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Evaluation of general public awareness, knowledge and attitude about common rheumatic diseases in Egypt: a multicenter study

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Abstract

Background Rheumatic diseases are the diseases of the connective tissue and medical disorders of the musculoskeletal system, with pain and/or stiffness as main manifestations, and which may or may not be accompanied by other organ system involvement. Public and patient's awareness is needed as the number of patients of various forms of arthritis and other musculoskeletal diseases is constantly on rise.

Objective The aim of our multicenter study is to evaluate awareness, knowledge, and attitude of general populations regarding common rheumatic diseases in Egypt.

Subjects and methods This was a multicenter study included 3000 subjects from 4 Egyptian governorates (750 subjects from each): Lower Egypt: Dakahlia and Damietta and Upper Egypt: Sohag and Qena. Entire cases completed the Awareness, Knowledge, and Attitude of Egyptian people towards four of the common rheumatic diseases (Rheumatoid arthritis, Systemic lupus erythematosus, Crystal-induced arthritis, and Osteoarthritis): AKARSCO questionnaire that included basic information, general knowledge, and attitude about rheumatic diseases.

Results The knowledge and awareness of rheumatic diseases are significantly higher among females. Regarding education level, there is a steady increase in the awareness with the rise of education level, with a highly significant correlation. Non-working and married participants had significantly higher knowledge compared to working and non-married ones. The attitude towards rheumatic diseases is significantly satisfactory among females. Regarding education level, there is a steady increase in the attitude with the rise of education level, with a highly significant correlation. Non-working and married participants had significant satisfactory attitude compared to working and non-married ones. The main sources of information about rheumatic diseases are media and Internet.

Conclusion The overall awareness, knowledge, and attitude of population towards rheumatic diseases are limited in Egypt. The participants' total score regarding the general knowledge level of rheumatic diseases, rheumatoid arthritis, SLE, gout, and osteoarthritis is bad. The participants' overall level regarding the attitude towards rheumatic diseases is unsatisfactory. The level of knowledge and attitude is affected by many factors like sex, work, education, residence, marital status, and family history of rheumatic diseases. The main sources of information about rheumatic diseases are media and Internet.

Keywords Knowledge, Attitude, Awareness, Rheumatic diseases

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Background

Rheumatic diseases are the diseases of the connective tissue and medical disorders of the musculoskeletal system, with pain and/or stiffness as main manifestations, and which may or may not be accompanied by other organ system involvement [1].

Rheumatoid arthritis (RA) is an autoimmune disorder of unknown etiology characterized by symmetric, erosive synovitis, and, in some cases, extra-articular involvement [2]. Systemic lupus erythematosus (SLE) is a complex autoimmune disease with chronic relapsing–remitting course and variable manifestations leading to a spectrum from mild mucocutaneous to devastating, life-threatening illness [3]. Osteoarthritis (OA) is the most common degenerative joint disease; it affects more than 25% of the population over 18 years old. Crystal-induced arthritis (CIA) is characterized by an intense inflammatory reaction triggered by the deposition of monosodium urate, calcium pyrophosphate, and basic calcium phosphate crystals in articular and periarticular tissues [4]. They are characterized by a broad range of clinical manifestations from asymptomatic to severely inflammatory. The most common presentations at the inflammatory end of the disease spectrum are gout and pseudo gout [5].

Providing the general population and patients with good quality information is an important strategy in the management of chronic diseases. Knowledge leads to changes in attitudes and behaviors and directly influences health status [6], and adequate information can promote self-management skills necessary for coping with the disease increasing adherence to therapy [7]. Several studies showed that requirements for information are associated with patients age and education, but the level of information about rheumatic diseases is low among patients living with these conditions [8]. A survey of the Dutch population showed similar results [7] to raise the need for the identification of dimensions involved in knowledge about rheumatic diseases and the quantification of common knowledge in each specific demographic, social, or pathology group; such quantification would benefit an education program targeted to musculoskeletal health [9].

The awareness, knowledge, and attitude of Egyptian population regarding rheumatic diseases are limited and deficient; thus, widespread mass educational and learning programs are needed [10]. So, we will provide in our study data about the present situation of common rheumatic diseases in multicenter, which can be used for the future planning of awareness raising and education programs.

The aim of this multicenter study is to evaluate awareness, knowledge, and attitude of general populations regarding common rheumatic diseases in Egypt.

Subjects and methods

Study design

This is a multicenter (Lower Egypt includes Dakahlia and Damietta governorates and Upper Egypt includes Sohag and Qena governorates) cross-sectional study conducted on a total of 3000 participants of general population over a period of 12 months (from June 2021 to May 2022).

Inclusion criteria include both sexes whose age is from 18 to 70 years.

Methods

Participants answered the Awareness, Knowledge and Attitude of Egyptian people towards four of the common rheumatic diseases (Rheumatoid arthritis, Systemic lupus erythematosus, Crystal induced arthritis and Osteoarthritis): AKARSCO questionnaire [10]. The items of the questionnaire were taken from some papers that used validated questionnaire [8, 10]. Data was collected via 4 rheumatologic physicians (one for each governorate). Answers were obtained from different centers via self-answering of the participants of the Arabic version of the questionnaire or through face-to-face interview for participants who were illiterate or via online version of the questionnaire.

The questionnaire applied composed of 7 parts and has 2 versions: Arabic version (the translation of English version): answered by the participants and English version: used in the study analysis.

The 7 parts of the questionnaire were as follows:

Basic information about the participants include the following: gender, educational level, occupation, residence, and marital status.

- General knowledge about rheumatic diseases including the cause of RDs, the role of investigations in the follow-up of RDs, if they can be contagious, if they can be healed, if they are heritable diseases, if they can be prevented by vaccinations, parts of the body can be affected by RDs, knowledge about diagnosis of RDs, knowledge about treatment of RDs, and source of knowledge about RDs
- Knowledge about rheumatoid arthritis including epidemiology (age, sex) and nature of rheumatoid arthritis, parts of the body can be affected by rheumatoid arthritis, knowledge about laboratory features of rheumatoid arthritis, knowledge about treatment of rheumatoid arthritis, and knowledge about biological drugs
- Knowledge about systemic lupus including knowledge about causes of SLE, symptoms and parts of the body affected by SLE, diagnosis and treatment of SLE, sex affected by SLE, and other forms of lupus

- Knowledge about crystal-induced arthritis including knowledge about gout, sex affected by gout, parts of the body affected by gout, nature and treatment of gout, and what is meant by pseudo gout
- Knowledge about osteoarthritis includes the following: nature of the disease, joints affected by osteoarthritis, age and sex affected by osteoarthritis, and treatment of osteoarthritis.
- Attitude towards patients with rheumatic diseases regarding agreement to marry a patient with any of the above rheumatic diseases is as follows: live in the same place with a person with rheumatic disease, play or work with a patient with rheumatic disease, inform your wife/husband that you have a rheumatic disease, and inform your friend that you have a rheumatic disease.
- Attitude towards management if a person have a rheumatic disease is as follows: ask for medical advice, buy some medications directly from the pharmacy, ask for a person who can remove evil spirits, ask for physiotherapy, and try some herbal and alternating medicines.

