



ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES

**Knowledge, Attitude, and Practice Regarding Rheumatoid Arthritis
Management and Associated Factors Among Primary Healthcare
Providers in Public Health Facilities of Addis Ababa, Ethiopia
(2025): A Cross-Sectional Study**

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COLLEGE OF HEALTH SCIENCES, SCHOOL OF MEDICINE

DEPARTMENT OF FAMILY MEDICINE

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(2025): A Cross-Sectional Study**

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Abstract

Background: Rheumatoid arthritis (RA) is a known chronic and autoimmune condition that needs to be diagnosed early to be managed early to prevent lifelong disability. There is little known about RA among PCPs in Ethiopia, which may contributed for the inadequate treatment and care of RA patients. In this study, PCPs knowledge, attitude, and practice (KAP) of RA diagnosis and management were identified with the factors linked.

Objective: In this study, the initial aim was to evaluate PCPs knowledge, attitudes, and practices regarding the diagnosis and management of RA in public health facilities in Addis Ababa, Ethiopia. The other intention of the study was to identify the socio-demographic and professional factors that influence these KAP levels, to guide proper interventions for stronger RA care at the primary healthcare level.

Methods: A cross-sectional study carried out during August 1 to September 30, 2025, that involved 210 healthcare providers among fourteen public health facilities in Addis Ababa. Data was gathered using a structured and self-administered questionnaire and analyzed with SPSS version 27 to assess RA KAP and the contributing factors to these outcomes.

Results: Among 210 primary healthcare providers (female-to-male ratio 1:1.44), the majority were Internal Medicine residents (29.0%) and General Practitioners (28.1%). Overall, 50.5% demonstrated poor knowledge of RA, while only 3.8% had good knowledge. Despite this, 62.4% exhibited a favorable attitude toward RA diagnosis and management, and 88.1% reported good clinical practice. Good knowledge was significantly associated with being an Internal Medicine resident (AOR = 11.7; 95% CI: 1.8–76.2; $p = 0.01$) or a Family Medicine resident (AOR = 30.0; 95% CI: 1.8–1190.3; $p = 0.03$), seeing ≥ 200 patients per week (AOR = 100.9; 95% CI: 11.2–908.1; $p < 0.001$), and working in tertiary hospitals (AOR = 2.44; 95% CI: 2.1–65.9; $p = 0.019$). Favorable attitudes were predicted by being a General Practitioner (AOR = 1.75; $p = 0.036$), Internal Medicine resident (AOR = 4.17; $p = 0.045$), or Family Medicine resident (AOR = 1.35; $p = 0.049$); having 11–20 years (AOR = 3.32; $p = 0.031$); and seeing ≥ 200 patients per week (AOR = 44.3; $p = 0.002$). Good practice was associated with age 25–29 years (AOR = 4.78; $p = 0.032$), seeing ≥ 200 patients per week (AOR = 1.03; $p = 0.047$), and experiencing difficulty obtaining expert opinion (AOR = 7.39; $p = 0.006$).

Conclusion: Primary healthcare providers in Addis Ababa have good practice and a positive attitude in RA care, which shows their commitment. However, knowledge gaps remain high even though RA is included in Ethiopia's Standard Treatment Guidelines. This can be solved by improving ongoing training, practical guidance, and access to specialist support, which can help strengthen RA management and patient outcomes.

KEY WORDS – RA Rheumatoid Arthritis

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Acronyms

AAU	Addis Ababa University
KAP	Knowledge, Attitude, and Practice
RA	Rheumatoid arthritis
DMARDS	Disease-modifying anti-rheumatic drugs
MTX	Methotrexate
CHS	College of Health Sciences
CV	Curriculum Vitae
FDA	Food and Drug Administration
GPs	General Practitioners
ACPA	Anti-citrullinated peptide/protein antibody
EULAR	European Alliance of Associations for Rheumatology
NCD	Non-Communicable Diseases
PCPs	Primary care physicians
WHO	World Health Organization
TASH	Tikur Anbessa Specialized Hospital
ALERT	All Africa Leprosy, Tuberculosis, and Rehabilitation Training Center
THHC	Teklehaymanot Health Center

1. INTRODUCTION

1.1. Background

Rheumatoid arthritis (RA) is a chronic, systemic, autoimmune, inflammatory disorder of unknown etiology that primarily involves synovial joints. The arthritis is typically symmetrical, and usually leads, if uncontrolled, to destruction of joints due to erosion of cartilage and bone, causing joint deformities. The disease usually progresses from the periphery to more proximal joints and results in significant locomotor disability within 10 to 20 years in patients who do not respond to treatment.

The global burden of RA is estimated to be around 0.24% (1), and females are affected more than males. The prevalence of RA in low- or middle-income countries (without including Africa) is in the range of 0.37% to 1.25%. Likewise, in Africa, the prevalence of RA is 0.1% to 2.5% in urban settings and 0.07% to 0.4% in rural settings (2,3). In Ethiopia, data remain limited; however, a recent study done at Black Lion Hospital in 2022 reported that RA accounts for approximately 20% of patients visiting the rheumatology clinic with rheumatologic complaints (4).

Rheumatoid arthritis most typically presents as polyarticular disease with a gradual onset, but some patients may present with acute onset, intermittent or migratory joint involvement, or monoarticular disease. The symptoms of RA can significantly impair a patient's ability to perform activities of daily living (e.g., walking, climbing stairs, dressing, using the toilet, getting up from a chair, or opening jars), and can also affect their capacity to work. Systemic symptoms may also be present, particularly in those with disease onset after the age of 60 (historically termed "elderly-onset RA"); in up to one-third of cases, acute-onset polyarthritis is accompanied by myalgia, fatigue, low-grade fever, weight loss, and depression. In fewer cases, extra-articular manifestations such as rheumatoid nodules or episcleritis may occur (5).

In Ethiopia, the early diagnosis and management of rheumatoid arthritis (RA) remain a significant challenge within the primary healthcare system. Most patients first present to primary health facilities, where frontline providers such as Nurses, Health officers, general practitioners and residents serve as the initial point of contact. However, due to limited training in musculoskeletal diseases, low clinical suspicion, and the nonspecific nature of early RA symptoms, delayed diagnosis is common. Often, Referral systems are inefficient, and specialist

care is mostly available in a few urban centers, such as Black Lion Hospital. Because of this, many patients have to live with active disease, joint damage, and disability for months before receiving the care they need. Therefore, improving the knowledge, attitudes, and practices of primary healthcare providers is crucial for earlier recognition, timely referral, and better long-term outcomes for RA patients.

1.2. Statement of the problem

Rheumatoid arthritis (RA) is a long-lasting autoimmune disease that mainly affects the joints, causing pain, swelling, and stiffness, especially in the mornings. If not properly treated, it can lead to permanent joint damage, deformities, and difficulties with everyday activities. RA systemic effect not only is physical deformity, RA often brings fatigue, emotional stress, and social challenges, because patients struggle with unpredictable flare-ups and the ongoing demands of the disease (6).

In many settings RA can often be diagnosed and managed with DMARDs late despite its known about its severity. Studies showed that permanent damage of the joint can occur in the first two years of the disease, and starting DMARDs within the first 12 weeks of symptoms, which is known as the "window of opportunity," offers greatest benefit. Unfortunately, in many low and middle-income countries, including Ethiopia, due to limited access to rheumatology care patients frequently were diagnosed and managed late.

The essential role of PCPs in RA care is well known because they are often the initial contact of this patients and sometimes the only point of contact. However, research shows that many primary care providers can recognize RA symptoms, but they often delayed referring patients to rheumatologists and rarely start DMARD treatment by themselves (8,9). These delays can lead to ongoing disease activity, more pain, joint damage, and long-term disability for those patients.

In Ethiopia, primary care providers in public health facilities do most of the responsibility for managing RA. However, we know very little of there actual knowledge, attitudes, and practices (KAP) when it comes to RA care. Gaining a better understanding of this factors is essential for forming interventions that can improve early diagnosis, timely treatment, reduce disability, and further enhance the quality of life for the people living with RA.

2. Literature Review

Rheumatoid arthritis (RA) is an autoimmune and also a chronic disease that is known by its gradual joint destruction and also systemic inflammation that leads to permanent disability if it's not treated properly and as early as possible. Early medical intervention with DMARDs, including synthetic and biological agents, has become a mainstay of RA management, with the aim to achieve a low disease activity through “treat-to-target strategies”. The Guideline from the American College of Rheumatology (ACR) and the European League Against Rheumatism (EULAR) emphasize early diagnosis and immediate initiation of DMARDs to prevent joint damage and improve long-term outcomes ((10,11).

In the low- and middle-income countries (LMICs), due to the limited access to rheumatologists, PCPs are often the first point of contact for this RA patients. PCPs play a critical role in the early diagnosis, the referral, and management of RA, but many studies reveal widespread gaps in PCP knowledge, attitudes, and practices (KAP) regarding RA care globally, including the U.S., Saudi Arabia, France, Pakistan, and several African countries (12). The Barriers included insufficient rheumatology training during medical education, limited continuing medical education (CME) opportunities, systemic challenges like time constraints, poor collaboration with specialists, and lack of access to diagnostic tools like rheumatoid factor and anti-CCP antibody testing (12,13).

For example, cross-sectional survey of 247 general practitioners in France show that although the majority know their role in diagnosis and comorbidity management, only 6.1% were reported no difficulties managing RA patients. Furthermore, 61.5% had identified causes of treatment non-adherence, and 61.1% expressed willingness to participate in multidisciplinary programs aimed to improving adherence (14). The other study done in Belgium, Flemish GPs expressed low confidence in detecting early RA due to nonspecific symptoms, inconclusive tests, and low incidence in general practice. The Barriers included long referral waits, patients have limited access to rheumatologists, patient non-adherence, and also weak teamwork between providers. These issues shows the need to improve basic diagnostic skills and involve the GPs earlier in RA care (15,16).

