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ORIGINAL ARTICLES

Patients', caregivers and clinicians' perspectives on education and support about methotrexate: survey to 26 European Countries

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ABSTRACT

Objectives: To assess patients', carers', nurses' and physicians' perspectives and experiences regarding patient education (PE) and support of Methotrexate (MTX) treatment in Europe.

Methods: An international team of researchers and clinicians, including rheumatology nurses, a pharmacist, a rheumatologist, and three patient representatives, developed a survey. Common and sample-specific questions were conceived for adult patients or carers (≥18 years) of children/young people with RMDs, nurses, and physicians working in rheumatology practice in Europe. The survey was available in English and, for patients/carers, in eight additional languages, disseminated between May 2022 and May 2023. Ethics committee approval was obtained (116_CEIPC/2022_IPC).

Results: A total of 1526 patients, 145 carers, 354 nurses, and 291 physicians (96% rheumatologists), from 26 European countries participated. Only 28% of patients had a PE with nurse when starting oral MTX, with a slight increase to 42% for the subcutaneous form, with variations across Europe (Northern=69%, Eastern=52%, Western=50%, Southern=23%). Patients' perspectives align with physicians, whereas nurses reported higher access rates. Around 77% of patients had/have concerns about side effects, which were discussed with health professionals in 69% of the cases, though 46% of these concerns remained unresolved. The priority ranking of topics to be addressed in PE was similar overall for the three subgroups.

Conclusion: PE and support regarding MTX are unequal across Europe and can be improved by offering opportunities to clarify concerns through more access to nursing consultations. There is an overall agreement between patients and clinicians regarding key areas of education, although a tailored approach is required.

Keywords: Methotrexate; Health Education; Patient Education as Topic; Rheumatology; Self-management.

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KEY-MESSAGES

- Access to rheumatology nurse consultations for methotrexate education is limited and unequal across Europe.
- Only two-thirds of patients discuss methotrexate concerns with clinicians, and half of these remain unclear.
- This study highlights the need to standardize nurses' training programs and recommendations on methotrexate education.

INTRODUCTION

Methotrexate (MTX) is the first-line treatment for rheumatoid arthritis[1–3], juvenile idiopathic arthritis[4], and other rheumatic and musculoskeletal diseases (RMDs)[3,5], being the most prescribed disease-modifying antirheumatic drug (DMARD)[6]. With over 40 years of use, MTX has a well-established clinical efficacy, inhibiting radiographic progression, improving functional capacity, and reducing cardiovascular morbidity and mortality[6,7]. MTX can be combined with other synthetic or biologic DMARDs to enhance effectiveness while maintaining safety[8]. Its favorable benefit-risk ratio and cost-effectiveness derive from its oral and subcutaneous administration, wide dosing range, and titration flexibility based on patient needs and response[7,9].

Like any medication, MTX may cause adverse events, including tolerability issues requiring close monitoring. Many of these can be mitigated through proper follow-up, patient education (PE), and proactive management, addressing fears and promoting self-management[7,10]. However, non-adherence and persistence are major concerns[11], with persistence rates varying widely: 50–94% at one year and 25–79% at five years[12]. A large cohort study linked non-adherence to patient beliefs and multi-morbidity, reinforcing the need to address concerns before and during therapy[13]. A recent qualitative study exploring Spanish patients' experiences identified barriers and facilitators related to (1) drug-specific aspects (package insert, side effects, administration), (2) patient-physician interactions, (3) social environment (disease visibility, patient associations), and (4) practical aspects of care (access to reliable information and broader health education)[14].

Rheumatology nurses play a key role in providing education and ongoing support, improving adherence, persistence, and safety[15,16]. A French retrospective study found that a nurse-led therapeutic education session significantly improved patient knowledge about MTX after six months[17]. Another French study[18], showed that patients educated by nurses on disease activity self-assessment had a higher rate of DMARD intensification than controls (17% vs. 10%). Despite this, according to our perceptions, in many European countries, patients lack access to nurse consultations when prescribed MTX, especially for oral formulations, and referrals are more common for technical training on subcutaneous administration. However, no data exist on these trends. Importantly, early referral of all MTX patients is crucial for treatment success, as maximum efficacy can take up to six months, and early side effects may lead to discontinuation[7].

While several recommendations guide MTX use for physicians[3,7,10,19] and other health professionals[9], no international guidance exists for nurses' role in PE, nor have nurses been fully involved in developing such recommendations at an international level. To address this gap, a European task force has developed points to consider for PE provided by nurses on MTX use[20] [full manuscript in submission]. The present survey aimed to inform this consensus exercise by evaluating patients', carers', nurses' and physicians' perspectives and experiences regarding education and support about MTX treatment in Europe.

METHODS

This was a cross-sectional descriptive study through a European survey, coordinated by the Portuguese Association of Health Professionals in Rheumatology (APPSReuma) in collaboration with professional and patient organizations from 16 countries.

This study was approved by the Ethics Committee of the Polytechnic Institute of Coimbra (#l116_CEIPC/2022_IPC). Written informed consent was obtained from all participants. The Software EnquestaFacil® was used for the survey, ensuring all requirements regarding data anonymization and security measures (server hosted at the Datacentre of Interxion, Spain).

Study Population

The survey targeted European individuals affected by RMDs who take/took MTX and health professionals who care for these patients. More specifically, the inclusion criteria were (1) Adults (≥18 years of age) with an RMD, with experience taking MTX; (2) Family members/caregivers of people with an RMD (age <18 years) taking MTX; and (3) Health professionals with >1-year experience in caring for patients with an RMD taking MTX.

A convenience sampling approach was used, with the survey being disseminated via social media channels, newsletters and online forums focused on RMDs, and mailing lists of professional organizations and individual networks between May 1st, 2022, and May 1st, 2023.

