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Awareness and experience of andropause symptoms in men referring to health centers: a cross-sectional study in Iran

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ABSTRACT

Introduction: Andropause is a gradual process and more similar to menopause in women. Knowledge and experience of symptoms of andropause is an important discussion in their lives.

Objectives: This study aimed to determine Awareness and Experience of Andropause Symptoms in Men referring to Health Centers in Rasht, Iran.

Materials and methods: This cross-sectional and analytical study included 140 men over 40 years referring to one of health centers. Collection tool of this study was a questionnaire consisting of three parts. The first part was about demographic characteristics, The second part was a researcher-made questionnaire, The third part was Aging Male Scales (AMS) questionnaire. Data were analyzed by descriptive and analytical statistics.

Results: This study showed 73.6% had experience symptoms of andropause. The mean knowledge score (of 20 score) for the $3/3 \pm 4/9$, with the level of education, occupation and income was statistically significant ($p < 0.05$). There was significant relationship the andropause symptoms with BMI and occupation ($p < 0.05$).

Conclusion: Based on the results of this study, despite the fact that the majority of men over age 40 had experienced symptoms of andropause, but their awareness about andropause was very low.

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Andropause; awareness; men; aging; hypogonadism

Introduction

Andropause is a gradual process nearly similar to menopause in women [1]. It occurs with gradual and constant decline of testosterone and dehydroepiandrosterone (DHEA) production in men [2]. In contrary to women menopause which is a globally known process with apparent temporal features related to absolute failure of gonadal or sex glands, andropause has a hidden late onset [3]. Andropause in adult men is clinical syndrome with testosterone deficiency [4]. It has been referred in different names as “male climacteric”, “androclise”, “Androgen Decline in Ageing Male (ADAM)”, “ageing male syndrome”, “Late Onset Hypogonadism (LOH)”, “male menopause”, “partial androgen deficiency in aging male (PADAM)”, “viropause”, “symptomatic late-onset hypogonadism

(SLOH)” or more accurately, “testosterone deficiency syndrome (TDS)” [3–6].

A study in Massachusetts showed the crude incidence rate of andropause as 12.3 per 1000 person-years. In other words, this figure reflects the prevalence of andropause as 481,000 new cases per year in among US men between 40 and 69 years old [7]. Studies have insisted that more than 70% of men over 40 years of age, experience andropause symptoms [8–12].

The onset of andropause symptoms is from 40 to 55 years old. The symptoms vary in different people [1] and include sexual dysfunction, decreased libido, general fatigue, mood swings, cognitive dysfunction, irritability, functioning difficulty and not enjoying life, night sweats and sometimes heart palpitations,

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shortening height, etc [1,2,13,14]. Andropause diagnosis requires clinical symptoms and confirming the reduced levels of free testosterone or bioavailability lower than normal level [5].

Andropause affects various aspects of men's health. It may be associated with an increased risk of bone fractures (osteoporosis two times more), the risk of death due to cardiovascular disease (two or three times more), metabolic syndrome and type 2 diabetes associated with low levels of blood testosterone [14–17]. These effects bring about an increased mortality rate in men [18]. The most important and common symptom of hypogonadism in men is decreased libido and erectile dysfunction. According to prior reviews, 83.3% of men over 60 years suffer from sexual dysfunction that has detrimental effect on their quality of life [19,20]. This condition may cause low self-esteem, anxiety and depression leading to negative effect on their relationship with their sexual partner [21].

Andropause is considered as a covert threat for men's family life. Most men deal with anxiety in this period of their life, but may not know the cause of it. Awareness of the different specific needs of andropause period is very important [22]. Significant body of studies in Iran, Asia, Europe and America have reported a low level of knowledge and awareness of andropause in spite of the importance of information in recognizing its symptoms, related factors and management. Based on studies conducted in Nigeria, 76.4% of participants in 2003 [23]; 45.1% in 2006 [8]; and 43% in 2014, had never heard about andropause [21].

Since health care is heavily dependent on people's health knowledge [24], men are usually indifferent to abnormal symptoms occurring to them due to socioeconomic status, masculinity, racism, lack of awareness of the need for primary care, religious beliefs [25]. Today's experience of andropause in men is equivalent to 20–30 years of menopause experience in women, therefore, ignorance and fear of it is primarily high among the public and even among many health professionals themselves [26].

Nowadays, men's health is worthy of high attention. Significant problems may appear due to andropause affecting diverse physical, mental and sexual health aspects. This reason plus the role of educating public on this issue triggered us to take an effective step in identifying the symptoms of andropause in men over 40 referring to health centers of Rasht city.

