ORIGINAL RESEARCH PAPER

Social Science

ANTHROPOMETRY, BODY FAT, BLOOD PRESSURE AND DIETARY NUTRIENT INTAKE OF YOUNG JAIN & MUSLIM GIRLS FROM MUMBAI CITY –A COMPARATIVE STUDY

KEY WORDS: Body Fat, Jain, Muslim, Adolescent girls, Dietary Intake

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ABSTRACT

OBJECTIVE: To study the differences and/or similarities (if any) between adolescent girls of Mumbai following Jainism and Islam.
Methodology: A Total of 350 young girls (150 Jains, 200 Muslims) in the mean age of 16.8±1.3 years were assessed for anthropometry (height, weight, BMI, WC, HC, and WHR), Total body fat percentage, blood pressure and dietary nutrient intake (Energy, Macronutrient and Micronutrient intake) using standard methods. Correlation between these parameters was calculated using Pearson's correlation.
Results: Muslim girls had lower BMI, waist and hip circumference, but the WHR was slightly higher than Jain girls. Blood pressure was not different between the groups although Total body fat of Jains was higher. The micronutrient intake of all the girls was below their RDA, but Jains had better iron and calcium intake than Muslims. Dietary intake of energy and macronutrients were better among Muslim girls.
Conclusion: Religion plays a vital role in the type of food we eat thus affect the nutrient profile of the diet. It further conditions the body composition which may determine the health status later in life.

1. INTRODUCTION

Adolescence is the phase of physical, psychological and social advancing from childhood to adulthood. The term "adolescents" refers to individuals falling between the ages of 10-19 years. Adolescent girls, forming approximately one-tenth of the population, are an extremely important segment of our society. The nutritional status of adolescent girls, the future mothers, significantly contributes to the nutritional status of the community at large.[1] India is a land of various religions that are characterized by disparate religious practices and beliefs. The sacred land of India has given birth to numerous religions such as Hinduism, Sikhism, Jainism, and Buddhism. Jainism is one of the archaic religions of India. Absolute non-violence of thought and action is the very fundamental discipline of Jainism. Jains form a small religious community in India, who are strict vegetarians. Even within the vegetarian regime, strict dietary codes are specified that restrict the consumption of many products of plant origin for e.g. potatoes, onions, and garlic etc. Recognizing plants as a life form, Jainism gives a scientific definition of vegetarianism, its limitations, and the necessity for the survival of the human race.[2] On the other hand, the term Islam connotes submission to the will of God. The disciple of Islam is called a Muslim. Muhammad was the name of the holy prophet through whom this religion was revealed.[3] Islam's holistic approach to health includes attend to one's bodies with respect and nourishing them with, not only faith but also with lawful, nutritious food. God has also presented a list of foods that are forbidden and rest everything else is considered lawful. "Forbidden to you (for food) are; dead animals - cattle-beast not slaughtered, blood, the flesh of swine, and the meat of that which has been slaughtered as a sacrifice for other than God..." (Quran 5:3) "And intoxicants." (Quran 5:91-92).[4] Hence, Islam prohibits the consumption of dead animals, blood, swine and intoxicants as mentioned in Quran.

METHODOLOGY

The correlation between dietary intake, anthropometry, body fat, and blood pressure has been studied in adolescent girls following Jainism and Islam in this study. Data on 350 young girls (150 Jains, 200 Muslims) from Mumbai city with the mean age of 16.8±1.3 years is presented in the current study. The mean age of Jain girls was 17.1±1.6 years and that of Muslim girls was 16.5±0.9 years.

Sample Size: 350 (150 Jains & 200 Muslims)
Sampling Technique: Purposive Random Sampling
Location: Mumbai

Inclusion criteria:
- Muslim and Jain girls
- Age group- 15-19 years
- Middle socio-economic class
- Attending college

Exclusion criteria:
- School dropouts
- Married girls
- Having any major illness

Analysis of the dietary nutrient intake was done using DietCal software (Version 5.0).

Data collection tool
- **Body Composition Monitor - Tanita BC 601 was used to assess the body fat composition of the participants**
- **Blood Pressure was checked with the help of Omron Blood Pressure Monitor**
- **Questionnaire; having the following-**
- General Information
- College Related Information
- Anthropometric Measurements
- Questions Based On Knowledge, Attitude And Practice [KAP] (Nutrition And Religion)
- Information Regarding Physical Activity
- Clinical Information
- Food Frequency Questionnaire
- 3-Day Dietary Recall

Statistical methods:
- Analyses were performed using SPSS software for Windows (version 16.0, 2007, SPSS Inc, Chicago, IL). Data are presented as Mean ± SD or frequency (percentage).
- Independent Sample T Test test was used to analyse difference in parameters between age groups.
- Pearson's correlation was used to assess correlation between variables. P-value < 0.05 was considered to be statistically significant.

Ethical Approval:
The study has received ethical approval from the Bay View Clinic, Mumbai, and registration number is 887302745

RESULTS AND DISCUSSION

As seen in **Table 1**, energy, carbohydrate, protein and fat intake

was significantly higher in Muslim girls as compared to Jain girls (p<0.05). On the other hand, calcium and iron intake was significantly higher in Jain girls as compared to Muslim girls (p<0.05) (**Table 1**).