Questionnaire design

A preliminary draft of the survey was developed by a steering group of researchers and shared with the other members of the task force (19 nurses, 1 rheumatologist, 1 pharmacist, 3 patient representatives). These pre-test results were presented during a virtual meeting and the main topic areas for the full survey were defined. The survey draft was subsequently refined through email discussions and pre-tested several times within the group.

The questionnaires for all stakeholder groups included three sections: (1) closed questions on demographic and clinical or professional characteristics; (2) experiences and perspectives on MTX education and management, primarily through closed questions; and (3) open-ended questions for additional comments. Some questions varied by subgroup, with a shorter version for physicians. Common questions included patient access to nurse consultations when prescribed oral vs subcutaneous MTX (yes/no/sometimes), prioritisation of the top five topics (from a list of 16) to be covered in MTX education, and the opportunity to discuss MTX benefits and concerns before starting treatment (rated on a 0–10 Likert scale). Nurses answered additional questions on MTX education practices, including the number of patients seen per week, timing and duration of consultations, follow-up methods (if any), educational strategies, training received, or the existence of national or local education guidelines. Full questionnaires are provided in Appendix I to III. Surveys for health professionals were available in English only, while for patients/carers, we were able to translate them (through the Expert Nurses) into eight additional languages (Danish, Estonian, German, Hungarian, Italian, Norwegian, Portuguese, and Swedish).

Data Analysis

Data from all three stakeholder surveys were cleaned, merged and analysed descriptively using SPSS® Statistics software, version 27.0 (IBM Corporation, Armonk, NY, USA). Responses from non-European countries were excluded from this analysis, and the countries were grouped following the United Nations geoscheme for Europe, established by the United Nations Statistics Division (UNSD), in four regions: Eastern, Northern, Southern, and Western (Supplementary Data S1 presents country assignment per region).

RESULTS

Participants characteristics

Complete responses were obtained from 1526 patients, 146 carers (totaling 1671 patients/carers), 354 nurses, and 291 physicians (96% rheumatologists), from 26 European countries, mainly from Northern (nurses 49%) and Southern Europe (patients 37% and physicians 46%), as shown in Table I. Supplementary Table S1 presents the responses per country, with a higher number of responses (for patients/carers) from Italy (n=412, 25%), Switzerland (n=210, 12%), Sweden and Hungary (n=182/180, 11%) and Czech Republic (n=152, 9%).

A total of 862 patients (52%) were taking oral and 358 (26%) subcutaneous MTX. This means that around 451 patients (27%) had taken one of these forms at some point, but not when they participated in the survey. Overall, 19% of the patients started with subcutaneous MTX, ranging from 10 to 29% across European regions (Supplementary Table S2). In terms of diagnosis, more than half reported Rheumatoid Arthritis, followed by Psoriatic Arthritis (14%) and Juvenile Idiopathic Arthritis (11%), as the most represented. Regarding health professionals, they worked mainly within hospitals (82%) and within a rheumatology department (~82%), with 94% of the physicians being specialised in rheumatology. Fourteen per cent of the nurses worked with paediatric patients, and a lower proportion of physicians did the same (3%) (**Table I**).

Patient's concerns and clarification around MTX side effects

Seventy-seven percent of the patients/carers reported concerns about potential unpleasant side effects, with these being more common in Southern (87%) and Eastern (80%) Europe. Among those with concerns, around 31% did not discuss them with anyone, a situation more frequent for the same regions. Physicians were the main point of contact for clarification (78%), with nurses consulted less frequently, either alone (6%) or with doctors (12%). Discussions with nurses (alone or with doctors) were more frequent in Northern Europe (15% and 24%) compared to other regions (~2% and ~10%). Despite these discussions, only just over half of the patients (54%) felt their concerns were adequately clarified, with clarification rates lowest in Eastern (39%) and highest in Western Europe (67%) (Table II).

Patient and Healthcare Professional Experiences with MTX Education

In Table III, we observe that only 28% of patients/carers reported having an educational session with a nurse when starting oral MTX, while for subcutaneous prescription, this proportion increased to 42%. Access to nurse consultation for oral MTX was lowest for Southern (11%) and highest for Western (43%) and Northern Europe (39%). The same pattern was observed for the subcutaneous form, which led to a nurse consultation

TABLE I. Distribution of respondents per region, patients' characteristics, and healthcare professionals' backgrounds and settings.

	Patients (n=1526) and carers (n=146) N=1671	Nurses N=354	Physicians / rheumatologists N=291
Regions of Europe (according to United Nations geoscheme)			
Eastern Europe	343 (21)	57 (16)	63 (22)
Northern Europe	373 (22)	174 (49)	61 (21)
Southern Europe	624 (37)	52 (15)	134 (46)
Western Europe	331 (20)	71 (20)	33 (11)
Age (mean (SD); min-max)			
Adults	51 (13); 17-89	–	–
Child	11 (4); 1-17	–	–
Sex			
Female	1310 (78)	–	–
Male	212 (13)	–	–
Other/Prefer not to mention	149 (9)		
Diagnosis			
Rheumatoid arthritis	878 (52.5)	–	–
Psoriatic arthritis	234 (14.0)	–	–
Juvenile Idiopathic Arthritis	179 (10.7)	–	–
Spondylarthropathies	94 (5.6)	–	–
Systemic Lupus Erythematosus	38 (2.3)	–	–
Scleroderma	28 (1.7)	–	–
Vasculitis	22 (1.3)	–	–
Mixed connective tissue disease	13 (0.8)	–	–
Polymyalgia rheumatica	11 (0.7)	–	–
Early undifferentiated arthritis	8 (0.5)	–	–
Myositis	6 (0.4)	–	–
Other	160 (9.5)	–	–
Healthcare setting			
Hospital	-	293 (82)	237 (82)
Private practice/primary care	-	45 (13)	42 (14)
Research institution or University	-	8 (2)	3 (1)
Other	-	9 (3)	9 (3)
Speciality of the department			
Rheumatology	-	291 (82)	241 (83)
Internal Medicine	-	6 (2)	16 (5)
Rheumatology and Internal Medicine	-	19 (5)	23 (8)
Rheumatology and another speciality	-	19 (5)	8 (3)
Other	-	20 (6)	3 (1)
Working situation specialised for:			
Adult patients	-	273 (77)	261 (90)
Children's/youth	-	50 (14)	8 (3)
Both	-	32 (9)	22 (7)
Years of clinical experience in rheumatology (mean (SD); min-max)	-	13 (9);1-40	18 (12); 1-45