Similarly, study from Saudi Arabia showed only 35% of primary care providers to be familiar enough with the diagnostic criteria and treatment guidelines for RA. Those who had been practicing longer generally had better understanding of the use of methotrexate and monitoring

better (17). The study from Pakistan showed less than half of the general practitioners felt confident managing early RA, even though they often see patients with joint pain. Some underestimated how serious RA can be and also assumed that managing it was mainly the specialist's job, which ended up in delaying treatment even more (18).

In sub-Saharan Africa, these problems are even harder to manage because of limited resources and weak health care systems. Another study from Uganda showed formal rheumatology trainings are not given for almost all PCPs, PCPs struggled with poor access to basic diagnostic tests, and were unsure about when or how to refer patients. This contributed to the late diagnoses and patients coming at advanced disease (19). The large study of Nigerian 609 family physicians also showed big gaps in knowledge, although CME programs did help improve their understanding and attitudes. Another report by Aderinto and colleagues noted that many African countries still lack proper rheumatology training programs, have very few specialists, and medicines that are important like DMARDs are often too expensive for most people. Because of this, many patients only seek help when the disease has already become severe (20).

In Ethiopia, most of rheumatology care is still centered at Tikur Anbessa Specialized Hospital in Addis Ababa. Reports show that RA makes up around 18.5% clinic visits there. And many patients seek care only after having symptoms for years, often already showing joint deformities (21). The main medications are Methotrexate and prednisolone. However, there are still big challenges such as patients are diagnosed late, lab and imaging services are limited, and many people delay seeking care (4,22). There's still very little understanding of what Ethiopian PCPs know or do about RA, which makes it harder to plan trainings or improve policies.

Recent evidence shows that training programs for PCPs can help with early RA diagnosis and management. For example, *van der Heijde et al.* found that CME courses that were focused on musculoskeletal exams and guideline-based treatment improved both diagnostic confidence and accuracy (23). In places with fewer resources, creative solutions like mobile diagnostic tools and online learning platforms have also helped PCPs improve their knowledge and skills (24,25). These approaches work well with "treat-to-target" strategy, which encourages early diagnosis, regular check-ins, also adjusting treatment as needed so patients can reach remission or low disease activity and do better in long run (26,27).

Addressing knowledge gap and practice gaps among primary care providers is key to reducing disabilities and lowering healthcare costs over time (28). Therefore, understanding what Ethiopian PCPs currently knows and does, and providing them with tailored, practical training, could make a real difference in RA care across the country.

3. Objective Of the Study

3.1. General Objective

- These study aimed to look at what healthcare providers in fourteen public health facilities in Addis Ababa, Ethiopia, knew, believed, and actually did when managing rheumatoid arthritis (RA).
- It also explored the factors that influenced there knowledge, attitudes, and practices between August and September 2025.

3.2. Specific Objectives

- To assess the level of knowledge of healthcare providers regarding the diagnosis and management of rheumatoid arthritis.
- To evaluate the practice of healthcare providers in the diagnosis and management of rheumatoid arthritis, including treatment approaches.
- To explore the attitude of healthcare providers toward rheumatoid arthritis management.
- To identify barriers affecting optimal rheumatoid arthritis diagnosis and treatment in public health facilities.
- To determine socio-demographic and professional factors associated with the knowledge, attitude, and practice of RA management among healthcare providers.

4. Methodology

4.1. Study area and study period

Study area:

This descriptive, multi-centered, cross-sectional health facility-based study was conducted in Addis Ababa, the capital and largest city of Ethiopia. As of 2025, Addis Ababa has an estimated population of approximately 5.96 million people. The city is divided into 11 administrative sub-

cities, each comprising multiple woredas (districts) . Within these sub-cities, there are a total of 97 public health centers and 14 public hospitals (29–31).

The study involved fourteen selected public health facilities across Addis Ababa, including ten health centers and four public hospitals. The health centers chosen are from two subcities and, namely, Lideta Health Center, Telehaymanot Health Center, Beletshachew Health Center, Hidase Health Center, and Abinet Health Center from Lideta Subcity and from Akaki Kality Sub city; Saris Health Center, Kality Health Center, Gelan Health Center, Serte Health Center, and Akaki Health Center. Located in both urban and peri-urban areas, these centers give a good perspective on how primary healthcare is actually provided.

This study included four hospitals: Black Lion (Tikur Anbesa) Specialized Hospital, Zewditu Memorial Hospital, ALERT Hospital, and Tirunesh Beijing General Hospital. They were chosen because of the areas they serve, the types of services they provide, and the variety of healthcare professionals, including family physicians.

Tikur Anbesa Specialized Hospital (TASH) is one of the largest government hospitals in Ethiopia. It offers many specialized medical services including a rheumatology clinic that cares for patients with autoimmune and musculoskeletal disorders like RA.

Rheumatology services currently offered only at TASH. These makes it clear how primary healthcare providers manage conditions like RA when specialized services are not available in the primary care level.

Study Period:

The study was done and the data was collected between **August 1 and September 30, 2025**.

4.2. Study Design

For achieving the studies objective descriptive and analytical cross-sectional study were used.

4.3. Selection of study population

4.3.1. Source Population

The frontline healthcare providers who was working in the selected public health facilities, including:

- Nurses
- Health Officers (HOs)
- General Practitioners (GPs)
- Family Medicine Residents (FMRs)
- Internal Medicine Residents (IMRs)
- Family Physicians (FPs)

This healthcare providers were classified as primary healthcare providers. Which means they are frontline staff who offered first-contact, continuous, and coordinated care, especially at the outpatient or primary care level.

4.3.2. Sampling Frame

It Consisted of the **list of all eligible healthcare providers** from each of facilities, classified by:

1. Facility type:
 - Tertiary teaching hospital: TASH
 - General hospitals: Zewditu, ALERT, Beijing
 - Health centers: all other sub-city health centers
2. **Professional category:** GP, FMR, IMR, FP, HO, and Nurse

Proportional allocation was applied to determine the number of participants from each facility and profession.

4.3.3. Study Population

The study population included the healthcare providers randomly selected from the sampling frame according to proportional allocation. A total of **214 participants** were recruited from the source population of 394 eligible PHCPs across the 14 facilities.

4.3.4. Study Subject

The study subjects were **individual healthcare providers** (Nurses, HOs, GPs, FMRs, IMRs, and FPs) who were actively involved in **direct patient care at outpatient or triage departments** during the study period.

4.3.5. Study Unit

The study unit was **an individual healthcare provider** who met the inclusion criteria and consented to participate in the study.

4.4. Eligibility Criteria

4.4.1. Inclusion Criteria

Participants were included if they met the following:

- Nurses and Health Officers currently working in adult outpatient departments (OPDs) of the selected public health facilities.
- General Practitioners (GPs) providing care in outpatient or triage units at the selected hospitals and health centres.
- Family Medicine Residents and Internal Medicine Residents actively involved in frontline patient management, particularly in outpatient or triage departments.
- Family Physicians currently practicing at the selected health facilities. Willing and able to provide informed consent to participate in the study.

4.4.2. Exclusion Criteria

Participants were excluded if they met any of the following:

- Specialist physicians (e.g., rheumatologists, internists).
- Residents not involved in direct outpatient or triage patient care.
- Healthcare providers who were on leave, unavailable, or absent during the study period.
- Individuals who declined participation or did not provide informed consent.
- Participants who provided incomplete responses to the study questionnaire.

4.5. Sample Size and Sampling Technique

Total Population

The total number of eligible PCPs across the selected facilities in Addis Ababa is 394, distributed as follows:

Table 1: The total number of eligible PCPs

Facility	GP	FMR	IMR	FP	HO	Nurse	Total
TASH	5	22	113	9*	0	0	149
Zewditu Hospital	8	0	0	0	0	0	8
ALERT Hospital	10	0	0	2	0	0	12
Beijing Hospital	10	0	0	3	0	0	13
Beletshachew HC	6	0	0	0	6	0	12
THHC	4	0	0	0	6	4	14
Lideta HC	6	0	0	0	6	4	16
Hidasie HC	10	0	0	0	10	8	28
Abinet HC	10	0	0	0	10	10	30
Saris HC	11	0	0	0	8	6	25
Kality HC	8	0	0	0	10	6	24
Gelan HC	6	0	0	0	6	4	16
Serte HC	5	0	0	0	7	7	19
Akaki HC	10	0	0	0	12	6	28
Total	109	22	113	14	81	55	394

*Includes senior Family Physicians at TASH who supervise FM residents.

4.5.1. Sample size determination:

The sample size(n) is calculated using Cochran's formula (a single population formula). By considering marginal error(d) 5, the confidence interval of 95% (Z=1.96) and since there is no

similar study done in our setup, I considered the 50% of proportion, and the calculated sample size is :

$$n = \frac{z^2 \times p(1-p)}{d^2}$$

$$d^2$$

Where

n = minimum sample size for a statistically significant survey

z = normal deviant at a portion of 95 % confidence and, which is 1.96

d = marginal Error taken as 5%

p = expected proportion of the population with R.A Knowledge is taken as 50%

$$q = 1-p$$

With this formula sample size will be **384**, the sample size is adjusted using the finite population correction (FPC) formula: $nf = \frac{n}{1 + \frac{n-1}{N}}$

Assuming the estimated total population (N) is **394**: $nf = \frac{384}{1 + \frac{384-1}{394}} \sim 195$

To account for a 10% non-response rate:

Final sample size = $195 + (10\% \text{ of } 195) = 195 + 19.5 = \mathbf{214}$

Thus, **214 participants** were recruited for the study.