Materials and methods

This cross-sectional and analytical study included men referring to one of health centers, Rasht as the only

existing referral laboratory center affiliated with Public Health Organization of this city. Men were referred for general laboratory tests and common matters such as receiving health cards, addiction test, etc. from other health centers. They were enrolled in the study through non-random sampling (purposive) method from July to September 2015 for 3 months. Using Cochran's sample size formula, 140 men were calculated based on a previous study [27] with 95% confidence interval (CI) and precision of 10%. During the study, 140 out of 240 men agreed to respond the questionnaire. They were informed about the purpose as well as any necessary explanation related to research and even it was promised they will be informed about the research results, if they are interested. They were included after obtaining written informed consent. Inclusion criteria for the study were age over 40 years without any underlying psychological problems and physical illness.

Collection tool of this survey was a questionnaire consisting of three parts. The first part had eight questions about demographic characteristics, age, marital status, education, occupation, income, smoking status, Body Mass Index (BMI); BMI was based on kg/m^2 and categorized to underweight <18.5 , normal range: 18.5–24.99, pre-obese: 25–29.99, obese ≥ 30 [28], blood pressure (BP); BP was based on The Seventh Report of the Joint National Committee (JNC 7) and categorized to normal $<120/80$, prehypertension: 120–139/80–89, hypertension $\geq 140/90$, stage 1: 140–159/90–99, stage 2 $\geq 160/100$ [29].

The second part included 20 questions for knowledge assessment on andropause. A researcher-made questionnaire based on prior studies was also used and the scoring was as follows; "correct", "wrong" and "I don't know" answers which were given 1 the first, zero scores to two last. Scores given to questions 2, 4, 7, 10, 11, 16, 18, 20 were reversed, so that "correct" and "I don't know" answers were given zero. "Wrong" answer was scored 1. These questions included awareness of the term andropause, its symptoms and complications, risk factors of men's andropause, awareness of treatment and diagnostics.

To evaluate validity–reliability of this self-made questionnaire and to measure awareness of andropause, based on quantitative indicators of validation; Content Validity Index (CVI), Content Validity Ratio (CVR), 11 skilled experts were consulted. All items had $\text{CVR} \geq 80\%$. Furthermore, the CVI obtained for each question was $\text{CVR} > 85\%$. Questions' reliability was obtained by test–retest on 21 subjects. The result equaled 98.8%. Pearson correlation coefficient between the two steps of the test was $r=0.815$.

In order to evaluate the internal consistency of the questions, Kuder–Richardson Formula 20 (KR-20) was used to estimate the level of awareness. The Richardson alpha equaled $\alpha=0.87$ which indicated a good internal validity for assessment of awareness.

The third part was Aging Male Scales (AMS) standard questionnaire, which contained 17 questions in three domains of somatic (questions: 1, 3, 4, 5, 9, 10), psychological (questions: 2, 6, 7, 8, 11, 13) and sexual (questions: 12, 14, 15, 16, 17) assessing the symptoms of andropause. Each question was scored from 1 to 5. Scoring ranging of each domain varied from 5 to 35. Score 17 showed the absence of any signs and score 85 the highest severe symptoms. Total scores obtained from AMS questionnaire were classified into four groups of: no/little (17–26), mild symptoms (27–36), moderate symptoms (37–49) and severe symptoms (>50). Cronbach's alpha coefficient for AMS questionnaire was obtained 0.85 in this study indicating its high reliability. There reliability and validity of this inventory were previously obtained by Khosravi et al. (2014) in Iran, according to local and climatic conditions. The Cronbach's alpha coefficient was obtained 0.7 [30].

In order to measure blood pressure, digital blood pressure monitor ALPK2-Wrist was used. Moreover, a tape measure was used to assess height and a digital scale (Personal Scale) for weight assessment with an accuracy of 50 g. Body mass index was calculated by the following Formula: $\text{weight (kg)}/[\text{height (m)}]^2$. In the present study, BMI was considered as “weight loss” 18.5, “normal” 18.5–24.9, overweight 25–29.9 and obesity 30 [28].

The data were analyzed by SPSS (version 21) based on variable, descriptive statistics, mean, SD and frequency distribution. Since the score of andropause symptoms had a normal distribution ($p=.084$), ANOVA and independent *t*-test were used to compare the symptoms of andropause in terms of socio-demographic variables. The variable scores had no normal distribution based on Kolmogorov–Smirnov and Shapiro–Wilk ($p<.001$). As a result, non-parametric Mann–Whitney and Kruskal–Wallis tests were used to compare the score of awareness according to personal–social variables.

