

Clinical implementation of musculoskeletal ultrasound among rheumatologists in Morocco

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Abstract

Objective: To document the current state of musculoskeletal US (MSUS) implementation and training among rheumatologists in Morocco.

Methods: A French-language questionnaire divided into 16 items and 5 domains (socio-demographic characteristics, training in MSUS, proposals for better use, MSUS in clinical practice, equipment and the main obstacles that prevent the implementation of MSUS in Morocco) was sent by e-mail to Moroccan rheumatologists.

Results: A total of 76 of the 300 questionnaires (25%) were returned. Most of respondents were young (55%) and were female (74%). MSUS was practiced daily by 50 (66%) respondents. They have formal university training in 96.8%. Fifty seven (75%) respondents have access to MSUS. They use MSUS in the following indications: shoulder pain (97%), Rheumatoid arthritis (97%), ankle pain (50%) and for echo-guided interventions in 60%. The cost of equipment and training was the main obstacle to the implementation of MSUS (75%), followed by operator depending examination (44 %).

Conclusion: Our results suggest that most of Moroccan rheumatologists practice MSUS after college education. The main obstacle for the diffusion of MSUS in Morocco was the cost of materiel and training.

Advances in knowledge: In Morocco, there has not been any study about musculoskeletal ultrasound (MSUS) practice among rheumatologists. This study allows to document the current state of MSUS implementation and training among rheumatologists in Morocco.

Abbreviations: MSUS: Musculoskeletal ultrasound, RA: Rheumatoid Arthritis, OMERACT: Outcome Measures in Rheumatoid Arthritis Clinical Trial, JIA: Juvenile Idiopathic Arthritis, EULAR: The European League Against Rheumatism, TTT: Teaching The Teachers

Introduction

Musculoskeletal ultrasound (MSUS) is a safe and a noninvasive technique that had a good satisfaction and acceptability from patients [1]. It has been increasingly incorporated into rheumatologist's practices during the last decade. In fact, it has been established to evaluate joints lesions in patients with rheumatic diseases, to assess individual's response to treatment and to guide interventional procedures [2]. MSUS may help the physician to diagnose early rheumatoid arthritis (RA) and provide many advantages over the other imaging tools [3]. In addition to non-irradiant, ultrasound is a less costly technology providing comparative and dynamic exam [4]. Conversely, the main disadvantages of MSUS are the long training duration for operators before exercise and the operator depending [2].

European countries were the first to incorporate MSUS into rheumatologist's practice and have developed training programs and curriculum under the umbrella of both the European League Against Rheumatism (EULAR) and the Outcome Measurement in Rheumatology Clinical Trials (OMERACT) group [5].

In recent years, Morocco has performed great progress at the use of the MSUS by rheumatologists. In fact, The Moroccan College of Rheumatology had developed training program for MSUS and organized national symposiums and courses to improve the percentage of rheumatologists performing this technique. Despite

this, this percentage seems to be still low. This study aimed to evaluate how Moroccan rheumatologists currently use MSUS, to analysis their training and to define the different obstacles that prevent the implementation of MSUS in Morocco.

Methods

A French-language questionnaire was designed in order to analyze the current state of training and practice of MSUS by rheumatologists, following some European, American and Asian studies [6-12]. This questionnaire was sent by e-mail to 300 Moroccan rheumatologists registered on the database of the Moroccan Society of Rheumatology. It consists of 16 items and 5 domains: socio-demographic characteristics, training in MSUS, proposals for better use, MSUS in clinical practice, equipment and the main obstacles that prevent the implementation of MSUS in Morocco. To improve the response rate, a second e-mail was sent systematically 1 week later to remind selected rheumatologists if there was no response to the first e-mail. Responses were analyzed blindly.

A descriptive analysis was performed using the software program SPSS (version 21.0) and Microsoft Excel.

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Results

A total of 76 of the 300 questionnaires (25%) were returned. Demographic characteristics of the respondents and clinical practice of MSUS are summarized in Tables 1 and 2, respectively.

