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Original Article

"ADAM AND AMS SCALE FOR ASSESSING ANDROPAUSE AMONG AGING INDIAN MEN"

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ABSTRACT

Objective: According to Indian Census 2011, India has 9% of population above the age of 60 years. Since andropause related effects are gradual and mimic many disease processes, clinical diagnosis is difficult to make. Very few studies have been done in North India to assess the awareness about andropause in males, which is why this study was conceived. To assess the awareness and knowledge about Andropause and its treatment modalities in males of Chandigarh.

Methods: The present study was conducted at Urban Health Training Centre (UHTC-44 B) of Government Medical College and Hospital, Sector 32, Chandigarh (GMCH) in male patients attending outpatient department. This non-interventional, individual cross sectional study was done from Aug 2010- Aug 2011 in males 40 years and above. Systematic random sampling was done and study sample comprised of 757 males. The subjects were given pre-structured and pre-tested questionnaire that had questions pertaining to socio-demographic profile, Ageing Men Score scale (AMS scale), ADAM scale (Androgen Decline in Ageing Men), views about andropause and its treatment modalities.

Results: Maximum subjects were from age group 40-49yrs (342; 45.17%), followed by those in age group of 60-69 years (141; 18.6%). 530 respondents (70%) indicated previous awareness regarding andropause or male menopause. Among andropause aware subjects, 440 (83.02%) respondents had poor knowledge about andropause and only 90 (16.98%) test takers actually had good knowledge about andropause. Age and marital status had little effect on knowledge of andropause. 627 (82.82%) had symptoms positive for andropause. Only 123 (19.61%) respondents were aware of treatment for andropause, 158 (25.21%) were willing to take treatment for andropause in form of testosterone injections or transdermal patches when informed about treatment options by health care workers. 360 (57.41%) respondents believed that healthy diet, exercise, herbal medications, Viagra and/or multivitamins can be used to treat andropause and refused to take testosterone injections. Remaining 239 (38.11%) respondents were not able to decide whether they want to take any treatment for andropause.

Conclusion: Though awareness about andropause was seen among most men but the study shows the need for provision of health education to increase the knowledge of andropause among adult males.

Keywords: Andropause, Awareness, Knowledge, India, ADAM scale, AMS scale.

INTRODUCTION

Demographic transition has led to an increase in population with advancing age. Aging encompasses problems especially psychological, behavioural, systemic and sexual dysfunction. According to Indian Census 2011, India has the largest number of people with age above 60 years and these account to 9% of India's total population. By 2050, in India number of elderly will grow to 25% from 62 million to 240 million [1].

In public health practice, quality of life is acknowledged as an indicator of health. It is also emphasized in WHO theme 2012 "Add Life to Years" which signifies the importance of quality of health of our ageing population. The process of ageing not only involves disabilities and health related morbidities but also a wide array of psychological aspects. An important aspect of ageing process is sexual health and well-being. Lot of importance has been given to aged female's sexual health along with its problems like menopause, breast cancer and cervical cancer which also has been considered in our national health programs. But in elderly men sexual health is not a well-researched area.

The process of ageing in men involves modifications in testosterone levels, with psycho-physical outcomes of variable intensity. Unlike the female menopause, the male counterpart is a slowly progressive condition. It has been established that testosterone decreases by approximately 1% per year after age 30[2]. The prevalence of hypogonadism in men at different ages is approximately 20% in men in their seventh decade with biochemical evidence of androgen deficiency, which increase to 50% of men in the eighth decade of life [2].

The progressive decrease in serum testosterone with age has been documented in several investigations, but most of them did not take into consideration the progressive decline in testosterone levels over various age groups and so there is no set criterion for normal testosterone levels in various age groups. This constellation of changes is referred to as Andropause or Male Climacteric [3].

Andropause or "male climacteric" is defined as "a clinical and biochemical syndrome associated with aging and characterized by a set of typical symptoms, as well as testosterone deficiency". The symptoms include alterations in the sexual, physical and mental domains. The sexually related manifestations include reduced libido, erectile dysfunction, and decreased ejaculatory force and volume. The condition also results in easy fatigability, hot flushes, blushing and sweating, depression, mood swings, nervousness, anxiety and irritability, poor concentration/ memory, adiposity, reduction in strength and bone/joint complaints. However, these symptoms are not specific enough to be considered pathognomic, which makes andropause difficult to clinically distinguish from aging [4, 5].