Results

In gauging the personal and social characteristics, 97.1% of subjects were married, only 2.9% had other status (1 single, 2 divorced and 2 widowed). The mean and SD of subjects' age was 52.09 ± 7.96 (range of 40–76 years old). No subject was underweight based

Table 1. Distribution frequency of andropause symptoms severity based on AMS questionnaire.

Severity of symptoms of andropause	N (%)
No/Little	37 (26.4)
Mild	54 (38.6)
Moderate	38 (27.1)
Severe	11 (7.9)
Total	140 (100)

on body mass index (<18.5). The mean and SD of body mass index was 27.16 ± 4.05 (range 18.6–41.66). The mean and SD of monthly income of subjects was 506 ± 37 (66–1970\$) US dollars. The mean and SD of systolic blood pressure was 128.178 ± 16.44 ranging from 90 to 180 mmHg. Mean and SD of diastolic blood pressure was recorded 74.39 ± 12.18 ranging from 40 to 100 mmHg.

Of 140 subjects, 103 (73.6%) experienced symptoms of andropause. Severity of symptoms of andropause is shown in Table 1. To compare the scores of symptoms in four domains after adjusted mean andropause symptoms scores (sum of the scores of each domain divided by the number of the questions in the domain), based on Friedman test, the data showed that significant differences existed between the adjusted scores ($p<.0001$). As the score of mental domain with mean and SD of 2.23 ± 0.92 and median = 2 had the most symptoms. Yet, physical domain with mean and SD of 1.82 ± 0.75 and median = 1.71 had the least andropause symptoms (Figure 1).

Regarding the relationship between symptoms based on AMS questionnaire and personal–social demographic variables, the score of symptoms of andropause was significantly associated with body mass index and subjects' occupation ($p<.05$) (Table 2).

Results revealed that the mean score of awareness was 3.3 ± 4.9 (range 0–19). About 52% of the participants had no information about andropause, only 14.3% had awareness score upper 10. On the frequency (as a correct/incorrect) answers for definition of andropause in the questionnaire, the lowest percent dedicated to “correct answer” to the expression “Andropause means the male menopause” (6.4%) and the highest correct answer (24.3%) belonged to “Andropause occurs in men with increased age” (Table 3).

Comparing the score of awareness and personal–social characteristics of subjects revealed a significant relationship between awareness score with educational level ($p=.0001$), occupation ($p=.003$) and income ($p=.006$). Thus, increased education and income were correlated with the awareness score. Interestingly, the score of employee's awareness was higher than that of the self-employed and workers (Table 4).

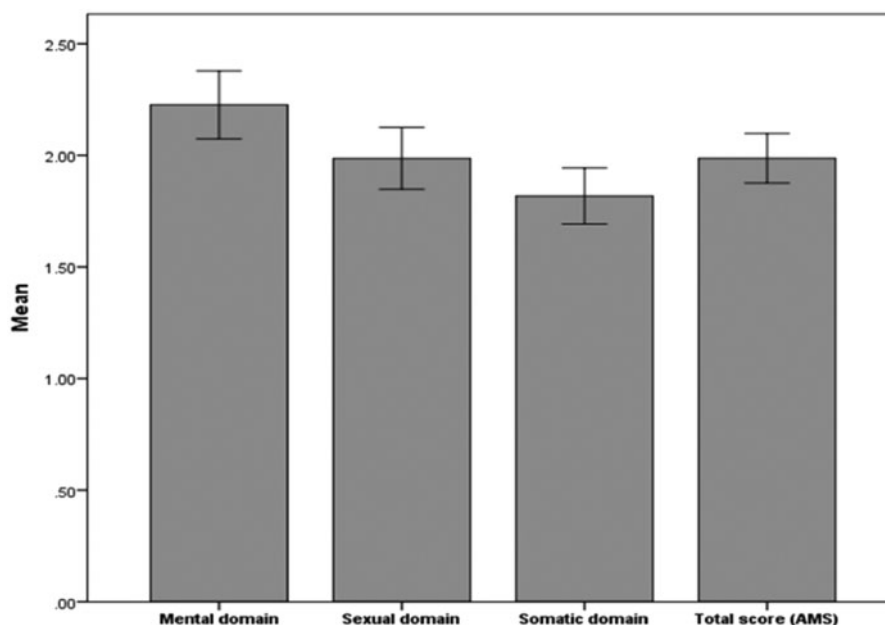


Figure 1. Distribution, 95% confident interval of adjusted mean andropause symptoms scores between domains.

