Clinical Rheumatology (2019) 38:1207–1212
https://doi.org/10.1007/s10067-018-04420-1

BRIEF REPORT

Contraception methods used by women with rheumatoid arthritis and psoriatic arthritis

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Received: 31 August 2018 / Revised: 28 November 2018 / Accepted: 27 December 2018 / Published online: 16 January 2019

Abstract

Rheumatoid arthritis (RA) and psoriatic arthritis (PsA) are common in women of childbearing age and are often treated with teratogenic medications. In this study, we assessed contraceptive methods in young women with RA or PsA and correlated contraceptive method efficacy with use of concomitant rheumatic medications. We combined the data from several cross-sectional surveys of women under the age of 40 with RA or PsA. Two surveys recruited participants from a clinic setting (RA and PsA Clinic Surveys), and the third survey recruited participants from CreakyJoints.org, an online forum for patients with inflammatory arthritis (CreakyJoints Survey). Of the 164 women included, 138 had RA (67 in RA Clinic Survey, 71 in CreakyJoints Survey) and 26 had PsA (19 in PsA Clinic Survey, 7 in CreakyJoints Survey). Use of specific contraceptive and rheumatic medications were similar between the clinic and online surveys. In the pooled analysis of the Clinic and CreakyJoints survey data, women with RA and PsA reported similar utilization of highly effective contraception methods (31.9% RA, 34.6% PsA) and effective methods (31.2% RA, 30.8% PsA), but different utilization of ineffective methods (35.5% RA, 11.5% PsA) and no methods (1.5% RA, 23.1% PsA), $p = 0.0002$. These proportions remained similar across subgroups taking methotrexate, anti-TNF biologics, and novel medications. Approximately two thirds of women with RA and PsA reported using effective or highly effective methods of contraception, though women with PsA were more likely to report no methods of contraception.

Keywords Contraception · Fertility · Psoriatic arthritis · Rheumatoid arthritis

Introduction

Rheumatologists have an opportunity to positively impact pregnancy outcomes for their patients. Rheumatoid arthritis (RA) and psoriatic arthritis (PsA) commonly affect women of childbearing age. Methotrexate is often used to treat both diseases, and it is a known teratogen. Post-conception methotrexate use has been associated with pregnancy loss rates of over 40% and major birth defects in up to 10% of babies [1]. Pregnancy safety data about medications approved by the FDA in the past decade is limited, so conception is best avoided while these are taken [2]. Furthermore, active arthritis during pregnancy may be associated with preterm birth and low birth

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weight, suggesting that controlling disease with safe medications may improve pregnancy outcomes. Some experts recommend long-acting reversible contraceptive methods like intrauterine devices and implants when a woman is taking methotrexate or has high disease activity [3]. Therefore, an adequate understanding of contraception methods used by women with inflammatory arthritis is essential for appropriate counseling [4, 5].

Prior studies have estimated that 48 to 82% of women of childbearing age with inflammatory arthritis use contraception [6–10]. However, only one study stratified results by type of inflammatory arthritis [8], an important limitation given that treatment strategies can differ substantially depending on the type of arthritis. No studies specifically describe contraception use in women with PsA. Given the lack of available literature on this topic, we sought to analyze survey data of women with RA and PsA to learn more about contraception methods being used and whether these methods varied according to use of anti-rheumatic medications.

Methods

We analyzed data from three similar cross-sectional surveys completed in different populations of women with inflammatory arthritis. All subjects completed informed consent and each survey was approved by the Duke Health Institutional Review Board.

1. RA Clinic Survey: participants were recruited for a study assessing fertility, infertility, pregnancy outcomes, and contraception use in women with RA. Patients were recruited by letter and in person from the Duke Rheumatology Clinic in 2015–2016 and were eligible for inclusion if they were between the ages of 20 and 40 and had been diagnosed with RA by a Duke University rheumatologist. Of the 152 women who received a letter, 75 (49%) completed the study.
2. PsA Clinic Survey: recruitment for this study was similar to the RA Clinic Survey except that patients were also recruited from Duke Dermatology Clinics and were identified by ICD-9 or ICD-10 code for PsA, confirmed by a Duke rheumatologist or dermatologist. Women were eligible for inclusion if they were between the ages of 20 and 50. Of the 100 women who received a letter, 40 (40%) completed the study.
3. CreakyJoints Survey: participants were recruited for this web-based survey in 2017 through CreakyJoints.org, an online community of people living with inflammatory arthritis. To be eligible, participants had to live in the USA or Puerto Rico, be between the ages of 18 (21 in Puerto Rico) and 50, and report having a diagnosis of inflammatory arthritis made by a physician. Participants were recruited via email invitations. Emails were sent to 15,332 potential candidates and 416 (2.7%) consented to be included in the study.

