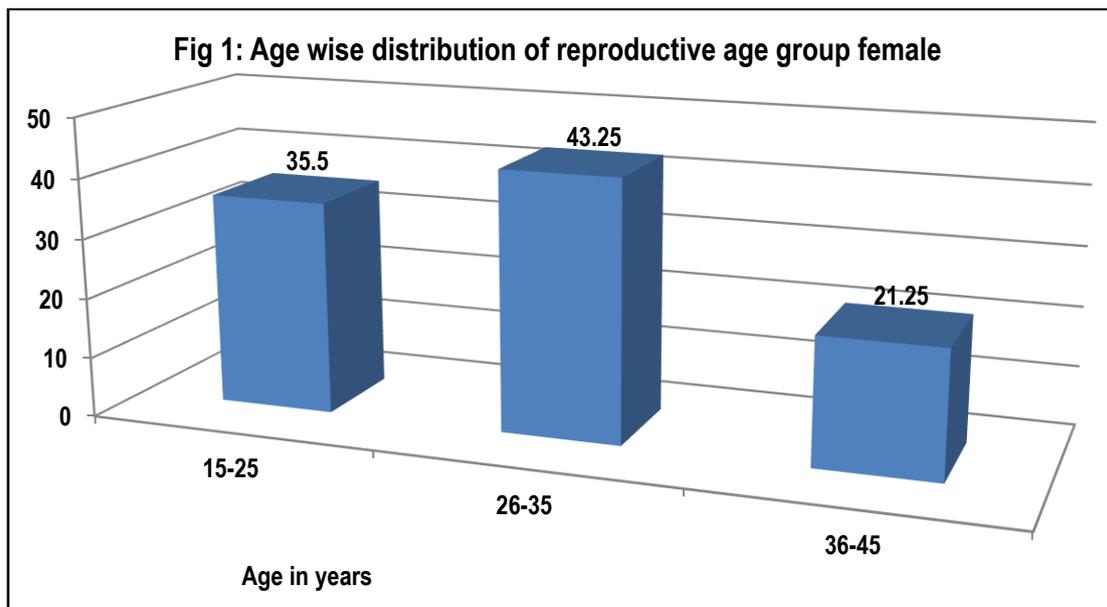


Figure 1: Distribution of Age of Reproductive age group female.

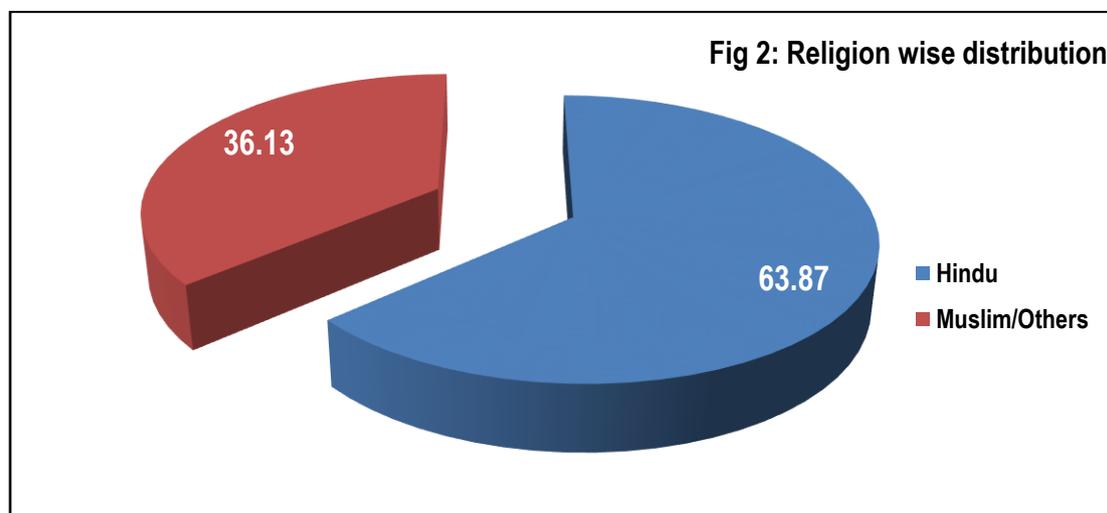


Figure 2: Distribution of Reproductive age group female according to Religion.

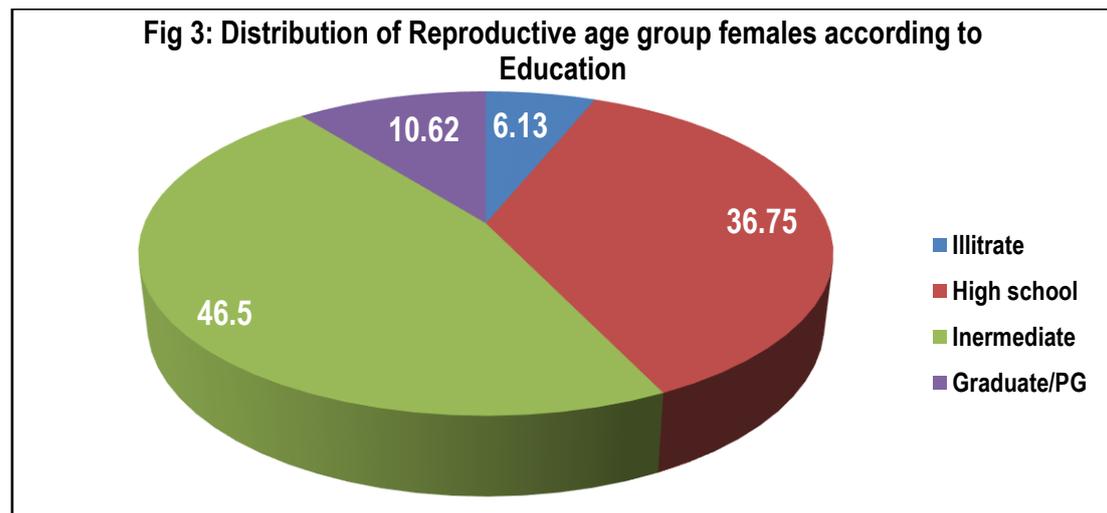


Figure 3: Distribution of Reproductive age group female according to Education.

