

Table S1. Search strategy.

Databases	Search terms
PubMed	(Multiple sclerosis[Title] OR disseminated sclerosis[Title] OR MS[Title]) AND (Mesenchymal[Title] OR MSC[Title] OR MSCs[Title] OR Bone Marrow Stromal Cells[Title])
Cochrane	Title Abstract keyword: (Multiple sclerosis OR disseminated sclerosis OR MS) AND (Mesenchymal OR MSC OR MSCs OR Bone Marrow Stromal Cells)
Scopus	TITLE("Multiple sclerosis" OR "disseminated sclerosis" OR MS) AND TITLE(Mesenchymal OR MSC OR MSCs OR "Bone Marrow Stromal Cells")
ScienceDirect	Title: ("Multiple sclerosis" OR "disseminated sclerosis" OR MS) AND (Mesenchymal OR MSC OR MSCs OR "Bone Marrow Stromal Cells")
Google Scholar	allintitle:("Multiple sclerosis" OR "disseminated sclerosis") (Mesenchymal OR MSC OR MSCs OR "Bone Marrow Stromal Cells")

Table S2. Quality assessment of the non-randomised experimental studies.

No	Study ID	1	2	3	4	5	6	7	8	9	Yes (%)
1	Baldassari 2019	Y	NA	U	Y	Y	Y	Y	Y	Y	87.5
2	Bonab 2005	Y	NA	NA	N	Y	Y	NA	Y	N	66.7
3	Bonab 2007	Y	NA	NA	N	Y	Y	NA	Y	N	66.7
4	Bonab 2012	Y	NA	NA	N	Y	N	NA	Y	N	50.0
5	Cohen 2017	Y	NA	NA	N	Y	N	NA	Y	Y	66.7
6	Cornick 2012	Y	NA	NA	N	Y	Y	NA	Y	Y	83.3
7	Dahbour 2017	Y	NA	NA	N	Y	Y	NA	Y	Y	83.3
8	De oliveira 2015	Y	NA	NA	Y	Y	N	Y	Y	Y	85.7
9	Harris 2016	Y	NA	NA	N	Y	Y	NA	Y	N	66.7
10	Harris 2018	Y	NA	NA	N	Y	Y	NA	Y	Y	83.3
11	Iacobaeus 2019	Y	NA	NA	N	Y	Y	NA	Y	Y	83.3
12	Karussis 2010	Y	NA	Y	N	Y	Y	Y	Y	Y	87.5
13	Lu 2013	Y	NA	NA	N	Y	Y	NA	Y	N	66.7
14	Meng 2018	Y	Y	U	Y	Y	Y	Y	Y	Y	88.9
15	Odinak 2012	Y	NA	NA	N	Y	Y	NA	Y	N	66.7
16	Riordan 2018	Y	NA	NA	N	Y	N	NA	Y	Y	66.7
17	Sahraian 2013	Y	NA	NA	N	Y	Y	NA	Y	N	66.7
18	Sahraian 2019	Y	NA	NA	N	Y	Y	NA	Y	N	66.7
19	Yamout 2010	Y	NA	NA	N	Y	N	NA	Y	N	50.0
20	Cohen 2023	Y	NA	NA	N	Y	Y	NA	Y	Y	55.6
21	Harris 2021	Y	NA	NA	N	Y	Y	NA	Y	Y	55.6
22	Petrou 2021	Y	NA	NA	N	Y	Y	NA	Y	Y	55.6

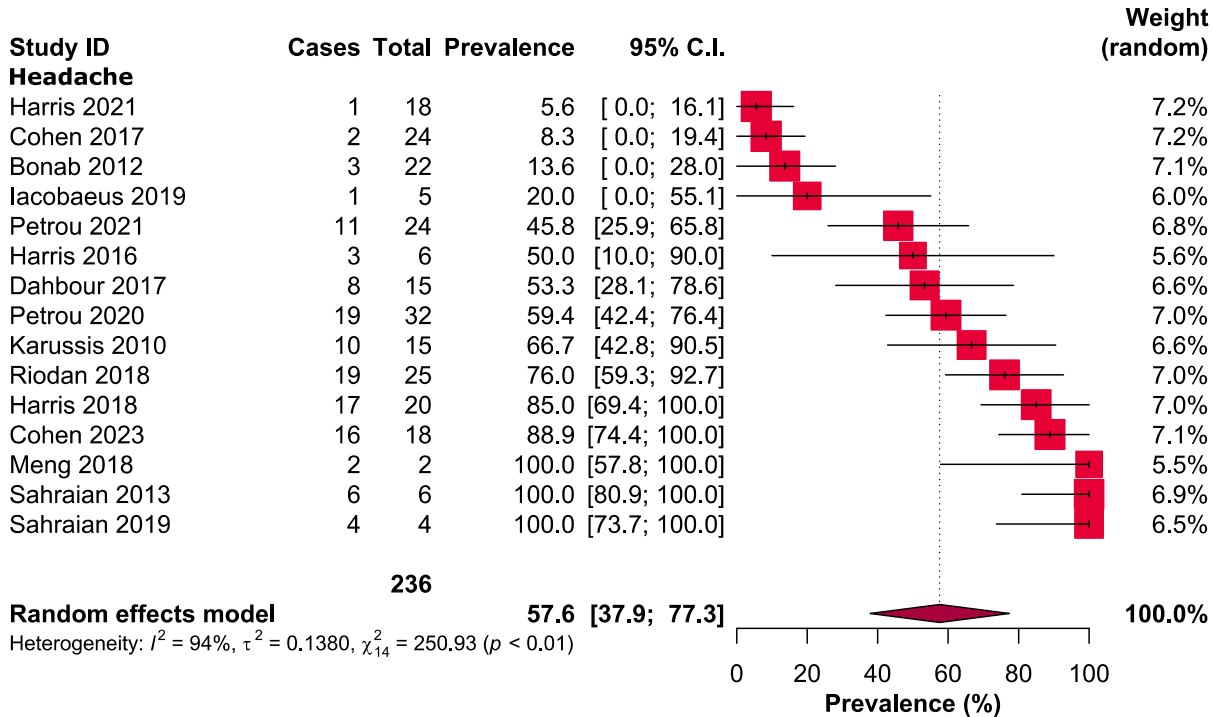