In each of the three surveys, patients were asked questions about their demographics, age at diagnosis, duration of disease, current and prior rheumatologic medication use, current and prior pregnancies, infertility, and current contraceptive method use. The RA and PsA Clinic Surveys also asked if any rheumatologist had discussed contraceptive methods with the patient. RAPID3 scores were available for the patients in the RA and PsA Clinic Surveys. RAPID3 is a validated measure of disease activity in RA [11] that has also been found to be informative in PsA [12, 13].

For the purposes of this study, we included patients from the three surveys listed above who were female, below the age of 40 years, and had a diagnosis of RA or PsA. Subjects were excluded if they were pregnant, trying to conceive, menopausal, had a hysterectomy, or had same-sex partners. In the CreakyJoints Survey, respondents who reported a diagnosis of both RA and PsA were included in the PsA group. Contraceptive methods for all respondents were grouped into the following effectiveness categories as defined by the Centers for Disease Control and Prevention: highly effective methods included surgical methods (tubal ligation, vasectomy) and long-acting reversible contraceptive methods (intrauterine devices and implants); effective methods included oral contraceptives pills and other hormonal methods (patches, rings, depot medroxyprogesterone); ineffective methods included barrier methods, rhythm methods, withdrawal, and abstinence [14]. Patients were considered not to be using any contraception if they did not report using any of the above methods. We also grouped patients by medication use. The anti-TNF group included patients currently using infliximab, adalimumab, etanercept, golimumab, or certolizumab. The "novel medications" group included patients currently using abatacept, apremilast, rituximab, tocilizumab, tofacitinib, secukinumab, and ustekinumab.

Our primary outcomes of interest were contraceptive method use overall and stratified by rheumatologic medication type. We performed this analysis after grouping the RA and PsA patients from each of the three surveys together, though we also report data from each individual survey. The effect of socioeconomic status was explored by comparing contraception use by education level (college degree or higher versus no college degree). We also assessed the impact of infertility and patients' discussions about contraception with rheumatologists on contraception utilization. Finally, a manual chart review was performed on the patients included in the RA clinic survey to analyze the contraception methods documented by rheumatologists in the clinic visit closest to the time of enrollment versus those reported in the survey.

Data are presented as medians for continuous or as percentages for categorical variables. Fisher's exact test compared contraceptive method use by medication class, education level, and patients' discussions about contraceptive methods with a rheumatologist. All statistical analyses were conducted in SAS 9.4 (Cary, North Carolina).

Results

A total of 196 patients met the initial criteria for inclusion. Of these, 25 patients were excluded due to a current pregnancy or active attempts to conceive, seven were excluded due to menopause or hysterectomy, and one patient was excluded as she