Table 2. Comparison mean \pm SD of andropause symptoms score according to anthropometric and socioeconomic parameters.

Variables	Status	N	Somatic symptoms score		Psychological symptoms score		Sexual symptoms score		Total score	
			(M \pm SD)	p	(M \pm SD)	p	(M \pm SD)	p	(M \pm SD)	p
Age	40–49 years	67	13.01 \pm 5.99	.387	10.90 \pm 4.78	.604	9.21 \pm 4.06	.056	33.12 \pm 12.76	.437
	50–59 years	51	13.02 \pm 4.82		11.59 \pm 4.54		10.75 \pm 3.91		35.35 \pm 10.81	
	Up to 60 years	22	11.14 \pm 3.36		10.77 \pm 4.12		10.23 \pm 4.67		32.14 \pm 7.18	
BMI (kg/m ²)	Under weight (slim) <18.5	0	–	.132	–	.219	–	.162	–	.021
	Normal weight: 18.5–24.99	36	11.28 \pm 3.47		10.03 \pm 4.12	.219	9.00 \pm 3.22	.162	30.31 \pm 7.22	.021
	Pre-obese: (overweight) 25–29.99	68	12.53 \pm 5.03		11.31 \pm 4.37		9.72 \pm 4.06		33.56 \pm 10.40	
	Obese >30 (obesity)	36	14.53 \pm 6.59		11.89 \pm 5.27		11.25 \pm 4.84		37.67 \pm 14.96	
Educational level	Illiterate	13	15.54 \pm 7.08	.485	12.15 \pm 5.13	.565	10.23 \pm 5.12	.52	37.92 \pm 14.12	.389
	Pre-high school	58	12.71 \pm 5.64		11.29 \pm 4.18		10.52 \pm 4.17		34.52 \pm 11.54	
	Diploma	41	12 \pm 3.50		10.98 \pm 4.54		9.32 \pm 3.55		32.29 \pm 8.43	
Occupation	College level	28	12.50 \pm 5.45		10.54 \pm 5.27		9.46 \pm 4.43		32.50 \pm 13.15	
	Self-employed	70	14.06 \pm 6.04	.028	12.29 \pm 4.88	.018	10.46 \pm 4.33	.158	36.80 \pm 12.91	.005
	Employee	42	11.48 \pm 4.07		10.05 \pm 4.19		9.81 \pm 3.97		31.33 \pm 8.79	
Income Status	Worker	28	11.25 \pm 3.79		9.86 \pm 3.65		8.79 \pm 3.78		29.89 \pm 8.42	
	<350 dollars	66	12.82 \pm 5.54	.751	11.53 \pm 4.66	.528	10.20 \pm 4.30	.650	34.55 \pm 12.33	.751
	350–700 dollars	48	12.17 \pm 4.50		10.92 \pm 4.58		9.92 \pm 4.09		33.00 \pm 10.60	
Smoking status	>700 dollars	26	13.50 \pm 5.83		10.50 \pm 4.43		9.27 \pm 3.89		33.27 \pm 10.31	
	Yes	35	13.97 \pm 6.57	.276	12.54 \pm 5.14	.530	9.51 \pm 4.38	.315	36.03 \pm 13.28	.176
	No	105	12.30 \pm 4.69		10.66 \pm 4.30		10.07 \pm 4.07		33.03 \pm 10.58	
SBP (mmHg)	Normal	31	11.87 \pm 4.43	.766	10.61 \pm 4.04	.962	9.06 \pm 3.89	.477	31.55 \pm 10.40	.368
	Pre-hypertension	68	13.12 \pm 6.03		11.43 \pm 4.94		10.37 \pm 4.15		34.91 \pm 12.43	
	Stage 1 HTN	28	11.71 \pm 3.28		11.04 \pm 4.85		9.46 \pm 3.75		32.21 \pm 9.17	
	Stage 2 HTN	13	14.85 \pm 5.76		11 \pm 3.44		10.69 \pm 5.34		36.54 \pm 11.60	
DBP (mmHg)	normal	77	12.62 \pm 5.52	.521	11 \pm 4.79	.925	9.79 \pm 4.03	.680	33.42 \pm 12.03	.429
	Pre-hypertension	32	12.19 \pm 4.99		11.16 \pm 4.36		9.22 \pm 3.88		32.56 \pm 10.05	
	Stage 1 HTN	25	13.76 \pm 5.04		11.56 \pm 4.66		11.72 \pm 4.45		37.04 \pm 11.37	
	Stage 2 HTN	6	12.50 \pm 4.32		10.83 \pm 3.19		8.00 \pm 4.15		31.33 \pm 7.76	

SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure.