1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)? 2. Were the participants included in any comparisons similar? 3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest? 4. Was there a control group? 5. Were there multiple measurements of the outcome both pre and post the intervention/exposure? 6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed? 7. Were the outcomes of participants included in any comparisons measured in the same way? 8. Were outcomes measured in a reliable way? 9. Was appropriate statistical analysis used? Abbreviations: Y: Yes, N: No, U: Unclear, NA: Not applicable.

Table S3. Quality assessment of the Randomised controlled trials.

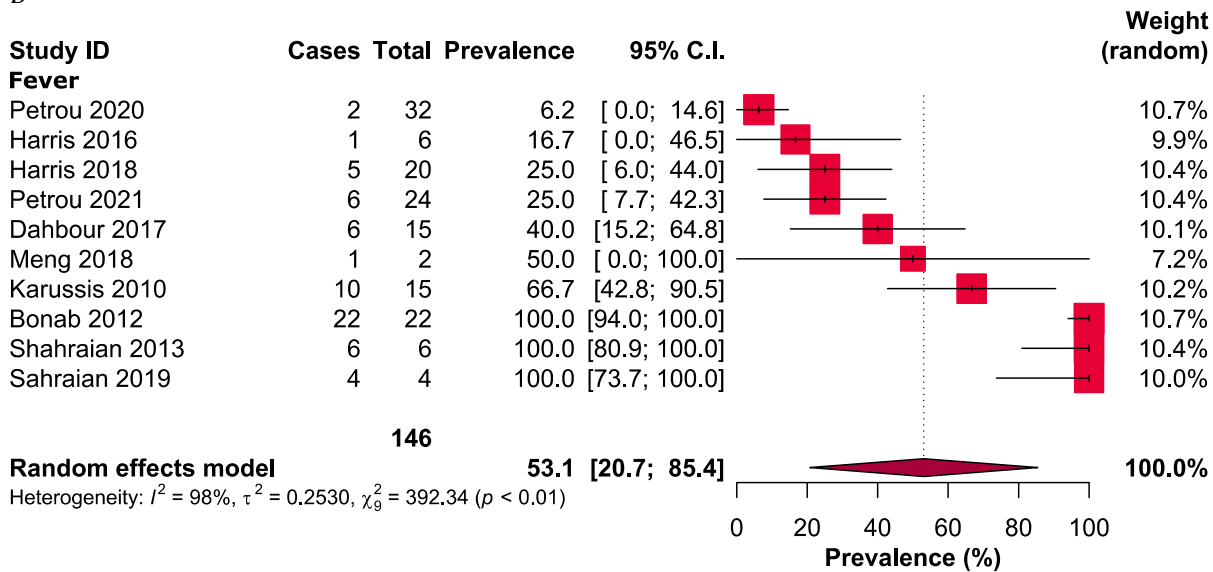
No	Study ID	1	2	3	4	5	6	7	8	9	10	11	12	13	Yes (%)
1	Fernandez 2018	Y	Y	N	Y	Y	Y	Y	N	N	Y	Y	Y	Y	76.9
2	Li 2014	Y	U	Y	Y	U	U	N	U	Y	Y	Y	Y	Y	61.5
3	Lublin 2014	Y	Y	Y	Y	Y	N	U	Y	Y	Y	Y	Y	Y	84.6
4	Nabavi 2023	Y	Y	Y	Y	Y	U	Y	Y	N	Y	Y	Y	Y	84.6
5	Petrou 2020	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	92.3
6	Uccelli 2021	Y	Y	Y	Y	Y	U	Y	Y	N	Y	Y	Y	Y	84.6
7	Tremblay 2022	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	92.3
8	Llufriu 2014	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	92.3

1. Was true randomization used for assignment of participants to treatment groups? 2. Was allocation to treatment groups concealed? 3. Were treatment groups similar at the baseline? 4. Were participants blind to treatment assignment? 5. Were those delivering treatment blind to treatment assignment? 6. Were outcomes assessors blind to treatment assignment? 7. Were treatment groups treated identically other than the intervention of interest? 8. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed? 9. Were participants analyzed in the groups to which they were randomized? 10. Were outcomes measured in the same way for treatment groups? 11. Were outcomes measured in a reliable way? 12. Was appropriate statistical analysis used? 13. Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial? Y: Yes, N: No, U: Unclear, NA: Not applicable.