Demographics

The most of respondents were young, 43% were aged between 30-40 years. The majority (74%) were female. They worked in a hospital/tertiary care center (31%), at a regional hospital (35 %), or in a private practice (34 %). Most of them (59%) had less than ten years experience.

Education and training

Sixty-two (81.6%) participants had some kind of training in MSUS. The most common forms of training undertaken were as follows: Formal University training (96.8%), informal training from rheumatologists (1.3%) and attendance at MSUS courses or Workshops (1.3%).

Thirty-six (48.6%) respondents proposed that MSUS should be taught by rheumatologists. Thirty-five (47.3%) respondents thought that multidisciplinary team could be implicated in MSUS teaching and just three participants (4.1%) think that radiologists could teach MSUS.

In the response of the question how MSUS training should be performed, sixty-eight (88.3%) respondents chose regular and continuous training. On the other hand, the proportions of the respondents who chose concentrated intensive sessions were 9.1% only. The respondents were asked also to choose the useful educational tools. Forty six (69.7%) respondents use website, thirty four (51.5%) use DVD, twenty height (42.4%) use book and twenty (30.3%) use courses.

Table 1. Demographic characteristics of the 76 respondents.

Parametrs	N=76
Age (years)	
<30	9 (12%)
30-40	33 (43%)
40-50	16 (21%)
>50	18 (24%)
Female	55 (74%)
Clinical experience (years)	
≤ 10	45 (59%)
10-20	12 (16%)
20-30	14 (18%)
>=30	5 (7%)
Sector of activity	
Private practice	21 (34%)
Regional hospital	22 (35%)
University hospital	19 (31%)

Table 2. MSUS in clinical practice.

Parametrs	N=76
Daily practice of MSUS	50(66%)
Duration of MSUS practice (years)	
• <5	42(85.7%)
• 5-10	4(8.2%)
• >10	3(6.1%)
Access to the equipment	57(75%)
• Personal	14(24%)
• Shared	43(75%)
Number of MSUS per week	
• 1-2	11(22.4%)
• 2-10	24(49%)
• >=10	14 (28.6%)
US-guided interventions	41(60%)

Current practice

Fifty-seven (75%) respondents have access to MSUS. The most of them (85.7%) use MSUS less than five years. Whereas, only 6.1% use it more than ten years. Fourteen (24%) respondents have their own equipment. 50 (66%) respondents practiced MSUS daily. In fact, 28.6% manipulate MSUS more than ten times a week, 49% practice MSUS two to ten times a week, but it was used less than two times a week in 22.4%. MSUS was considered to be most useful in the following indications: shoulder pain (97%), rheumatoid arthritis (97%), ankle pain (50%) and for guidance of interventional procedures in 60% (figure 1). The main joints explored by MSUS were shoulder (100 %), wrist / hand (92 %) and knee (69%) (figure 2). The cost of equipment and training were the main obstacles to the implementation of MSUS (75%), followed by operator depending examination (44 %) and other reasons (12%).

Discussion

Many papers have been published showing great interest of rheumatologists in MSUS in their daily practice and in research settings. In addition to its advantages compared to other imaging tools, MSUS has proved its usefulness to help clinicians to specify diagnosis and prognosis on the one hand, and to monitor the disease activity, indication and evaluation of therapeutic effects, on the other [3,13, 14, 15].

The pathological definitions of synovial hypertrophy, enthesopathy, tenosynovitis and bone erosion was reported by the Outcome Measures in Rheumatoid Arthritis (RA) Clinical Trial (OMERACT) ultrasound working group [16]. The same group had published recently a paper defining the minimal disease activity in RA by MSUS and the scoring system for synovitis in Juvenil Idiopathic Arthritis (JIA) [17]. In order to standardize the MSUS examination and interpretation, some organizations have published recommendations and guidelines for the standard format and elements of MSUS report [18- 20].