In view of perceived similarities between some of the manifestations of andropause and menopause in females, some workers have used the term 'male menopause'. Morales et al have described it as a misnomer and suggested a new term ADAM, while some others preferred the term 'partial androgen decline in aging males' (PADAM). The different terminology notwithstanding, what is obvious is that, whereas this androgen-related phenomenon had been largely neglected in the past, it is now receiving increasing attention in the literature, largely from works reported from developed countries [5, 6].

Though measurement of free testosterone is the gold standard for diagnosis of primary and secondary hypogonadism, but owing to financial and technical constraints it may not be possible in all the situations. Hence, attempts were made to develop certain non-invasive or non-interventional tools to diagnose hypogonadism on the basis of clinical presentation. These tools were developed to

screen men exhibiting these general symptoms for a suite of other possible deficiencies, so that the chance of making the correct clinical diagnosis could be improved. The most widely used tools include the Ageing Men Score (AMS) scale and Androgen Deficiency of the Aging Male (ADAM) questionnaire which has a sensitivity of 88% and a specificity of 60% in men [6,7].

This pilot study was conducted in men to assess their awareness about andropause.

MATERIAL AND METHODS

The present study was conducted at Urban Health Training Centre (UHTC-44 B) under Government Medical College and Hospital, Sector 32, Chandigarh (GMCH) in male patients attending outpatient department. A detailed history was taken to exclude any factor that may interfere with androgen synthesis among respondents which comprised of history of genital surgery, usage of any drugs that could interfere with synthesis or action of sexual hormones, any drug usage for depression / bipolar disorders, endocrine disorders, metabolic syndrome and psychological dysfunction. A general physical examination was done on each respondent (except rectal examination). The study group was then divided into two categories. One who had heard about andropause and other group who were unaware about the term and symptoms of andropause. Then among andropause aware respondents, using a structured AMS score questionnaire, knowledge quotient was found. The original AMS score increases point by point, indicating increasing severity, in patients with: "no complaints" (17-26 points), "mild" (27-36 points), "moderate" (37-49 points), and "severe" (≥ 50 points) complaints. But since we used AMS scale as a measure to estimate the knowledge of respondents for andropause, we only used "yes" or "no" as responses and a respective score of 1 and 0. Those who scored ≥ 9 symptoms were labelled as havin g good knowledge regarding andropause and those who scored < 9 were labelled as having poor knowledge (Table 3 & 4). AMS scale has a sensitivity of 73.6% and specificity of 70.4% to judge the knowledge about andropause. [8]. St. Louis questionnaire or ADAM scale (Androgen deficiency of Aging males) [9] was used for assessing symptoms of andropause. It is divided into three categories pertaining to energy, mood and sexual disorders. It comprises of 10 questions related to symptoms so observed in men with low bio-available testosterone. Each question is assigned a score of 1. Affirmative answers to questions 1 or 7, or to any other three questions provide a positive result on the ADAM questionnaire. In all other cases it is considered to be negative. This questionnaire has sensitivity of 88 % and specificity of 60 % against the serum bio-available testosterone level.

1.	Do you have Decrease in Libido?
2.	Do you have lack of Energy?
3.	Do you have decrease in strength?
4.	Have you lost height?
5.	Have you noticed a decrease in enjoyment of life?
6.	Are u sad or grumpy?
7.	Are your erections less strong?
8.	Have you noted a recent deterioration in your ability to play sports?
9.	Are you falling sleep after dinner?
10.	Has there been a recent deterioration in your work performance?

Affirmative answers to questions 1 or 7, or to any other three questions provide a positive result on the ADAM questionnaire

Fig. 1: **ADAM'S questionnaire**

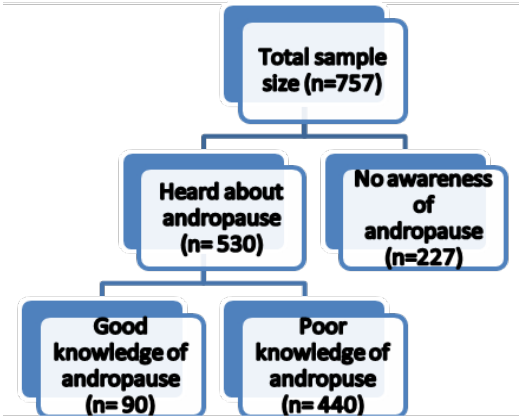

Fig. 2: Flow chart showing awareness of andropause

Table 1: **Socio-demographic data of respondents**

Age group(years)	Frequency (n = 757)	Percentage (%)
40-49	342	45.17
50-59	245	32.36
60-69	141	18.62
70-79	23	3.03
≥80	6	0.007
Marital status		
Single	12	1.58
Married	696	91.94
Divorced	8	1.05
Widowed	41	5.54

