Published in final edited form as:

J Clin Rheumatol. 2017 August ; 23(5): 273–277. doi:10.1097/RHU.0000000000000559.

Rheumatologists Modestly More Likely to Counsel Smokers in Visits without Rheumatoid Arthritis Control: An observational study

Andrew P Vreede, MD¹, Heather M Johnson, MD, MS², Megan Piper, PhD³, Daniel J Panyard, BS⁴, Joanna C Wong, BS⁵, and Christie M Bartels, MD, MS⁴

¹University of Wisconsin School of Medicine & Public Health, Department of Medicine, Madison, WI 53705, USA

²University of Wisconsin School of Medicine & Public Health, Department of Medicine, Division of Cardiovascular Medicine, Madison, WI 53705, USA

³University of Wisconsin School of Medicine & Public Health, Department of Medicine, Center for Tobacco Research and Intervention, Madison, WI 53711, USA

⁴University of Wisconsin School of Medicine & Public Health, Department of Medicine, Division of Rheumatology, Madison, WI 53705, USA

⁵Tufts University School of Medicine, Boston, MA 02110, USA

Abstract

Background—Among patients with rheumatoid arthritis (RA), smoking increases risk for severe RA and pulmonary and cardiovascular disease (CVD). Despite this, little is known about smoking cessation counseling by rheumatologists.

Objectives—We examined predictors of tobacco counseling in RA patients who smoke including the effect of perceived RA control. We hypothesized that patients with controlled RA would receive more counseling according to the competing demands model, which explains that preventive care gaps occur as a result of competing provider, patient, and clinic factors.

Methods—This secondary data analysis involved RA patients with an additional CVD risk factor identified in an academic medical center 2004–2011. Trained abstractors assessed documented smoking counseling and rheumatologists' impression of RA control in clinic notes. We used multivariable logistic regression to predict having received smoking cessation counseling, including sociodemographics and comorbidity in models.

Corresponding author and reprint requests: Christie Bartels, MD MS, 1685 Highland Avenue, Room 4132, Madison, WI, USA, 53705-2281, Phone: (608) 263-3457, Fax: (608) 263-7353, cb4@medicine.wisc.edu.

Conflicts of Interest and Source of Funding: This work was supported by the National Institute of Arthritis and Musculoskeletal and Skin Diseases, part of the National Institutes of Health (NIH), under Award Number K23AR062381 to CMB. Additional support was from NIH-NCATS 9U54TR000021 to the Health Innovation Program/Community-Academic Partnerships core of UW ICTR-CTSA, and NIH-NHLBI 1 K23 HL112907 to HMJ. CMB receives separate grant support from Independent Grants for Learning and Change (Pfizer), who had no role in the design, conduct, interpretation, or writing of this study manuscript. Authors have no other conflicts of interest. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Results—We abstracted 3,396 RA visits, including 360 visits (10%) with active smokers. Perceived controlled RA was present in 31% of visits involving smokers (39% in non-smokers). Beyond nurse documentation, providers documented smoking status in 39% of visit notes with smokers, and smoking cessation counseling in 10%. Visits with controlled versus active RA were less likely to include counseling (OR 0.3, CI 0.1–0.97). Counseling was more likely in visits with prevalent cardiovascular, pulmonary, and psychiatric disease, but decreased with obesity.

Conclusions—Smoking cessation counseling was documented in 10% of visits and was less likely when RA was controlled. Given smoking's impact on RA and long-term outcomes, systematic cessation counseling efforts are needed.

Indexing Terms

Rheumatoid arthritis; smoking; smoking cessation counseling; public health; cardiovascular

INTRODUCTION

Smoking assessment and cessation counseling are recommended at all clinical encounters for all current smokers [1], including those with rheumatoid arthritis (RA) [2], but occur variably [3]. In RA, tobacco use is strongly associated with increased RA incidence [4], worse RA severity, and treatment failures [5]. Smoking also contributes to the leading causes of death in RA: cardiovascular, pulmonary, and oncologic diseases [6]. Systematic reviews show that smoking cessation counseling results in 1.7 times higher quit rates [7]. Consequently, RA experts and guidelines recommend smoking cessation counseling for current smokers [2, 8]. However, very little is known regarding the rate of rheumatologists performing tobacco counseling. Estimates from retrospective physician surveys indicate that only half of rheumatologists self-reported that they provided smoking cessation counseling to the majority of their patients [9]. Moreover, self-reporting may overestimate true counseling rates.