Discussion

The results of this study revealed that 73.6% of men over 40 years (ranged 40–76) had experienced symptoms of andropause, according to AMS questionnaire,

it is consistent with another study in Iran (73.3%), though it used the Androgen Deficiency in Aging Males (ADAM) to assess the symptoms of andropause [27]. Some studies conducted in other countries

Table 3. Distribution frequency of awareness questions about andropause.

Number	Phrases	False N (%)	True N (%)
1	Andropause means the male menopause.	131 (93.6)	9 (6.4)
2	Andropause in men is exactly similar to menopause.	113 (80.7)	27 (19.3)
3	Andropause is caused by a reduction in sexual hormones level in men.	113 (80.7)	27 (19.3)
4	Alopecia is one of the andropause symptoms in men.	108 (77.1)	32 (22.9)
5	Aging is accompanied by experiencing andropause in men.	106 (75.8)	34 (24.3)
6	Reduction in sexual tendency is one of the andropause symptoms in men.	111 (79.3)	29 (20.7)
7	Impotence is not one of the andropause symptoms in men.	111 (79.3)	29 (20.7)
8	Nervousness is one the andropause symptoms in men.	127 (90.7)	13 (9.3)
9	Lack of energy is one of the andropause symptoms in men.	122 (87.1)	18 (12.9)
10	Hot flashes is not andropause symptoms.	120 (85.7)	20 (14.3)
11	Excessive sweating is not an andropause symptom in men.	126 (90)	14 (10)
12	Bread growth reduction is a symptom of andropause in men.	119 (85)	21 (15)
13	Muscle mass and muscle strength loss is a symptom of andropause in men.	115 (82.1)	25 (17.9)
14	Obesity is a predisposing factor of andropause in men.	118 (84.3)	22 (15.7)
15	Alcohol use is a predisposing factor of andropause in men.	109 (77.9)	31 (22.1)
16	Andropause symptoms are not controllable and treatable.	116 (82.9)	24 (17.1)
17	Medical treatment is used in controlling andropause in men.	111 (79.3)	29 (20.7)
18	Andropause cannot be diagnosed via signs and symptoms.	115 (82.7)	24 (17.3)
19	Andropause can be diagnosed via blood test.	117 (83.6)	23 (16.4)
20	Andropause is followed by complete fertility loss in men.	120 (85.7)	20 (14.3)

Table 4. Compared mean between awareness score based on socioeconomic and personal variables.

Variables	N	Awareness score		p
		(M ± SD)		
Age (years)	40–49	67	3.72 ± 4.96	.3
	50–59	51	3.14 ± 5.09	
	Up to 60	22	2.64 ± 4.68	
Educational level	Illiterate	13	0 ± 0	.0001
	Pre-high school	58	0.86 ± 2.18	
	Diploma	41	5.34 ± 5.53	
Occupation	College level	28	7.07 ± 5.61	.003
	Self-employed	70	3.79 ± 5.06	
	Employee	42	4.83 ± 5.54	
Income status	Worker	28	0.96 ± 2.08	.006
	<350\$	66	2.45 ± 4.54	
	350–700\$	48	2.75 ± 4.01	
	>700\$	26	6.65 ± 6.16	

evaluated andropause symptoms with various questionnaire which prove our results are accurate by ADAM questionnaire in India, (71.13%) and Korea, (75.3%) and by AMS questionnaire in Indonesia (70.94%) [8–12]. Additionally, the results in a study done by Hong Kong which is in line with this study showed that 80% men were living with little-to-mild levels of aging symptoms base on AMS questionnaire [31].

The mean score of andropause symptoms experience in this study was 33.81 ± 11.36 . Therefore, the results are so close to a research performed previously in Japan which had used AMS questionnaire to evaluate the symptoms of andropause, with mean 34.5 ± 11.6 [32] and total mean scores in Hong Kong ranged between 26.02 ± 7.91 and 32.99 ± 7.91 in different age groups [31].

Although the study by Akkuzu in Turkey suggested that only 16.9% of men between 40–64 years had experienced andropause symptoms, according to AMS

questionnaire [33], perhaps this difference is due to the low sample size (63 men) compare with this study (140 men).