Table 1 Demographic and clinical characteristics of survey participants

Characteristics	RA Clinic Survey	RA CreakyJoints	PsA Clinic Survey	PsA CreakyJoints
Total number of women	67	71	19	7
Median age (IQR)	33 (28–37)	35 (31–37)	32 (27–37)	36 (31–38)
Median age at diagnosis (IQR)	25 (17–31)	25 (16–31)	27 (21–33)	24 (16–32)
Median disease duration (IQR)	5 (2–15)	7 (3–17)	3 (1–8)	4 (3–22)
Median RAPID3 (IQR)[a,b]	1.8 (0.5–4.7)	–	3.3 (1.9–4.9)	–
Ethnicity and race (%)				
Hispanic ethnicity	3 (4.5%)	7 (10.5%)	1 (5.3%)	1 (14.3%)
White	55 (82.1%)	60 (84.5%)	16 (84.2%)	4 (57.1%)
Black or African American	2 (3.0%)	0 (0.0%)	2 (10.5%)	0 (0.0%)
Other or unknown race	10 (14.9%)	11 (15.5%)	1 (5.3%)	3 (37.5%)
Education				
Less than college or vocational degree	16 (24.2%)	17 (23.9%)	7 (36.8%)	2 (28.6%)
College or vocational degree	33 (50%)	26 (36.6%)	8 (42.1%)	2 (28.6%)
Graduate or professional degree	17 (25.8%)	25 (35.2%)	4 (21.1%)	3 (42.9%)
Missing	1 (1.5%)	3 (4.2%)		
Insurance[c]				
Private/employer based	56 (83.6%)	–	16 (84.2%)	–
Medicare/Medicaid	9 (13.4%)	–	2 (10.5%)	–
Military/veteran	2 (3.0%)	–	1 (5.3%)	–
None	1 (1.5%)	–	0 (0%)	–
Work status				
Full-time	41 (61.2%)	–	13 (68.4%)	–
Part-time	6 (9.0%)	–	2 (10.5%)	–
On disability	7 (10.5%)	–	1 (5.3%)	–
Do not work for pay	13 (19.4%)	–	3 (15.8%)	–
Current medications (%)				
NSAIDs	31 (46.3%)	40 (56.3%)	9 (47.4%)	5 (71.4%)
Steroids	14 (20.9%)	27 (38.0%)	3 (15.8%)	3 (42.9%)
Hydroxychloroquine	26 (38.9%)	25 (35.2%)	2 (10.5%)	2 (28.8%)
Sulfasalazine	11 (16.4%)	6 (8.5%)	2 (10.5%)	2 (28.8%)
Methotrexate	33 (49.3%)	24 (33.8%)	4 (21.1%)	4 (57.1%)
Leflunomide	2 (3.0%)	3 (4.2%)	0 (0.0%)	0 (0.0%)
Anti-TNF	27 (40.3%)	30 (42.3%)	9 (47.4%)	3 (42.9%)
Novel medications	9 (13.4%)	20 (28.2%)	4 (21.1%)	2 (28.8%)
No RA/PsA medications	4 (6.0%)	3 (4.2%)	2 (10.5%)	0 (0.0%)

RA CreakyJoints: CreakyJoints Survey participants with RA

PsA CreakyJoints: CreakyJoints Survey participants with PsA

[a] Data on RAPID3 scores, insurance, and work status not collected in the CreakyJoints Survey

[b] RAPID3 disease activity: > 12 = high, 6.1–12 = moderate, 3.1–6 = low, ≤ 3 = remission

[c] Respondents were allowed to select more than one response; therefore, percentages do not total to 100%

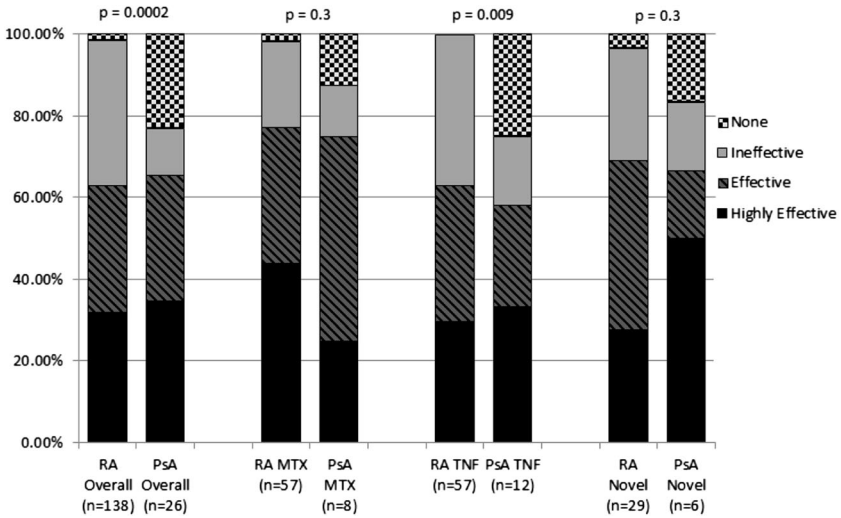

Fig. 1 Contraception methods in RA and PsA patients. MTX, methotrexate. Ineffective methods: barrier, rhythm, withdrawal, abstinence. Effective methods: oral contraceptives, patches, rings, depot medroxyprogesterone. Highly effective methods: tubal ligation, vasectomy, intrauterine devices, and implants. RA and PsA novel: patients taking abatacept, apremilast, rituximab, tocilizumab, tofacitinib, secukinumab, and ustekinumab