Given this uncertainty regarding rheumatologist smoking cessation practices, the objective of our study was to examine the frequency and predictors of smoking cessation counseling by rheumatologists in visits with active RA smokers with at least one additional cardiovascular disease (CVD) risk factor. Using the model of competing demands, which posits that preventive health counseling needs compete with the patient's active problems and demands [10], we hypothesized that smoking cessation counseling would occur more frequently in visits in which RA was perceived to be controlled.

MATERIALS AND METHODS

Patients and Setting

This observational cohort study investigated RA visits in three rheumatology clinics within a large academic multispecialty medical group between 2004 and 2011. This secondary data analysis study combined two previously described cohorts of RA patients identified using a published algorithm defined as ≥ 2 visits with International Classification of Diseases, Ninth Edition (ICD-9) claims for RA (714.0–714.33, 714.4, 714.80, 714.81, 714.89) [11]. All patients were ≥ 20 years old and seen regularly for primary and rheumatology care (≥ 2 health

system visits with at least one primary care visit in 24 months) and had rheumatology clinic notes clearly documenting rheumatoid arthritis in the absence of another specific inflammatory arthritis diagnosis (Figure 1). One cohort included RA patients with prevalent hypertension [12] according to Electronic Health Record (EHR) algorithms using the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-7) [13]. The second cohort included patients who were eligible for cholesterol screening or control [14, 15]. A minority of patients were included in both cohorts; these duplicate visits were removed prior to analysis. Patients were excluded from analysis if blood pressure or cholesterol normalized or if they died prior to cohort entry.

Current smokers were identified by the EHR smoking status documented during registration or vital sign collection. Using a standard form, trained abstractors reviewed all rheumatology RA clinic visit notes on eligible patients until death, migration, risk factor control, or January 1, 2012. A visit-level dataset was then constructed to facilitate manual abstraction of visit notes during the eligible period.

Data sources

Using a standard form, trained abstractors reviewed all rheumatology RA clinic visit notes on eligible patients. For every 200 charts reviewed by an individual abstractor, quality assurance audits were performed on 10 charts to ensure agreement between abstractors. The project was approved by the University of Wisconsin Health Sciences Institutional Review Board under number 2012-0053 with a waiver of informed consent.

Outcomes

Our primary outcome was the occurrence of smoking cessation counseling among current smokers identified using an abstraction template (see Abstraction Template Table, Supplemental Data File 1). Counseling encompassed any discussion of smoking or its risks, advice or instructions to quit or cut back, referral to primary care or a tobacco quit line, and the provision of cessation medications. The secondary outcome was the documentation of smoking status by the rheumatologist. Both outcomes were abstracted from visit notes.

Variables

Our primary explanatory variable was whether the patient's RA was controlled. Since RA disease activity measures were not available for all visits during the study period, we used perceived RA control at the visit according to the rheumatologist's note, which was categorized as "controlled" or "not controlled." Control was interpreted from rheumatologists' impressions describing that RA was: well controlled, under good control, in remission, inactive, quiescent, or showing no active disease or arthritis. Lack of control was interpreted from impressions that RA was: uncontrolled, active, mild, minimal, relatively controlled, or improving.

Additional explanatory variables included patient baseline sociodemographic factors and comorbidities. Sociodemographic factors included age, sex, race, marital status, language, and ever being enrolled in Medicaid. Baseline comorbidities included body mass index

(BMI) categories (underweight, normal weight, overweight, obese), CVD, diabetes mellitus, hyperlipidemia, hypertension, pulmonary disease, and anxiety and/or depression (see Table of ICD-9 Code Reference Definitions, Supplemental Data File 2). CVD was defined to include congestive heart failure, peripheral vascular disease, transient ischemic attack/stroke, myocardial infarction, and ischemic heart disease. In order to control for baseline composite comorbidity burden and health needs, we used a validated single score calculated via the Johns Hopkins Adjusted Clinical Groups (ACG) Case-Mix System (version 10). Correlation matrices showed no evidence of collinearity for covariates in the full model.

Statistical Analysis

In order to compare differences in smokers and nonsmoking patients and visits with and without perceived RA control, we used chi-square testing for categorical variables and analysis of variance (ANOVA) for continuous variables. We performed unadjusted regression analysis for each explanatory variable with our primary outcome, followed by stepwise multivariable logistic regression analysis to examine predictors of smoking cessation counseling. For all statistical tests, we considered a p-value <0.05 significant. Patient sample selection and data variable creation were conducted using SAS version 9.1.3; statistical analysis was conducted using Stata version 12.