Table 2: **Relationship between respondent's age, sex, martial status and the awarness of andropause. Data are given**

As number(%)				
Socio-demographic variable	**Awarness of andropause (%)**	**No awarness about andropause (%)**	**total (%)**	**p-value**
≤ 59	456 (77.68)	131(22.32)	587 (77.54)	
≥60	74(43.52)	96(56.47)	170(22.45)	<0.05
Total	530 (70)	227 (30)	757	
Marital status				
Ever married	520 (68.69)	225(31.30)	745(99.60)	
ver married	10(83.33)	2(16.66)	12(0.39)	>0.05
	530(70)	227(30)	757	

Table 3: **The aging males symptoms (ams) scale-which of the following sympoms apply to you at this time?please mark the appropirate box for each symptoms**

Symptoms	**Yes**	**No**
1. **Decline in your feeling of general well-being** (general state of health, subjective feeling)		
2. **Joint pain and muscular ache** (lower back pain, joint pain, pain in a limb, general back ache)		
3. **Excessive sweating** (unexpected / sudden episodes of sweating, hot flushes independent of strain)		
4. **Sleep problems** (difficulty in falling asleep, difficulty in sleeping through, waking up early and feeling tired, poor sleep, sleeplessness)		
5**. Increased need for sleep, often feeling tired**		
6. **Irritability** (feeling aggressive, easily upset about little things, moody)		
7. **Nervousness** (inner tension, restlessness, feeling fidgety)		
8. **Anxiety** (feeling panicky)		
9. **Physical exhaustion / lacking vitality** (general decrease in performance, reduced activity, lacking interest in leisure activities, feeling of getting less done, of achieving less, of having to force oneself to undertake activities)		
10. **Decrease in muscular strength** (feeling of weakness)		
11. **Depressive mood** (feeling down, sad, on the verge of tears, lack of drive, mood swings, feeling nothing is of any use)		
12. **Feeling that you have passed your peak**		
13. **Feeling burnt out, having hit rock-bottom**		
14. **Decrease in beard growth**		
15. **Decrease in ability/frequency to perform sexually**		
16. **Decrease in the number of morning erections**		
17. **Decrease in sexual desire/libido** (lacking pleasure in sex, lacking desire for sexual intercourse		

Table 4: **Awareness and knowledge of andropause**

Variable	**Number (n=530)**	**Percentage** (%)
Heard of Andropause	440	83.02
Knowledge about andropause	90	16.98

Table 5: **Level of awareness and knowledge of andropause**

Variables	**Knowledge**		
	Good (%)	**Poor (%)**	**Total (%)**
Age ≤ 59 years	84 (24)	266 (76)	350(66.03)
Age ≥ 60 years	46 (25.55)	134(74.44)	180 (33.96)
Total	90 (16.98)	440(83.02)	530
Marital status			
Ever Married	135 (25.96)	385 (74.03)	520 (98.11)
Unmarried	2 (20)	8(80)	10 (1.89)
	137(25.84)	393(74.15)	530

Study Time

The study was done from Aug 2010- Aug 2011

This non-interventional, individual cross- sectional study was designed to determine the awareness of andropause and associated morbidities.

Sample size

The target participants were males, 40yrs and above. Systematic random sampling was done and every 3rd male visiting the centre was included in the study. A total of 890 males were approached. But 15 % refused to participate; hence 757 males comprised the study sample. Varied reasons for refusal were- non interest in study (57%), paucity of time (35%) and not comfortable with topic (8%).

Ethical aspects

The objectives of the study were explained to the participants prior to collecting data. Information was collected by health care workers and confidentiality of subjects was ensured. Consent was taken from

them before collecting data. The study was approved by institute's ethical committee.

Statistical analysis

Data was collected, compiled and analysed using percentages and proportions. Persons X^2test was used to find relationships between variables compared.

RESULTS

Demographic characteristics of respondents

The analysis of the 757 questionnaires that were satisfactorily completed showed that 342 respondents (45.17%) were in the age group of 40-49 years, 745 (98.41%) had been in marital relationships ('ever married'), with 696 (91.94%) being currently married (Table 1).

Awareness of andropause

A total of 530 respondents (70%) indicated previous awareness regarding andropause or male menopause. People less than 60 years of age had a better level of awareness (77.68%) compared with the older group (43.52%), which was statistically significant with $p<0.05$ at 95 % CI. Marital status showed to have a little impact on the awareness towards andropause with no statistically significant difference shown between those who were married and those who were not ($p>0.05$ at 95% CI) (Table 2).

