

Association of Obesity in Patients with Osteoarthritis of Knee

Inderbir Singh, Jaspal Singh Sandhu and Shyamal Koley

Department of Sports Medicine and Physiotherapy, Guru Nanak Dev University, Amritsar 143 005, Punjab, India

KEY WORDS Obesity. Osteoarthritis of Knee. North Indian Population.

ABSTRACT The present study deals with the measurements of Q angles, inter-tibial distance, body mass index, per cent fat and waist-hip ratio in patients with osteoarthritis of knee ($n = 40$) and appropriate controls. The results suggest that obesity is in close association with osteoarthritis of knee.

INTRODUCTION

Osteoarthritis is a joint disorder in which there is a progressive softening and disintegration of articular cartilages. These changes result from a variety of abnormalities which predispose to mechanical failure of hyaline articular cartilage. Degenerative changes in osteoarthritis involving the weight bearing joints are directly related to obesity and wear and tear brought about by the activities of daily living (Kale and Bellare, 1988). Overload due to obesity further accentuates degenerative changes in the weight bearing joints, specially in knee.

Reports regarding the association of obesity with osteoarthritis of knee are available from different corners of the Globe (Hollingsworth and Melson, 1982; Jiganti et al., 1993; Felson, 1988 and 1993; Spector et al., 1993; Bullough and Cawston, 1994; Hart and Doyle, 1995 and Anders and Hochberg, 1997), not much literature is available regarding Indian populations. To fulfill the lacunae of knowledge the present

study was planned.

MATERIALS AND METHODS

Twenty obese males and twenty obese females of the age group 35-65 years who were radiologically confirmed cases of tibiofemoral arthritis were selected randomly as study group. The equal number of healthy males and females were considered as controls, matching every aspects with the study group expect the osteoarthritic symptoms.

Measurements of left and right Q angles, intertibial distance, per cent fat, body mass index and waist-hip ratio were taken after Kale and Bellare (1988). Standard statistical calculations were also made.

RESULTS AND DISCUSSION

Table 1 shows mean values and standard deviations of Q angles (both left and right), intertibial distance, basal metabolic index (BMI), percent body fat and waist-hip ratio in normal and obese males and females. The obese males have higher mean values in left Q angle (16.97°), right Q angle (16.63°), intertibial distance (11.81 cm), BMI (33.12 kg/sq.m), percent body fat (37.62%) and in waist-hip ratio (5.84) than normal males (10.56° , 10.33° , 9.77 cm, 24.02 kg/sq.m, 22.62% and 0.93, respectively).

Table 1: Mean values and standard deviations of Q angles (left and right), intertibial distance, BMI, per cent fat and waist-hip ratio in normal and obese males and females

	Normal Males		Obese Males		Normal Females		Obese Females	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Q angle (Left)	10.56°	0.79	16.97°	0.85	12.50°	0.87	19.23°	1.92
Q angle (Right)	10.33°	0.77	16.63°	1.24	12.47°	0.91	18.30°	1.61
Inter tibial distance (cm)	9.77	0.98	11.81	1.23	11.55	0.93	15.16	0.93
BMI (kg/m ²)	24.02	1.42	33.12	2.51	23.37	0.69	31.40	2.16
Per cent Fat	22.62	2.23	37.62	2.88	25.93	1.25	39.58	1.29
Waist/Hip ratio	0.93	0.05	5.84	0.21	0.87	0.01	0.90	0.02

Combinations	Q angle (Left)	Q angle (Right)	Inter Tibial distance (cm)	BMI (kg/m ²)	Per cent Fat	Waist/Hip Ratio
Normal males vs Normal females	8.88 ³	8.08 ³	5.87 ³	2.12 ¹	5.94 ³	4.26 ³
Obese Males vs Obese females	4.83 ³	3.68 ³	10.28 ³	2.32 ¹	2.78 ¹	1.02
Normal males vs Obese males	26.24 ³	19.32 ³	6.10 ³	14.10 ³	18.40 ³	1.01
Normal females vs Obese females	14.26 ³	14.06 ³	12.31 ³	16.02 ³	35.81 ³	4.63 ³

1 indicates $P < 0.05$, 3 indicates $P < 0.001$

Similarly, obese females have higher mean values in left Q angle (19.23°), right Q angle (18.30°), intertibial distance (15.16 cm), BMI (31.40 kg/sq.m.), percent body fat (39.58%) and in waist-hip ratio (0.90) than normal females (12.50°, 12.47°, 11.55 cm, 23.27 kg/sqm. 25.93% and 0.87, respectively). Highly significant differences ($p < 0.001$) were noted both in left and right Q angle, intertibial distance, BMI, percent body fat and waist-hip ratio between normal males and females, obese males and females, normal males and obese males, and between normal females and obese females with some exceptions. In BMI, between normal males and females (t -value = 2.12) and between obese males and females (t -value = 2.32) and in percent body fat between obese males and females (t -value = 2.78), statistically significant differences were noted and non-significant differences were observed between obese males and females (t -value = 1.02), and between normal males and obese males (t -value = 1.01) in waist-hip ratio.

Considering the findings of the present study we may conclude that obesity has a strong association with osteoarthritis of knee.

REFERENCES

- Andres, R. and Hochberg, M.C.: Metabolic correlates of obesity and radiographic features of knee osteoarthritis; data from Baltimore Longitudinal study of Aging. *J. Rheumatol.*, 24: 702-707 (1997).
- Bullough, P. and Cawston, T.: Pathology and biochemistry of osteoarthritis. pp. 29-58. In: M. Doherty Osteoarthritis (Ed.). Wolfe, London (1994).
- Felson, D.: Epidemiology of hip and knee osteoarthritis. *Epidemiol. Rev.*, 10: 1-28 (1988).
- Felson, D.: The course of osteoarthritis and factors that affect it. *Rheum. Dis. Clin. North Am.*, 19: 607-615 (1993).
- Hart, D.J. and Doyle, D.V.: Association between metabolic factors and knee osteoarthritis in women. The Clingford study. *J. Rheumatol.*, 22: 1118-1123 (1995).
- Hollingsworth, P. and Melson, R.D.: Measurement of radiographic point space in rheumatoid knee; correlation with obesity. *Rheumatol Rehabil.*, 21: 9-14 (1982).
- Jiganti, J.J., Goldstein, W.M. and Willims, C.S.: Comparison of preoperative morbidity in arthroplasty in obese and non obese patients. *Clin. Orthop.*, 289: 179-189 (1993).
- Kale, S. and Bellare, B.V.: Pathomechanics of knee osteoarthritis and obesity. *J. I.A.P.*, 9: 13-16 (1988).
- Poole, A., Rizkalla, G. and Lonescu, M.: Osteoarthritis in the human knee; A dynamic process of cartilage matrix degradation, synthesis and reorganization. *Agents Actions*, 39 (Suppl): 3-13 (1993).
- Spector, T.D., Hart, D. J., Byne, J. and Harris, P.A.: Definition of osteoarthritis of knee for epidemiological studies. *Ann. Rheum. Dis.*, 52: 790-794 (1993).