RESULTS

A total of 612 RA patients (3,396 visits) were identified, of whom 546 (89%) had tobacco status documented. Our analysis included 360 visits with 67 current smokers with RA (Table 1). RA smokers had a mean age of $54 \pm$ SD 11 years. Notably, 0% of smokers and 10% of non-smokers were over age 80. Consistent with RA epidemiology, 61% of RA smokers were women and 81% were Caucasian. Compared to non-smokers, current smokers were younger, less often female, less often Caucasian, more likely to have ever received Medicaid, had lower BMI, and were more likely to have baseline CVD.

Examination of our secondary outcome revealed that rheumatologists documented smoking status in the clinic note in 39% of 360 visits with electronically documented smokers. Of the 360 visits, 31% of visits were classified as the patient having subjectively controlled RA (Table 1), in contrast to non-smokers where 39% of visits had subjectively controlled RA (data not shown). Among visits involving smokers without controlled RA, a higher proportion had ever received Medicaid, a marker of socioeconomic adversity. Visits with uncontrolled RA also included a higher percentage of patients with comorbid anxiety/depression and hypertension, and a lower percentage of cardiovascular disease, renal disease, and hyperlipidemia compared to visits with patients with controlled RA.

Smoking cessation counseling, our primary endpoint, was documented in 10% of visits. Overall, documentation of smoking cessation counseling was less likely to occur in clinic visits of smoking patients with subjectively controlled RA versus clinic visits of patients with uncontrolled RA (OR 0.3, CI 0.1–0.97, $p=0.02$) (Table 2). Obese patients were less likely to receive smoking cessation counseling (OR 0.4, CI 0.1–0.9, $p=0.03$). Patients with comorbid cardiovascular (OR 2.8, CI 1.3–6.2, $p=0.009$) or pulmonary disease (OR 3.5, CI 2.7–18.9, $p<0.001$) were more likely to receive cessation counseling. In a multivariable

model, RA control (OR 0.3, CI 0.1–0.97, $p=0.043$), obesity (OR 0.3, CI 0.1–0.9, $p=0.04$), and pulmonary disease (OR 5.0, CI 1.7–14.4, $p=0.003$) continued to be significant predictors. Only two notes (of 360 total notes, 0.56%) documented quit line referral; no cessation medications were discussed and documented in any of the RA clinic notes.

DISCUSSION

Despite the deleterious effects of smoking on RA and cardiovascular health, we found low rates of rheumatologists acknowledging smoking status (39%) and offering cessation counseling (10%) to current smokers. These findings are consistent with prior studies reporting poor health behavioral counseling among generalists and specialists. Far from optimal, these findings might be explained by rheumatologists' perceived limited role in preventive care. In our prior qualitative interviews, some rheumatologists reported being less likely to identify or manage CVD risk factors (e.g., hypertension, smoking) due to the perception that this is the role of primary care physicians [16].

We hypothesized that patients with controlled RA would be more likely to receive smoking cessation counseling due to the model of competing demands. In this application of the model, the rheumatologist needs to spend less fixed clinic time managing the patient's RA, resulting in more available time for health behavior counseling. Surprisingly, in contrast to our hypothesis, we found that patients with controlled RA were less likely to receive smoking cessation counseling.

The results of our study may instead be explained by rheumatologists' assumptions and beliefs that the poor RA control is a result of tobacco use. Under this paradigm, rheumatologists would be less likely to address tobacco use unless it was perceived as directly influencing the RA. In the case of uncontrolled RA, the rheumatologist might be more inclined to provide smoking cessation counseling if they reason that smoking is worsening RA severity. The rheumatologist would also provide more counseling when confronted with a patient with a smoking-related disease, as was seen in this study in patients with CVD and pulmonary disease.

Primary prevention, however, prior to the development of smoking-related complications, is a critical unmet public health need in RA. Recent reports indicate a 1.8 higher odds of incident COPD among RA patients compared to non-RA patients [17]. Additionally, it is well established that patients with RA face 60% higher risk of premature CVD [18]. Given that smoking is among the most threatening yet modifiable risk factors for the leading causes of premature death in RA, rheumatology clinics have an important opportunity to impact population health by improving smoking cessation care. One significant barrier to smoking cessation is that RA patients are often unaware of the causative relationship between RA severity and smoking [19]. Making this connection more explicit could be critical to motivate cessation.