The score for each participant was measured by giving each “right answer” a score of 1, each “wrong answer” a score of 0, and each “I do not know” a score of 0, and then we summated answers, giving a total score ranging from 0 to 134.

Results

Table 1 shows that the present study was conducted on 3000 Egyptian populations. Their mean age was 38.1 ± 11.6 years. They were 50.2% females and 49.8% males. Fifty-two percent of them was urban, and 29.7% was rural. Regarding education, 11.4% of participants were illiterate, and most of them (34.6%) were university educated. Most of participants (39.5%) were not working. Most of them (66.2%) were married, and 14.1% was single.

Figure 1 shows that most of our participants (43.8%) got their information from media and Internet. The second source was from a patient (21.3%), from a doctor (17.5%), and lastly from a friend (17.4%).

Table 2 shows the general concept of our populations about rheumatology; only 1356 (45.2%) agreed that it is a separate branch of medicine. Regarding the cause of rheumatic diseases (RDs), 59.3% related RDs to inflammatory cause. About 40% of participants ignored the role of investigations in monitoring disease activity and/or complications, as 61.6% reported that investigations monitor disease activity and 61.2% reported that investigations monitor disease complications. Only 54% agreed that RDs cannot be contagious, and 23.9% believed that

Table 1 The sociodemographic data of the study population

	n	%
Age years (mean \pm SD)	38.1 \pm 11.6	
Gender		
Male	1494	49.8
Female	1506	50.2
Educational level		
Illiterate	343	11.4
Primary	411	13.7
Secondary	950	31.7
University	1038	34.6
Postgraduate	258	8.6
Profession		
Manual	357	11.9
Technical	599	20.0
Official	417	13.9
Professional	441	14.7
Not working	1186	39.5
Residence		
Urban	1559	52.0
Rural	890	29.7
Suburban	551	18.4
Marital status		
Single	423	14.1
Married	1987	66.2
Divorced	302	10.1
Widowed	288	9.6
Family history of rheumatic diseases		
Yes	1230	41.0
No	1149	38.3
I don't know	621	20.7

RDs can be contagious. About half of our participants agreed that RDs cannot be healed and reported that it can be heritable. Only 38.6% saw that RDs cannot be prevented by vaccination.

Regarding clinical features of RDs, only 26.9% of participants reported that in RDs, the immune system commonly attacks other body organs and tissues.

Regarding diagnosis of RDs, only 23.9% agreed that it is based on a set of clinical, serological, and radiological measures.

Regarding treatment of RDs, 24.4% of our participants reported that DMARDs are a group of medications commonly used in people with RDs, 31.8% reported that the aim of treatment protocol of RDs is to improve symptoms and stop disease progression in most cases, and only 20.8% agreed that medications used for the treatment of RDs are potentially toxic; only 33.6% agreed that the cost of antirheumatic drugs is a burden, but biologic agents are more expensive than chemical drugs like DMARDs.

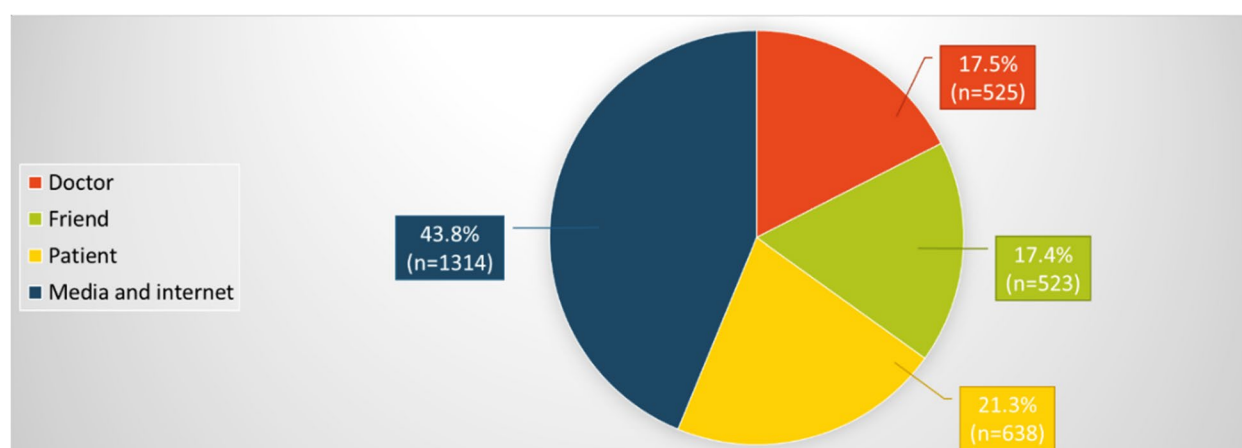


Fig. 1 The source of participant knowledge regarding rheumatic diseases

Table 2 General knowledge about rheumatology

	Frequency of correct answer	
	n	%
What do you know about rheumatology?		
Rheumatology is the same as orthopedics	1315	43.8
Rheumatology is a branch of orthopedics	1158	38.6
Rheumatology is a branch of internal medicine	731	24.4
Rheumatology is the same as immunology	1077	35.9
Rheumatology is directly related to rehabilitation	1316	43.9
Rheumatology is a separate branch of medicine	1356	45.2
In general, the causes of rheumatic diseases are as follows:		
Genetic disorders	1470	49.0
Inflammatory disease	1780	59.3
Autoimmune disorder	1349	45.0
Degenerative disease	1271	42.4
The role of investigations in the follow up of rheumatic diseases aim to as follows:		
Monitor disease activity	1849	61.6
Monitor disease complications	1835	61.2
Monitor drugs side effects and/or complications	1624	54.1
Rheumatic diseases can be as follows:		
Contagious	1619	54.0
Healed	1491	49.7
Heritable	1511	50.4
Prevented by vaccination	1157	38.6
Clinical features		
In rheumatic diseases, the immune system commonly attacks other body organs and tissues	808	26.9
Diagnosis of rheumatic diseases is based on a set of clinical, serological, and radiological measures	718	23.9
Treatment of rheumatic diseases		
DMARDs are a group of medications commonly used in people with rheumatic diseases	732	24.4
Aim of treatment protocol of rheumatic diseases is to improve symptoms and stop disease progression in most cases	954	31.8
Medications used for the treatment of rheumatic diseases are potentially toxic	623	20.8
The cost of antirheumatic drugs is a burden, but biologic agents are more expensive than chemical drugs like DMARDs	1008	33.6

Figure 2 shows that participants' total score regarding the general knowledge level of rheumatology is bad (47.5%), only 12.4% is good, 21.5% is average, and 18.6% is very bad.