Data are presented as n (%) unless stated differently. Percentages may not sum to exactly 100% due to rounding.
SD: Standard Deviation; min–max: minimum–maximum.

TABLE II. Patients' concerns about methotrexate side effects and clarification sources across European Regions

	Total (n=1671)	Western Europe (n=331)	Southern Europe (n=624)	Northern Europe (n=373)	Eastern Europe (n=343)
Concern about the possibility of potential unpleasant side effects (e.g. hair loss, nausea, impact on liver function)					
Yes	1283 (77)	220 (66)	545 (87)	243 (65)	275 (80)
Did you discuss this concern with anyone?					
Yes	875 (69)	176 (81)	364 (67)	176 (73)	159 (58)
Nurse	49 (6)	4 (2)	15 (4)	26 (15)	4 (2)
Doctor	685 (78)	148 (84)	307 (85)	103 (58)	127 (81)
Nurse and doctor	107 (12)	18 (10)	29 (8)	43 (24)	17 (10)
Other health professional	34 (4)	6 (4)	13 (3)	4 (3)	11 (7)
Have you been clarified about your concerns?					
Yes	688 (54)	145 (67)	282 (52)	154 (64)	107 (39)

Data are presented as n (%)
Percentages may not sum to exactly 100% due to rounding.

TABLE III. Comparison on the access to nurse consultation about by stakeholders and regions based on the prescription mode

		Total	Western Europe	Southern Europe	Northern Europe	Eastern Europe
Based on your experience, does every patient that initiates MTX have at least one educational session with a nurse?						
Nurses	Yes, for oral or SC prescriptions	211 (60)	26 (37)	16 (31)	150 (86)	19 (33)
	Yes, only if the MTX is SC	94 (26)	29 (41)	26 (50)	10 (6)	29 (51)
Physicians / rheumatologists	Yes, for oral or SC prescriptions	90 (31)	8 (24)	26 (19)	27 (44)	29 (46)
	Yes, only if the MTX is SC	92 (32)	18 (55)	43 (32)	15 (25)	16 (25)
Have you had an educational session with a nurse? (at the start of the oral or for the subcutaneous MTX)?						
Patients and carers	Yes, for oral prescription	383 (28)	119 (43)	47 (11)	127 (39)	90 (29)
	Yes, for SC prescription	315 (42)	99 (50)	75 (23)	85 (69)	56 (52)

Data are presented as n (%).
MTX: Methotrexate. SC: Subcutaneous.

in 69% of instances in Northern, but remained as low as 23% in Southern. In Supplementary Table S3 we also provide these statistics per country, showing that countries within the same region vary significantly in this regard, such as (nurse consultation for oral MTX): 10% for Hungary vs 53% for Czech Republic (Eastern Europe); 12% for Estonia vs 73% for Denmark (Northern); 2% for Greece vs 18% for Spain (Southern); 39% for Belgium vs 70% for the Netherlands (Western).

The perspectives of clinicians are different from patients, with nurses perceiving that most patients (60%) have access to them, either for oral or subcutaneous education, compared to 31% of the physicians (and 28% of patients) (Table III).

In Figure 1 we observe the results regarding the opportunity to discuss the benefits of MTX before prescribing; patients rated a mean (SD) of 5.0 (3.6) out of 10, somewhat lower than nurses (5.8 (3.9)) and much lower than rheumatologists (8.9 (1.6)), with similar perceptions regarding the opportunity to discuss concerns.

Regarding the duration of the first educational session with a nurse, most patients (55%) perceived it as brief (<10 minutes) compared to only 15% of nurses reporting that amount of time, as most (55%) reported between 10 and 30 minutes and 32% between 31 and 60 minutes.

Nurses' Experiences and Perspectives

Regarding nurses perspectives of their practices, as shown in Table IV, in Southern Europe, most nurses (73%) reported that PE regarding MTX self-administration occurs on the day of the first dose, whereas in