Instituting or collaborating with smoking cessation programs can improve cessation rates. One Spanish rheumatology clinic reported a four-fold increase in quit rates after developing a smoking cessation protocol [20]. North American tobacco quit line referrals are widely

available, free, and highly effective tools in supporting patients to quit smoking [1]. Yet, as shown by our low referral rate (1%), they are underutilized in RA clinics.

One successful way to overcome low preventive care delivery is staff protocol interventions. According to competing demands frameworks, this shifts demands from the physician to support staff and systematizes practice [10]. We are currently testing the feasibility of rheumatology staff protocols to facilitate electronic health record referrals to the quit line for interested patients (<https://www.hipxchange.org/QuitConnect>). Future work should examine this and other strategies to support smoking cessation in RA patients to reduce harms of RA and improve long-term patient outcomes.

We acknowledge several limitations of this study. Examining only one health system potentially limits generalizability; however, we did assess three separate clinics with 15 providers. The sample size of active RA smokers was low (n=57) which was a major limitation of our study; however, we were analyzing at the visit-level, and there were 360 visits included in the analyses. Our secondary data analysis study included patients only if they had uncontrolled BP or cholesterol, yet one might expect more counseling for patients with multiple cardiovascular risk factors. Our definition of disease control reflected the subjective impressions of the rheumatologist rather than objective disease activity scores, which were not available for all years. Nevertheless, in practice, decisions are commonly based upon subjective impressions rather than calibrated data. Additionally, we recognize that physicians may not consistently document counseling. Despite these limitations, these results clearly refute our hypothesis. However, this study should be repeated with larger numbers of rheumatoid arthritis patients who smoke not restricted to those with comorbid cardiovascular disease risk factors.

In contrast to our hypothesis, perceived uncontrolled RA predicted more likely smoking cessation counseling by rheumatologists than controlled RA, but overall counseling rates were low at 10%. Counseling occurred more often for patients with cardiopulmonary complications. Our findings highlight the need for systematic, proactive smoking cessation counseling or referral processes in rheumatology clinics prior to smoking-related complications.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Thank you to Health Innovation Program programming and analytics staff, Katya Voelker MD for assistance with data preparation and abstraction, and Courtney Maxcy, Aimée Wattiaux, Amanda Perez, and staff at the Health Innovation Program for manuscript support.

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Key Points

1. Rheumatologists infrequently perform smoking cessation counseling with RA patients (10% of eligible visits).
2. Counseling occurred more frequently in visits involving patients without RA control or with smoking-related complications.
3. Systematic smoking cessation practices should be investigated to prevent smoking-related complications in RA patients.

Figure 1.

Flow diagram detailing study protocol, including inclusion and exclusion criteria as well as the outcome of documented smoking cessation counselling in the clinician note.

RA patient-level characteristics by smoking status and visit-level characteristics by RA control among smokers

Table 1

Characteristic	All Patients n=546			All Smoker Visits n=360		
	Smokers n=67 n (%)	Non-Smokers n=479 n (%)	p	RA Controlled n=110 n (%)	RA Not Controlled n=250 n (%)	p
Age (mean, SD)	54.4, 10.6	62.5, 13.2	<0.001	54.9, 8.6	51.9, 8.7	0.003
18–39	4 (6.0)	19 (4.0)	0.002	1 (0.9)	14 (5.6)	0.04
40–59	42 (62.7)	185 (38.6)		75 (68.2)	181 (72.4)	
60–79	21 (31.3)	223 (46.6)		34 (30.9)	55 (22)	
80+	0	52 (10.9)		0	0	
Gender						
Male	26 (38.8)	109 (22.8)	0.01	28 (25.5)	68 (27.2)	0.730
Female	41 (61.2)	370 (77.2)		82 (74.5)	182 (72.8)	
Race						
White	54 (80.6)	442 (92.3)	<0.001	86 (78.2)	199 (79.6)	0.002
Black	9 (13.4)	12 (2.5)		15 (13.6)	48 (19.2)	
Other	4 (6.0)	25 (5.2)		9 (8.2)	3 (1.2)	
Language						
English	62 (92.5)	458 (95.6)	0.32	100 (90.9)	235 (94)	0.290
Non-English	5 (7.5)	21 (4.4)		10 (9.1)	15 (6)	
Marital Status						
Married	35 (52.2)	283 (59.1)	0.22	61 (55.5)	151 (60.4)	<0.001
Single	18 (26.9)	82 (17.1)		11 (10)	63 (25.2)	
Separated/divorced	14 (20.9)	114 (23.8)		38 (34.5)	36 (14.4)	
Medicaid (ever)	22 (32.8)	24 (5.0)	<0.001	20 (18.2)	102 (40.8)	<0.001
BMI ^d (mean, SD)	28.6, 6.5	30.1, 7.4	0.12	28.7, 6.4	29.7, 7.3	0.22
ACG ^b (mean, SD)	1.3, 0.7	1.4, 0.7	0.18	1.3, 0.5	1.1, 0.4	0.007
Comorbidity						
Cardiovascular disease ^c	15 (22.4)	147 (30.7)	0.03	26 (23.6)	27 (10.8)	0.002
Chronic kidney/ESRD ^d	4 (6.0)	34 (7.1)	0.77	5 (4.5)	1 (0.4)	0.005
Diabetes mellitus	11 (16.4)	71 (14.8)	0.89	19 (17.3)	37 (14.8)	0.550