Table 3 shows the participants' knowledge about RA, 26.1% reported that it is an autoimmune disease, and 30.5% reported that it is an inflammatory disease. Regarding epidemiology of RA, 25.7% reported that it is more common in females, and 43% reported that it can start at any age.

Regarding clinical and laboratory features, 38.1% reported that RA affect joints only, 58.3% reported that it affects musculoskeletal system only, and only 33% of our participants reported that all body systems may be affected by RA. Only 19.4% reported that RF test is not diagnostic for RA.

Regarding treatment of RA, 33.5% reported that RA is a treatable disease, but complete cure is impossible, 28.6% of participants agreed that analgesics are the treatment lines available for RA, 45.4% of participants agreed that steroids are the treatment lines available for RA, and only 26% agreed that the treatment lines available are drugs used to modify the course of RA itself. Regarding biologic drugs, only 25.7% knew that they are drugs specific for certain biologic processes, and 18.4% reported that they are drugs extracted from living tissues only.

Regarding general knowledge about SLE, among our study participants, 50.6% are believed an inherited gene to be the cause of SLE, and 37.8% of our participants reported that SLE is more common in females. Only 16.2% stated that any body system can be affected by SLE. Regarding types of lupus, 24.8% knew discoid lupus, 36.1% knew drug-induced lupus, and 29.2% knew neonatal lupus; 51.5% reported that skin rash is a common symptom of systemic lupus, and 29.6% reported that

SLE diagnosis is based on clinical features and laboratory findings. Regarding treatment of SLE, 52.4% of participants reported that SLE is treated by drugs specific for lupus.

Figure 3 shows that participants' total score regarding the general knowledge level of rheumatoid arthritis is bad (48.7%), only 12.6% is good, 26.4% is average, and 12.3% is very bad.

Figure 4 shows that participants' total score regarding the general knowledge of SLE is bad (51.2%), only 9.1% is good, 17% is average, and 22.7% is very bad.

Table 4 explores our participant's knowledge about gout, only 25.3% of our participants knew what is meant by crystal induced arthritis, and only 25.2% knew what is meant by pseudogout; 50.8% of participants stated that gout is a disease which affects the feet of patients when the uric acid is high, 27.7% of participants reported that males are affected much more than females, and 22% stated that uric acid is the cause of gout.

Regarding management of gout, 41.9% saw that gout is a completely curable disease; patient may be cured on appropriate treatment, and 63.1% agreed that it is treated by medical drugs specific for gout.

Regarding general knowledge about OA among our study participants, the cause of OA was multifactorial as decided by most of our subjects, with a complication of obesity (agreed by 55.6%). Regarding epidemiology of OA, our subjects (31.7%) agreed that OA is much more in old-aged persons, over 50 years; regarding sex, 29.9% agreed that OA is more in females.

Subjects agreed that the most affected joints were knees (75.4%) and then spines (48.1%), and the least affected joints were hands (31.2%). Regarding treatment of OA, most of participants (67.2%) agreed that OA can be treated with medication and/or physiotherapy, and

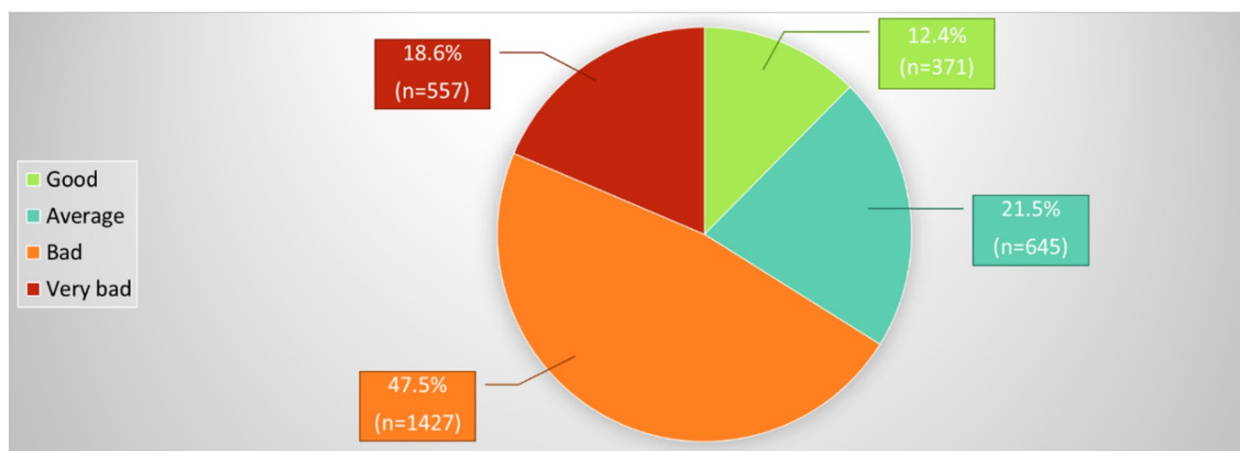


Fig. 2 Participants' total score regarding the general knowledge level of rheumatology

Table 3 Participants' general knowledge about rheumatoid arthritis and systemic lupus

	Frequency of correct answer	
	<i>n</i>	%
Nature of RA		
Rheumatoid arthritis is an autoimmune disease	782	26.1
Rheumatoid arthritis is an inflammatory disease	916	30.5
Epidemiology		
Rheumatoid arthritis is more common in females	772	25.7
Rheumatoid arthritis can start at any age	1290	43.0
Clinical and laboratory features		
What systems of the body are affected by RA?		
It affects only joints	1142	38.1
It can affect musculoskeletal system	1749	58.3
It can affect GIT	759	25.3
It can affect kidneys	1017	33.9
It can affect the liver	649	21.6
It can affect the brain and nervous system	922	30.7
All body systems may be affected	990	33.0
RF test is diagnostic for RA	582	19.4
Treatment of RA		
Treatment protocol of RA can completely cure the disease	1005	33.5
What are the treatment lines available for RA?		
Analgesics	859	28.6
Steroids	1362	45.4
Drugs used to modify the course of RA itself	779	26.0
What is meant by biological drugs?		
Drugs extracted from living tissues only	551	18.4
Drugs specific for certain biologic processes	771	25.7
Which of these are believed to be the causes of SLE?		
An inherited gene	1518	50.6
Exposure to ultraviolet light	927	30.9
Estrogen	875	29.2
A hidden infection	930	31.0
Female sex	1159	38.6
Environmental pollution	1273	42.4
An autoimmune process	1244	41.5
SLE is more common in females	1135	37.8
In SLE, the immune system makes antibodies against the body's tissues	933	31.1
Which part of the body might be affected by lupus?		
Joints	1409	47.0
Skin	1654	55.1
Kidneys	1096	36.5
Heart	1074	35.8
Brain	800	26.7
Any body system can be affected	487	16.2
Besides SLE, types of lupus include which of the following?		
Discoid lupus erythematosus	744	24.8
Lupus caused by certain medicines	1082	36.1
Neonatal lupus	877	29.2
Which of these is a common symptom of systemic lupus?		
Fever	1052	35.1