4.5.2. Sampling Technique

Proportion:

A **proportionate stratified random sampling** technique was used to ensure representation across **facility types** and **professions**. The population was first stratified by:

1. Facility type:
 - Tertiary teaching hospital: TASH
 - General hospitals: Zewditu, ALERT, Beijing
 - Health centres: All other sub-city health centres
2. Profession: GP, FMR, IMR, FP, HO, and Nurse

Step 1: Sample allocation by facility type (n = 214)

Table 2: Sample allocation by facility type

Facility type	Population (N)	Proportion	Sample n _i
Tertiary teaching hospital	149	0.378	81
General hospitals	33	0.084	18
Health centres	212	0.538	115
Total	394	1.0	214

Step 2: Sample allocation by profession (n = 214)

Table 3: Sample allocation by profession

Profession	Population (N)	Proportion	Sample n _i
GP	109	0.277	59
FMR	22	0.056	12
IMR	113	0.287	61
FP	14	0.036	8
HO	81	0.206	44

Profession	Population (N)	Proportion	Sample n_i
Nurse	55	0.140	30
Total	394	1.0	214

Step 3: Participant Selection

Within each stratum, participants were randomly selected from eligible staff lists using systematic random sampling. At TASH, senior Family Physicians supervising residents were included in the FP stratum, even if not providing regular outpatient care.

4.6. Data Collection Procedure

From **August 1 to September 30, 2025**, the principal investigator collected data by visiting each health facility in person. The questionnaire was supplemented digitally by using the mobile application known as Kobo Collect. The data collection was followed the following steps:

- How Participant recruited:
 - The eligible PCPs were chosen based on the above list
 - The purpose of the study were explained and informed consent taken priorly.
- How the Questionnaire Was Administered:
 - The questionnaire link from Kobo Collect shared to participants on their mobile.
 - The Participants completed the questionnaire on-site during breaks or free time.
- How Data Quality Was Checked:
 - The submitted questionnaires were checked on right away to make sure answers were complete and consistent.
 - Any missing or unclear response were clarified with participants.

4.6.1. Data Collection Instrument

Data was collected using a structured, the self-administered questionnaire taken from GEPRAI (General Practitioners in Rheumatoid Arthritis) survey developed in France. The original questionnaire evaluate general practitioners' knowledge, attitudes, and practices of RA management and it's multidisciplinary care (14).

For these study, some question from the original GEPR-I survey were taken that suit the Ethiopian primary care setting. Furthermore, few questions was added to look at local practices, available resources, and challenges in managing RA. Separate pretest was not done, since the GEPR-I survey had already been tested in previous study.

The final questionnaire can be found on: <https://ee.kobotoolbox.org/x/MhqDLstr>.

The questionnaire contained of three main sections including:

- **Section I:** Contained 6 question about participants' demographic characteristic and clinical practice.
- **Section II:** Included 28 question assessing participants' knowledge and management practices in RA. self-rating questions for PCPs was also included in these section.
- **Section III:** comprised of 7 questions about community hospital link and teamwork in RA management.

Quality control:

- Missing and inconsistent data were excluded at the time of collection of data personally by the investigator.

Scoring system:

- Knowledge, attitudes and practices were scored individually under each domain, higher scores indicating better knowledge, positive attitude and good practice.
- Adequacy cut-off points were determined according to previous studies and expert opinion, similar to the Eis et al's work methodology (32).

4.7. Study Variables

4.7.1. Outcome Variables

The principal outcomes of the study were knowledge, attitudes, and practices (KAP) of health care providers in RA management: Categorized as:

- **Knowledge:**
 - Good ($\geq 75\%$ correct answers), Moderate (50–74%), and Poor ($< 50\%$)
- **Attitude:**

- Favorable ($\geq 75\%$), Neutral (50–74%), and Unfavorable ($< 50\%$)
- **Practice:**
 - Good ($\geq 75\%$ correct), Fair (50–74%), and Poor ($< 50\%$)

4.7.2. Predictor Variables

Factors potentially associated with KAP included:

- Sociodemographic characteristics: Age, sex
- **Professional characteristics:** Educational level, years of clinical practice
- **Training and experience:** Prior RA training, number of RA patients seen, CME participation

4.8. Operational Definitions

- **Rheumatoid Arthritis (RA):** is an autoimmune, inflammatory arthritis which affect three or more joints, with positive rheumatoid factor (RF) and/or ACPA/anti-CCP, elevated CRP and/or ESR, and lasting more than six weeks.
- **Primary Care Providers (PCPs):** are defined as healthcare professionals in public health facilities that are first-contact and gives comprehensive care. It Includes General Practitioners (GPs), Family Medicine Residents (FMRs), Internal Medicine Residents (IMRs), and Family Physicians (Seniors).
- **Knowledge:** is the level of understanding of RA's clinical features, diagnostic criteria, and treatment approach. Scoring:
 - **Attitude:** is the belief and perceptions toward RA diagnosis and treatment.
 - **Practice:** is the actual clinical application of RA knowledge in the patient care.
 - **Evidence-based treatment:** is how well PCPs use available and updated guidelines in there actual practice.

4.9. Data Quality Control

The questionnaire were taken and contextualized from **The GEPRA-I survey** (BMC Primary Care, 2022; DOI: 10.1186/s12875-022-01744-5)

To ensure high data quality:

- I, the principal investigator, reviewed the study objectives, ethical requirements, and how to use the KoboCollect platform properly

- I identified and clarified any missing or unclear responses during data collection. Also, the features like skip logic, mandatory fields, and real-time validation in KoboCollect helped reduce errors.
- All collected data was stored with access restricted maintaining the confidentiality.

4.10. Data Processing and Analysis

SPSS version 27.0 was used for statistical analysis

Descriptive analysis: the demographic characteristics and professional characteristics (age, sex, educational level, years of clinical practice, prior RA training, and the number of RA patients managed) of the study participant were summarized using frequency, percentage, mean, standard deviation, median, and interquartile range.

Outcome variables: KAP scores were obtained according to the scoring system described in Section 4.7.

Multiple regression analysis was performed to explore how the factor such as age, sex, educational level, years of clinical practice, prior RA training, and the number of RA patients managed was associated with participants' knowledge, attitude, and practice (KAP) levels

Statistical significance: A p-value < 0.05 was considered statistically significant.

Data presentation: Findings were summarized using tables, charts, and graphs as appropriate to make the result clear.

4.11. Ethical Clearance

I started the study by obtaining ethical clearance from the Research and Publication Committee of the Department of Family Medicine at Addis Ababa University. Following these, a clearance letter was given by the Addis Ababa City Public Health Research and Emergency Management Directorate to all sub-city health departments, and then to the specific health centers involved in the study. For the four public hospitals included, approval was obtained from each hospital's Research Office before data collection began. All participants provided written informed consent, and their confidentiality was ensured.

4.12. Dissemination of Results

The study finding will be presented during the thesis defense at TASH, Addis Ababa University. The paper will be submitted to the TASH-AAU Research and Publication Office. In addition, the results will be shared with Addis Ababa City Public Health Research and Emergency Management Directorate as per their request, and efforts will be made to publish in an academic journal.

5. Result

5.1. Response Rate

A total of **214 healthcare provider** were invited to participate in the study. Of these, **210 completed the questionnaires**, giving in a **response rate of 98.1%**.

The **four non-respondents** was **senior Family Medicine Specialists at Tikur Anbessa Specialized Hospital (TASH)**. Their participation could not be obtained despite attempts to include them; however, their absence did not noticeably affect the overall representativeness of the study samples.

5.2. Socio-Demographic Characteristics of Participants

A total of 210 healthcare providers participated in this study, with the above-mentioned response rate of 98.1%. The majority were **Internal Medicine Residents (29.0%) and General Practitioners (28.1%)**, followed by Health Officers (20.0%), Nurses (14.3%), Family Medicine Residents (6.7%), and Family Physicians (4.3%). Regarding year since graduation, most participants had graduated in the past ten years (73.8%) and report high patient volumes, with over half (55.2%) attending to greater than 200 patients per week.

On the other hand, the workplace distribution is determined as 55.2% worked in health centers, 36.2% in tertiary hospitals, and 8.6% in general hospitals. In terms of exposure to rheumatoid arthritis (RA), most participants have managed **fewer than 15 RA patients** in the previous year, with follow-up intervals from every 3 to 12 months.