Implementation, training and teaching of MSUS have been studied across several countries [5,8,9,21-23]. European rheumatologists adopted MSUS into their practices earlier than their colleagues from other countries [5,19]. The current survey represents the first study in Morocco and Africa assessing the implementation of MSUS in routine rheumatology practice. Our results suggest that the majority of Moroccan Rheumatologists are interested and learning MSUS, but only 66% are using this technology daily. The main indications were as follows: shoulder pain, rheumatoid arthritis, ankle pain and guidance of interventional procedures. Shoulder, wrist, hand and knee were the main joints explored by MSUS, similarly to a Romanian and a Spanish study [7,24]. MSUS was used for procedures guidance by 60% of responds, more frequently than European, Japanese or American rheumatologists [5,8,9].

Cost of equipment and training was a considerable challenge and impediment in the implementation of MSUS in Morocco. In 2010, Samuels et al found that operator and reader variability, cost of training and purchasing equipment, fear of insufficient reimbursement and doubt of its utility, were the major concerns about the growth of MSUS in rheumatology across U.S.A [9]. In the same study, the clear majority of respondents have expressed their interest to learn how to use the machines. In a British survey of rheumatologists, the principal reason for not performing MSUS was the lack of training [25]. However, Maasa et al found that the development of training courses and informal training have doubled the number of MSUS users in Japan over 3 years [26]. At present, no standard educational training program in MSUS exists, and there is no consensus for evaluating competence of rheumatologists using MSUS. In 2001, the EULAR working group

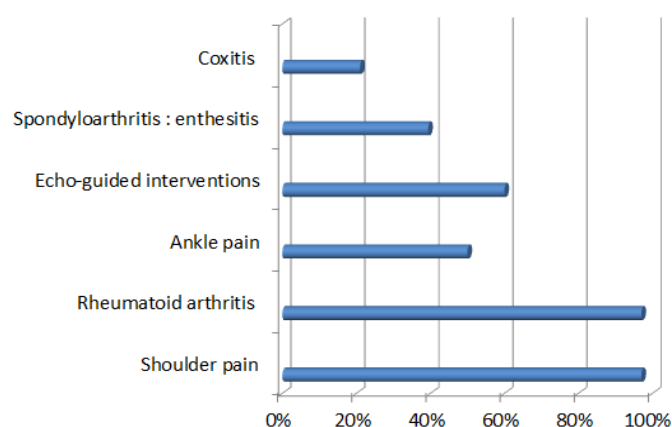


Figure 1. Indications for MSUS according to Moroccan rheumatologists.

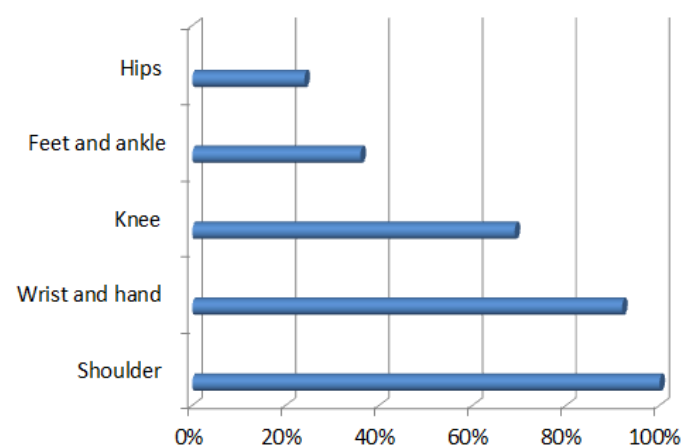


Figure 2. The main joints explored by MSUS.

for MSUS had developed guidelines for standardize ultrasonographic imaging methods [27]. The same group had developed recently a manual with a guidelines representing an educational support in order to organize the MSUS Teaching The Teachers (TTT) courses and then, to insure improvement and homogenization of training [28]. In our study, most of rheumatologists have received a continuous university education taught by Moroccan seniors of rheumatology who are expert in MSUS. This education consisted of theoretical and practical courses organized by the University of Medicine of Rabat over one year in three sessions. At the end of training, the competency assessment is based on a theoretical and practical examination and a certified diploma is awarded.