Table 3 (continued)

	Frequency of correct answer	
	<i>n</i>	%
Skin rash	1546	51.5
Swollen joints	1461	48.7
Extreme fatigue	1111	37.0
SLE diagnosed based on clinical features, laboratory findings	889	29.6
How is SLE treated?		
Anti-inflammatory medicine	1213	40.4
Drugs specific for lupus	1571	52.4
Just palliative treatment	971	32.4
SLE is non-treatable disease	488	16.3
Steroids are the cornerstone in the treatment of SLE	724	24.1

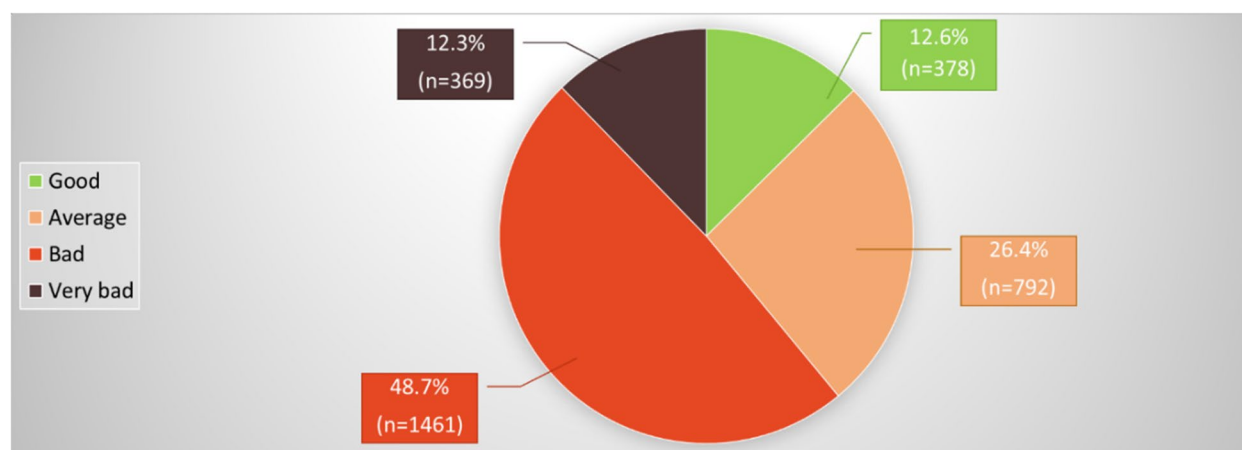
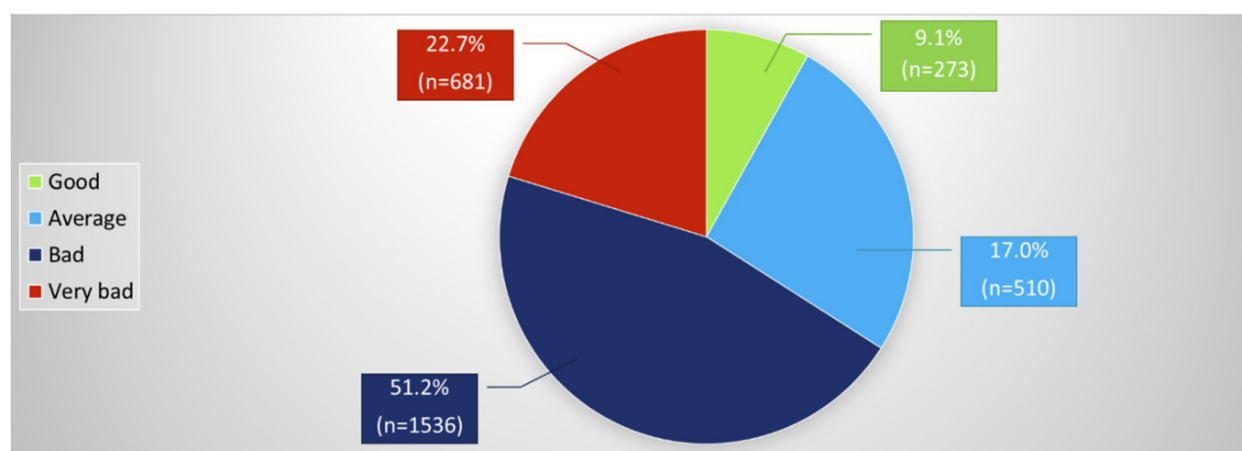
**Fig. 3** Participants' total score regarding the general knowledge level of rheumatoid arthritis**Fig. 4** Participants' total score regarding the general knowledge of SLE

Table 4 Participants' knowledge about gout, its related diseases, and osteoarthritis

	Frequency of correct answer	
	<i>n</i>	%
Crystal-induced arthritis		
Do you know what is meant by crystal induced arthritis?	758	25.3
Pseudo gout is a disease similar to gout but is due to other forms of crystals than urate crystals	757	25.2
What is gout?		
A disease of kings that affect only people with low activity and high protein diets	1337	44.6
A disease which affects the feet of patients when the uric acid is high	1525	50.8
An infectious disease	1821	60.7
An inherited disease	1375	45.8
Predisposition for gout		
Males are affected much more than females	832	27.7
Uric acid is the cause of gout	659	22.0
Management of gout		
Gout can be classified as completely curable disease; patient may be cured on appropriate treatment	1258	41.9
What is the treatment of gout?		
Medical drugs specific for gout	1893	63.1
Steroids	812	27.1
NSAIDs	1154	38.5
Surgery	1638	54.6
Physiotherapy	1240	41.3
There is no treatment of gout	1871	62.4
Osteoarthritis (OA) is categorized as follows:		
An aging process, not a disease	1258	41.9
An infectious disease	2027	67.6
A genetic disease	1432	47.7
An inflammatory disease	1027	34.2
An autoimmune disease	1428	47.6
A complication of obesity	1669	55.6
Epidemiology		
What is the age of onset of OA is?	952	31.7
Which gender has a higher risk of OA?	897	29.9
What are the joints affected by OA?		
Knees	2263	75.4
Elbows	1266	42.2
Hips	1167	38.9
Shoulders	1156	38.5
Hands	936	31.2
Wrists	1165	38.8
Ankles	1076	35.9
Spine	1443	48.1
OA can be managed by?		
Surgery only (arthroplasty). All other modalities are just palliative	985	32.8
Medication and/or physiotherapy	2017	67.2
Reduction of weight	1582	52.7
It is nontreatable at all as it is a normal aging process	548	18.3

52.7% of them agreed that it can be treated with reduction of weight. Only 18.3% agreed that it is non-treatable at all as it is a normal aging process.

