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Review Article

Prevalence of restless legs syndrome in North American and Western European populations: A systematic review

Kim E. Innes [a,b,*], Terry Kit Selfe [a,b,1], Parul Agarwal [a,2]

[a] Department of Community Medicine, West Virginia University School of Medicine, P.O. Box 9190, Morgantown, WV 26506-9190, United States
[b] Center for the Study of Complementary and Alternative Therapies, University of Virginia Health System, P.O. Box 800782, McLeod Hall, Charlottesville, VA 22908-0782, United States

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ABSTRACT

Background: Restless legs syndrome (RLS) is a potentially debilitating sleep disorder that affects a significant percentage of North American and European adults. Although standardized RLS diagnostic criteria are now established and widely accepted, reported prevalence estimates have varied widely. In this paper, we review the literature regarding RLS prevalence in North American and Western European adult populations, examine potential sources of variation, briefly discuss the impact of RLS, and offer recommendations for future research.

Methods: To identify qualifying studies, we searched 6 scientific databases and scanned bibliographies of relevant review papers and all identified articles. Studies including fewer than 300 participants, that did not use any of the 4 standard diagnostic criteria, were published prior to 1995 or targeted clinical populations were excluded.

Results: Thirty-four papers detailing results of large, population-based studies in 16 North American and Western European countries met our inclusion criteria, including 5 multi-country studies ($N = 69{,}992$ participants) and 29 single country studies ($N = 163{,}188$ participants); all but one were cross-sectional. Reported general prevalence rates ranged from 4% to 29% of adults, averaging 14.5 ± 8.0% across studies. Reported prevalence averaged higher in primary care populations than in populations derived from random sampling or geographically defined cohorts (19.5 ± 7.9% vs. 12.3 ± 7.2%). Diagnostic and severity criteria differed considerably among studies, as did inclusion criteria, with corresponding variation in prevalence estimates. Prevalence averaged higher in women and older adults; more limited data suggest race/ethnicity, parity, health status, and other factors may also contribute to the observed variation in prevalence. RLS has profound, negative effects on health, well-being, and quality of life, yet detection rates remain low.

Conclusions: Collectively, these studies indicate that RLS is a common disorder of major clinical and public health significance in the Western industrialized world, affecting between 4% and 29% of adults. The wide variation in reported prevalence likely reflects differences in demographic factors, health status, and other population characteristics; study population source and sampling frame; and inconsistencies in RLS diagnostic criteria and procedures. Prospective studies and corresponding incidence data on RLS are lacking, hindering the evaluation of both causal factors and sequelae.

1. Introduction

Restless legs syndrome (RLS) is a potentially debilitating sleep and sensorimotor disorder that affects a significant percentage of North American and Western European adults [1–4]. RLS is characterized by a distressing, irresistible urge to move the legs which is usually accompanied by uncomfortable sensations in the lower extremities, that begins or worsens during periods of inactivity, is worse during the evening and nighttime hours, and is partially or totally relieved by movement [1,3,5]. Recognition of RLS as an important clinical condition is growing, in part aided by standardized minimal clinical criteria developed by an international expert consensus in 1995 [6] and revised in 2003 [1] (Table 1). While there remains some debate regarding the specificity of these criteria, the diagnostic guidelines developed by the international restless legs syndrome study group (IRLSSG) [1] are now widely

* Corresponding author at: Department of Community Medicine, West Virginia University School of Medicine, P.O. Box 9190, Morgantown, WV 26506-9190, United States. Tel.: +1 304 293 5206; fax: +1 304 293 2700.
E-mail addresses: kinnes@hsc.wvu.edu (K.E. Innes), tselfe@hsc.wvu.edu (T.K. Selfe), pagarwal@hsc.wvu.edu (P. Agarwal).
[1] Tel.: +1 304 293 2082; fax: +1 304 293 2700.
[2] Tel.: +1 304 293 2968; fax: +1 304 293 2700.

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Table 1
Commonly used diagnostic criteria for restless legs syndrome (RLS).

IRLSSG minimal criteria (1995) [6]
(1) Desire to move the limbs usually associated with paresthesias/dysthesias;
(2) Motor restlessness;
(3) Symptoms are worse or exclusively present at rest (i.e. lying, sitting) with at least partial and temporary relief by activity;
(4) Symptoms are worse in evening/night.

IRLSSG essential criteria (2003) [1]
(1) An urge to move the legs, usually accompanied or caused by uncomfortable and unpleasant sensations in the legs (Sometimes the urge to move is present without the uncomfortable sensations and sometimes the arms or other body parts are involved in addition to the legs);
(2) The urge to move or unpleasant sensations begin or worsen during periods of rest or inactivity such as lying or sitting;
(3) The urge to move or unpleasant sensations are partially or totally relieved by movement, such as walking or stretching, at least as long as the activity continues;
(4) The urge to move or unpleasant sensations are worse in the evening or night than during the day or only occur in the evening or night. (When symptoms are very severe, the worsening at night may not be noticeable but must have been previously present.)