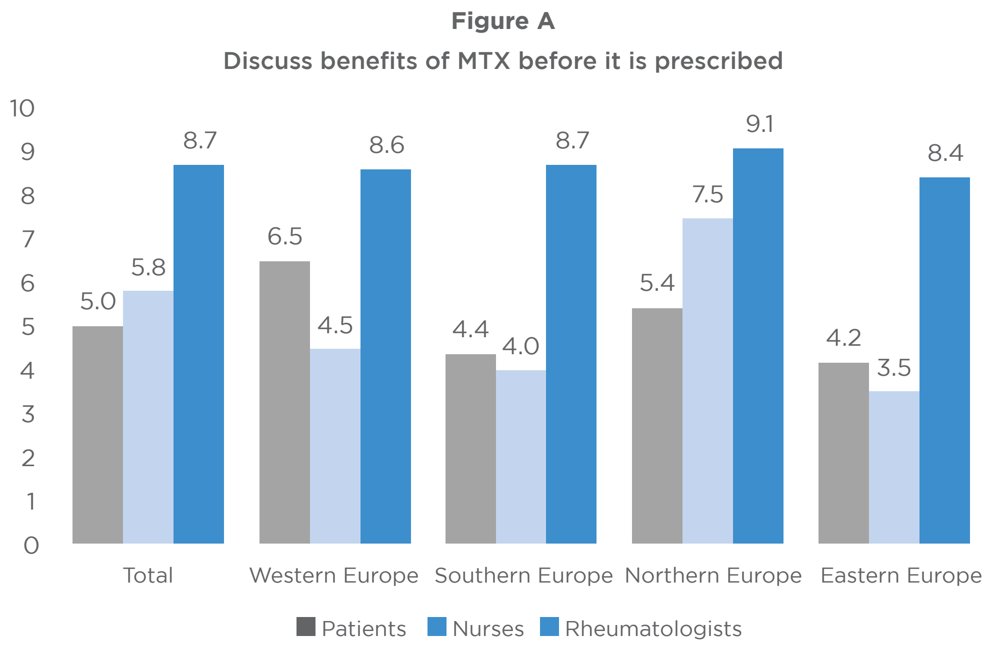

Figure A

Discuss benefits of MTX before it is prescribed

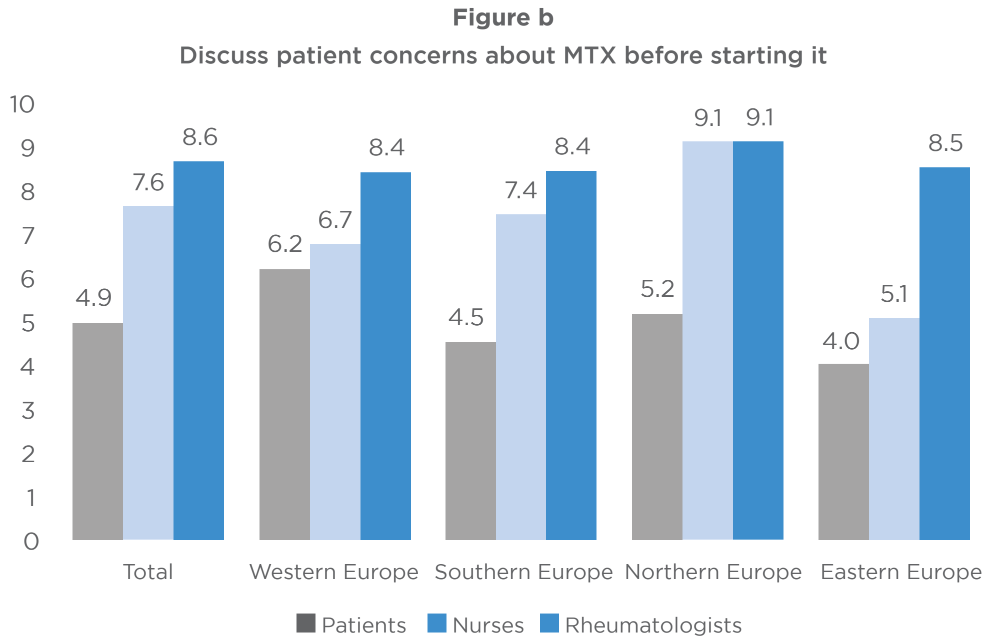

Figure b

Discuss patient concerns about MTX before starting it

Figure 1. Opportunity to discuss the benefits and concerns about MTX before initiation.
Data are presented as means. Figure A: Results of the question asked to patients, nurses and rheumatologists: "Do you discuss the benefits of MTX with the clinicians/patient before it is prescribed?" Figure B: Results of the question asked to nurses and rheumatologists: "Do you give the patient an opportunity to discuss their concerns about MTX before it is prescribed?" and to patients: "Did you have the opportunity to voice your concerns regarding MTX before starting it?" Responses were measured on a Likert scale from 0-10, where 0 indicates "Not discussed at all" and 10 indicates "Able to discuss all concerns." MTX: Methotrexate.

Northern Europe, it is typically provided before (61%). Across all regions, most patients receive a single education session (71%), which is most common in Eastern Europe (82%), while in Northern Europe, all patients receive at least one session. Regarding follow-up, nurses in Eastern Europe indicated that appointments are generally not conducted (68%), whereas in Northern Europe, a second follow-up is offered for some patients (58%). This follow-up often combines face-to-face and remote care, a practice more frequent in Northern (43%) and Southern (31%) Europe (Table IV).

In Northern Europe, most nurses use checklists or

TABLE IV. Experiences and perspectives of nurses on MTX administration support and PE