Figure 5 shows that participants' total score regarding the general knowledge of gout is bad (53.3%), only 10.3% is good, 53.3% is average, and 21.8% is very bad.

Figure 6 shows that participants' total score regarding the general knowledge of osteoarthritis is bad (37.1%), only 17.4% is good, 28% is average, and 17.5% is very bad.

Figure 7 shows that participants' total score regarding the general knowledge of rheumatology and all aforementioned diseases is average (38.2%), 27.9% is good, 26.8% is bad, and 7.1% is very bad.

Table 5 shows the attitude towards individuals with rheumatic diseases. A substantial proportion of participants had negative attitudes towards individuals with rheumatic diseases. To the extent that 28% of participants reported not to marry a person with a rheumatic disease, 19.1% of participants reported not to live in the same place with a person with a rheumatic disease, and 15.4% reported not to play or work with a patient with

a rheumatic disease. This was reflected by their decision not to inform their contacts if they had a rheumatic disease, as 13.6% of participants decided not to inform their wife/husband, 21.9% decided not to inform their friends, and 35.5% decided not to inform their colleagues. The majority of participants (74.8%) agreed to seek medical advice if they had a rheumatic disease. Other nonmedical routes were also agreed by many of them such as buying some over-the-counter medications (36.9%), ask for a person for removing evil spirits (21.5%), ask for physiotherapy (51%), and try herbal and alternative medicine (40.3%).

Figure 8 shows that participants' overall level regarding the attitude towards rheumatic diseases is unsatisfactory (55%), while 45% is satisfactory.

Table 6 shows factors affecting knowledge and awareness of the study population about rheumatic diseases. We found that awareness and knowledge about rheumatic diseases are significantly higher among females. Regarding education level, there is a steady increase in the awareness with the rise of education level, with a

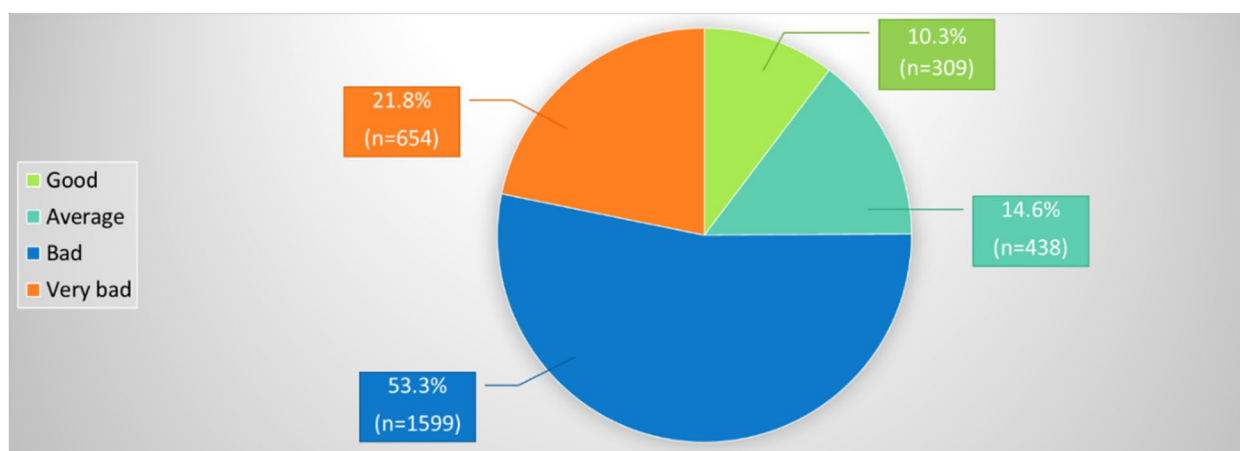


Fig. 5 Participants' total score regarding the general knowledge of gout

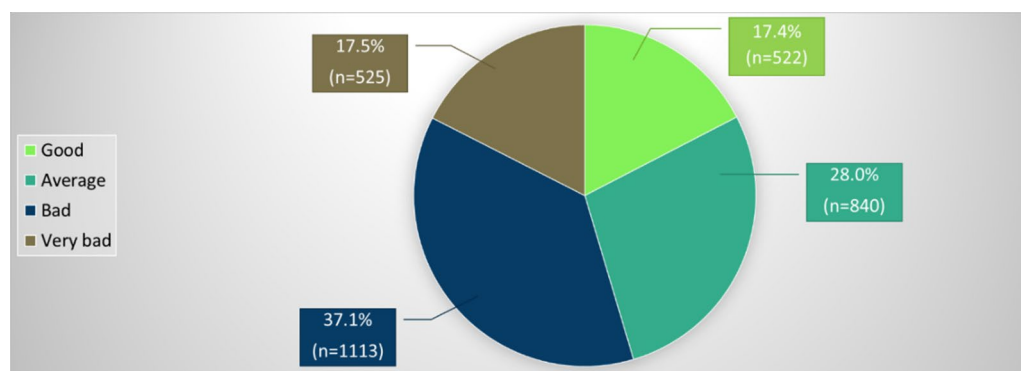


Fig. 6 Participants' total score regarding the general knowledge of osteoarthritis

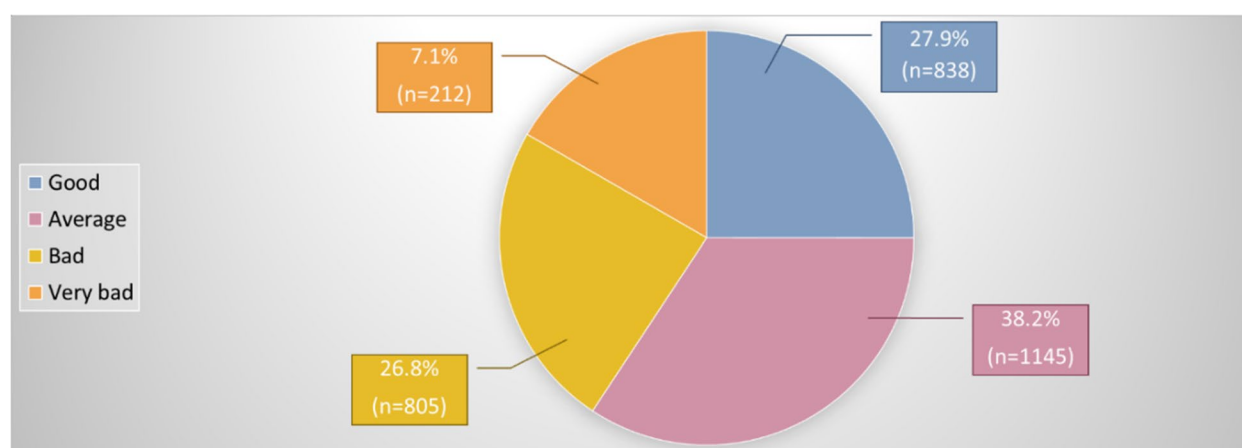


Fig. 7 Participants' total score regarding the general knowledge of rheumatology and all aforementioned diseases