The main source of information among andropause aware respondents (530, 70%) was mass media (66.4%) followed by doctors/health care providers (20.8%), friends/relatives (6.0%), and pamphlets/books (3.8%). Internet was the source of information in 3.0% respondents.

Table 6: **Adams scale**

Age (years)	N (%)	Decrease in libido (question 1)*	Erection less strong (question 7)*	Feel Lack of energy and decrease in strength	Notice Decreased enjoyment of life	Lost height	Feeling of sadness or grumpy	Deterioration in ability to play sports	Fall asleep after dinner	Recent deterioration in work performance
40-49	342 (45.2)	165 (48.2)	96 (28.07)	240 (70.1)	153 (44.7)	47 (13.7)	46 (13.4)	144 (42.1)	284 (83.04)	102 (29.8)
50-59	245 (32.7)	177 (72.2)	156 (63.6)	201 (82.4)	184 (75.1)	136 (55.5)	130 (53.6)	152 (62.04)	198 (80.8)	186 (75.9)
60-69	141 (18.6)	138 (97.8)	141 (100)	138 (97.8)	96 (68.08)	126 (89.3)	96 (68.08	122 (86.5)	121 (85.8)	123 (87.2)
70-79	23 (3.03)	23 (100)	23 (100)	23 (100)	18 (78.2)	23 (100)	23 (100)	22 (95.6)	19 (82.6)	23 (100)
≥ 80	6 (0.79)	6 (100)	6 (100)	6 (100)	5 (83.33)	6 (100)	5 (83.33)	6 (100)	5 (83.33)	6 (100)

*Affirmative answer to questions 1 or 7 or to any other 3 questions provides a positive result on ADAM questionnaire.

Table 7: **Respondents who were willing to take treatment (n=627)**

Variable	Adam score positive	
Age	yes	no
≤59	207	96
≥60	420	34

Table 8: willing to take treatment with testosterone injection or transdermal patch (n=627)

Age	Yes	No	Can't Decide
≤59	48	209	46
≥60	105	158	61

ADAM scale was then used among all respondents to find those with symptoms of andropause. The subjects were also given structured questionnaire that had questions pertaining to socio-demographic profile, views about andropause and its treatment modalities.

Knowledge of andropause

Among andropause aware individuals we then measured the knowledge using Ageing Men Score (AMS) scale.

Knowledge analysis

Ageing men scale (AMS) (Table 3) among 530 andropause aware subjects, showed that 440 (83.02%) respondents had poor knowledge about andropause and only 90 (16.98%) subjects were actually categorised as having good knowledge about andropause (fig. 1). Age and marital status were found to have little effect on knowledge of andropause which was not found statistically significant with $p> 0.05$ (Table 4 and 5). Among andropause aware respondents, 451 (85%), believed that andropause has some health related effects.

ADAM scale

ADAM questionnaire was given to all 757 respondents to see how many of them had symptoms consistent with andropause, and it showed that 627 (82.82%) had symptoms positive for andropause (Table 6). Only 123 (19.61%) among 627 respondents who had symptoms positive for andropause were aware of treatment for andropause. Among these 627 respondents, 158 (25.21%) were willing to take treatment for andropause in form of testosterone injections or transdermal patches (Table 8). 360 (57.41%) respondents believed that healthy diet, exercise, herbal medications, Viagra and/or multivitamins can be used to treat andropause and refused to take testosterone injections. Remaining 109 (17.38%) respondents were not able to decide whether they want to take any form of treatment for andropause at present.

DISCUSSION

Elderly male sexual health and its outcome has been inadequately studied world-over. Aging or senescence does not start after 60 years of age; rather changes pertaining to sexual health have their antecedents in the middle age. It's important to understand the sexual health importance and its impact on overall health of elderly population.

There are wide arrays of changes with ageing as far as sexual life is concerned but there always is an internal drive or need for sexual fulfilment. Sexual health in elderly is usually misunderstood and neglected. Continuation of sexual activity by elderly population is also dependent on yet another important aspect which is "cultural acceptance". Our society in general has a very limited view as far as sexual health of elderly is concerned. In India, it is presumed that elderly males should adopt for vanaprastha life/ sanyas life as far as sexual desire is concerned. So, even if, the elderly would face difficulties pertaining to sexual health they would not openly discuss it as they would as young. But this picture is changing slowly and now increasingly more number of elderly population are coming forward for discussing their sexual health [10,11].