The present study revealed that there is no significant relationship between symptoms of andropause and age, hypertension, smoking and income. Results of another study in Iran are consistent with these findings [27]. However, some studies showed that with aging raised, increasing the prevalence of andropause symptoms [8,32], Which contradicts with our conclusions. Unlike age, a significant association with BMI, type of occupation and income was seen in this study.

On the other hand, a significant association between the total score of andropause symptoms and BMI was revealed, in other words, with an increase in BMI, the score of andropause symptoms increased. This finding was different from results of the studies conducted by others [27,32,34]. The reason for these inconsistent findings could be the difference in the questionnaire used to evaluate the symptoms of andropause, sample size and age range of subjects.

Moreover, in our study, there was a significant positive correlation between total score andropause symptoms and the score of the somatic domain and BMI so that an increase in BMI increased the score of the symptoms. This finding was not in line with the results of a study in Taiwan [35]. The reason for these inconsistent findings could be the difference in the BMI classification.

In sum, it seems that type of occupation is a socioeconomic factor affecting andropause symptoms. Workers have experience andropause symptoms more than employees and self-employed. Thus, the findings of this study are compatible with Hirokawa's study where high job requirements reduced testosterone

levels leading to increased symptoms of andropause [32].

Moreover, the highest mean score was seen in the somatic domain. Some studies have reported similar findings [31,32,34]; however, after adjusted of domains' score, the mental domain had the highest score, it seems that the symptoms of andropause mostly have psychological manifestations. While Yuen had the highest mark in somatic domain after adjusted of the scores [31] and also in Hirokawa's study after adjusted of the scores, sexual domain had the highest score [32]. These differences are due to difference in sample size and areas or the same social class.

In our study, mean score of psychological and somatic domains had a significant association with occupation and mean score of the sexual domain had a borderline significant association with age which was similar to one study [32]. Although the association between the score of the sexual domain and age was borderline significant in our study, the association would be significant if the sample size were larger.

In this study, despite that 73.6% of the subjects experienced andropause, their awareness was very low (15.15%), compatible with the studies carried out in Nigeria in 2006 (Experience: 96%, awareness: 55%) [8] and in India in 2011 (71.13% of experience, 29.65% of awareness) [9], 2015 (82.82% of experience, 16.98% awareness) [10]. It can be said that most men over 40 years old had experienced andropause symptoms while their awareness was low. Yet, a similar study in Turkey showed different results from our findings. Based on AMS questionnaire, only 16.9% of men over 40 had experienced these symptoms, though 46% of them lacked awareness [33].

As our study reported a low level awareness of andropause, studies in Asian countries such as India [9], Nigeria [8] and Kuwait [36] have also reported same observation on society. In contrary to the related studies in Europe [37] and US [38] where most people had heard about andropause but they had no accurate knowledge and logical information [37,38]. This might be due to the reason that in the US study, no age range was considered and people from different age groups had participated. Since people fewer than 40 are younger and use social media more than others so it is sensible that they had much more information. The population of a study which was conducted in Europe included medical doctors who, similar to the American youth, had higher awareness than the public.

The results of this study also indicated that awareness of andropause process among men significantly

associated with their level of education, so that a higher level of education increased their awareness which is similar to the findings of Keshtkaran in Iran [22]. Similarly, Ayako et al. in Japan revealed that level of awareness and knowledge about andropause was higher in women nurses than women employees [39]. In contrast, a study investigated public and clinicians such as doctors, nurses and pharmacologists where both groups had wrong beliefs and ideas about unsexual symptoms of andropause [38]. Whereas our findings insisted that education level was an effective factor in this regard.

Conclusion

According to our results, despite the fact that majority of men over age 40 had experienced symptoms of andropause, their awareness of andropause was very low. Therefore, educating people about andropause should be on the main core of medical planning especially for university courses. Few studies have sought this issue so further research are also suggested to focus on andropause issues and complications. Needless to say, society, health centers and universities should also keep the society informed and make wide-spread knowledge on this important issue.

Limitations

Our study limitation was that some men could not provide us with accurate information on their symptoms because they were either too old or low educated or both. Also, diagnosing andropause requires clinical manifestations as well as low level of free testosterone or bioavailability lower than normal, so it is suggested that future studies evaluate the andropause symptoms along with the testosterone in large population.

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Disclosure statement

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Ethical approval

This research was approved by Ethical Committee of Guilan University of Medical Sciences (Ref. IR, GUMS.REC.1394.31) on May, 2015.

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