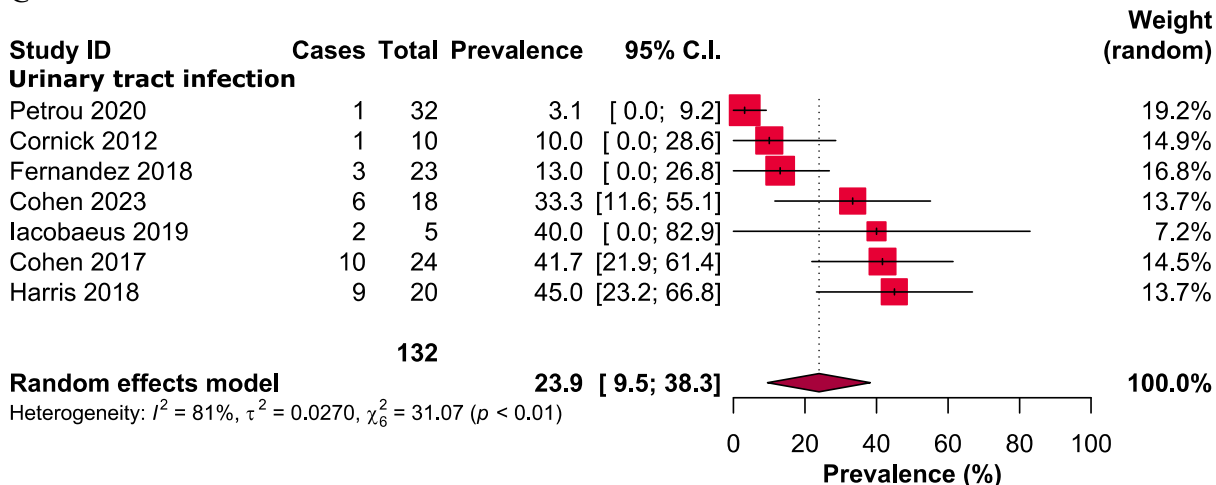
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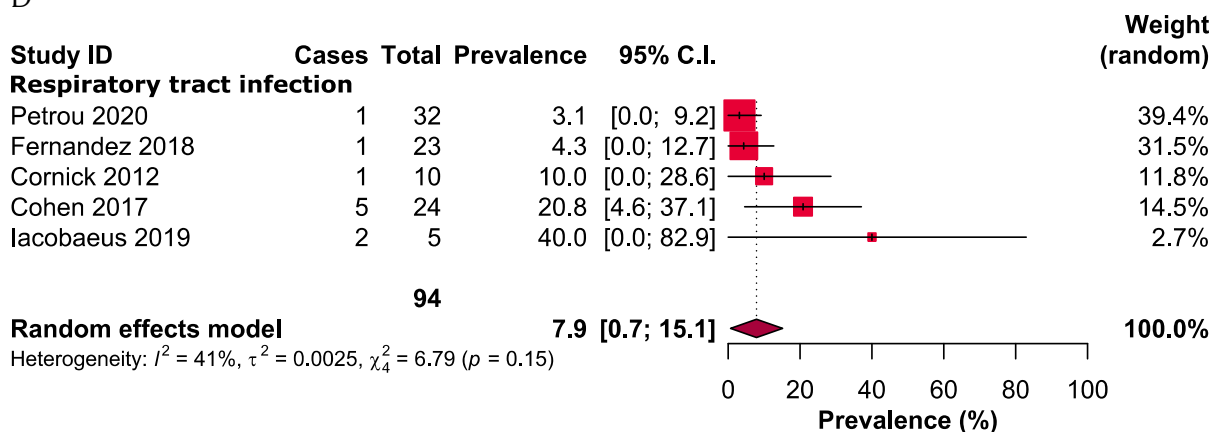
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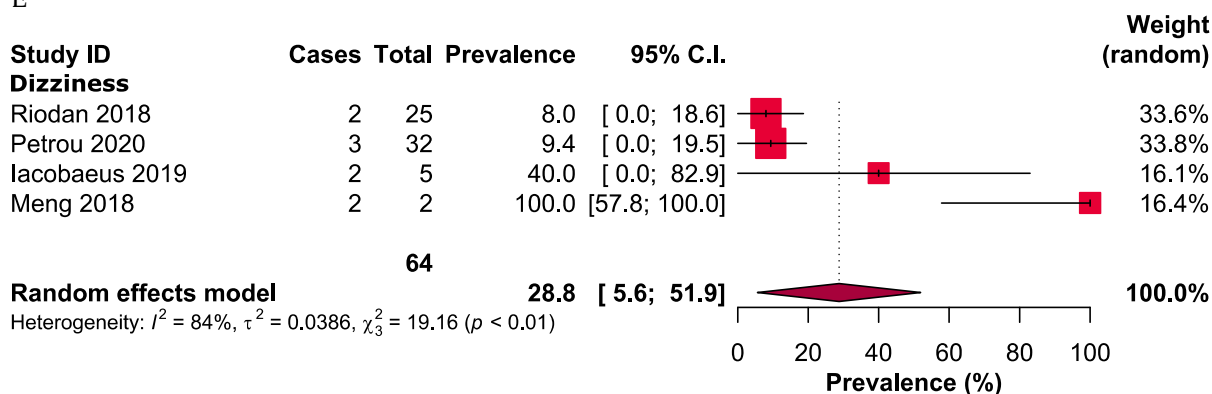
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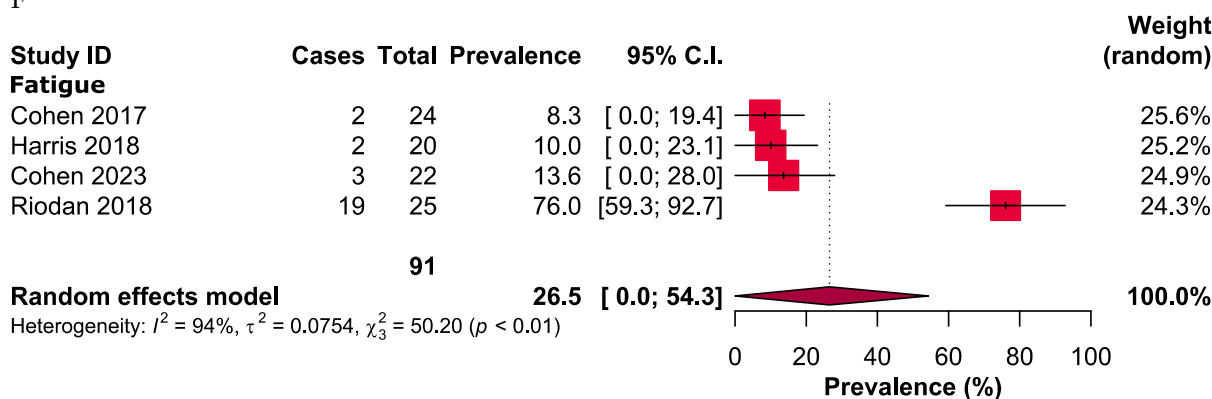