ICSD-90 criteria [95]*
Criterion A: A complaint of unpleasant sensations in the legs at night or difficulties in initiating sleep.
Criterion B: Disagreeable sensations of 'creeping' inside the calves often associated with general aches and pains in the legs.
Criterion C: The discomfort is relieved by movement of the limbs.

ICSD-2 Diagnostic Criteria for Adults (2nd Edition, 2005) [96]**
(A) The patient reports an urge to move the legs, usually accompanied or caused by uncomfortable and unpleasant sensations in the legs.
(B) The urge to move or the unpleasant sensations begin or worsen during periods of rest or inactivity such as lying or sitting.
(C) The urge to move or the unpleasant sensations are partially or totally relieved by movement, such as walking or stretching, at least as long as the activity continues.
(D) The urge to move or the unpleasant sensations are worse, or only occur, in the evening or night.
(E) The condition is not better explained by another current sleep disorder, medical or neurological disorder, mental disorder, medication use, or substance use disorder.

Abbreviations: ICSD, international classification of sleep disorders; IRLSSG, international restless legs syndrome study group.
* Used in one multi-national study included in this review [22].
** Not used by any of the studies included in this review.

accepted [2,4]. The establishment of standardized diagnostic criteria, coupled with the increasing appreciation of RLS as a disorder of significant clinical and economic impact have, in turn, led to a growing number of population-based studies regarding RLS prevalence and epidemiology in both North American and Western European populations. However, despite apparent broad disparities in reported estimates and corresponding uncertainty regarding the public health significance of RLS, prevalence data from these studies have not, to our knowledge, been comprehensively reviewed. In this paper, we present a systematic review of the published literature regarding RLS prevalence in the general Western European and North American populations, discuss potential sources of variation, outline the implications regarding the clinical and public health impact of RLS, and offer recommendations for future research.

2. Methods

Included in this review are original population-based studies published from 1995–2010 in the peer-reviewed scientific literature that provided data on prevalence of RLS in North American and/or Western European populations. We excluded studies that targeted clinical populations, were based only on chart or medical record review, were not available in English, did not target North American or Western European populations, included fewer than 300 participants, did not specifically target RLS, did not specify diagnostic criteria for RLS, or did not incorporate any of the 4 diagnostic criteria for RLS outlined by the IRLSSG. Studies published only in dissertation or abstract form or that did not report quantitative outcome data were also excluded.

To identify potentially eligible studies, we searched 6 scientific databases from 1995 to July 2010, including MEDLINE, CINAHL, Academic Search Complete, PsycINFO, PsycARTICLES, and Health Source: Nursing/Academic Edition. Search terms included (restless leg* OR RLS) AND (prevalence OR epidemiology). Titles and abstracts of the citations were scanned to identify potential articles for the review. In addition, we manually searched our own files, the citation sections of all identified articles, and the reference sections of recent (2000–2010) review articles concerning restless legs syndrome. Potentially eligible papers were retrieved in hard copy form for more detailed review.

Data extraction for each eligible paper was performed by at least two of the three authors according to predefined criteria, and recorded on standardized forms. Discrepancies or disagreements during the data extraction and evaluation process were resolved by discussion and consensus by at least two reviewers (KEI and PA/TKS).

3. Results and discussion

Of over 1300 potentially relevant abstracts and citation indices scanned, 55 possibly eligible papers were identified for detailed review; of these, 21 were excluded for the following reasons: one targeted clinical populations only, 6 did not present original data or reported data included in another paper, 2 were not available in English, 3 were available only in abstract or report form, 4 did not specifically target RLS, 3 used a definition of RLS that did not include any of the 4 IRLSSG standard criteria, and in 2, estimates were based solely on medical records with no specified diagnostic criteria.

Tables 2 and 3 summarize findings from the remaining 34 eligible population-based North American and Western European studies. To date, large population-based studies yielding data on RLS prevalence have been conducted in at least 16 North American and Western European countries, including the US [7–18], Canada [19], UK [8,10,20–22], Ireland [20,23,24], France [8,10,25,26], Germany [8,10,20,22,27–30], The Netherlands [20], Denmark [20,31], Norway [31], Sweden [32–36], Switzerland [37], Finland [38], Italy [8,22,39], Spain [8,10,20,22], Portugal [22], and Greece [40] (Table 2). All were published within the last decade, with almost 75% published in 2005 or later. Collectively, these studies represent a combined total of 233,180 participants and include 5 multi-country studies (N = 69,992 total participants) [8,10,20,22,31] and 29 single country studies (N = 163,188 total participants) (Table 2).