



Neck and Shoulder Pain in Violin and Viola Players: A Systematic Review and Meta-Analysis

Jong Hyeon Yoon ¹, Hyun Ho Choi ¹, Hyewon Choi ¹, Sen Jay Oh ², Ji Hyun Kim ², Jong Hyun Oh ³,
Tae Uk Kim ², Seo Young Kim ², Yuna Kim ², Chang Hyung Lee ⁴, and Jung Keun Hyun ^{1,5}*

- 1 Department of Rehabilitation medicine, Ajou University School of Medicine, Suwon 16499, Korea
2 Department of Rehabilitation Medicine, College of Medicine, Dankook University, Cheonan 31116, Korea
3 Department of Software Convergence, Kyung Hee University, Yongin 17104, Korea
4 Department of Rehabilitation medicine, Pusan National University Yangsan Hospital, Yangsan 50612, Korea
5 Department of Biomedical Science, Ajou University School of Medicine, Suwon 16499, Korea

* Corresponding author: rhhyun@ajou.ac.kr

Background

Neck and shoulder pain is common in violin and viola players and may impair performance and function. However, prevalence estimates vary widely across studies, and evidence for preventive or therapeutic interventions remains limited. This systematic review and meta-analysis quantified the burden of neck/shoulder pain in upper-string players and summarized effects of non-pharmacologic interventions relevant to rehabilitation practice.

Methods

PubMed, Scopus, and the Cochrane Library were searched from January 1990 through December 2025. We included observational studies reporting (or allowing extraction of) neck and/or shoulder pain prevalence in violin/viola players and randomized controlled trials (RCTs) evaluating interventions with neck/shoulder outcomes. Prevalence was pooled using random-effects models with logit transformation. Prespecified subgroup analyses examined instrument category (upper-string vs other instrumentalists), sex, professional status, and recall period (short ≤ 1 month vs long ≥ 3 months). Risk of bias was assessed using the modified Hoy tool (prevalence studies) and RoB 2 (RCTs).