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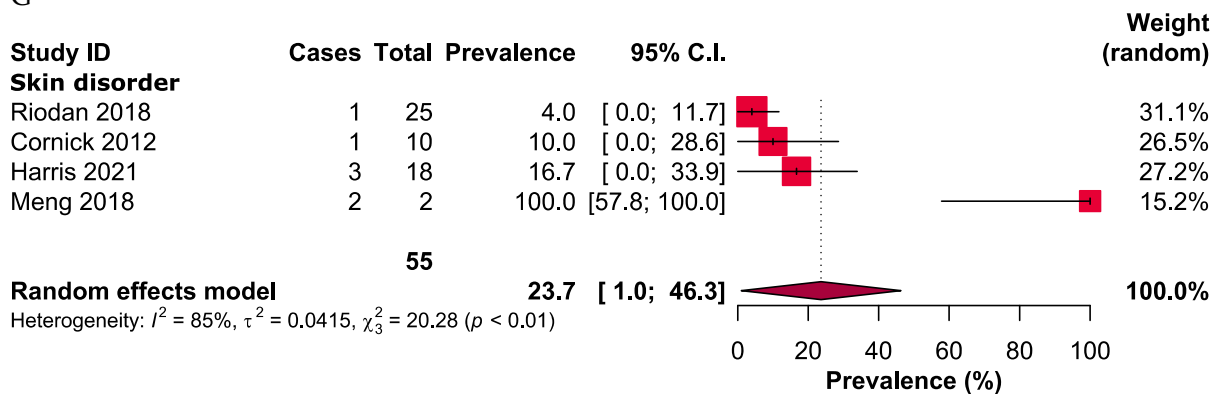
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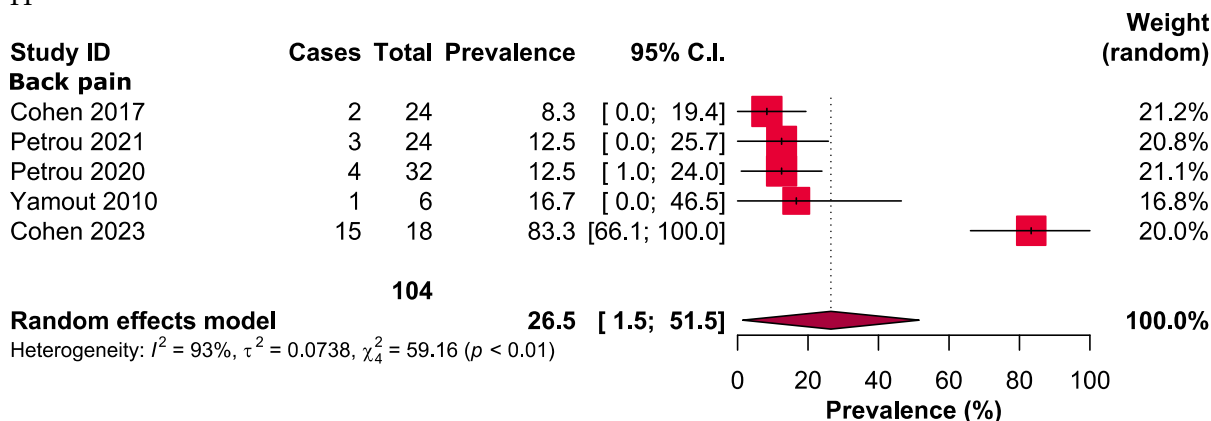
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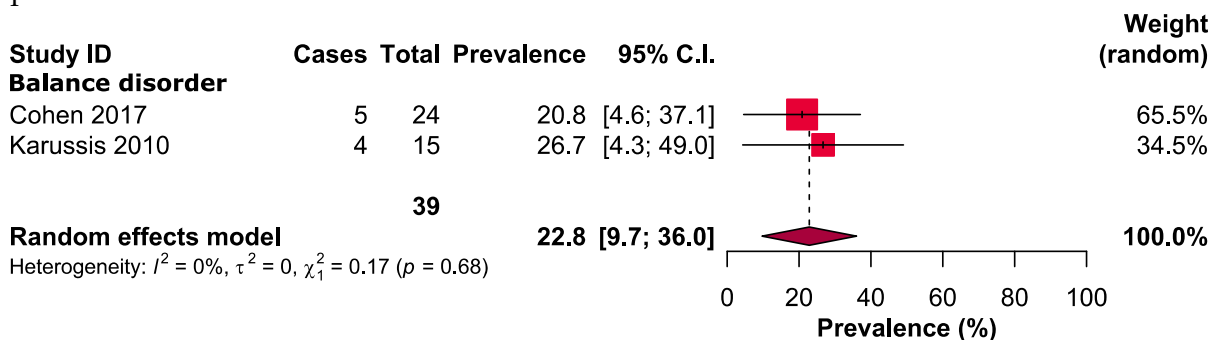
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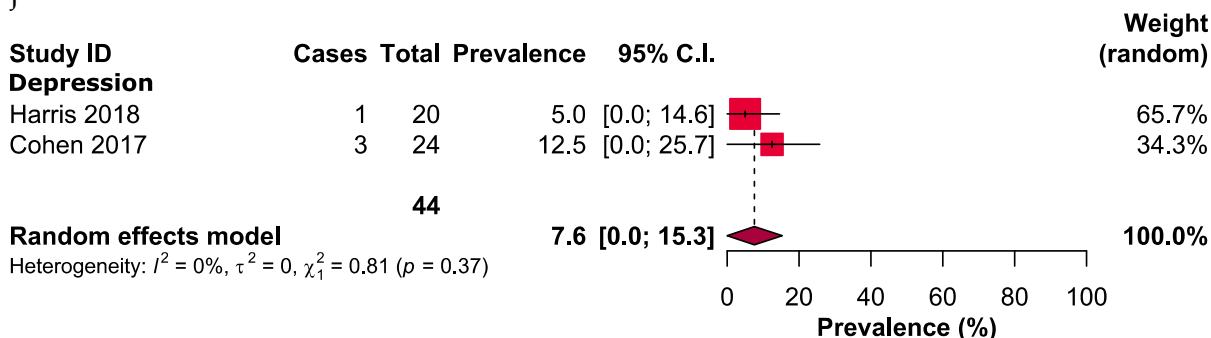