Table 4 Socio-Demographic Characteristics of Participants (N = 210)

Variable	Category	Frequency	Percent (%)	Cumulative Percent (%)
Age group (years)	<25	4	1.9	1.9
	25–29	59	28.1	30.0
	30–34	73	34.8	64.8
	35–39	57	27.1	91.9
	40–44	14	6.7	98.6
	45+	3	1.4	100.0
Gender	Female	86	41.0	41.0
	Male	124	59.0	100.0
Years since graduation	<5	72	34.3	34.3
	5–10	83	39.5	73.8
	11–20	46	21.9	95.7
	21+	9	4.3	100.0
Professional title	Family Medicine Resident	12	5.7	5.7
	Family Medicine Specialist	4	1.9	7.6
	General Practitioner	59	28.1	35.7

Variable	Category	Frequency	Percent (%)	Cumulative Percent (%)
	Health Officer	44	21.0	56.7
	Internal Medicine Resident	61	29.0	85.7
	Nurse	30	14.3	100.0

Source: Own Survey

Table 5: Workload and Health Facility Characteristics

Variable	Category	Frequency	Percent (%)	Cumulative Percent (%)
Patients seen per week	<50	20	9.5	9.5
	50–100	40	19.0	28.5
	101–200	34	16.2	44.8
	>200	116	55.2	100.0
Type of health facility	General hospital	18	8.6	8.6
	Health centre	116	55.2	63.8
	Tertiary teaching hospital	76	36.2	100.0

Source: Own Survey

Table 6: Rheumatoid Arthritis Exposure and Difficulties

Variable	Category	Frequency	Percent (%)	Cumulative Percent (%)
RA patients managed in past year	No patient	18	8.6	8.6
	Less than 5	67	31.9	40.5
	Between 5 and 15	64	30.5	71.0
	Over 15	61	29.0	100.0
Frequency of receiving RA patients	Less than every 12 months	11	5.2	5.2
	More than every 12 months	20	9.5	14.7
	Every 12 months	54	25.7	40.4
	Every 3–6 months	54	25.7	66.1
	Less than every 3 months	21	10.0	76.1
	More than every 3 months	50	23.8	100.0
Difficulty obtaining expert opinion on RA	No	52	24.8	24.8
	Yes	158	75.2	100.0
Difficulty in managing RA patients	No particular difficulty	135	64.3	64.3

Variable	Category	Frequency	Percent (%)	Cumulative Percent (%)
	Some difficulties	75	35.7	100.0

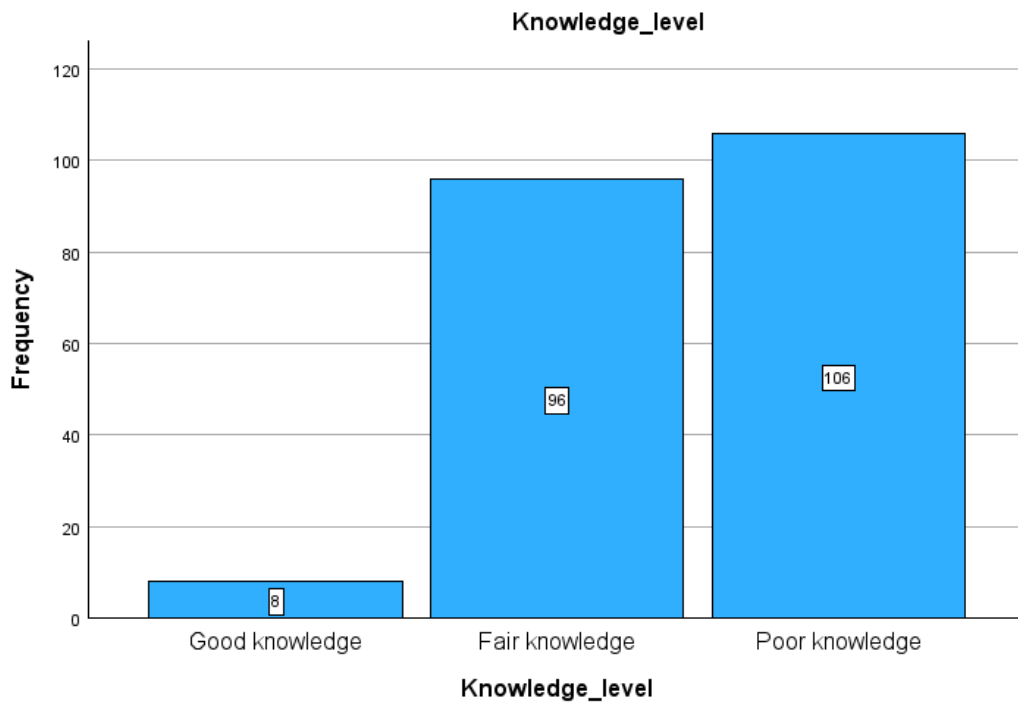
Source: Own Study

5.3. Knowledge Level on Rheumatoid Arthritis (RA)

From the 210 healthcare providers that participated in the study, **only 3.8% showed good knowledge** of RA, while 45.7% had fair knowledge and 50.5% had poor knowledge (Figure 1). Which means that more than half of the participants had a limited understanding of RA diagnosis and management, pointing to a notable knowledge gap among healthcare providers in Addis Ababa's public health facilities.

Looking at specific knowledge areas, 64.3% of participants correctly recognized that the distal interphalangeal (DIP) joint is not typically affected in RA, and 59.0% knew that at least six weeks of inflammatory signs are required for diagnosis. In addition, 55.2% correctly identified that all major laboratory markers, Anti-ACPA, Anti-CCP, CRP, and ESR, are included in the EULAR/ACR 2010 classification criteria, and most respondents accurately selected one joints as the minimum needed for classification.

Figure 1. Distribution of Knowledge Levels among Healthcare Providers (N = 210)



5.3.1. Factors Associated with Knowledge

Knowledge level show significant associations with **professional title, number of patients seen per week, type of health facility, number of RA patients managed in the past year, and frequency of receiving RA patients** ($p < 0.001$ for all). Professional title was a strong predictor: Internal Medicine residents (AOR = 11.7, 95% CI: 1.8–76.2, $p = 0.01$) and Family Medicine residents (AOR = 30.0, 95% CI: 1.8–1190.3, $p = 0.03$) were more likely to demonstrate good knowledge compared to nurses. As well as those managing ≥ 200 patients per week (AOR = 100.9, 95% CI: 11.2–908.1, $p < 0.001$) and those having greater exposure to RA cases, demonstrated better knowledge levels. Facility type was important, as those working in tertiary teaching hospitals had higher odds (AOR = 2.44, 95% CI: 2.1–65.9, $p = 0.019$), while health center staff had lower odds (AOR = 0.25, 95% CI: 0.08–0.80, $p = 0.02$). RA case exposure also mattered: providers who had seen fewer than 5 RA patients in the past year were less likely to have good knowledge (AOR = 0.75, $p = 0.028$), whereas those seeing 5–15 patients had higher odds (AOR = 2.10, $p = 0.048$). Frequency of RA encounters was significant, with those receiving patients every 3–6 months more likely to have good knowledge (AOR = 1.76, $p = 0.039$). Finally, place of rheumatology follow-up influenced knowledge, with providers whose patients were mostly followed in hospitals showing lower odds (AOR = 0.074, $p = 0.042$).

Table 7: Professional title and Knowledge level Crosstabulation (Logistic Regression)

Variable	Category	AOR	95% CI	p-value	Significance
Professional title	Internal Medicine resident	11.72	1.80–76.21	0.010	Significant
	Family Medicine resident	30.03	1.76–1190.3	0.030	Significant
Patients seen per week	101–200 vs <50	40.91	4.24–394.8	0.001	Highly significant
	≥200 vs <50	100.9	11.21–908.1	<0.001	Highly significant
Facility type	Health center vs hospital	0.25	0.08–0.80	0.020	Significant
	Tertiary teaching hospital	2.44	2.09–65.95	0.019	Significant
RA patients received in past year	<5 vs none	0.75	0.05–0.97	0.028	Significant
	5–15 vs none	2.10	1.10–35.62	0.048	Significant
Frequency of RA encounters	Every 3–6 months vs <3 months	1.76	1.56–5.43	0.039	Significant
Place of rheumatology follow-up	Mostly hospital vs private care	0.07	0.006–0.92	0.042	Significant

Figure 2. Professional title with Knowledge level Crosstabulation

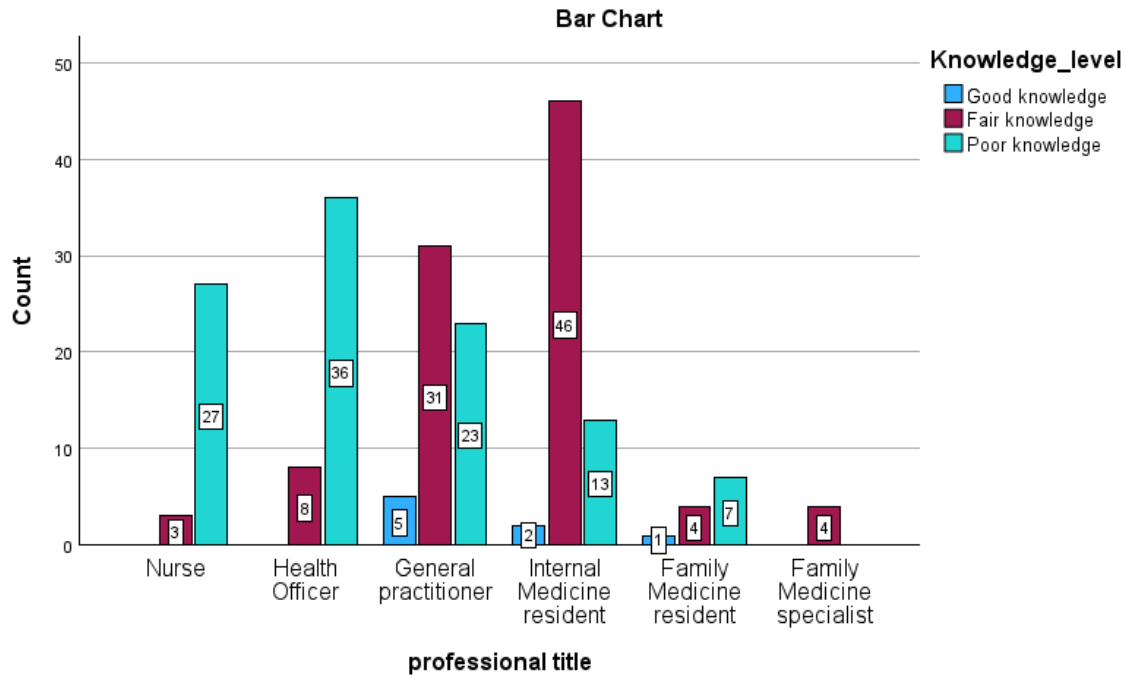
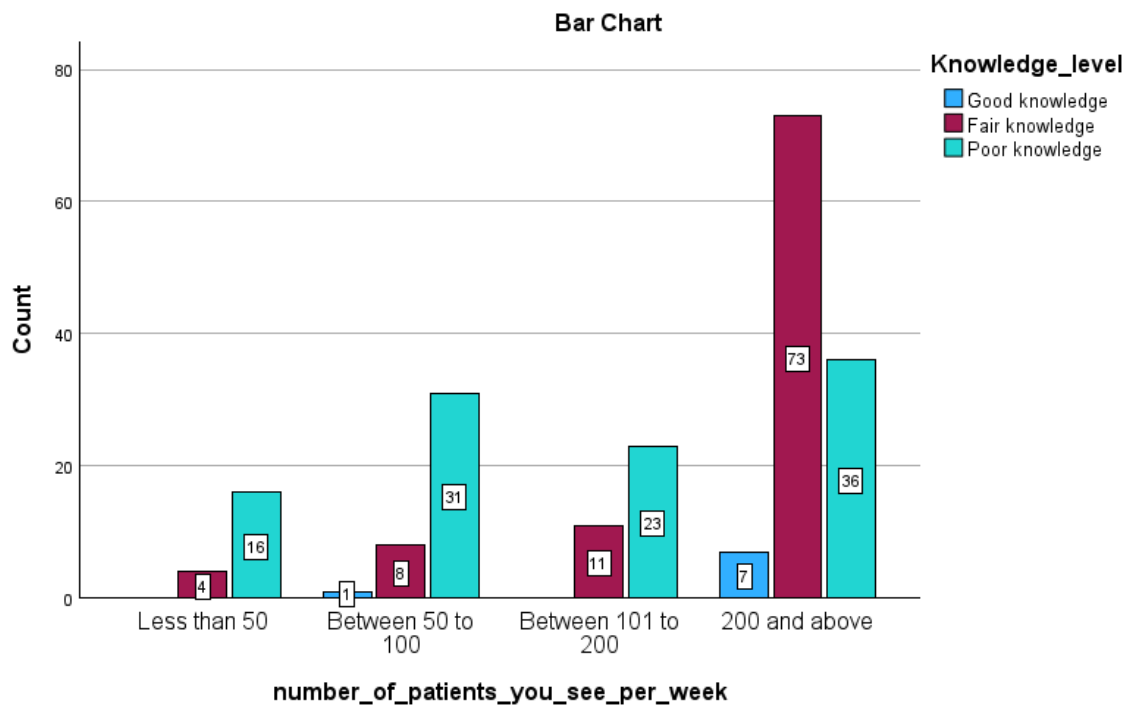