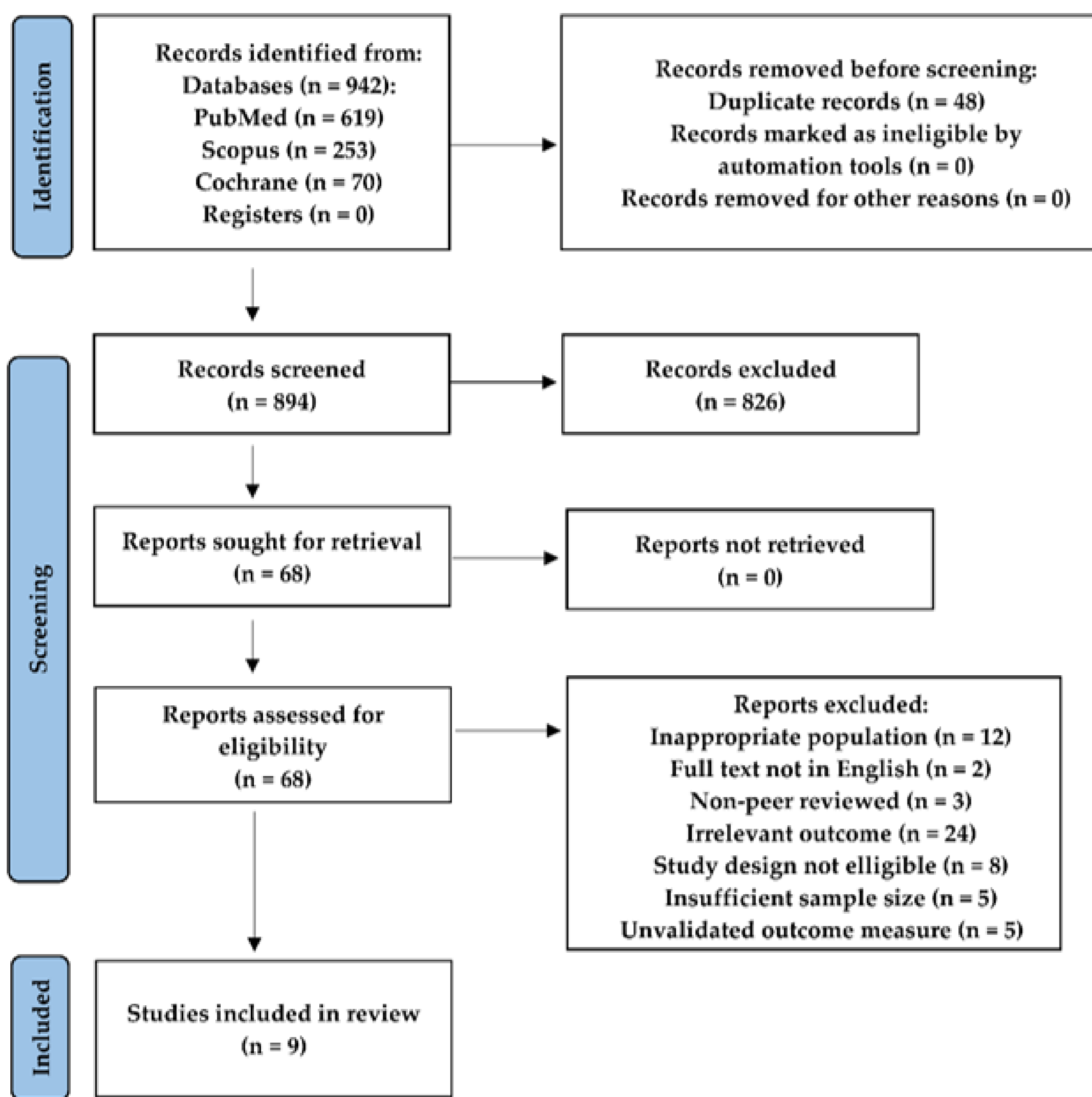


Figure 1. PRISMA 2020 flow diagram of the literature search and study selection process.