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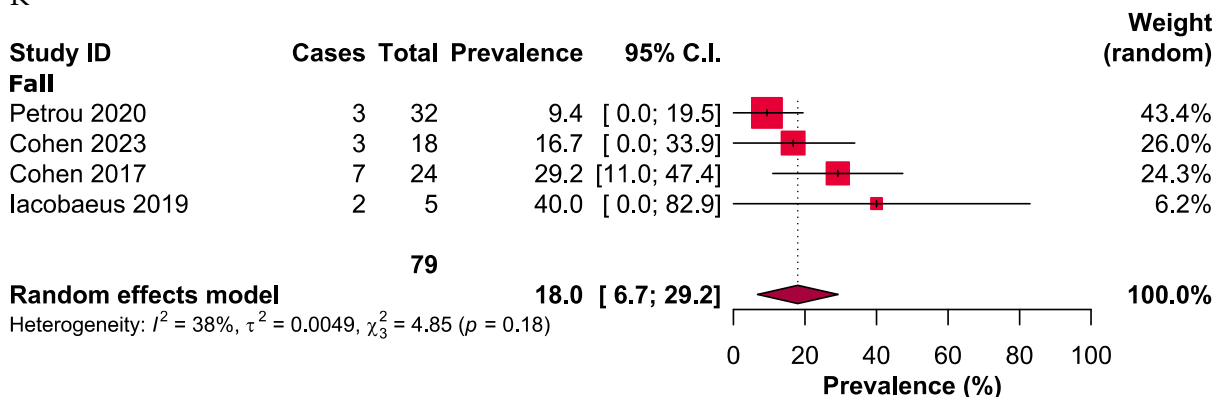
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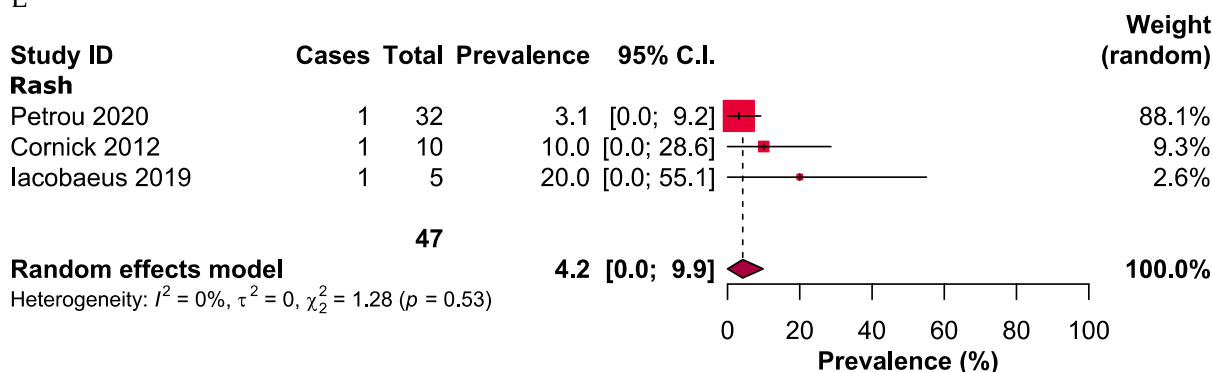
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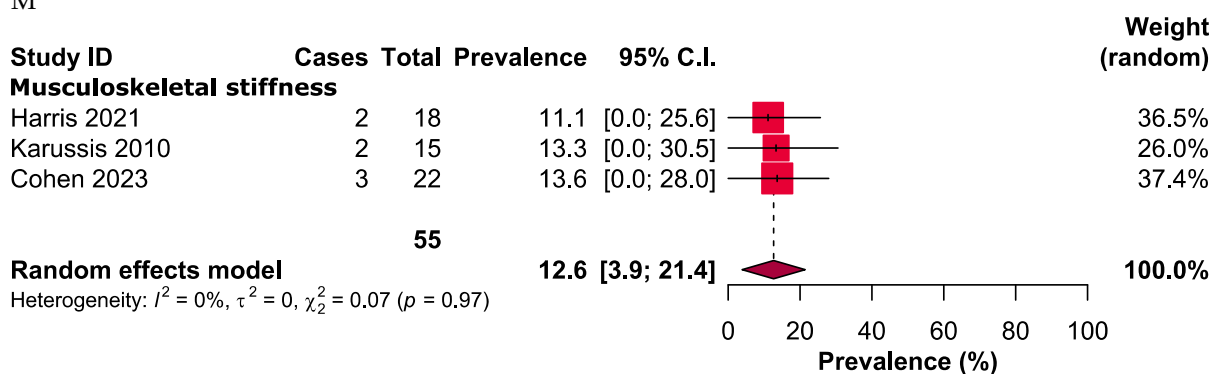
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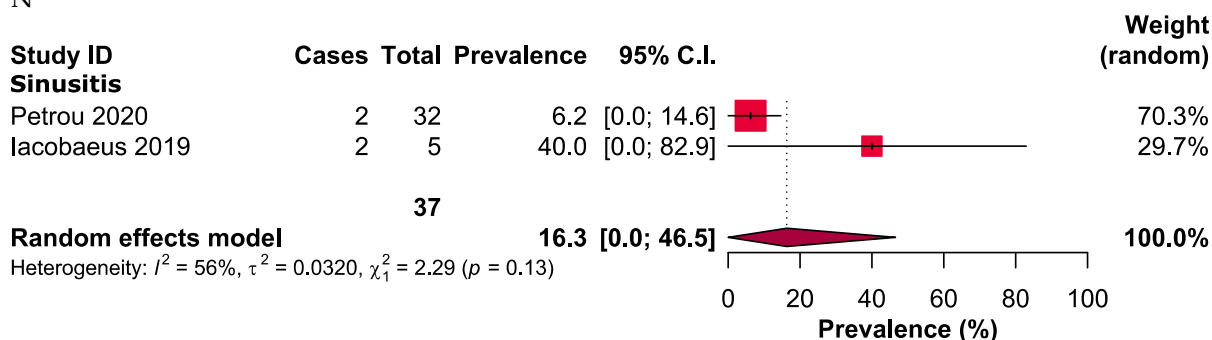