Table 5 Attitude of participants towards rheumatic diseases

	Strongly agree		Agree		Undecided		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%	n	%
Marry a patient with any of the above rheumatic diseases?	300	10.0	573	19.1	1286	42.9	580	19.3	261	8.7
Live in the same place with a person with rheumatic disease?	595	19.8	1025	34.2	808	26.9	384	12.8	188	6.3
Play or work with a patient with rheumatic disease?	708	23.6	1089	36.3	742	24.7	276	9.2	185	6.2
Inform your wife/husband that you have a rheumatic disease	1173	39.1	685	22.8	736	24.5	368	12.3	38	1.3
Inform your friend that you have a rheumatic disease	918	30.6	693	23.1	731	24.4	396	13.2	262	8.7
Inform your colleagues that you have a rheumatic disease	776	25.9	490	16.3	669	22.3	840	28.0	225	7.5
I will ask for medical advice	1608	53.6	637	21.2	384	12.8	275	9.2	96	3.2
I will buy some medications directly from the pharmacy	530	17.7	577	19.2	504	16.8	794	26.5	595	19.8
I will ask for a person who can remove evil spirits	350	11.7	293	9.8	532	17.7	899	30.0	926	30.9
I will ask for physiotherapy	895	29.8	635	21.2	606	20.2	518	17.3	346	11.5
I will try some herbal and alternating medicines (e.g., cupping or acupuncture)	737	24.6	471	15.7	658	21.9	667	22.2	467	15.6

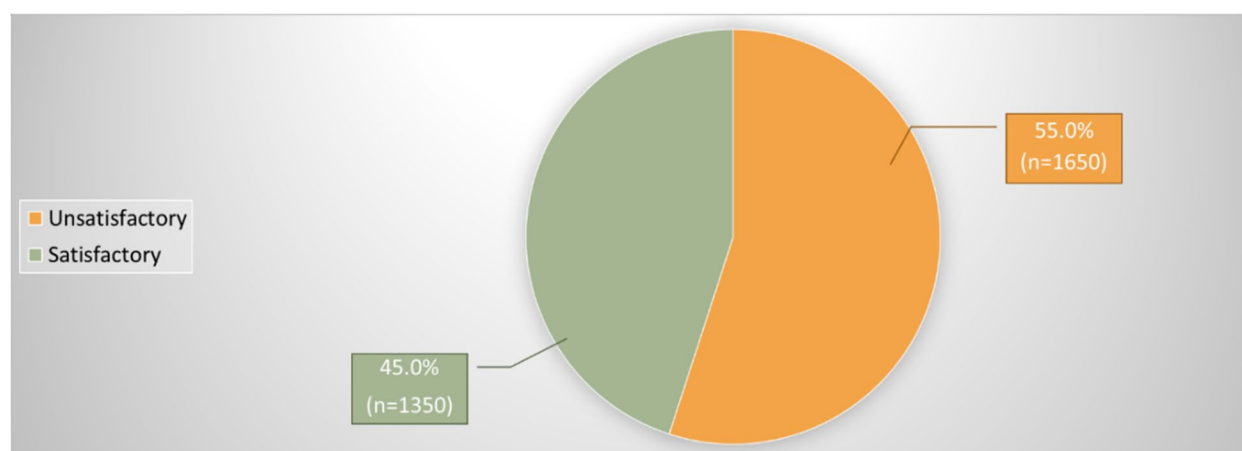


Fig. 8 Participants' overall level regarding the attitude towards rheumatic diseases

Table 6 Association between the sociodemographic state and the participants' total knowledge of the diseases

	Good		Average		Bad		Very bad		Chi-square test	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	χ^2	<i>P</i>
Age (mean \pm SD)	37.1 \pm 10.8		38.6 \pm 11.9		38.3 \pm 11.8		37.7 \pm 11.4		1.549*	0.200
Sex										
Male	203	47.3	275	42.6	755	52.9	261	52.3		
Female	226	52.7	370	57.4	672	47.1	238	47.7	21.065	< 0.001
Education										
Illiterate	48	9.1	33	3.8	176	15.6	86	18.0		
Primary	55	10.4	95	11.0	183	16.2	78	16.3		
Secondary	139	26.2	277	32.1	387	34.3	147	30.7		
University	183	34.5	399	46.2	327	29.0	129	26.9		
Postgraduate	105	19.8	60	6.9	54	4.8	39	8.1	256.821	< 0.001
Profession										
Manual	47	12.7	62	9.6	159	11.1	89	16.0		
Technical	108	29.1	93	14.4	301	21.1	97	17.4		
Official	66	17.8	89	13.8	198	13.9	64	11.5		
Professional	30	8.1	67	10.4	269	18.9	75	13.5		
Not working	120	32.3	334	51.8	500	35.0	232	41.7	112.652	< 0.001
Residence										
Urban	192	51.8	400	62.0	740	51.9	227	40.8		
Rural	89	24.0	172	26.7	445	31.2	184	33.0		
Suburban	90	24.3	73	11.3	242	17.0	146	26.2	79.907	< 0.001
Marital status										
Single	50	12.6	92	14.5	191	13.5	90	16.1		
Married	236	59.4	421	66.5	960	68.1	370	66.1		
Divorced	57	14.4	67	10.6	139	9.9	39	7.0		
Widowed	54	13.6	53	8.4	120	8.5	61	10.9	29.254	0.001
Family history										
Yes	532	68.7	362	46.6	297	28.0	39	10.0		
No	181	23.4	296	38.1	493	46.6	179	45.9		
I don't know	61	7.9	119	15.3	269	25.4	172	44.1	542.381	< 0.001
Sources of information										
From a doctor	53	14.3	99	15.3	280	19.6	93	16.7		
From a friend	56	15.1	112	17.4	267	18.7	88	15.8		
From a patient	77	20.8	145	22.5	290	20.3	126	22.6		
From media and Internet	185	49.9	289	44.8	590	41.3	250	44.9	18.075	0.034

* *t*-value, Student's *t*-test

highly significant correlation. Non-working and married participants had significantly higher knowledge compared to working and non-married ones. Regarding residence, urban people had the highest knowledge scores, followed by rural, and lastly those who came from slum areas. Lastly, participants with positive family history of rheumatic diseases had higher knowledge than those with negative family history.