Characteristic	All Patients n=546			All Smoker Visits n=360		
	Smokers n=67 n (%)	Non-Smokers n=479 n (%)	p	RA Controlled n=110 n (%)	RA Not Controlled n=250 n (%)	p
Hypertension	29 (43.3)	298 (62.2)	0.009	36 (32.7)	115 (46)	0.019
Hyperlipidemia	24 (35.8)	195 (40.7)	0.7	43 (39.1)	54 (21.6)	0.001
Pulmonary disease	8 (11.9)	59 (12.3)	0.18	5 (4.5)	15 (6)	0.580
Depression-Anxiety	10 (14.9)	80 (16.7)	0.28	7 (6.4)	41 (16.4)	<0.001

^a BMI=Body Mass Index;

^b ACG=Adjusted Clinical Groups;

^c Cardiovascular disease includes Congestive Heart Failure, Peripheral Vascular Disease, Transient Ischemic Attack/Stroke, Ischemic Heart Disease;

^d ESRD=End-Stage Renal Disease

Table 2

Bivariate and multivariate predictors of tobacco counseling (n=360 visits)

	OR	95% CI	p
<i>Bivariate</i>			
RA Control	0.3	0.1–0.9	0.023 ^a
Age: 40–59yo (18–39 Ref ^b)	1.5	0.2–11.5	0.726
>59yo	2.2	0.3–18.1	0.470
Sex: Female	1.2	0.5–2.5	0.734
Race: Black (White Ref)	0.3	0.1–1.1	0.062
Other	1.5	0.3–7.3	0.595
Language: Non-English	0.4	0.1–2.6	0.306
Non-Married	0.5	0.2–1.3	0.167
Medicaid (ever)	0.8	0.4–1.7	0.573
BMI Underweight (Normal Ref)	1.6	0.4–5.6	0.485
BMI Overweight	0.9	0.3–2.1	0.372
BMI Obese	0.4	0.1–0.9	0.027 ^a
ACG Middle Tertile (Lowest Ref)	0.6	0.3–1.4	0.232
Highest Tertile	0.6	0.3–1.4	0.241
Cardiovascular disease ^c	2.8	1.3–6.2	0.009 ^a
Diabetes mellitus	1.6	0.7–3.7	0.286
Hyperlipidemia	1.2	0.6–2.5	0.687
Hypertension	2.8	1.4–5.8	0.020 ^a
Pulmonary disease	3.5	2.7–18.9	<0.001 ^a
Anxiety/Depression	2.4	1.2–5.0	0.018 ^a
<i>Multivariate Model</i>			
RA Control	0.3	0.1–0.97	0.043 ^a
Pulmonary disease	5.0	1.7–14.4	0.003 ^a
BMI Underweight	0.6	0.2–2.5	0.526
BMI Overweight	0.5	0.1–1.8	0.286
BMI Obese	0.3	0.1–0.9	0.038 ^a

^a p<0.05;^b Ref=Reference category;^c Cardiovascular disease includes Congestive Heart Failure, Peripheral Vascular Disease, Transient Ischemic Attack/Stroke, Ischemic Heart Disease