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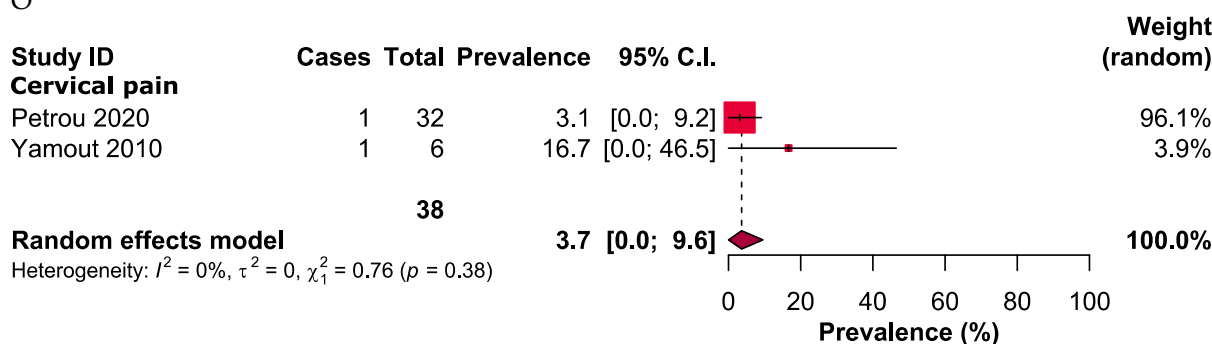
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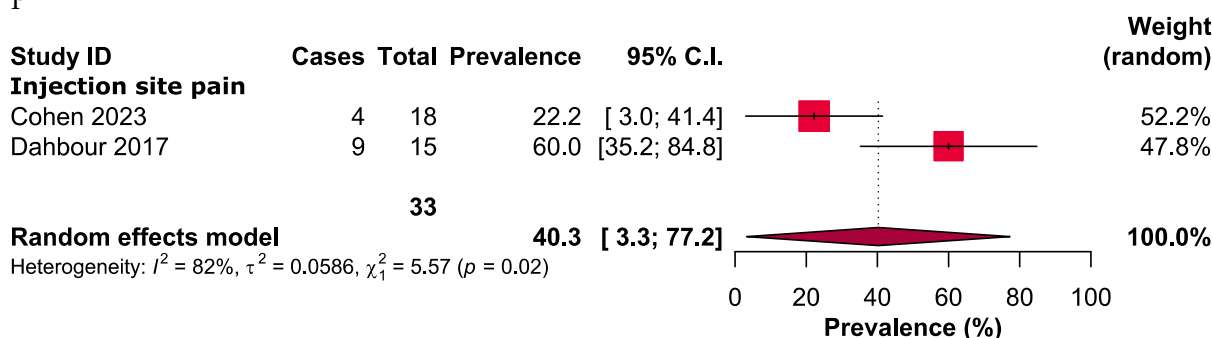
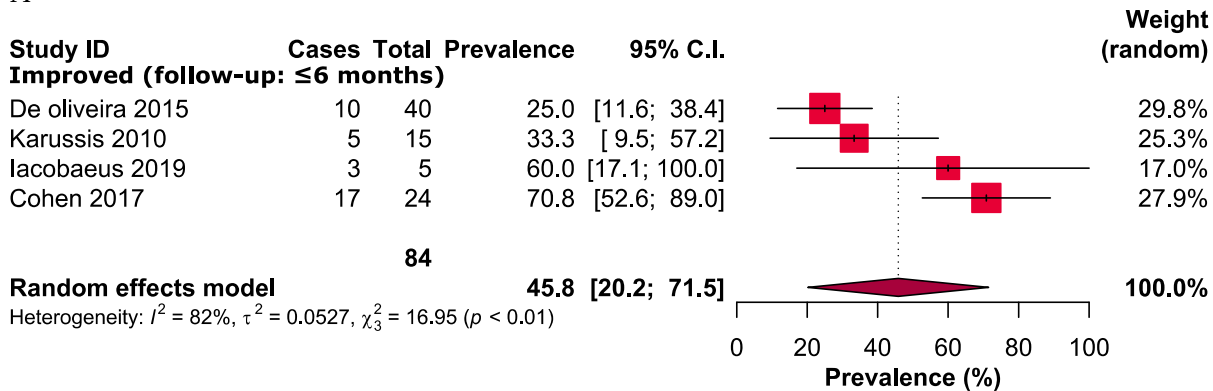
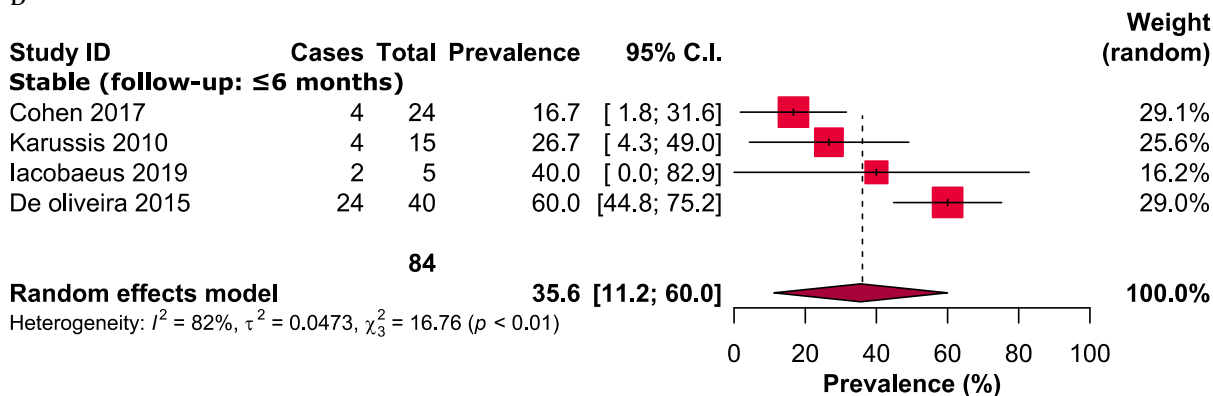


Figure S1. Adverse events in patients with multiple sclerosis following the mesenchymal stem cell therapy. A) headache, B) fever, C) urinary tract infection, D) respiratory tract infection, E) dizziness, F) fatigue, G) skin disorder, H) back pain, I) balance disorder, J) depression, K) fall, L) rash, M) Musculoskeletal stiffness, N) sinusitis, O) cervical pain, and P) injection site pain.