	Total (n=354)	Western Europe (n=71)	Southern Europe (n=52)	Northern Europe (n=174)	Eastern Europe (n=57)
Is the PE about self-administration/parental administration of MTX usually done on the same day that MTX is taken for the first time?					
Yes, on the same day	176 (50)	39 (55)	38 (73)	62 (36)	37 (65)
No, usually PE occurs before administration	161 (46)	26 (37)	11 (21)	106 (61)	18 (32)
No, usually PE occurs after administration	17 (5)	6 (8)	3 (6)	6 (3)	2 (4)
Please indicate how many sessions a patient has with a nurse on self-administration of subcutaneous MTX?					
None	10 (3)	2 (3)	4 (8)	0 (0)	4 (7)
One session	252 (71)	53 (75)	29 (56)	122 (70)	47 (82)
Two sessions	33 (9)	4 (6)	5 (10)	19 (11)	5 (9)
Other	60 (17)	12 (17)	14 (27)	33 (19)	1 (2)
Do you have follow-up appointments after the first session, in your department?					
No, we do not have a follow-up	100 (28)	22 (31)	16 (31)	23 (13)	39 (68)
Yes, we usually schedule a second follow-up for ALL patients	70 (20)	17 (24)	16 (31)	31 (18)	6 (11)
Yes, we usually schedule a second follow-up for SOME patients	148 (42)	24 (34)	12 (23)	101 (58)	11 (19)
Other	36 (10)	8 (11)	8 (15)	19 (11)	1 (2)
Is this second follow-up face-to-face or remote care (primarily)?					
Face-to-face only	89 (25)	30 (42)	14 (27)	31 (18)	13 (23)
Remote care only	29 (8)	1 (1)	1 (2)	27 (16)	0 (0)
Both	104 (29)	10 (14)	16 (31)	74 (43)	4 (7)
Do you use checklists or any written prompts during the consultation to ensure that important information has been delivered to the patient?					
Yes	234 (66)	38 (54)	28 (54)	141 (81)	26 (46)
Do you provide the patient with a telephone advice line for support or concerns?					
No	41 (11)	17 (24)	4 (8)	0 (0)	20 (35)
Yes, a general phone number from my department	119 (33)	28 (39)	14 (27)	50 (29)	26 (46)
Yes, a direct phone number to the nursing team	184 (52)	22 (31)	29 (56)	122 (70)	11 (19)
Yes, other relevant contact numbers	20 (6)	6 (8)	2 (4)	10 (6)	2 (4)
Yes, helpline email	46 (13)	5 (7)	9 (17)	30 (17)	2 (4)
Other contacts	16 (4)	2 (3)	3 (6)	11 (6)	0 (0)
Do you usually assess the patient's therapeutic compliance?					
No, I have no means to do that	142 (40)	33 (46)	17 (33)	54 (31)	38 (67)
Yes, I ask the patient in an informal way (for eg, looking at the diary of administration)	173 (49)	25 (35)	33 (63)	102 (59)	12 (21)
Yes, I ask patients to fill out a standard questionnaire	19 (5)	9 (13)	0 (0)	4 (2)	6 (11)
Other	21 (6)	4 (6)	2 (4)	14 (8)	1 (2)
Have you received specific training to advise patients about MTX?					
Yes	169 (48)	43 (47)	18 (34)	104 (59)	14 (25)
Are you aware of any national recommendation for the care and follow-up of patients under MTX?					
Yes	201 (57)	31 (44)	25 (48)	131 (75)	13 (23)

Data are presented as n (%)
Percentages may not sum to exactly 100% due to rounding.
MTX: Methotrexate. PE: Patient Education

prompts to ensure essential information is conveyed (81%) and provide patients with support contacts, mainly direct phone numbers (70%) or helpline emails, which are partially used in Southern and Northern Europe (17% both). For therapeutic compliance assessment, nurses in Western (46%) and Eastern (67%) Europe reported lacking proper means to evaluate it, while those in Southern (63%) and Northern (59%) Europe often assessed it informally. Additionally, most Northern European nurses received specific training on MTX counseling (59%) and were aware of national care guidelines (75%). In contrast, these aspects were less common in Eastern Europe (25% and 23%, respectively).

In Figure 2 we present the top 5 (out of 16) topics to be discussed about MTX according to patients and carers, nurses and rheumatologists. The full list is presented in Supplementary Table S4. We can observe that the most important topics for patients and carers, nurses, and rheumatologists were related to MTX side effects and their management (85%, 71% and 76%, respectively). Nurses prioritized discussing the administration technique (68%), whereas patients considered this less important (28%). Rheumatologists emphasized explaining why the patient is taking MTX (76%) and family planning (69%); however, patients showed less interest in the latter (20%).

DISCUSSION

This was the first European-level multi-disciplinary study assessing the perspectives of patients, carers, nurses, and physicians on access to nurse consultations for PE and support regarding MTX. The results of this survey provide a overview of current practices and highlight key gaps in education and support for RMD patients across Europe.

The results reveal that only 28% of patients had access to a nurse consultation when starting oral MTX, although this increased to 42% for subcutaneous MTX. The increase in nurse consultations for subcutaneous MTX may reflect the perception of rheumatologists (and health managers) on the nurses' roles, primarily focused on instrumental training (e.g., teaching self-injection technique) rather than providing comprehensive education about the treatment, which is essential no matter the administration form. Another international survey on the implementation of European League of Associations for Rheumatology (EULAR) recommendations for the role of nurses highlighted that some rheumatologists question whether nurses possess adequate knowledge to deliver the recommended care[21]. However, accumulating evidence supports the positive impact of nurse-led interventions on patient outcomes, such as clinical efficacy, safety, quality of life, treatment adherence, satisfaction, and self-efficacy, among others[16,22–24]. Evidence specifically regarding MTX education indicates that PE can be delivered in various formats, with results showing significant benefits, particularly in terms of patient satisfaction and adherence[25].

It should also be highlighted that like other studies, our results found substantial inequalities across Europe. Northern European countries reported better access and more frequent discussions with nurses,