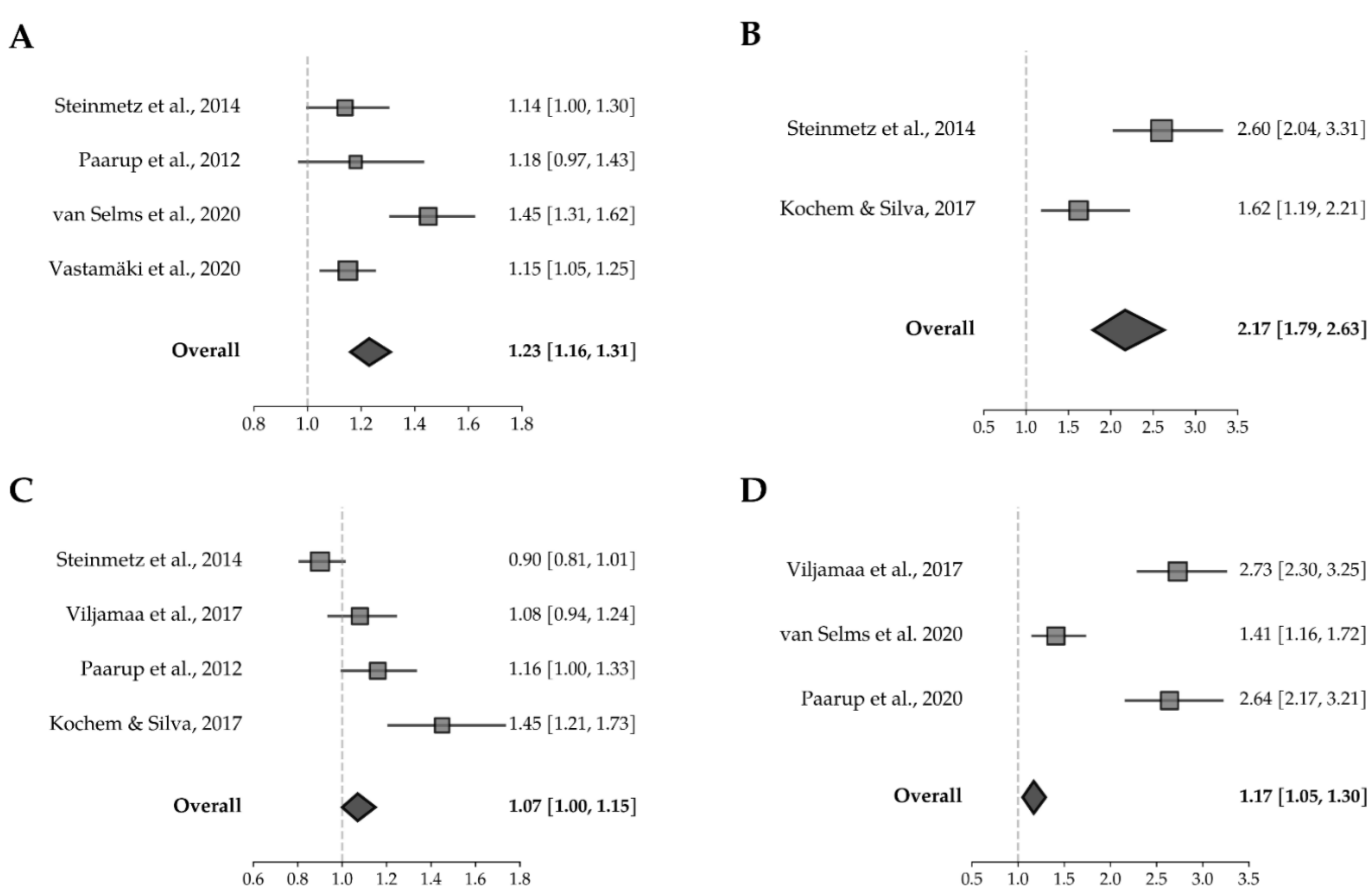


Figure 2. Subgroup comparisons of neck/shoulder pain prevalence (RRs): (A) upper-string vs other instrumentalists, (B) long vs short recall, (C) amateur/student vs professional, (D) female vs male. Squares indicate study estimates; diamonds pooled effects.

Results

Six cross-sectional studies (n=1,055) were included for prevalence synthesis. The pooled prevalence of neck and/or shoulder pain among upper-string players was 70.5% (95% CI 63.0–77.0) with substantial heterogeneity ($I^2=83.2\%$). Subgroup patterns showed higher prevalence in upper-string players than other instrumentalists (RR 1.23, 95% CI 1.16–1.31), higher prevalence with long vs short recall periods (RR 2.17, 95% CI 1.79–2.63), and higher prevalence in females vs males (RR 1.17, 95% CI 1.05–1.30). Differences between amateur/student and professional musicians were small and borderline. Three RCTs evaluating exercise/education-based programs or adjunctive taping reported short-term improvements, but pooled intervention effects were imprecise due to heterogeneity and limited follow-up.

Conclusions

Approximately seven in ten violin/viola players report neck/shoulder pain. Variation in case definitions and recall periods substantially influences prevalence estimates. Current RCT evidence suggests potential short-term benefit of multimodal rehabilitation-oriented approaches (exercise and education), but stronger, adequately powered trials with standardized outcomes and longer follow-up are needed. These findings support targeted prevention and rehabilitation strategies addressing playing load, ergonomic setup, and cervical–scapular conditioning in upper-string musicians

Author	Year	Country	Professional status	Study Design	n	Mean Age (SD)	Recall Period	Primary Outcomes
Paarup et al.	2012	Denmark	Professional orchestra	Cross-sectional	216	44.7(10.8)	7 days	Neck pain: 64.8%, Shoulders ~50%
Kochem et al.	2017	Brazil	Professional violinists	Cross-sectional	106	23.9(9.9)	12 months, 7 days	Musculoskeletal pain: 86.8% (last 12 months), 77.4% (last week)
Viljamaa et al.	2017	Finland	Professional orchestra	Cross-sectional	361	45.0(10.0)	1 month	Neck pain: 69% (female), 52% (male); Musculoskeletal disorders: 73-88%
Steinmetz et al.	2015	Germany	Professional orchestra	Cross-sectional	408	43.9(10.3)	3 months, Lifetime	Lifetime neck pain: 72.8% (higher in upper-strings)
van Selms et al.	2019	Netherlands	Mixed (Amateur/Professional)	Cross-sectional	1470	41.6 (17.2)	1 month	Neck/shoulder pain: 52.5% (Upper-strings: 69.2%)
Vastamäki et al.	2020	Finland	Mixed (Student/Professional)	Cross-sectional	590	35.8(11.6)	5 years, Lifetime	Lifetime neck pain: ~82% (higher in upper-strings)
Roos and Roy	2018	Canada	(Student/Professional)	RCT (pilot)	30	38.1(12.0)	N/A (intervention)	MPIQM pain intensity change: -4.0; 1wk follow up
Topdemir et al.	2021	Turkey	Professional violinists	RCT(3-arm)	117	22.8 (3.9)	N/A (intervention)	VAS change (effective in intervention group: p<0.05); 11wk follow up
Wolff et al.	2021	USA	Student musicians	RCT (pilot)	57	21.5(4.0)	N/A (intervention)	MPIQM pain intensity change: -4.6; 8wk follow up

Abbreviations: VAS, visual analogue scale; MPIQM, Musculoskeletal Pain Intensity and Interference Questionnaire for Musicians; RCT, randomized controlled trial.

