Effect of Formal Education Level on Measurement of Rheumatoid Arthritis Disease Activity

Young Ho Lee
Division of Rheumatology, Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea

Rheumatoid arthritis (RA) is a chronic inflammatory disease that leads to joint damage and bone destruction, disability, and increased mortality. The occurrence and outcome of RA is influenced by both genetic and environmental factors. The environmental risk factors for RA include sex, age, smoking, diet, socioeconomic status (SES), and ethnicity. SES is comprised of a combination of factors including education, occupation, and income. A low SES has been associated with a worse clinical outcome and high disease activity in patients with RA [1].

Education, as a composite for SES, is regarded as the best surrogate measure of SES, although the associations between education and diseases are independent of other socioeconomic variables. The formal education level is an easily measured socioeconomic variable and is used as a quick and useful proxy for SES. An inverse association has been demonstrated between the level of education and clinical symptoms in RA patients. A more severe clinical status in RA patients has been associated with a lower formal education level, and this association is not explained by age, sex, clinical setting, smoking history, treatment used, or disease duration [1]. A prospective study showed that RA patients with the lowest formal education level presented with higher Health Assessment Questionnaire scores, higher tender and swollen joint counts, and more X-ray damage [2]. Over a follow-up period of 5 to 8 years, those with the lowest education level showed a tendency for a worse outcome [2]. A Sweden study demonstrated that patients with RA and lower education and occupation had higher hospitalization rates compared to the general population [3].

Morbidity and mortality rates in patients with RA have also been reported to vary significantly according to the level of formal education [4]. Associations between a low formal education level and increased morbidity and mortality have been well established in patients with RA [4]. A low formal education level is a significant predictor of premature mortality in patients with RA, and dose-response relations have been noted for formal education as a predictor of mortality [5]. A long-term cohort study in which the participants were followed for up to 35 years showed that low education was a significant risk factor for mortality among RA patients [6]. The association between lower formal education level and increased morbidity and mortality due to RA was not explained simply by age or disease duration.

Previous studies have shown an association between low formal education and an increased risk of RA with mixed results. A population-based case-control study found that subjects without a university degree were at a significantly higher risk for developing RA compared to individuals with a university degree [4]. A study revealed that the RA prevalence rate decreased with higher education in the Korean population, and the difference was statistically significant even after controlling for sex and age [7]. A population-based study in Norway found an inverse association between longer education and risk of RA, but this association was not statistically significant after adjusting for age, sex, marital status, body mass index, employment status, and baseline smoking [8]. Further studies are needed to explore the association between formal education and RA risk.
The associations between education and morbidity and mortality are not limited to RA. A number of chronic diseases occur more frequently in individuals with low formal education, and a low SES is associated with increased mortality and morbidity from RA as well as cardiovascular disease, cancer, pulmonary disease, and the general population [9]. A clear gradient has been demonstrated between SES and mortality and health. As the SES decreases, the mortality rates increase.

The reasons for the association between formal education and the clinical status and mortality of RA remain unclear. However, plausible mechanisms have been suggested. Formal education is a surrogate for many variables including income, diet, compliance with medical care, general health habits, and overall lifestyle. Patients with a low formal education level may delay seeing a doctor because of financial considerations, ignorance, or poor access [1]. Behavioral risk factors such as smoking, diet, obesity, and a sedentary lifestyle appear to be more frequent among persons with low education [10]. Individuals with low education are more likely to be unemployed or have higher risks of injury due to work in physically demanding jobs and greater degrees of stress [10,11]. In addition, they are less likely to engage in self-care activities for RA [10,11].

In a previous issue of this journal, Kim et al. [12] demonstrated the effect of formal education level on measurement of RA activity and concluded that significant associations with education were found in Korean RA patients according to most RA Core Data Set measures and 4 indices including disease activity score with 28 joint count (DAS28). Education was more likely to explain the variation in most measures and indices compared to age, sex, or disease duration. Multiple regression analysis including age, sex, disease duration, and formal education revealed that the formal education level was the only significant variable that explained the variations in RA activity including tender joint count, pain, and DAS28. The study by Kim et al. [12] provided strong evidence that a low formal education level is associated with high disease activity in Korean RA patients.

This study had 2 shortcomings that should be considered. First, this was a cross-sectional study, but the question was best answered in the context of prospective cohort studies. The results of cross-sectional studies often differ from those of longitudinal cohort studies, because cross-sectional studies include only prevalent cases that are currently under a follow-up. This may bias the results. It is also difficult to distinguish cause and effect in cross-sectional studies. Second, other confounding variables such as income, occupation, therapies used, and smoking were not analyzed. It is well established that smoking is a risk factor in the development of RA; it is also a predictive factor for a poor response to RA treatment and is associated with development of extra-articular manifestations in RA patients [13].

In conclusion, there is clear evidence that a low formal education level is associated with a poor outcome and higher mortality in RA patients. However, the influence of environmental factors on the outcome of RA has received little attention. Formal education, which was not included in many studies conducted on the morbidity and mortality of RA, remains a neglected variable. These findings may have pragmatic implications for clinical studies on RA, because formal education, like other socioeconomic variables such as income and occupation, is easily determined. Inclusion of formal education in RA databases may provide useful insight for understanding the unexplained variation in the clinical status and mortality of RA.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

5. Pincus T, Keysor J, Sokka T, Krishnan E, Callahan LF. Patient questionnaires and formal education level as prospective predictors of mortality over 10 years in 97% of 1416 patients with rheumatoid arthritis from 15 United States private practices. J Rheumatol 2004;31:229-34.
9. Pincus T, Callahan LF, Burkhauser RV. Most chronic diseases are reported more frequently by individuals with fewer than 12 years of formal education in the age 18-64 United States population. J Chronic Dis 1987;40:865-74.