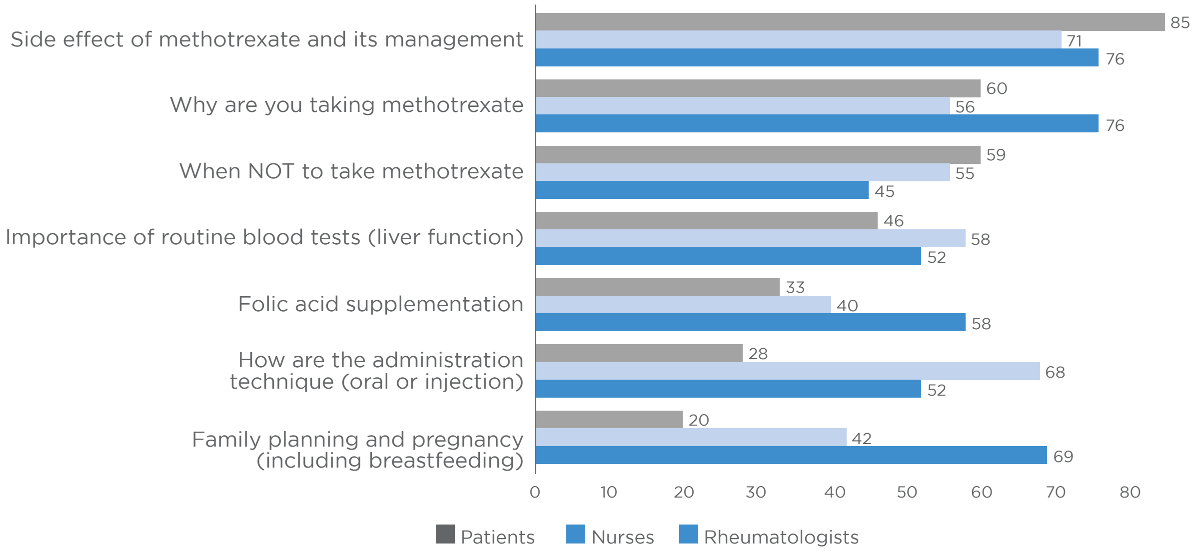

Figure 2. Key information areas that need to be discussed with a patient about methotrexate.
These we the top issues selected among a list of 16 provided. Full list of results provided in Supplementary Table S4.

whereas Southern and Eastern Europe had the poorest overall results. Similar findings were reported in the van Eijk-Hustings assessment of EULAR recommendations' implementation on the role of the nurse, where agreement and application were lowest in Eastern and Central Europe[21]. An international survey involving 1873 patients and 1131 rheumatologists from 26 and 31 countries, respectively, also demonstrated significant gaps in the implementation of standards of care[26]. Rheumatologists in countries with lower gross domestic product and non-EU countries were more likely to report problematic gaps, while no relevant differences were observed among patients[26]. In contrast, a similar study conducted in the Netherlands, which merged perspectives of both rheumatology nurses (n=39) and rheumatologists (n=52), revealed much better alignment between healthcare professionals and patients[27]. Discrepancies across Europe are well-documented and start at a more elemental level, namely regarding clinical eligibility criteria for starting a first reimbursed biologic in patients with rheumatoid arthritis[28]. Naturally, these discrepancies extend to access to "other healthcare professionals", which was identified as one of the most significant gaps in poorer countries and new or non-EU member states[26]. A Portuguese audit similarly concluded that many rheumatology departments lack dedicated nurses, who were considered essential for promoting specialization and expanding responsibilities. The report emphasized the need for collaboration with professional organizations to improve training for rheumatology nurses and ensure better PE and support[29].

Our study revealed a relevant discrepancy between health professionals and patients/carers in the perceived opportunities to discuss MTX benefits and concerns before starting treatment. In this context, 78% of patients reported that physicians were the primary point of contact for discussing concerns about potential side effects. In fact, it is likely to happen that, rheumatologists are many times the single option they have. However, despite these discussions, many patients felt that their concerns were not fully addressed, highlighting a significant communication gap. We may anticipate that access to a dedicated nurse consultation for this purpose would improve the level of clarification, but there are no enough studies to clarify this. A study analysed the video-records of 10 patient-nurse consultations in the UK, and concluded that consultations generally consisted of communication from nurse to patient rather than a dialogue for the clarification of patient doubts, 'overloading' them with information[30]. Thus, access only, is not enough. Other international surveys have shown that while 90% of physicians were satisfied with their communications with their patients regarding RA treatment, 61% of patients felt uncomfortable raising concerns or fears with their physician[31]. In contrast, a survey of psoriatic arthritis (PsA) patients and physicians showed higher satisfaction with communication, with ≥85% of both groups reporting being very or somewhat satisfied and most patients (≥86%) felt comfortable raising concerns. Still, over 40% were considered at risk of suboptimal communication, indicating room for improvement[32]. These findings highlight the need for more opportunities for patients to express concerns and specialized communication training for health professionals to foster meaningful dialogue and shared decision-making, in line with EULAR recommendations for the generic competencies of health professionals in rheumatology[33].

Our survey revealed substantial variability in nurse practices regarding PE on MTX. Notably, only 49% of nurses reported receiving specific training for MTX education. Studies from the UK have shown that the training nurses receive for educating patients about MTX varies significantly, directly impacting their confidence and competencies[30,34]. Confidence often develops with experience and can take several months to build, while standard training is perceived as highly beneficial[35]. More homogenization of training at a national level is needed on this ground, as well as improve awareness of educational offerings[36].Other key variations identified in our study included the availability of follow-up appointments and dedicated telephone or email support, which have been shown to improve care efficiency and meet patients' ongoing needs[37–39] and improved efficiency[40].

Additionally, about half of the nurses were unaware of any national recommendations for the care and follow-up of patients on MTX. This highlights the urgent need for a consensus document to guide rheumatology nurses and healthcare managers on the content, delivery, and timing of PE. The results of this survey and a scoping review[25] served as informing evidence to an European taskforce aiming to address the identified gaps, with the resulting manuscript under submission.

This study is not without limitations. First, the use of convenience sampling and data collection through social media may have introduced volunteer bias, which can, for instance, lead to an over-representation of individuals with stronger opinions or higher care needs, potentially limiting the generalizability of the findings. However, this approach enabled the inclusion of a heterogeneous group of stakeholders, which helped capture a broad range of perspectives. Second, the self-reported data could be subject to recall bias. Nevertheless, given that this study is based on personal experiences and perspectives, the self-reported method is an appropriate means of collecting such data.