The process of ageing in men in particular is associated with various physical and psychological outcomes. It is difficult to diagnose age related hypogonadism using serum testosterone levels as such facilities are not freely available across India and owing to reluctance of population at large to get these tests done. Our study, focused on level of the awareness and knowledge of Indian men about andropause using AMS and ADAM questionnaire. Extensive research using MEDLINE and PUBMED did not yield any satisfactory study done on Indian men for their awareness and knowledge on andropause and so this study was conducted.

Our study has shown that there exists a high level of awareness among Indian men for andropause with 70% respondents categorised as andropause-enlightened who were aware of age related sexual drive decrease in males, but there exists a very poor knowledge about andropause with only around 17 % respondents having a good knowledge in terms of wide spectrum of symptoms that are included under andropause as shown in (Table 4). So there exists a wide difference in awareness and full understanding of all the aspects pertaining to andropause.

Similar findings were seen in a study done by Tan [12]thatreported a general lack of andropause awareness by elderly male population in Texas, USA. Our study in alignment with that done by Yan [13]which highlighted awareness about andropause among Chinese men to be around 70%. But our results were in contrast with a study conducted in Nigeria by Adebajo et al [14], in which andropause awareness among adult males was around to be 46 % and 59% male adults had heard of andropause and had no knowledge whatsoever about andropause signs and symptoms.

People younger than 60 years of age were found to have a better awareness about andropause with 77 % respondents in andropause aware group compared to respondents above age of 60 years. These results are out of synchrony with study conducted by Fatusi et al [15] whose work on Nigerian men showed higher awareness about andropause among older population probably due to acceptance of andropause related symptoms as a part of ageing process. This difference in awareness among Indian population and Nigerian population can be attributed to greater use of mass media, health care facilities and/or internet facilities. Marital status did not have any impact on awareness or knowledge of andropause, as both married (ever married) and never married group of respondents did not differ significantly in term of their awareness/ knowledge about andropause.

ADAM questionnaire showed that andropause was positive in almost 83% respondents which is similar to results in a study by Clapauch et al [16]. Only 123 (20 %) respondents were aware of any treatment so available for andropause in form of testosterone injections or transdermal testosterone patches. Among respondents who were found positive using ADAM scale when told about treatment options, only 158(25%) were willing to take testosterone injection/transdermal patches. 360 (57%) respondents believed that healthy diet, exercise, herbal medications, Viagra and/or multivitamins can be used to treat andropause The subjects who were willing to take testosterone took it basically to have beneficial effect on sexual pleasure and erectile dysfunction. But the proven benefits of this therapy have yet to be demonstrated [16]. Herbal medicines were used by one fifth of subjects in the age group less than 60 years. Herbal medicines were especially taken to improve their libido and to have a good sexual life. More participants were open to using herbal medicines because of no fear of side effects unlike other medicines which they thought maybe associated here with side effects. Some of the herbal sexual supplements or enhancers very commonly used were Tablets King Cobra, Himalayan Niagra, Ginseng and herb shilajit. Another reason for using herbal medicines was their low cost and over the counter availability [17].

The awareness of allopathic medicines for restoration of libido was very limited. In majority, the source of information was media. Around, one fourth of subjects less than 60 years of age, were using Viagra regularly. This drug was launched in India in 2005,and was promoted by media as a wonder drug for enhancement of libido and sexual pleasure. This led to increase in its usage. But the usage of Viagra in our study was not specifically for andropause, but rather on an experimental basis, out of curiosity. Similarly injections were taken by respondents in all age group but that too were not specifically for andropause but rather for general vigour. Multivitamins and calcium supplementation also were taken to overcome the malaise and decreasing strength. Exercise was common in elderly males, not for overcoming the symptoms of andropause but rather as an objective to stay fit. But studies have cited that exercise does have stimulatory effect for testosterone production [18]and so can have some beneficial effect on symptoms of andropause.

Limitation

In our study we used a structured questionnaire whose validity has only been tested in a very few studies. Also, the testosterone level detection is gold standard test to detect andropause but same could not be performed due to lack of logistics. It is an OPD (Out Patient Department) study and not community based study.

CONCLUSION

This study establishes the fact that though Indian men were aware about andropause, but a proper knowledge of the entire spectrum of andropause has to be generated in males so that they can manage or resort to treatment for the changes and morbidities associated with this syndrome.

CONFLICT OF INTERESTS

Declared None

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