Figure 3. Number of patients you see per week with the Knowledge level Crosstabulation

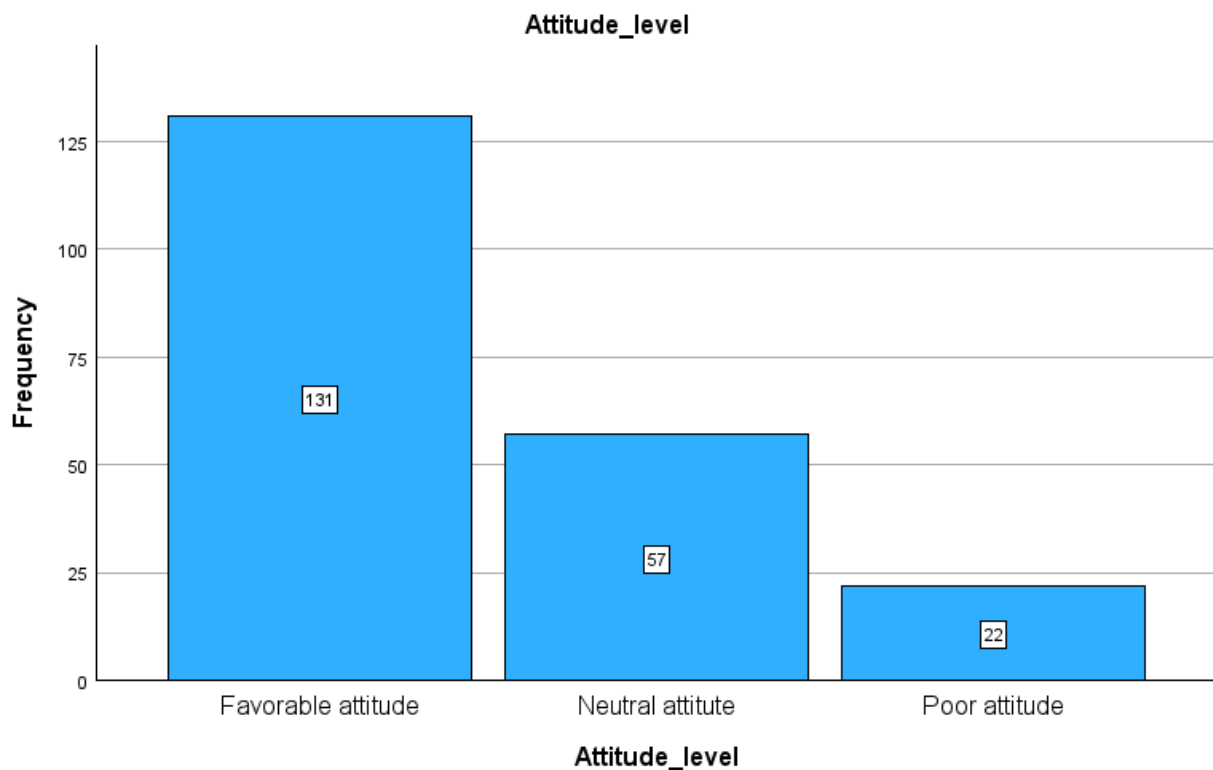


5.4. Attitude Level on Rheumatoid Arthritis (RA)

62.4% demonstrated a favorable attitude toward the RA management, while 27.1% were neutral and 10.5% exhibited a poor attitude. The healthcare provider perceived their role in RA care as significant, with 61.9% considering themselves extremely important in diagnosing RA and 63.8% supporting patient with treatment management. Participants also recognized the importance of monitoring the disease activity, treatment effectiveness, treatment tolerance, and comorbidities.

Despite of this positive views, fewer than half of the respondents felt adequately prepared to manage early RA symptom. However, most showed a strong willingness to participate in a team work.

Figure 4. Attitude Level



5.4.1. Factors Associated with Attitude

Factors associated with favorable attitude towards RA diagnosis and management were identified through multivariate logistic regression. Professional role was significant: General Practitioners (AOR = 1.75, 95% CI: 1.18–7.99, $p = 0.036$), Internal Medicine residents

(AOR = 4.17, 95% CI: 3.00–20.98, $p = 0.045$), and Family Medicine residents (AOR = 1.35, 95% CI: 1.18–7.99, $p = 0.049$) were more likely to demonstrate favorable attitudes compared to nurses. Years since graduation also showed strong associations, with providers who graduated 5–10 years earlier (AOR = 7.01, 95% CI: 2.78–17.30, $p = 0.043$) and 11–20 years earlier (AOR = 3.32, 95% CI: 3.06–45.44, $p = 0.031$) more likely to have favorable attitudes, while those with ≥ 21 years since graduation had reduced odds (AOR = 0.90, 95% CI: 0.017–0.935, $p = 0.048$). Patient volume was another important predictor: seeing 50–100 patients per week (AOR = 17.64, 95% CI: 1.50–207.63, $p = 0.023$), 101–200 patients (AOR = 24.96, 95% CI: 1.40–446.1, $p = 0.029$), and ≥ 200 patients (AOR = 44.29, 95% CI: 3.86–508.12, $p = 0.002$) were significantly associated with favorable attitudes. Frequency of RA encounters mattered as well, with providers receiving patients every 3–6 months (AOR = 1.19, 95% CI: 1.01–7.37, $p = 0.037$) and every 6–12 months (AOR = 1.69, 95% CI: 1.05–61.54, $p = 0.047$) showing higher odds of favorable attitudes. Finally, difficulty in obtaining expert opinion was negatively associated, with those reporting challenges less likely to have favorable attitudes (AOR = 0.68, 95% CI: 0.33–0.76, $p = 0.048$).

Table 8: Summary of Factors Associated with Attitude

Variable	Category	AOR	95% CI	p-value	Significance
Professional title	General Practitioner	1.75	1.18–7.99	0.036	Significant
	Internal Medicine resident	4.17	3.00–20.98	0.045	Significant
	Family Medicine resident	1.35	1.18–7.99	0.049	Significant
Years since graduation	5–10 years vs <5	7.01	2.78–17.30	0.043	Significant
	11–20 years vs <5	3.32	3.06–45.44	0.031	Significant
	≥ 21 years vs <5	0.90	0.017–0.935	0.048	Significant (lower)
Patients per week	50–100 vs <50	17.64	1.50–207.63	0.023	Significant
	101–200 vs <50	24.96	1.40–446.1	0.029	Significant

Variable	Category	AOR	95% CI	p-value	Significance
	≥ 200 vs <50	44.29	3.86–508.12	0.002	Highly significant
Frequency of RA cases	Every 3–6 months vs <3 months	1.19	1.01–7.37	0.037	Significant
	Every 6–12 months vs <3 months	1.69	1.05–61.54	0.047	Significant
Expert opinion access	Difficulty obtaining specialist	0.68	0.33–0.76	0.048	Significant (lower)