Third, the results should be interpreted with caution due to the imbalance in sample sizes between countries and the grouping of countries by region, as shown in Supplementary Tables S1 and S4. For example, if one country has a disproportionately large number of responses that differ significantly from other countries, this could introduce bias into the results of that region (e.g. Italy contributes with 66% of patients for the total of 6 countries within Northern Europe). Future analyses may consider weighting data by national population or performing sensitivity analyses excluding dominant countries to test the robustness of regional comparisons. Finally, the lack of matching between context of the subsamples of participants should be considered i.e. although we compared perspectives and experiences from three stakeholders, the precise comparisons within the same department or country could yield more specific insights. Country-specific analyses are planned by this group, after this international overview publication, which can include multivariate analyses to identify predictors of access to nurse education or resolution of concerns.

This study concludes that while there is a clear recognition of the importance of PE in MTX therapy, there is high variability in the delivery and content of educational sessions. This study also highlights significant disparities in access to nurse consultations and the quality of care provided to patients across Europe. Patients report that opportunities to discuss the benefits and address concerns regarding MTX prior to prescription are insufficient. Key topics that should be addressed include the rationale for using MTX, potential side effects and their management, and circumstances in which MTX should not be taken for safety reasons. These findings suggest a need to better align educational content with patient needs and concerns. The differences in priority areas between patients, carers and healthcare professionals underscore the need for collaborative approaches to PE that encompass both clinical priorities and patient-centric concerns. Consistent with the literature, the importance of standardizing education, addressing misconceptions, and providing continuous support is emphasized.

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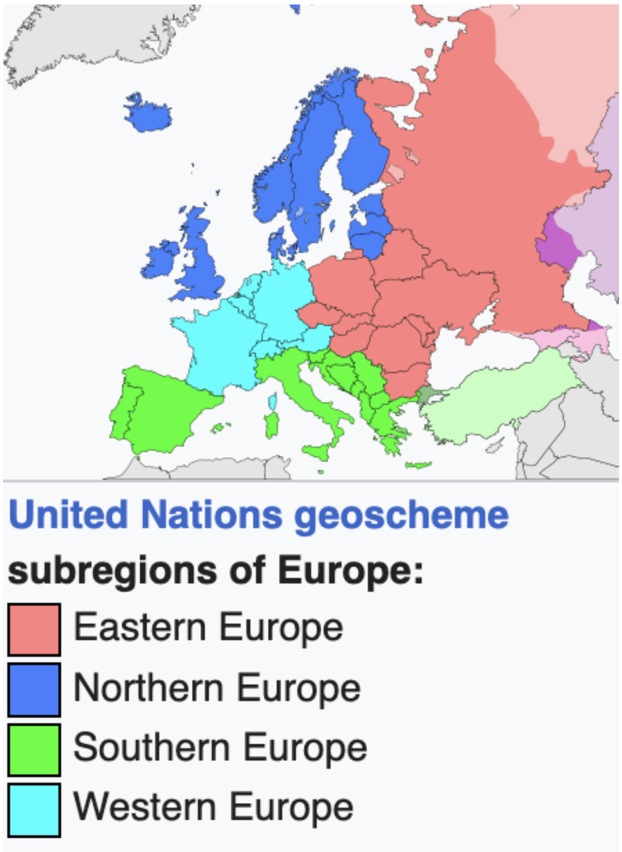
SUPPLEMENTARY METHODS



Supplementary Data S1. Distribution of European Union countries by regions.
Distribution of countries per region according to the "Standard Country or Area Codes for Statistical Use" of the United Nations (https://unstats.un.org/unsd/methodology/m49/).
Depicted as an image in Wikipedia (https://en.wikipedia.org/wiki/United_Nations_geoscheme_for_Europe)
In bold are the countries for which we had at least one response for our study:

- Eastern: Belarus, **Bulgaria, Czechia, Hungary, Poland**, the Republic of Moldova, **Romania**, the Russian Federation, **Slovakia**, and **Ukraine**.
- Northern: Åland Islands, **Denmark, Estonia**, the Faroe Islands, Finland, Iceland, **Ireland**, the Isle of Man, **Latvia**, Lithuania, **Norway**, the Svalbard and Jan Mayen Islands, **Sweden**, the **United Kingdom**, and the Channel Islands (Guernsey, Jersey, and Sark).
- Southern: Albania, Andorra, Bosnia and Herzegovina, **Cyprus**, Croatia, Gibraltar, Greece, the Holy See, **Italy**, Malta, Montenegro, North Macedonia, **Portugal**, San Marino, **Serbia**, Slovenia, and **Spain**.
- Western: Austria, **Belgium**, **France, Germany**, Liechtenstein, **Luxembourg**, Monaco, the **Netherlands**, and **Switzerland**.

SUPPLEMENTARY TABLES

SUPPLEMENTARY TABLE S1. Responses from patients, nurses and rheumatologists per country