Our study was limited by low response rate similar to previous survey [8,10,23,29]. So, our results reflect only a part of Moroccan rheumatologists. Secondly, the group responding to the questionnaire was essentially represented by rheumatologists who were trained and interested in MSUS.

Conclusion

The MSUS seems to be an important tool to complete physical examination and to improve patient care. Implementation of MSUS into rheumatologic practice must to be planned. Continuing education is important to be up to date with the development of scientific data and technology. This is the first study to evaluate and analyze MSUS use by Moroccan rheumatologists. It seems that the most of them

practice this technique after college education. The main obstacle for the diffusion of MSUS in Morocco was the cost of materiel and training.

Conflict of interest

No conflict of interest, financial or other exists.

References

1. Acebes C, Harvie JP, Wilson A (2016) Clinical usefulness and patient satisfaction with a musculoskeletal ultrasound clinic: results of a 6-month pilot service in a Rheumatology Unit. *Rheumatol Int* 36: 1677-1681. [Crossref]
2. Iagnocco A, Naredo E, Bijlsma JWJ (2013) Becoming a musculoskeletal ultrasonographer. *Best Practice & Research Clinical Rheumatology* 27: 271-281.
3. Lage-Hansen PR, Lindegaard H, Chrysidis S, Terslev L (2017) The role of ultrasound in diagnosing rheumatoid arthritis, what do we know? An updated review. *Rheumatol Int* 37: 179-187. [Crossref]
4. SudoÅ, SzopiÅska I, Jans L, Teh J (2017) Rheumatoid arthritis: what do MRI and ultrasound show. *J Ultrason* 17: 5-16. [Crossref]
5. Naredo E, D'Agostino MA, Conaghan PG et al (2010) Current state of musculoskeletal ultrasound training and implementation in Europe: results of a survey of experts and scientific societies. *Rheumatology* 49: 2438-2443. [Crossref]
6. Mandl P, Naredo E, Conaghan PG, D'Agostino MA, Wakefield RJ, et al (2012) Practice of ultrasound-guided arthrocentesis and joint injection, including training and implementation, in Europe: results of a survey of experts and scientific societies. *Rheumatology* 51: 184-190. [Crossref]
7. Tamas MM, Fodor D, Rednic N (2011) Musculoskeletal ultrasonography in Romania – Results from a specific questionnaire. *Med Ultrason* 13: 10-14. [Crossref]
8. Samuels J, Abramson SB, Kaeley GS (2010) The Use of Musculoskeletal Ultrasound by Rheumatologists in the United States. *Bull NYU Hosp Jt Dis* 68: 292-298. [Crossref]
9. Takase K, Ohno S, Ideguchi H, Takeno M, Shirai A, et al. (2010) Use of musculoskeletal ultrasound in Japan: a survey of practicing rheumatologists. *Mod Rheumatol* 20: 376-380. [Crossref]
10. Wong SPY, Kwan CH (2016) Current state of the use of musculoskeletal ultrasound (MSUS) and view on the future development of MSUS training and services in Hong Kong: Results of a survey among the members of the Hong Kong Society of Rheumatology. *Hong Kong Bulletin on Rheumatic Diseases* 16: 1-5.
11. Janta I, Terslev L, Ammitzbøll-Danielsen M et al (2016) EFSUMB COMPASS for Rheumatologists dissemination and implementation – an international survey. *Med Ultrason* 18: 42-46. [Crossref]
12. Mandl P, Baranaukaite A, Damjanov N et al (2016) Musculoskeletal ultrasonography in routine rheumatology practice: data from Central and Eastern European countries. *Rheumatol Int* 36:845-854. [Crossref]
13. Díaz-Torné C, Moragues C, Toniolo E, Geli C, Castellví I, et al. (2017) Impact of ultrasonography on treatment decision in rheumatoid arthritis: the IMPULSAR study. *Rheumatol Int* 37: 891-896. [Crossref]
14. Sakellariou G, Conaghan PG, Zhang W, Bijlsma JWJ, Boyesen P, et al. (2017) EULAR recommendations for the use of imaging in the clinical management of peripheral joint osteoarthritis. *Ann Rheum Dis* 76: 1484-1494. [Crossref]
15. PÅaza M, Nowakowska-PÅaza A, PracoÅ G, SudoÅ, SzopiÅska I (2016) Role of ultrasonography in the diagnosis of rheumatic diseases in light of ACR/EULAR guidelines. *J Ultrason* 16: 55-64. [Crossref]
16. Wakefield R, Balint PV, Szkudlarek M et al (2005) Musculoskeletal ultrasound including definitions for ultrasonographic pathology. *J Rheumatol* 32: 2485-2487. [Crossref]
17. Terslev L, Iagnocco A, Bruyn GA, Naredo E, Vojinovic J, et al. (2017) The OMERACT Ultrasound Group: A Report from the OMERACT 2016 Meeting and Perspectives. *J Rheumatol* [Crossref]
18. Iagnocco A, Porta F, Cuomo G et al (2014) The Italian MSUS Study Group recommendations for the format and content of the report and documentation in musculoskeletal ultrasonography in rheumatology. *Rheumatology* 53: 367-373. [Crossref]
19. Cannella AC, Kissin EY, Torralba KD, Higgs JB, Kaeley GS (2014) Evolution of musculoskeletal ultrasound in the United States: implementation and practice in rheumatology. *Arthritis Care Res (Hoboken)* 66: 7-13. [Crossref]