Figure 5: Attitude Level and Age Crosstabulation

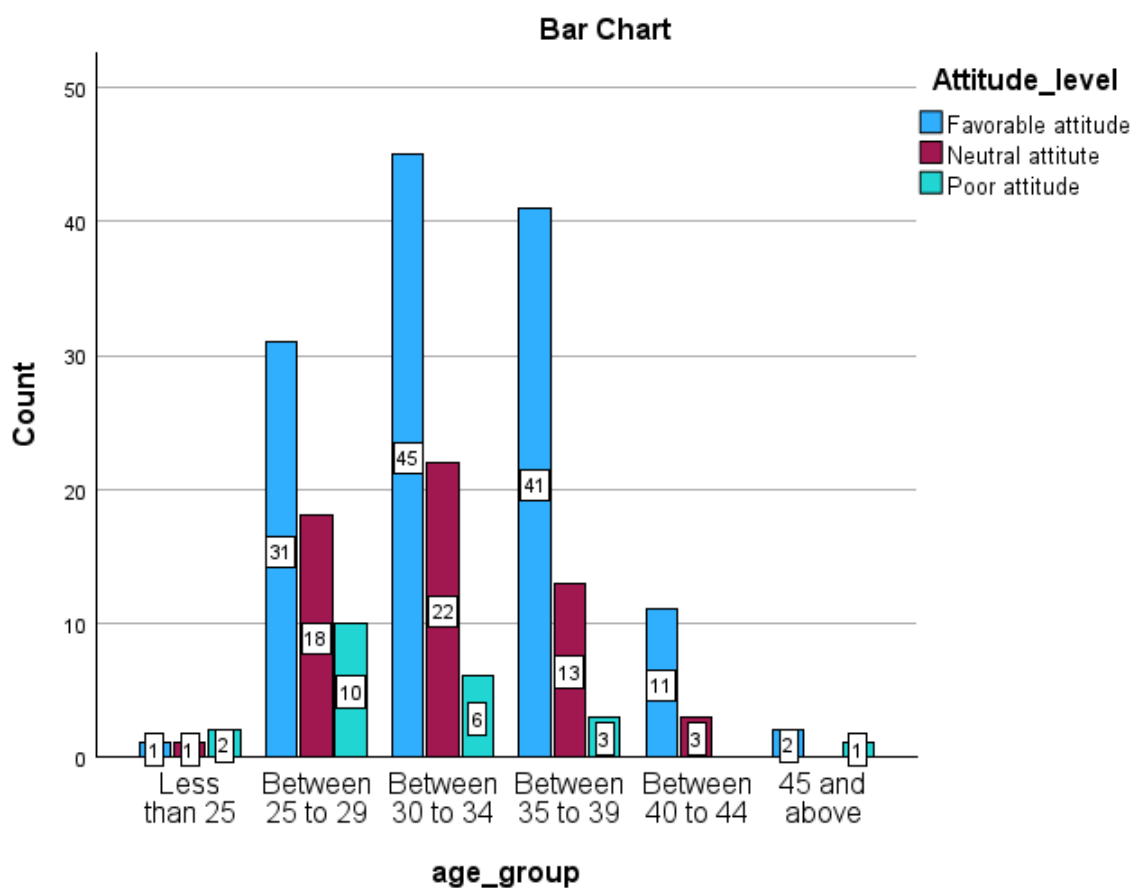


Table 9: Comparison of number of patients seen per week with Attitude level

Count

		Attitude level			
		Favorable attitude	Neutral attitude	Poor attitude	Total
number_of_patients_you_	Less than 50	2	9	9	20
see_per_week	Between 50 to 100	15	19	6	40
	Between 101 to 200	21	11	2	34
	200 and above	93	18	5	116
Total		131	57	22	210

Chi-Square Tests

	Value	Df	Asymptotic Significance (2- sided)
Pearson Chi-Square	61.658 ^a	6	<.001
Likelihood Ratio	57.116	6	<.001
Linear-by-Linear Association	52.084	1	<.001
N of Valid Cases	210		

5.5. Practice on Rheumatoid Arthritis Management

The result of most of the participants, which is **88.1% demonstrated good clinical practices** in managing RA, while 9.0% fair, and 2.9% poor practice. Conventional DMARDs started soon after diagnosing in about 68%, 28.6% waited three months to start the medication, and 2.9% keep the initial dose without change. Difficulty of access to a rheumatologist was reported in 75.2%. 80.5 % of RA patients have there regular follow up mainly in hospital. For pain management, 53.9% used NSAIDs and COX-2 inhibitors both, while 29.0% used only one of the type. Non pharmacologic methods was less common: of this 45.7% knows the role of physiotherapy, 35.7% recommend exercises, and 6.7% advised on diet. Overall, drug treatments generally follows guidelines, but **non-pharmacologic approaches are underused**.

Table 10: RA practice level

Practice level	Frequency	Percent (%)
Good	185	88.1
Fair	19	9.0
Poor	6	2.9

5.5.1. Factors Associated with Practice

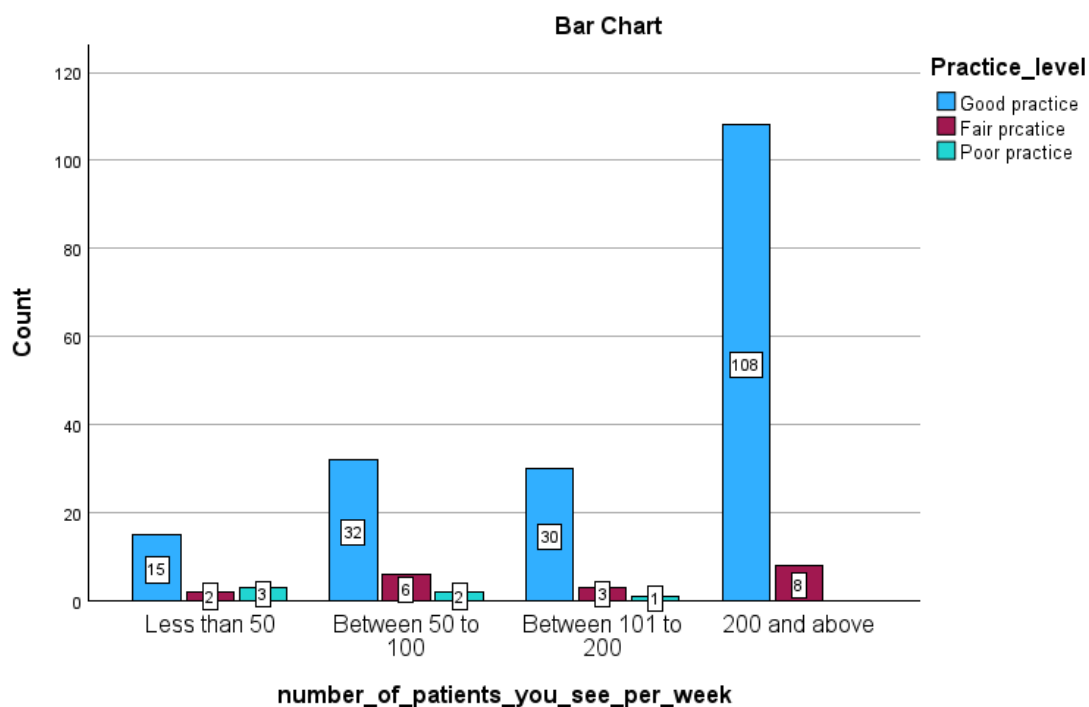
Good practice in RA diagnosis and management were identified through multivariate logistic regression analysis. Age was a significant predictor: providers aged 25–29 years (AOR = 4.78, 95% CI: 1.23–101.52, $p = 0.032$), 30–34 years (AOR = 2.81, 95% CI: 2.42–27.77, $p = 0.045$), and 35–39 years (AOR = 1.27, 95% CI: 1.27–50.37, $p = 0.048$) were more likely to demonstrate good practice compared to those under 25 years. Patient load also showed a strong effect, with providers seeing ≥ 200 patients per week having higher odds of good practice (AOR = 1.03, 95% CI: 1.02–16.05, $p = 0.047$). Frequency of RA encounters was important, as those receiving patients every 3–6 months were more likely to report good practice (AOR = 1.80, 95% CI: 1.56–12.02, $p = 0.043$). Finally, difficulty in obtaining expert opinion was positively associated, with

providers reporting challenges being significantly more likely to demonstrate good practice (AOR = 7.39, 95% CI: 1.77–30.86, $p = 0.006$).

Table 11: Summary of factors associated with Practice level

Variable	Category	AOR	95% CI	p-value	Significance
Age group	25–29 vs <25	4.78	1.23–101.52	0.032	Significant
	30–34 vs <25	2.81	2.42–27.77	0.045	Significant
	35–39 vs <25	1.27	1.27–50.37	0.048	Significant
Patients per week	≥200 vs <50	1.03	1.02–16.05	0.047	Significant
Frequency of RA cases	Every 3–6 months vs <3 months	1.80	1.56–12.02	0.043	Significant
Expert opinion access	Difficulty obtaining specialist	7.39	1.77–30.86	0.006	Significant

Figure 6: Number of Patients You see Per Week * Practice Level Crosstabulation



5.6. Community–Hospital and Interprofessional Collaboration

Most participants reported the coordination in RA follow-up to be poor: **89.5% noted weak communication** between health professionals, and **85.7% got limited specialist feedback**.

Despite this, they showed strong support for collaboration, about 80% were willing to join programs with hospitals and pharmacists, 87% saw secure email as helpful, 95% wanted training in motivational interviewing, and 96% were willing to spend extra time on adherence if properly trained and compensated. Overall, while current coordination is limited, primary care providers are motivated to take part in integrated care and strengthen teamwork to improve RA outcomes.

6. Discussion

From this study, the knowledge, attitudes, and practices of primary care providers (PCPs) regarding RA management in Addis Ababa, Ethiopia examined and analyzed. While attitudes were generally positive and clinical practices mostly good, significant gaps in knowledge were observed. Similar trends was reported in other low- and middle-income countries, where PCPs often know less about RA but still follow reasonable practice. The Nigeria family physicians demonstrated limited understanding of RA diagnostic criteria and treatment guidelines, though targeted CME interventions was effective in improving knowledge (13,23). Similarly, studies in

Pakistan and Saudi Arabia reported insufficient knowledge among PCPs, with experience and clinical exposure being key factors for better knowledge (33).