Regarding association between sources of information and knowledge, we found that our participants with good knowledge about rheumatic diseases got their

information from media and Internet (49.9%) and then from a patient (20.8%), a friend (15.1%), and finally from a doctor (14.3%). Participants with a very bad knowledge got their information from media and Internet (44.9%) and then from a patient (22.6%), a doctor (16.7%), and finally from a friend (15.8%).

Table 7 shows factors affecting attitude of the study population towards rheumatic diseases. We found that attitude towards rheumatic diseases is significantly satisfactory among females. Regarding education level, there is a steady increase in the attitude with the rise of

Table 7 Association between the sociodemographic state and the participants' total attitude level of the diseases

	Unsatisfactory		Satisfactory		Chi-square test	
	<i>n</i>	%	<i>n</i>	%	χ^2	<i>P</i>
Age (mean \pm SD)	37.8 \pm 11.6		38.5 \pm 11.6		1.703 ^a	0.089
Sex						
Male	867	52.5	627	46.6	11.055	0.001
Female	783	47.5	723	53.6		
Education						
Illiterate	186	11.3	157	11.6	63.678	< 0.001
Primary	222	13.5	189	14.0		
Secondary	618	37.5	332	24.6		
University	498	30.2	540	40.0		
Postgraduate	126	7.6	132	9.8		
Profession						
Manual	200	12.1	157	11.6	67.108	< 0.001
Technical	393	23.8	206	15.3		
Official	252	15.3	165	12.2		
Professional	184	11.2	257	19.0		
Not working	621	37.6	565	41.9		
Residence						
Urban	869	52.7	690	51.1	17.297	< 0.001
Rural	445	27.0	445	33.0		
Suburban	336	20.4	215	15.9		
Marital status						
Single	238	14.4	185	13.7	46.358	< 0.001
Married	1018	61.7	969	71.8		
Divorced	194	11.8	108	8.0		
Widowed	200	12.1	88	6.5		
Family history of rheumatic diseases						
Yes	593	35.9	637	47.2	39.288	< 0.001
No	693	42.0	456	33.8		
I don't know	364	22.1	257	19.0		

^a *t*-value, Student's *t*-test

education level, with a highly significant relation. Non-working and married participants had significant satisfactory attitude compared to working and non-married ones. Regarding residence, urban people had more significant satisfactory attitude than rural and subrural. Participants with positive family history of rheumatic diseases had more significant satisfactory attitude than participants with negative family history.

Discussion

Awareness of population about rheumatic diseases is greatly important as lack of awareness may lead to delay in seeking medical care [11]. In Egypt, we lack the studies about awareness of Egyptian populations regarding rheumatic diseases. So, we provided in our study data about the present situation of common rheumatic diseases

in multicenter in Egypt considering Upper and Lower Egypt.

In terms of general knowledge about rheumatology, we found that 47.5% of our participants had a bad level of knowledge, 21.5% had an average level of knowledge, and only 12.4% had a good level of knowledge. This is in consistent with El Saman et al. study [10], which was conducted in Sohag in Egypt. They reported that the majority of the participants fell in the "bad" level, and "average" levels, with no one had "excellent" level of knowledge regarding RDs. Outside Egypt, Alkhdaire et al. [12] conducted a study to investigate the knowledge and perception of the general population living in the Qassim region in Saudi Arabia regarding RDs. The knowledge of the general public was inadequate.

A community-based survey conducted in Syria revealed that the majority of the participants fell in the

“bad” level [13]. An analogous study was performed in the Netherlands, showing that in general, the public did not know much about RDs [7].

Severo et al. [9] conducted a study in Portugal. The respondents gave the right answer to a mean of 10.5 statements out of 17 statements. This study showed that there are several knowledge flaws about RDs in the general population. One out of four considered the false general beliefs as true, and approximately, 30% did not have detailed knowledge on RDs.

This poor knowledge may be due to that many individuals with musculoskeletal diseases seemingly neglect their disease, not looking for help at all or seeking treatment only above a very high pain threshold [14]. Also, the prevalence of RDs in Egypt is not high as other diseases [15]. These diseases may take the full attention by our society. Also, RDs are not well included in the mass media in our region, and rheumatic and musculoskeletal diseases are learned by the internists and not the rheumatologists in most of our universities [16].

On the contrary to our study, a community-based survey was conducted in Riyadh City, Saudi Arabia, which showed that 77% of the patients were aware of rheumatic diseases; this high awareness level may be due to that most of this study population were educated [17].

Regarding general knowledge about rheumatoid arthritis, our study revealed that 48.7% of our participants had a bad knowledge, 26.4% of participants had an average knowledge, and only 12.6% had a good knowledge. This is consistent with El Saman et al. study [10] that reported the general knowledge about RA among the study population. About 55% reported having heard of RA. About 14% of participants related RA to an autoimmune cause, while over 33% thought that it is an inflammatory disease. Hazzazi et al. study [18] in Jazan, Saudi Arabia, showed that population had poor knowledge of RA. The average awareness about RA symptoms was 38.54%.

Regarding general knowledge about SLE, our study revealed that 51.2% of our participants had a bad knowledge, 17% of participants had an average knowledge, and only 9.1% had a good knowledge. This is consistent with El Saman et al. study [10] which reported that near half of the participants agreed that SLE is an autoimmune disease. Swollen joints and skin rash were the commonest manifestations approved by the participants as common symptoms of SLE. Less than 1/3 of participants supposed that SLE diagnosis requires a combination of clinical, laboratory, and imaging studies. More than half agreed that SLE is treated by drugs specific for lupus.

In Alharbi et al. study [19] conducted in Dammam, Saudi Arabia, about 54% of respondents had no idea about SLE, the majority of them had no clear idea regarding treatment and complications of the disease, about

one-third of respondents had idea that SLE is more prevalent among females, a significant majority of participants did not know about SLE, however, most of them did not know if it is fetal or not. Furthermore, SLE awareness is poor even between medical students in Saudi Arabia; a study was carried out in medical school about major symptoms and reported that they did not have clear idea about complications and treatment of SLE disease [20, 21].