Country	Patients and carers	Nurses	Physicians / rheumatologists
Eastern Europe			
Bulgaria	1 (0,1)	–	1 (0,3)
Czech Republic	**152** (9,1)	38 (10,7)	29 (10,0)
Hungary	**180** (10,8)	19 (5,4)	32 (11,0)
Poland	–	–	1 (0,3)
Romania	8 (0,5)	–	–
Slovakia	1 (0,1)	–	–
Ukraine	2 (0,2)	–	–
Northern Europe			
Denmark	21 (1,3)	3 (0,8)	4 (1,4)
Estonia	80 (4,8)	8 (2,3)	26 (8,9)
Republic of Ireland	25 (1,5)	27 (7,6)	18 (6,2)
Latvia	1 (0,1)	–	1 (0,3)
Norway	37 (2,2)	38 (10,7)	3 (1,0)
Sweden	**182** (10,9)	20 (5,6)	2 (0,7)
United Kingdom	27 (1,6)	78 (22)	7 (2,4)
Southern Europe			
Cyprus	4 (0,2)	2 (0,6)	–
Greece	46 (2,8)	1 (0,3)	4 (1,4)
Italy	**412** (24,6)	4 (1,1)	64 (22,0)
Portugal	77 (4,6)	32 (9,0)	52 (17,9)
Serbia	1 (0,1)	–	–
Spain	83 (5,0)	13 (3,7)	14 (4,8)
Western Europe			
Belgium	86 (5,1)	10 (2,8)	3 (1,0)
France	16 (1,0)	1 (0,3)	2 (0,7)
Germany	5 (0,3)	43 (12,1)	5 (1,7)
Luxembourg	3 (0,2)	2 (0,6)	–
Netherlands	11 (0,7)	–	–
Switzerland	**210** (12,6)	15 (4,2)	23 (7,9)
Total	1671 (100)	354 (100)	291 (100)

Data are presented as n (%)

SUPPLEMENTARY TABLE S2. Methotrexate Usage Patterns (Oral and Subcutaneous) Across European Regions

	Total (n=1671)	Western Europe (n=331)	Southern Europe (n=624)	Northern Europe (n=373)	Eastern Europe (n=343)
Are you taking ORAL MTX?					
No, started with SC	312 (19)	51 (15)	180 (**29**)	48 (13)	33 (**10**)
Took it once, but not now	497 (30)	91 (27)	327 (38)	74 (20)	95 (28)
Yes, I'm taking	862 (52)	189 (57)	207 (33)	251 (**67**)	215 (63)
Are you taking SC MTX?	(n=1358)	(n=279)	(n=444)	(n=325)	(n=310)
No	605 (45)	80 (29)	122 (27)	201 (62)	202 (65)
Yes, I did take it, but not now	395 (29)	101 (36)	211 (47)	43 (13)	40 (13)
Yes, I'm taking	358 (26)	98 (35)	111 (25)	81 (25)	68 (22)

Data are presented as n (%). MTX: Methotrexate. SC: Subcutaneous.

SUPPLEMENTARY TABLE S3. Proportion of patients who had a session about MTX with a nurse for oral and subcutaneous, per country

Country	Patients/carers included as participants in the survey (n=1671)	Had an educational session with a nurse at the start of			
		Oral MTX (n=1359)#		SC MTX (n=753)#	
	n	n†	%‡	n†	%‡
Eastern Europe					
Bulgaria	1	0	–	0	–
Czech Republic	**152**	137	53.3	65	70.8
Hungary	**180**	163	9.8	38	26.3
Poland	–	–	–	–	–
Romania	8	8	12.5	5	0
Slovakia	1	1	0	0	–
Ukraine	2	2	0	0	–
Northern Europe					
Denmark	21	15	73.3	11	81.8
Estonia	80	80	12.5	13	38.5
Republic of Ireland	25	24	66.7	12	58.3
Latvia	1	1	100	0	–
Norway	37	27	37.0	20	75.0
Sweden	**182**	158	41.8	59	68.4
United Kingdom	27	20	65.0	10	90.0
Southern Europe					
Cyprus	4	4	0	1	100
Greece	46	43	2.3	17	5.9
Italy	**412**	266	9.0	210	13.8
Portugal	77	62	16.1	39	56.4
Serbia	1	1	0	0	–
Spain	83	67	17.9	54	40.7
Western Europe					
Belgium	86	79	39.2	35	51.4
France	16	9	0	5	0
Germany	5	4	0	3	0
Luxembourg	3	3	0	2	50.0
The Netherlands	11	10	70.0	4	100.0
Switzerland	**210**	175	46.6	150	90.0

The n of both oral and SC groups is not mutually exclusive, and each n reports to the number of patients among the sample who replied to that question (could have replied only to one or another or to both); † – number of patients who replied from this country to this question; ‡ - This percentage reports to a total n that is not displayed in the table; thus, it does not report to the n†. This is because the question had 3 possible options for the answer and we are reporting here only the percentage of one option. MTX: Methotrexate. SC: Subcutaneous.

SUPPLEMENTARY TABLE S4. Topics elected for top 5 priorities to be discussed with patients prescribed with methotrexate*

Key information areas to be discussed with the patient	Patients	Nurses	Rheumatologists
Side effects of methotrexate and its management	1416 (85)	252 (71)	222 (76)
Why you are taking methotrexate	1005 (60)	199 (56)	222 (76)
When NOT to take of methotrexate	995 (59)	196 (55)	131 (45)
Importance of routine blood tests (liver function)	766 (46)	207 (58)	151 (52)
Handling if having an infection	633 (38)	89 (25)	56 (20)
Folic acid supplementation	553 (33)	143 (40)	168 (58)
Vaccination and Immunization	524 (31)	85 (24)	68 (23)
Handling if having a surgery and dental care	499 (30)	32 (9)	16 (5)
How are the administration technique (oral or injection)	470 (28)	242 (68)	152 (52)
Potentially cause hair thinning or loss of air	348 (21)	10 (3)	8 (3)
Fear or perceived cancer risk	342 (20)	6 (2)	3 (1)
Family planning and pregnancy (including breastfeeding)	338 (20)	150 (42)	201 (69)
Alcohol interaction	181 (11)	55 (15)	36 (12)
Useful contact details	111 (7)	47 (13)	14 (5)
Storage of methotrexate	74 (4)	51 (14)	5 (2)
Smoking cessation	50 (3)	9 (2)	2 (1)
Data are presented as n (%)			

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* The question asked to participants was: “What are the key information areas that need to be discussed with a patient about methotrexate? Please select the TOP 5 topics (i.e. all may be important, but you should select the mandatory ones to discuss during the first session)”.