Knowledge were higher among providers with more clinical experiences, higher patient volumes, and specialized trainings. Younger clinician or those with less exposure had lower knowledge. Despite knowledge gaps, most PCPs show good practice, such as early DMARD use and appropriate pain management, suggesting that practical experience can compensate for limited formal knowledge.

Most of the participant displayed favorable attitudes toward RA care, seeing themselves as essential in diagnosis, treatment monitoring, and patient support. This aligns with the finding from France, where general practitioners recognized their role in patient management and expressed willingness to engage in multidisciplinary programs (14). In Ethiopia, positive attitudes were associated with recent medical training, higher patient exposure, and active involvement despite the limited specialist supports. Limited access to expert consultations were identified as a barrier that could negatively influence attitudes, consistent with studies from sub-Saharan Africa where systemic challenges affect providers' confidence (34).

Although most French GPs reported counseling patients on lifestyle modifications, including exercise and diet, our results indicate that such non-pharmacologic interventions remain less practiced in Ethiopia. This likely reflects resources and training constraints common in LMIC settings (14).

The study also identified significant gaps in coordination and feedback between PCPs and specialists, consistent with reports from France and Belgium, where long referral times and limited interprofessional collaboration slows down effective RA management (9,14,15). Despite this, Ethiopian PCPs expressed strong interest in participating in multidisciplinary initiatives, adopting secure communication systems, and supporting adherence programs. This suggests a high readiness among PCPs to participate in integrated care, which have been shown to improve patient outcomes in both high- and low-resource settings (8,36).

7. Conclusion

This study found a significant gap in knowledge of rheumatoid arthritis among primary care providers in Addis Ababa, with more than half of the participants showing limited understanding

of diagnosis and management. Despite of that, attitudes was positive, and clinical practices were generally good, reflecting professional commitments and reliances on practical experience.

Knowledge, attitudes, and practices was influenced by specialization, patient volume, frequency of RA follow-up, and access to specialist advice. Providers were highly motivated to participate in collaborating community and hospital, multidisciplinary programs, and trainings to improve patient care.

This findings highlight the need for targeted education, continuous professional development, and stronger interprofessional communication with collaboration to bridging knowledge gaps, align practice with guidelines, and enhance RA care in resource-limited settings like Ethiopia.

8. Recommendations

Based in our findings, several steps could improve the care we give for RA patients in Addis Ababa on different levels. Top on the list we can Start from the Ministry of Health and the Addis Ababa Health Bureau in which easy-to-use guides and digital tools for frontline clinicians, and expanding continuous professional development through workshops, online courses, and practical case discussions could be practiced. The other is the health facilities that should set up clear referral pathways, create a team of multidisciplinary care, and encourage mentorship and bedside teaching to support junior staffs.

Hospitals and academic institutions like TASH can give more credits to rheumatology in health professional training, support research and knowledge sharing. Provider themselves should engage in ongoing learning, recognizes RA early, refers patients promptly, and educate patients on adherence and lifestyle measure. For Future researchers focus should be on larger multicenter studies, and evaluate the impact of training and tele-rheumatology programs on knowledge and patient outcomes.

Strengths and Limitations of the Study

Strengths

- ✓ The study achieved a high response rate of 98.1%.

- ✓ The study included Health Officers, Nurses, doctors, and residents from variety of health facilities providing a more accurate and generalizable picture of RA management across Addis Ababa's primary care system.
- ✓ Comprehensive Assessment of KAP level of PCPs.

Limitations

1. **Being cross-sectional:** the study cannot establish causal relationships between KAP and associated factors.
2. **Inclusion of Health Officers and Nurses:** HOs and Nurses often lack formal rheumatology training, which may lower overall measured knowledge compared to studies including only physicians.
3. **Self-Reported Practice:** Self-reported practices may be biased, leading to overestimation of good practice.
4. **Potential Selection Bias:** Although the response rate was high, the non-participation of some senior specialists may slightly affect representativeness in that professional category.
5. **Urban-only study setting:** Conducting the study exclusively in Addis Ababa limits generalizability to rural areas and the wider national context.
6. **Adapted questionnaire:** Although adapted from validated tools, the questionnaire may not have fully captured local practice patterns and contextual challenges.

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10. Annex

Annex 1: Adapted RA KAP Questionnaire (used in this study)

Structured Questioner for Data collection

RA Knowledge Attitude Practice Survey

SECTION 1: Demographics & Practice Characteristics

1. What is your gender?

☐ Male

☐ Female

2. What is your age group?

☐ <25

☐ 25–29

☐ 30–34

☐ 35–39

☐ 40–44

☐ 45+

3. What is your professional title?

☐ Nurse

☐ Health Officer

☐ General Practitioner

☐ Family Medicine Resident

☐ Internal Medicine Resident

☐ Family Medicine Specialist

4. How many years since you graduated medical school?

☐ <5

☐ 5–10

☐ 11–20

☐ 21+

5. Approximately how many patients do you see per week?

☐ <50

☐ 50–100

☐ 101–200

☐ >200

6. What type of health facility do you work in?

☐ Tertiary teaching hospital

☐ General hospital

☐ Primary Hospital

☐ Health centre

☐ Other: _____

SECTION 2: Knowledge Attitude & Practice of RA (28 questions)

7. How many patients with rheumatoid arthritis (RA) have you received in the past year?

☐ No patient

☐ Less than 5 patients

☐ Between 5 and 15 patients

☐ Over 15 patients

8. How often do you receive these patients on average?

☐ Less than every 3 months

☐ Every 3 to 6 months

- ☐ Every 6 to 12 months
 - ☐ More than every 12 months
9. Where do you think specialist rheumatology follow-up for your RA patients is carried out?
- ☐ Mostly in hospitals
 - ☐ Mostly in primary care
 - ☐ Both
10. Have you ever had difficulties in getting expert opinion about RA?
- ☐ Yes
 - ☐ No
11. For adults with newly diagnosed active rheumatoid arthritis, offer first-line treatment with cDMARD (conventional disease-modifying anti-rheumatic drug) monotherapy:
- ☐ After 3 months of persistent symptoms
 - ☐ As soon as possible after diagnosis
 - ☐ Maintaining the initial therapy dose
12. If control of pain and stiffness is inadequate for a person with rheumatoid arthritis, consider:
- ☐ Consider Traditional NSAIDs only
 - ☐ Consider Cox II selective inhibitors only
 - ☐ Consider Traditional NSAIDs or cox II selective inhibitors
13. Adults with rheumatoid arthritis should:
- ☐ Have access to physiotherapy to learn about the benefits of wax baths
 - ☐ Consider a strengthening and stretching hand exercise programme provided they have been on a drug regimen for rheumatoid arthritis for at least 3 weeks
 - ☐ Be reassured that strong scientific evidence supports the benefits of diet for rheumatoid arthritis
14. Which joint is not involved in Rheumatoid arthritis
- ☐ Knee joint
 - ☐ Wrist
 - ☐ DIP joint
 - ☐ PIP joint

15. For diagnosing Rheumatoid arthritis duration of inflammatory signs must be

- ☐ 4weeks
- ☐ 6 weeks
- ☐ 3 weeks
- ☐ 8 weeks

16. Which of the following laboratory markers are not included in the EULAR dx criteria

- ☐ Anti-CCP Abs
- ☐ Anti- ACPA-Abs
- ☐ ESR
- ☐ CRP
- ☐ none of the above

17. The least number of joints that must be involved for diagnosing Rheumatoid arthritis

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

18. How important is your role in the management of patients with RA?

	Not at all important	Not very important	Relatively important	Very important	Extremely important
In diagnosing the disease					
In monitoring the disease					
In monitoring the effectiveness treatment					
In monitoring the tolerance treatment					
In renewing DMARDs					
In adjusting treatments (corticosteroids or					

DMARDs)					
In managing co-morbidities					
In supporting patients in their treatment management					

19. Do you assess the medication adherence of these patients during the consultation?

- ☐ Yes
☐ No

20. Have you ever identified any causes of non-adherence in these patients?

- ☐ Yes
☐ No

21. If yes to question 15, what were the causes of non-adherence (the 2 main ones, briefly in a few words)?

22. Do you believe that connected tools can improve tolerance and adherence?

- ☐ Yes
☐ No

23. In which aspects do you experience difficulties in the management of patients with RA?

Multiple answers possible

- ☐ I do not face any particular difficulty
☐ Practical management of medicines (e.g. storage)
☐ Benefits of certain diets (e.g. gluten-free, lactose-free)
☐ Instructions for particular situations (e.g. infections)
☐ Potential adverse effects
☐ Information on biosimilars
☐ Contraindicated vaccines
☐ Recommended vaccines
☐ Treatment strategies (choice of medicines, monotherapy or not)

24. Do you regularly discuss health and diet recommendations with RA patients (including physical activity, smoking cessation, healthy diet, etc.)?

