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## RESEARCH ARTICLE

### DECLINING TREND OF SPERM COUNT AMONG URBAN DWELLERS

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#### ABSTRACT

The objective of study is to see the trend of oligospermia in urban and rural population in and around Patna Medical College and Hospital (PMCH), Patna. The study was done from December 2006 to January 2013 in PMCH and private laboratory situated near PMCH. The urban population included people residing in Patna and the rural population consisted of people residing in villages around Patna, who had come to PMCH for treatment of infertility.

#### INTRODUCTION

It has been observed that the sperm count is decreasing globally specially in the studies carried out in the last 5 decades (Hunt *et al.*, 1994; Birnbaum *et al.*, 1994; Carlsen *et al.*, 1992; Sharpe *et al.*, 1995; Zinaman *et al.*, 2013). This decreasing trend was first time brought in to the notice by Professor Niels Skakkeback, a Danish scientist at Copenhagen University. His study extended from 1938-92. Similar studies were done by Jarko Farjarinen on 538 men who died between 1981 to 1991 and they found the similar decreasing trend. The sperm production was 56.4% in 1981 and 26.9% in 1991 with decrease in average testicular weight also. Adamopoulos *et al.* (1996) in Athens studied 23850 men from 1977 to 1993 and found similar result. Various studies show that the fall in number is primarily due to hormonal, environmental and lifestyle effects.

#### MATERIAL AND METHODS

A prospective study was done from December 2006 to January 2013 in PMCH and a private laboratory situated near PMCH. Both Hindu and Muslim were screened. Cases were divided into rural and urban groups. The urban population included people residing in Patna and the rural population consisted of people residing in villages around Patna, who had come to PMCH for treatment of infertility. Person who had sperm count below 20million/ml was considered as oligospermic. The cases of azoospermia were also considered under this category.

The cases of oligospermia were given a questionnaire regarding life-style with the following questions.

- i) Place of residence : Urban or Rural
- ii) Job : Stressful or Non-stressful
- iii) Eating habits: Packaged or junk food or healthy food
- iv) Under garments: Tight fitting synthetic / Loose cotton based.

Seminal fluid was collected from patients with at least 3 days of abstinence, and then it was analyzed as per WHO criteria. The main focus was on the total sperm count.

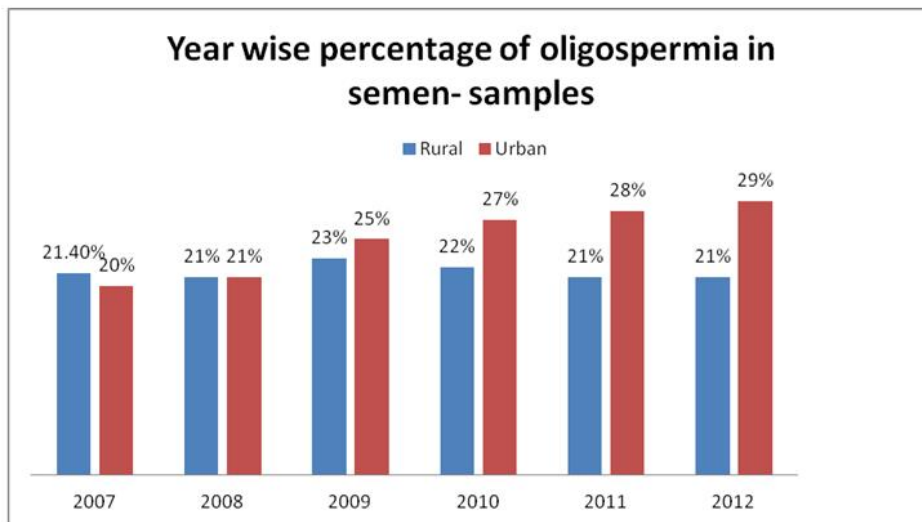
#### RESULTS

336 Cases were studied within the span of six years within 2006 to 2012. Age group ranged from 18 to 55 years with mean age of 31 years.

##### Year wise percentage of oligospermia in semen samples

From the above chart it is evident that the cases of oligospermia among rural dwellers remain almost constant from 2007 to 2012 (i.e. 21.4 to 21%). In urban population however the percentage of oligospermia went up from 20% to 29%. Data from the lifestyle questionnaire to all the oligospermic patients revealed the following facts. In rural population however 91.4% oligospermic patient did not have any of the risk factors. It was seen that the urban population with oligospermia had a stressful, mainly sedentary job, surviving on unhealthy food habit and wearing tight fitting synthetic undergarments. These factors may be contributory to the fall of sperm count among the urban dwellers.

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#### Urban population

Year	Tight garments + sedentary life + stress	Fast food+stress	Others
2007	42.85%	14.28%	42.85%
2008	25%	25%	50%
2009	44.4%	22.22%	33.33%
2010	27.27%	27.27%	45.45%
2011	50%	10%	40%
2012	46.15%	23.07%	30.76%

In the urban population it is found that 60.34% people had one or more risk factors.

#### Rural population

Year	Tight garment+sedentary+stress	Fast food+stress	Others
2007	0%	0%	100%
2008	0%	0%	100%
2009	25%	0%	75%
2010	9.09%	0%	83.33%
2011	0%	0%	100%
2012	0%	0%	100%

## DISCUSSION

Oligospermia was defined as sperm count less than 20 million/ml but by WHO recommendation on 2010 oligospermia is said to be sperm count below 15 million/ml. In order to maintain uniformity in this study which spanned over 6 years from 2006 to 2012, oligospermia was taken to be sperm count less than 20 million/ml. A healthy man's seminal fluid shows volume 2 to 6ml, motility >60% and count >20 million/ml. All the above values are decreasing gradually in highly industrialized countries, it's not only the sperm count but also the volume and motility is also decreased. Greater proportion of deformed spermatozoa is also seen. The reason for rise in oligospermia among urban dwellers can be attributed to high stressful life leading to hormonal imbalance. It has been seen in study by Shiva Dindyal *et al.* (2004) of imperial college, London that high oestrogen can lead to oligospermia, Sharpe *et al.* (1995) Packed food with preservatives and insecticides and high spice level can be ascribed as another cause for the fall in sperm count among city dwellers. It has been seen in several studies by Sharpe *et al.* (1995) Brooks *et al.* (1998) and Muller *et al.* (1995) that chemicals present in plastic lining of food cans, and pesticides have Xeno-oestrogenic effect leading to

oligospermia (Hunt *et al.*, 1994; Sharpe *et al.*, 1993); Brooks *et al.*, 1998; Muller *et al.*, 1995; Christian *et al.*, 1999). Urban population wearing tight fitting synthetic undergarments results in increased scrotal temperature. This is an already proven fact that high temperature results in decrease spermatozoa count. Furthermore Octyl Phenol a breakdown product of a group of chemical used by manufacturers of some detergents, plastics, textiles and paints has been proven to cause lowering of sperm count and also abnormality of sperm in rats (Wright *et al.*, 2002). Insecticides and pesticides such as DDT and PCB have a detrimental effect on sperm count. This has been shown in a study by Sharpe *et al.* in 1995. Dioxin, a chlorinated hydrocarbon liberated from industries also decreases sperm count (Birnbaum *et al.*, 1994; Sharpe *et al.*, 1993; Muller *et al.*, 1995). In this study an attempt has been made to see the trend of fall in the spermatozoa in urban (Industrialised/populated population) in comparison to the rural population. This study is in agreement with the global trend that heavy industrialization specially in West has lead to decrease in sperm count.

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