Table 1. Characteristics of studies included in the systematic review and meta-analysis

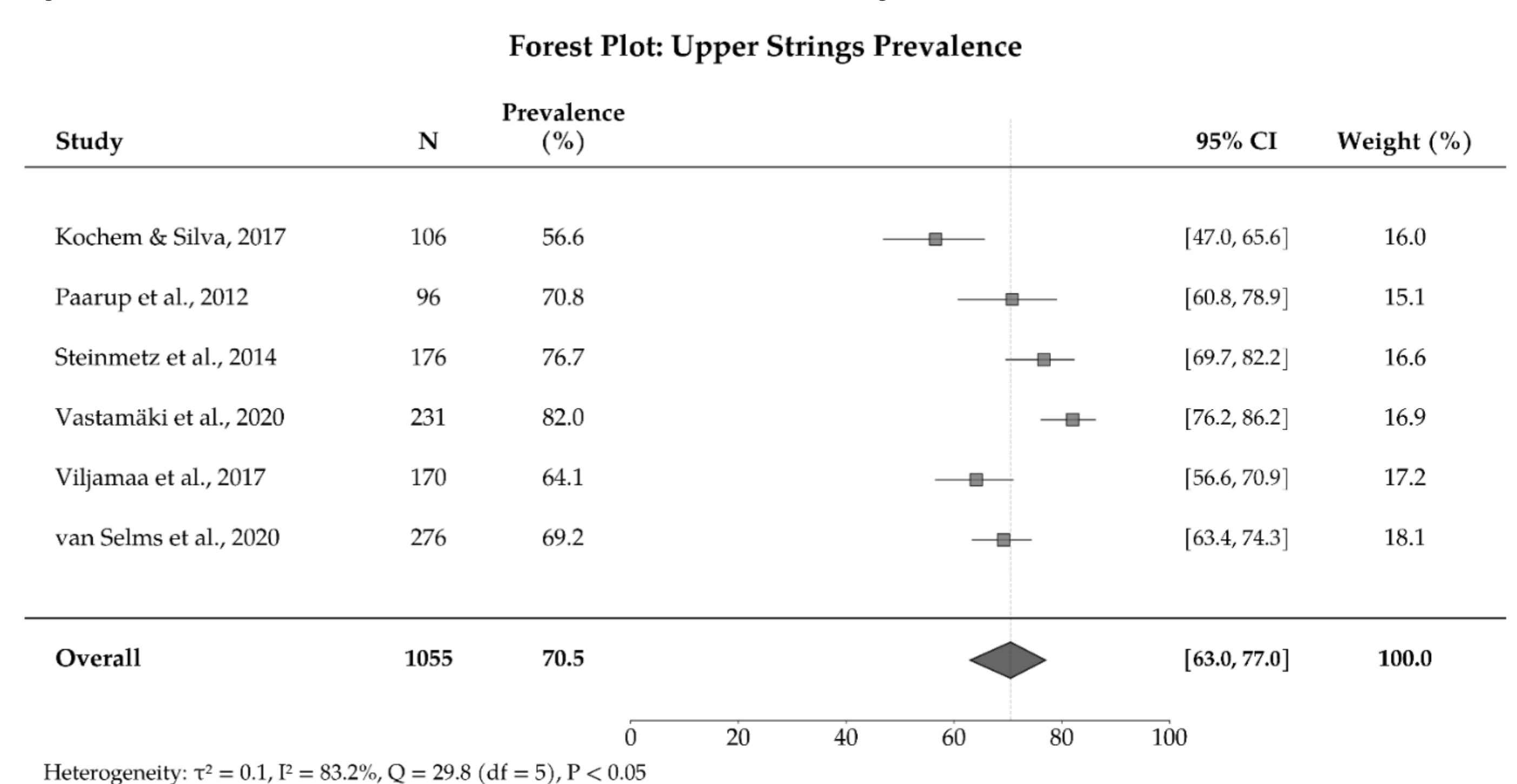


Figure 3. Random-effects pooled prevalence of neck/shoulder pain in upper-string players (6 studies; N=1,055).