reported a same-sex partner, leaving 164 patients in the final analysis. There were 67 patients in the RA Clinic Survey, 19 patients in the PsA Clinic Survey, and 78 patients in the CreakyJoints Survey, 71 of whom had RA and 7 of whom had PsA (Table 1). In general, women in the CreakyJoints Survey were slightly older, had a longer duration of disease, and used more steroids than women in the clinic surveys. All three surveys included many women with high levels of education and full-time employment. Across the three surveys, there were a total of 57 women with RA on methotrexate and 8 women with PsA on methotrexate. Only 5 women were taking leflunomide; therefore, contraception use for this group was not analyzed separately.

In the pooled analysis of the Clinic and CreakyJoints Survey data, women with RA and PsA reported similar utilization of highly effective contraception methods (31.9% RA, 34.6% PsA) and effective methods (31.2% RA, 30.8% PsA), but different utilization of ineffective methods (35.5% RA, 11.5% PsA) and no methods (1.5% RA, 23.1% PsA), $p = 0.0002$. An analysis of contraception rates among women taking methotrexate, anti-TNF drugs, and novel medications is depicted in Fig. 1. In general, the highest rates of effective and highly effective contraception method utilization were in women taking methotrexate. Only the anti-TNF group maintained a statistically significant difference in type of contraception use between the RA and PsA populations ($p = 0.009$). Data from each individual survey are represented in Table 2.

There was no significant difference in contraception use by education level in the RA ($p = 0.4$) or PsA ($p = 0.9$) patients. Infertility was commonly self-reported in the Clinic and CreakyJoints Survey populations (RA 24%, PsA 22%). However, of the eight women on no methods of contraception, none reported infertility or a diagnosis of polycystic ovary syndrome.

In the RA Clinic Survey, 32.8% of the participants had never discussed contraception with their rheumatologist. In the PsA Clinic Survey, 57.9% reported not having this discussion ($p = 0.06$ compared with RA patients). Of the eight women on no methods of contraception, only one had discussed contraception with her rheumatologist.

Finally, a manual chart review of the RA Clinic Survey participants found that contraception methods were not documented by clinicians in 30.8% of the patients. Among these women, 70% self-reported using ineffective contraception methods. On the other hand, of those with physician-documented contraceptive in the chart, only 29% self-reported ineffective methods in the survey.

Discussion

Overall, high rates of contraceptive use were reported in both the RA and PsA populations. The highest rates of effective and highly effective contraception method use in our study were in women on methotrexate, a known teratogen. However, high rates were still seen in women on TNF inhibitors, which are now considered to be relatively safe during pregnancy [5]. This suggests that other factors beyond patients' knowledge regarding medication teratogenicity drive a large portion of patients' decisions to use effective and highly effective methods of contraception.

The rate of contraception use in our study is higher than other reported rates among women with inflammatory arthritis [6–10]. This could be due to the high-socioeconomic status of many of our participants, although we did not find a significant difference in contraception use by education level. Another reason for the high rates in our study could be the use of patient-reported data instead of provider documentation. A recent analysis of 2455 female rheumatology patients of reproductive age in a US medical center found that 32.1% used prescription contraception and 7.9% used highly effective prescription methods [10]. However, this data was