- ☐ Yes
☐ No

25. Do you discuss/investigate the following items? (Tick as appropriate) - Multiple answers are possible

- ☐ Cardiovascular risk factors
☐ Vaccination status
☐ Cancer screening tests
☐ Oral health
☐ Risk of osteoporosis
☐ Pulmonary damage
☐ Digestive disorder
☐ Depression
☐ None of the items above

26. Regarding DMARDs, what is your patients' level of knowledge about ...?

	Very Insufficient	Insufficient	No opinion	Sufficient	Excellent
Mechanism of action					
Potential adverse effects and associated behaviours					
Frequency of administration					
Vaccination status					
Biosimilars					
Self-injection					

27. On a scale of 0 to 10, how would you rate your knowledge of the current treatment strategy for RA?

0 1 2 3 4 5 6 7 8 9 10

28. For the DMARD METHOTREXATE check the item(s) you are most comfortable with:

- ☐ Their mechanism of action
- ☐ Their place in the therapeutic strategy
- ☐ Their administration regimen
- ☐ Their safety profile
- ☐ Precautions for use and contraindications
- ☐ Their possible drug interactions
- ☐ Their associated risks and procedures to follow
- ☐ I am not comfortable with the above items

29. In your opinion, targeted therapies (biological or synthetic) should be used preferentially:

- ☐ In monotherapy
- ☐ In association with methotrexate
- ☐ I don't know

30. Have you ever experienced a patient receiving targeted therapy (biotherapy, or synthetic treatments such as XELJANZ® or OLUMIANT®)?

- ☐ Yes
- ☐ No

31. If yes to question 32, any adverse reaction you noticed?

32. Have you ever received any structured/formal training specifically on rheumatoid arthritis (RA)? (Examples: CME sessions, workshops, online accredited courses, or hospital teaching programs. Do not include self-study or casual learning.)

- ☐ Yes
- ☐ No

33. Primary care providers should initiate treatment for suspected rheumatoid arthritis without waiting for specialist confirmation.

- ☐ Strongly Agree

- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

34. I feel adequately prepared and confident to manage early symptoms of rheumatoid arthritis in my clinical practice.

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

SECTION 3 (7 questions): Community-hospital and multidisciplinary collaboration

35. Do you think that the follow-up of patients with RA is sufficiently coordinated between health professionals?

- ☐ Yes
- ☐ No

36. Do you receive sufficient feedback from the specialist regarding follow-up, changes, and monitoring of background treatment?

- ☐ Yes
- ☐ No

37. Would you be willing to participate in a multi-professional programme with hospital professionals and community pharmacists to improve patient adherence?

- ☐ Yes
- ☐ No

38. If no to question 36, why not? Multiple answers possible

- ☐ Lack of time
- ☐ Lack of motivation
- ☐ Lack of training
- ☐ Lack of willingness of patients
- ☐ Too few patients involved in my practice

- ☐ Lack of added value
 - ☐ Other reason(s)
39. Do you find it useful to have a secure email system to communicate with other professionals about your patients?
- ☐ Yes
 - ☐ No
40. Would you like to be trained in motivational interviewing for adherence?
- ☐ Yes
 - ☐ No
41. During a consultation with one of your patients, would you be willing to spend additional time exploring and reinforcing adherence, with appropriate training and remuneration?
- ☐ Yes
 - ☐ No

Thank you for completing the survey!

[Annex 2: Original GEPR-I Questionnaire](#)

SECTION 1 (1 page; 8 questions): Demographic and practice characteristics

1. What is your gender?*

2. What is your age?*

☐ 25-29 years

☐ 30-34 years

☐ 35-39 years

☐ 40-44 years

☐ 45-49 years

☐ 50-54 years

☐ 55-59 years

☐ 60-64 years

☐ 65-69 years

☐ 70-74 years

3. What is your practice department?*

☐ Ain

☐ Allier

☐ Ardèche

☐ Cantal

☐ Drome

☐ Isère

☐ Loire

☐ Haute Loire

☐ Puy de Dôme

☐ Rhône

☐ Savoie

☐ Haute Savoie

4. What is your practice location?*

☐ Rural area

☐ Semi-rural area

☐ Urban area

5. What is your practice structure?*

☐ Medical practice alone

☐ Medical group practice

- ☐ Multidisciplinary health centre
- ☐ Employee in a health care institution
- ☐ Other

6. How long have you been established?*

- ☐ Less than 5 years
- ☐ Between 5 and 10 years
- ☐ Between 10 and 20 years
- ☐ Between 20 and 30 years
- ☐ Over 30 years

7. In what year did you complete your thesis?*

- ☐ Before 1985
- ☐ Between 1985 and 1990
- ☐ Between 1991 and 1995
- ☐ Between 1996 and 2000
- ☐ Between 2001 and 2005
- ☐ Between 2006 and 2010
- ☐ Between 2011 and 2015
- ☐ After 2015

8. How many patients do you see per week?*

- ☐ Less than 50 patients
- ☐ Between 50 and 100 patients
- ☐ Between 100 and 200 patients

- ☐ Over 200 patients

SECTION 2 (2 pages; 20 questions): practice and knowledge in RA

9. How many patients with rheumatoid arthritis (RA) have you received in the past year?*

- ☐ No patient
- ☐ Less than 5 patients
- ☐ Between 5 and 15 patients
- ☐ Over 15 patients

10. How often do you receive these patients on average?*

- ☐ More than every 3 months
- ☐ Every 3 to 6 months
- ☐ Every 6 to 12 months
- ☐ Less than every 12 months

11. Where do you think specialist rheumatology follow-up for your RA patients is carried out?*

- ☐ Mostly in hospitals
- ☐ Mostly in primary care
- ☐ Both

12. Have you ever had difficulties in getting expert opinion about RA?*

- ☐ Yes
- ☐ No

13. How important is your role in the management of patients with RA?*

Not at all important Not very important Relatively important Very important
Extremely important

In diagnosing the disease

In monitoring the disease

In monitoring the effectiveness treatment

In monitoring the tolerance treatment

In renewing DMARDs

In adjusting treatments (corticosteroids or DMARDs)

In managing co-morbidities

In supporting patients in their treatment management

14. Do you assess the medication adherence of these patients during the consultation?*

☐ Yes

☐ No

15. Have you ever identified any causes of non-adherence in these patients?*

☐ Yes

☐ No

16. If yes to question 15, what were the causes of non-adherence (the 2 main ones, briefly in a few words)?

17. Do you believe that connected tools can improve tolerance and adherence?*

☐ Yes

☐ No

18. In which aspects do you experience difficulties in the management of patients with RA?

Multiple answers possible*

☐ I do not face any particular difficulty

☐ Practical management of medicines (e.g. storage)

☐ Benefits of certain diets (e.g. gluten-free, lactose-free)

☐ Instructions for particular situations (e.g. infections)

☐ Potential adverse effects

☐ Information on biosimilars

☐ Contraindicated vaccines

☐ Recommended vaccines

☐ Treatment strategies (choice of medicines, monotherapy or not)

19. Do you regularly discuss health and diet recommendations with RA patients (including physical activity, smoking cessation, healthy diet, etc.)?*

☐ Yes

☐ No

20. Do you discuss/investigate the following items? (tick as appropriate) - Multiple answers possible*

☐ Cardiovascular risk factors

☐ Vaccination status

☐ Cancer screening tests

☐ Oral health

- ☐ Risk of osteoporosis
- ☐ Pulmonary damage
- ☐ Digestive disorder
- ☐ Depression
- ☐ None of the items above

21. Regarding DMARDs, what is your patients' level of knowledge about ...?*

Very Insufficient Insufficient No opinion Sufficient
Excellent

Mechanism of action

Potential adverse effects and associated behaviours

Frequency of administration

Vaccination status

Biosimilars

Self-injection

22. On a scale of 0 to 10, how would you rate your knowledge of the current treatment strategy for RA?*

0 1 2 3 4 5 6 7 8 9 10

23. For the new synthetic targeted therapies XELJANZ® (tofacitinib) and OLUMIANT® (baricitinib), check the item(s) you are most comfortable with:*

- ☐ Their mechanism of action
- ☐ Their place in the therapeutic strategy
- ☐ Their administration regimen

- ☐ Their safety profile
- ☐ Precautions for use and contraindications
- ☐ Their possible drug interactions
- ☐ Their associated risks and procedures to follow
- ☐ I am not comfortable with the above items

24. For injectable targeted therapies (=biotherapies), tick the item(s) you are most comfortable with:*

- ☐ Their mechanism of action
- ☐ Their place in the therapeutic strategy
- ☐ Their administration regimen
- ☐ Their safety profile
- ☐ Precautions for use and contraindications
- ☐ Their possible drug interactions
- ☐ Their associated risks and procedures to follow
- ☐ Their biosimilars
- ☐ I am not comfortable with the above items

25. Were you aware of the 2018 update in the recommendations for the management of RA?*

- ☐ Yes
- ☐ No

26. In your opinion, targeted therapies (biological or synthetic) should be used preferentially:*

- ☐ In monotherapy

☐ In association with methotrexate

27. Have you ever experienced adverse reactions in a patient receiving targeted therapy (biotherapy, or synthetic treatments such as XELJANZ® or OLUMIANT®)?*

☐ Yes

☐ No

28. If yes to question 27, which ones (the 2 most frequent, briefly in a few words)?

SECTION 3 (1 page; 7 questions): Community-hospital and multidisciplinary collaboration

29. Do you think that the follow-up of patients with RA is sufficiently coordinated between health professionals?*

☐ Yes

☐ No

30. Do you receive sufficient feedback from the specialist regarding follow-up, changes, and monitoring of background treatment?*

☐ Yes

☐ No

31. Would you be willing to participate in a multi-professional programme with hospital professionals and community pharmacists to improve patient adherence?*

☐ Yes

☐ No

32. If no to question 31, why not? Multiple answers possible*

☐ Lack of time

☐ Lack of motivation

☐ Lack of training

☐ Lack of willingness of patients

☐ Too few patients involved in my practice

☐ Lack of added value

☐ Other reason(s)

33. Do you find it useful to have a secure email system to communicate with other professionals about your patients?*

☐ Yes

☐ No

34. Would you like to be trained in motivational interviewing for adherence?*

☐ Yes

☐ No

35. During a consultation with one of your patients, would you be willing to spend additional time exploring and reinforcing adherence, with appropriate training and remuneration?*

☐ Yes

☐ No

Thank you for completing the survey.