CONCLUSION

Waist hip ratio is a good predictor of Diabetes Mellitus type 2, as a significant number of study subjects were found with high risk of Diabetes and prediabetes with waist hip ratio > 0.85. Thus waist hip ratio can be effectively used as predictor for Diabetes Mellitus type 2.

RECOMMENDATIONS

It can be concluded from our study that the burden for Type 2 diabetes mellitus among the rural and the Urban area female of Moradabad is significant. A large group of female under risk of diabetes and pre diabetes is under younger population 26-35 yrs age, which is a pointer that the burden of the diabetes or prediabetes is going to increase in near future. Therefore it is pertinent to recommend effective remedial measures for prevention and control of diabetes mellitus.

REFERENCES

1. Facts of diabetes: Diabetes India health Unlocked. 2016; assessed on March 8, 2017; Available from helathindiaunlocked.com/diabetesindia/posts/historyofdiabetes,
2. Statistics about diabetes: American diabetes association. 2017; Assessed on March 11, 2017; Available from www.diabete.org/diabetes-basics.statistics,
3. About Diabetes. 30 Sep – 2015; assessed on March 2017. Available on www.heart.org/diabetes>About Diabetes,
4. The Indian Diabetes Risk Score/Cadi, Available on www.cardi research.org. Assessed on January 21 2017.
5. Brahmbhatt K, Chakroborty T, Gopal C, Shwethashree M, Mandappady S, Saundrya T, et al. Assessment of risk of type 2 diabetes using simplified Indian Diabetic risk Score – community based cross sectional study. *Indian J Community Med.* 2016;12(5):2522-6.
6. Sathish T, Kannan S, Sarma SP, Razu O, Sauzet O, Thankappan KR. Seven-year longitudinal change in risk factors for non-communicable diseases in rural Kerala, India: The WHO STEPS approach. *Plos one.* 2017; 12:1-9.
7. Gupta S, Khare N, Sonal K. A Study of Diabetes Prevalence and its Risk Factors in the Medical College Faculty of Bhopal, Madhya Pradesh. *Austin J Endocrinol Diabetes.* 2014; 1(2): 1 - 3 .
8. Taksande B, Ambade M, Joshi R. External validation of Indian diabetes risk score in a rural community of central India. *Journal of Diabetes Mellitus.* 2012;2: 109-13.

9. Patel D, Shah M, Ahir G, Amin V, Singh MP. A study on validation of Indian Diabetic risk score (MDRF) for screening of Diabetes Mellitus among the high risk group (policeman) of diabetes mellitus in Bhavnagar city. *Innovative J of Medical and Health Sci.* 2012; 2(5):109-11.

10. Patil R, Gothankar J. Assessment of risk of type 2 diabetes using the Indian Diabetes Risk Score in an urban slum of Pune, Maharashtra, India: a cross-sectional study. *WHO South-East Asia J of Public Health.* 2016; 5: 53-8.

11. Oommen A, Abraham V, George K, Jacob V. Prevalence of risk factors for non-communicable diseases in rural & urban Tamil Nadu. *Indian J Med Res.* 2016;14:48-52.

12. Rao R, Kulkarni M, Narayanan S, Kamath V, Kamath A, Ballala K, Sujatha K. Utility of Indian Diabetic Risk Score (IDRS) in a Rural Area of Coastal Karnataka. *Indian J of Evolution of Med and Dental Sciences* 2014. 3 (13): 3272-7.

13. Schetulze M, Hoffman K, Boing H, Lniseisen J, Rohrmann S, Mohliq M. An Accurate Risk Score Based on anthropometric, dietary, and lifestyle factors to Predict the Development of Type 2 Diabetes. *Diabetes Care.* 2017; 30(3):501-15

14. Shehri F. Quality of life among Saudi Diabetics. *J of Diabetes Mellitus.* 2014;4:225-31.

15. Vardhan A, Prabha A, Shashidhar K. The Value of the Indian Diabetes Risk Score as a Tool for Reducing the Risk of Diabetes among Indian Medical Students. *J of Clin and Diagnostic Res.* 2011;5(4): 718-20.

Source of Support: Nil. **Conflict of Interest:** None Declared.

Copyright: © the author(s) and publisher. IJMRP is an official publication of Ibn Sina Academy of Medieval Medicine & Sciences, registered in 2001 under Indian Trusts Act, 1882.

This is an open access article distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Cite this article as: Alankrata Jain, Anurag Srivastava, Sadhana Singh, Neha Priya. Waist Hip Ratio as a Predictor of Diabetic Status in Reproductive Age Group Women in Urban and Rural Moradabad. *Int J Med Res Prof.* 2017 Nov; 3(6):396-400. DOI:10.21276/ijmrp.2017.3.6.086