Regarding general knowledge about gout, our study revealed that 53.3% of our participants had a bad knowledge, 14.6% of participants had an average knowledge, and only 10.3% had a good knowledge. This is consistent with Osama et al. study [22] in Sohag, Egypt, which revealed that the overall level of awareness about gout was insufficient among the general population in Egypt. Alshammari and Mujtaba's study [23] found low awareness and knowledge regarding gout among Qatari people as knowledge regarding etiology, predisposing factors, complications, and diagnosis of gout was insufficient knowledge. In contrast to our study, Atalla et al. study [24] in Taif city, Saudi Arabia, reported that the majority of the participants were somewhat aware about gout disease. Most of the participants believed that gout disease was preventable. Also, majority of the participants seemed to have an idea about symptoms and causes of gout disease.

Regarding general knowledge about OA, our study revealed that 37.1% of our participants had a bad knowledge, 28% of participants had an average knowledge, and only 17.4% had a good knowledge. This is consistent with Alahmed et al. [25] study that is carried out in Hail, Saudi Arabia, which revealed that 59.1% of participants had a bad knowledge and 40.9% of participants had a good knowledge. Alyami et al. study [26] in Jeddah, Saudi Arabia, demonstrated lack of knowledge about OA and associated risk factors in the general public.

In contrast to our study, a study conducted at Saudi Arabia revealed that the majority of participants were of satisfactory level of awareness regarding all aspects of knee OA such as risk factors, preventive measures, relieving measures, and symptoms, and this is explained by that middle-aged population with high level of education was the main core respondents, and this may be because of the method of data collection, which is according to the electronic survey [27].

In our study, regarding factors affecting knowledge about RDs, we found that female gender and non-working participants are more aware about RDs. This is consistent with El Saman et al. study [10] and based on their reports that awareness and knowledge about RDs were significantly higher in females and non-working. Also, it is in consistent with Alkhdairi et al. study [12] in Qassim

and Ali and Kudsi study [13] in Syria that reported a higher knowledge in females than in males. This is in contrast with Alenzi et al. [17] study in Riyadh city, Saudi Arabia, which reported that men had significantly higher awareness scores regarding RDs than women. High knowledge about RDs in females may be due to that men perceived RDs as less serious than did women, were less frightened, had lower intentions, and were less interested in information about RDs [7].

In our study, we found that education level is positively correlated with knowledge about RDs; higher educated respondents knew more about RDs than less educated respondents. This is consistent with other studies as Alkhdairi et al. [12], Ali and Kudsi [13], and Alenzi et al. [17] that reported that people who had received appropriate education were more aware of RDs than those with a lower level of education.

Regarding residence, we found that urban people had the highest knowledge scores, followed by rural, and lastly those who came from slum areas. This is consistent with El Saman et al. [10] study. Our study revealed that married people had the highest level of knowledge; this is in contrast with El Saman et al. [10] and Ali and Kudsi [13] studies which reported that single people had the highest knowledge, while Alkhdairi et al. [12] study found that place of residence, marital status, and occupational status were not the relevant factors for knowledge. This may be due to differences in sample size and score used.

Our study revealed that people who had family history of rheumatic diseases had a higher knowledge about RDs than those without family history. This is consistent with Van Der Wardt et al. [7] study that stated that people who had few contacts with rheumatic patients knew less about RDs. Van Der Wardt et al. [7] attributed this to that respondents with many personal contacts with rheumatic patients felt more susceptible to these diseases and were more interested in information about rheumatic disorders than respondents with fewer personal contacts with rheumatic patients.

In our study, we found the main sources of participants' knowledge about RDs were media and Internet (43.8%). This is consistent with Ali and Kudsi [13] study in Syria that reported social media was the approach that was utilized by the most as a source of information (58.03%). In contrast to our study, Van Der Wardt et al. [7] found that the respondents had rarely consulted the mass media for information on rheumatic diseases.

Regarding attitude towards patients with rheumatic diseases, there is a paucity of researches conducted. Our study revealed 55% unsatisfactory result and 45% satisfactory. This is consistent with El Saman et al. [10] study in which 47.6% showed bad attitude, 24.8% showed average attitude, and 14.4% showed very bad attitude. This

may be attributed to cultural beliefs as some were advised to take other courses of action (e.g., alternative medicines, religious consultation) or were advised that symptoms were unimportant [28].

Regarding factors affecting attitude towards rheumatic diseases, we found that it is affected by the same factors affecting knowledge in our study. We found that attitude towards rheumatic diseases are significantly satisfactory among females. Regarding education level, there is a steady increase in the attitude with the rise of education level, with a highly significant relation. Non-working and married participants had significant satisfactory attitude compared to working and non-married ones. Regarding residence, urban people had more significant satisfactory attitude than rural and subrural. Participants with positive family history of rheumatic diseases had more significant satisfactory attitude than participants with negative family history. To our knowledge, we did not find similar data in published articles.

Limitations

Despite this is the first multicenter Egyptian study about evaluation of general public awareness, knowledge, and attitude about common rheumatic diseases, there are several study limitations; first, we cover only 4 governorates representing Upper and Lower Egypt, and further studies to cover other parts of Egypt are recommended. Second, we need to ask about more rheumatic diseases as osteoporosis, ankylosing spondylitis, fibromyalgia, and others.

Recommendations

Further studies including more governorates representing all of the Egyptian population is required. Further studies including more rheumatic diseases are required. Effort must be paid to elevate population knowledge and improve attitude towards rheumatic diseases by different means aiming at improving awareness and giving a positive attitude towards patients with rheumatic diseases.

Conclusion

The overall awareness, knowledge, and attitude of population towards rheumatic diseases are limited in Egypt. The participants' total score regarding the general knowledge level of rheumatic diseases is bad. The participants' total score regarding the general knowledge level of rheumatoid arthritis, systemic lupus erythematosus, osteoarthritis, and gout is bad.

The participants' overall level regarding the attitude towards rheumatic diseases is unsatisfactory. The level of knowledge and attitude is affected by many factors like sex, work, education, residence, marital status, and family history of rheumatic diseases. The main sources

of information about rheumatic diseases are media and Internet.

Abbreviations

AKARSCO	The Awareness, Knowledge and Attitude of Egyptian people towards four of the common rheumatic diseases (Rheumatoid arthritis, Systemic lupus erythematosus, Crystal-induced arthritis and Osteoarthritis)
SLE	Systemic lupus erythematosus
RA	Rheumatoid arthritis
OA	Osteoarthritis
CIA	Crystal-induced arthritis
RDs	Rheumatic diseases
DMARDs	Disease-modifying antirheumatic drugs

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Authors' contributions

OMG collect information from Dakahlia. WAA collect information from Qena. ARR collect information from Sohag. OEE collect information from Damietta. All authors read and approved the final manuscript.

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Availability of data and materials

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Declarations

Ethics approval and consent to participate

Study protocol was submitted for approval by institutional research board (IRB) code number: MS.21.02.1392. Informed verbal consent was obtained from each participant sharing in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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