Table 2 Contraception methods reported in each survey

	RA Clinic Survey	RA CreakyJoints	PsA Clinic Survey	PsA CreakyJoints
Overall, *n* (%)	67	71	19	7
Highly effective methods	19 (28.4%)	25 (35.2%)	7 (36.8%)	2 (28.6%)
Effective methods	18 (26.9%)	25 (35.2%)	4 (21.1%)	4 (57.4%)
Ineffective methods	28 (41.8%)	21 (30.0%)	2 (10.5%)	1 (14.3%)
No methods	2 (3.0%)	0 (0.0%)	6 (31.6%)	0 (0.0%)
Patients on MTX, *n* (%)	33	24	4	4
Highly effective methods	14 (42.4%)	11 (45.8%)	1 (25.0%)	1 (25.0%)
Effective methods	9 (27.3%)	10 (41.7%)	1 (25.0%)	3 (75.0%)
Ineffective methods	9 (27.3%)	3 (12.5%)	1 (25.0%)	0 (0%)
No methods	1 (3.0%)	0 (0%)	1 (25.0%)	0 (0%)
Patients on anti-TNF, *n* (%)	27	30	9	3
Highly effective methods	5 (18.5%)	12 (40.0%)	2 (22.2%)	1 (33.3%)
Effective methods	10 (37.0%)	9 (30.0%)	2 (22.2%)	2 (66.7%)
Ineffective methods	12 (44.4%)	9 (30.0%)	2 (22.2%)	0 (0%)
No methods	0 (0%)	0 (0%)	3 (33.3%)	0 (0%)
Patients on novel medications, *n* (%)	9	20	4	2
Highly effective methods	1 (11.1%)	7 (35.0%)	3 (75%)	0 (0%)
Effective methods	3 (33.3%)	9 (45.0%)	0 (0%)	1 (50.0%)
Ineffective methods	4 (44.4%)	4 (20.0%)	0 (0%)	1 (50.0%)
No methods	1 (11.1%)	0 (0%)	1 (25.0%)	0 (0%)

RA CreakyJoints: CreakyJoints Survey participants with RA

PsA CreakyJoints: CreakyJoints Survey participants with PsA

MTX, methotrexate

Ineffective methods: barrier, rhythm, withdrawal, abstinence

Effective methods: oral contraceptives, patches, rings, depot medroxyprogesterone

Highly effective methods: tubal ligation, vasectomy, intrauterine devices, and implants

Novel medications: abatacept, apremilast, rituximab, tocilizumab, tofacitinib, secukinumab, and ustekinumab

obtained through chart review. In our study, there was a large discrepancy between contraception methods documented in the chart and those reported by patients in the surveys. Our data also differs from prior reports in that we stratified our results by specific type of inflammatory arthritis. To our knowledge, this is the first study to report contraception methods used by women with PsA.

Many women in our study were using contraception without prompting from their rheumatologists. However, seven of the eight women on no methods of contraception had not discussed contraception with their rheumatologist. In addition, women with PsA were more likely to be on no methods of contraception, and there was a trend towards fewer discussions between rheumatologists and PsA patients about contraception. Furthermore, our manual chart review of women in the RA Clinic Survey found that women on ineffective methods of contraception were more likely to have no form of contraception documented. Taken together, we feel that this data underscores rheumatologists' role in discussing contraception methods with young women with inflammatory arthritis.

There are several limitations to this study. While the study was adequately powered to assess for differences in contraception use by diagnosis, it was underpowered to assess for differences by medication. The study is also limited by the low number of PsA patients, thus warranting further analysis of this population in the future. To obtain a sufficient sample size, we combined data from different survey settings, which could introduce bias. A key difference between the surveys was that the diagnosis of inflammatory arthritis was determined by a rheumatologist in the Clinic Surveys but was self-reported in the CreakyJoints Survey. However, age at diagnosis, disease duration, and anti-rheumatic medication use was similar between the Clinic and CreakyJoints Surveys, suggesting that the self-reported diagnoses are reliable. Finally, our study only assessed if women discussed contraception with their rheumatologists. We did not assess if

they discussed contraception methods with other providers or if they have access to gynecologic care.

In conclusion, we found high rates of effective and highly effective contraception use in women with RA and PsA. However, women with PsA were less likely to use any form of contraceptive than women with RA, and there was a trend towards fewer discussions between rheumatologists and women with PsA about contraception. Our findings emphasize the crucial role that rheumatologists play in providing appropriate contraception counseling to their patients and raise questions as to why this might be neglected in women with PsA.

Funding This work was partially supported through a Patient-Centered Outcomes Research Institute (PCORI) award (PPRN-1306-04811).

Compliance with ethical standards

Conflict of interest The authors JRC, SG, and WBN receive support from a Patient-Centered Outcomes Research Institute (PCORI) award and ArthritisPower is in part supported by this grant. The authors have no other disclosures to report. We have full control of all primary data and agree to allow the journal to review the data if requested.

Disclaimer All statements in this manuscript, including its findings and conclusions, are solely those of the authors and do not necessarily represent the views of PCORI, its Board of Governors or Methodology Committee.

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