Table 1: Nutrient intake of girls when compared with RDA

	Jains (n=150)	Muslims (n=200)	Average (n=350)	RDA	P value
Energy (kcal/day)	1059±129	1204±177	1142±174	2440	0.001
Carbohydrates (g/day)	144±22.3	153.1±27.3	149.2±25.7	-	0.001
Proteins (g/day)	28.6±6.3	32.6±6.9	30.9±6.9	55.5	0.001
Fats (g/day)	40.3±6.8	51.2±10.7	46.6±10.7	35*	0.001
Calcium (mg/day)	435.3±132	310.5±88.4	362.3±124.7	800	0.001
Iron (mg/day)	7.7±2.9	6.6±1.7	7.1±2.3	26	0.001

Data presented as Mean±SD
*visible fat

Figure 1 shows percentage energy contribution from macro-nutrients of both the groups. As seen in **Figure 1,** percentage energy intake from carbohydrates was significantly higher and that from fats was significantly lower in Jain girls as compared to Muslim girls (p<0.05). On the other hand, there was no significant difference in percentage energy intake from proteins between the two groups (p>0.05)

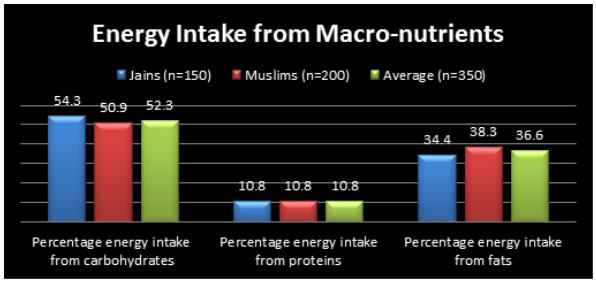

Figure 1: Energy Intake from Macro-Nutrients

Percentage recommended dietary intake for energy and protein was significantly lesser in Jain girls as compared to Muslim girls (p<0.05) **(Table 2).** Percentage recommended dietary intake of calcium and iron was significantly higher for Jain girls as compared to Muslim girls (p<0.05) **(Table 2).**

Table 2: Dietary energy, macronutrient, and micronutrient intake of the participants as percentage of RDA

	Jains (n=150)	Muslims (n=200)	Average (n=350)	P value
Percentage recommended intake for energy	48.1±8.6	50.8±8.2	49.7±8.5	0.003
Percentage recommended intake for proteins	55±13.8	63.1±15.2	59.6±15.2	0.001
Percentage recommended intake for calcium	60.8±20.7	39.8±11.9	48.5±19.2	0.001
Percentage recommended intake for iron	1.9±0.7	1.7±0.5	1.8±0.5	0.007

Data presented as Mean±SD

Table 3 gives Total body fat and blood pressure of girls when classified according to religion. Muslim girls had significantly lesser Total body fat as compared to Jain girls (p<0.05) **(Table 3).** However, there was no significant difference in systolic or diastolic BP of the girls from the 2 religion (p>0.05) **(Table 3).**

Table 3: Body Fat and blood pressure of girls when classified according to religion

	Jains (n=150)	Muslims (n=200)	Average (n=350)	P value
Total body fat (%)	31.7±7.7	27.8±7.1	29.5±7.6	0.001
Systolic BP (mmHg)	108±13	107±12	107±13	0.645
Diastolic BP (mmHg)	74±8	73±11	73±10	0.603

Data presented as Mean±SD

Table 4 gives anthropometric measurements of girls when classified according to religion. As seen in **Table 4,** Jain girls had significantly higher weight, BMI, waist and hip circumference as compared to Muslim girls (p<0.05). Waist to hip ratio was also significantly different between the 2 groups (p<0.05) **(Table 4).** There was no significant difference in height of the 2 groups (p>0.01) **(Table 4).**

Table 4: Anthropometric measurements of girls when classified according to religion

	Jains (n=150)	Muslims (n=200)	Average (n=350)	P value
Height (cm)	156.1±5.0	157.1±5.9	156.7±5.6	0.122
Weight (kg)	53.2±10.8	50.2±10.0	51.5±10.5	0.007
BMI (kg/m2)	21.8±4.4	20.3±3.7	21±4.1	0.001
Waist circumference (cm)	73±9.4	70.3±8.1	71.4±8.8	0.004
Hip Circumference (cm)	96.1±10.6	90.8±8.8	93.1±10.0	0.001
Waist to hip ratio	0.76±0.06	0.77±0.06	0.77±0.06	0.038

Data presented as Mean±SD

5. CONCLUSION

- Religion acts as a guiding principle which shapes the diet of people
- Significant differences were observed in the diet of the girls belonging to their respective religion
- Higher intake of Milk and Milk Products were observed among Jain girls which contributed to higher calcium intake as compared to Muslim girls
- Muslim girls were seen to have a higher protein and fat intake as compared to Jain girls, which could be due to their non vegetarian food intake along with dietary fats
- It was observed that the macronutrient intake of Muslim girls were higher as compared to their counterparts, but the total body fat was found to be lower
- Dietary intake of macronutrient like carbohydrate, protein and fat, and micronutrients like calcium and iron was found to be lower than the RDA in both the groups, corrective measures need to be taken
- Adolescence is a stage where there is an increased need for nutrition in order to prepare the body for adulthood, thus Balanced Diet should be consumed
- Nutrition and health education is the need of the hour; especially for this age group thus emphasis on consumption of balanced diet is must

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