20. American Institute of Ultrasound in Medicine (AIUM) (2014) AIUM Practice Guideline for Documentation of an Ultrasound Examination. *J Ultrasound Med* 33: 2219-2224. [[Crossref](#)]
21. Hernández-Díaz C1, Ventura-Rios L2, Gutiérrez M2,3, Roth J4 (2016) Ultrasonography in pediatric rheumatology in Latin America. Expanding the frontiers. *Clin Rheumatol* 35: 1077-1080. [[Crossref](#)]
22. Taggart AJ, Wright SA, Ball E, Kane D, Wright G (2009) The Belfast musculoskeletal ultrasound course. *Rheumatology (Oxford)* 48: 1073-1076. [[Crossref](#)]
23. Duftner C, Schüller-Weidekamm C, Mandl P, Nothnagl T, Schirmer M, et al. (2014) Clinical implementation of musculoskeletal ultrasound in rheumatology in Austria. *Rheumatol Int* 34: 1111-1115. [[Crossref](#)]
24. de Miguel E1, Andreu JL, Naredo E, Möller I; Grupo de Trabajo de Ecografía de la Sociedad Española de Reumatología (ECOSER) (2012) Situation of Spanish echography in Spanish rheumatology 2012. *Reumatol Clin* 8: 310-314. [[Crossref](#)]
25. Platt P, Raftery G, Kane D (2007) Attitudes of United Kingdom rheumatologists to musculoskeletal ultrasound practice and training Joanna Cunningham. *Ann Rheum Dis* 66:1381-1383.
26. Backhaus M, Burmester GR, Gerber T, Grassi W, Machold KP, et al. (2001) Guidelines for musculoskeletal ultrasound in rheumatology. *Ann Rheum Dis* 60: 641-649. [[Crossref](#)]
27. Hama M, Takase K, Ihata Ai et al (2012) Challenges to expanding the clinical application of musculoskeletal ultrasonography (MSUS) among rheumatologists: from a second survey in Japan. *Mod Rheumatol* 22: 202-208. [[Crossref](#)]
28. Iagnocco A, Terslev L, Backhaus M (2015) Educational recommendations for the conduct, content and format of EULAR musculoskeletal ultrasound Teaching the Teachers Courses. *RMD Open* 1: e000139. [[Crossref](#)]
29. Kellerman SE, Herold J (2001) Physician response to surveys. A review of the literature. *Am J Prev Med* 20: 61-67. [[Crossref](#)]