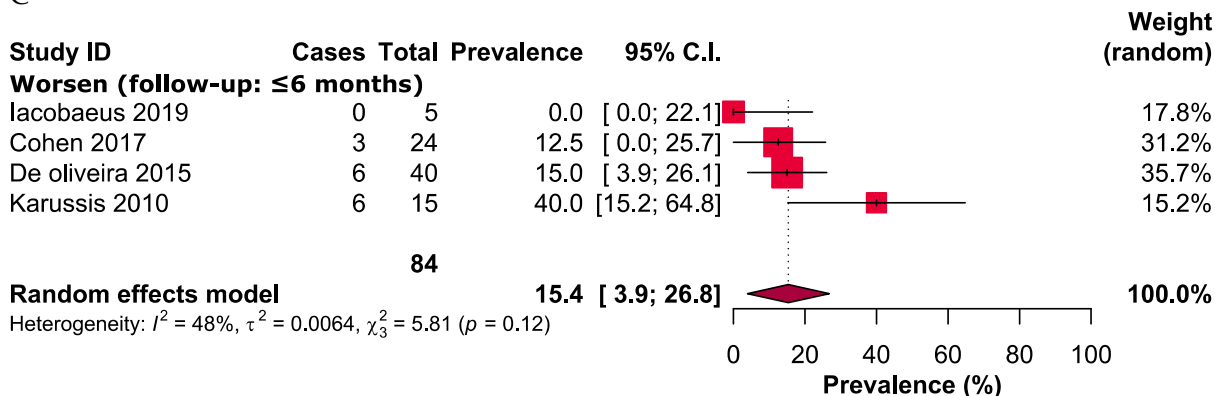
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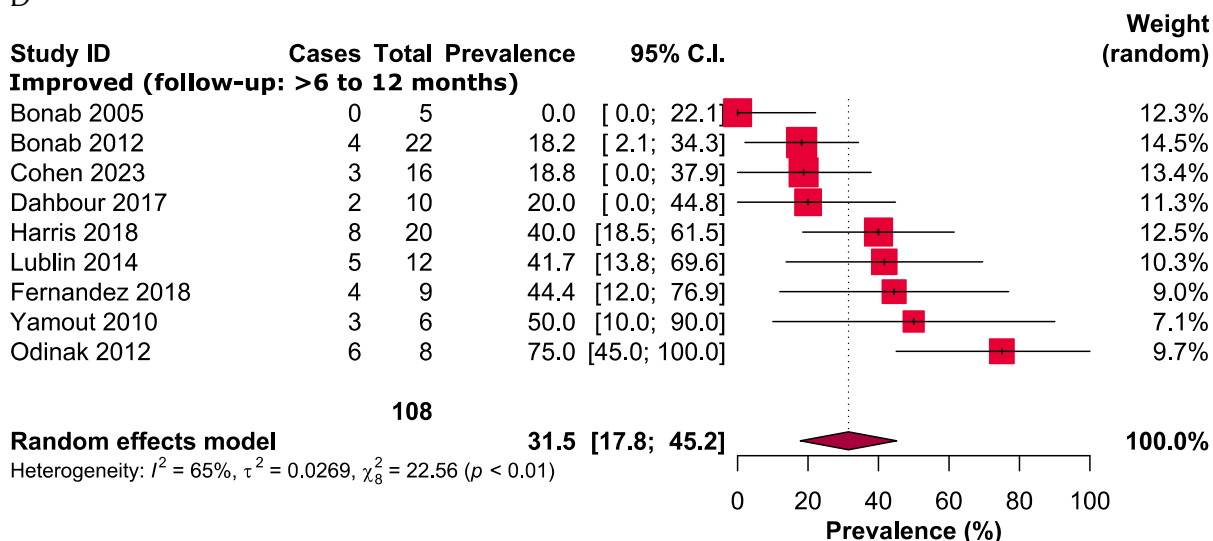
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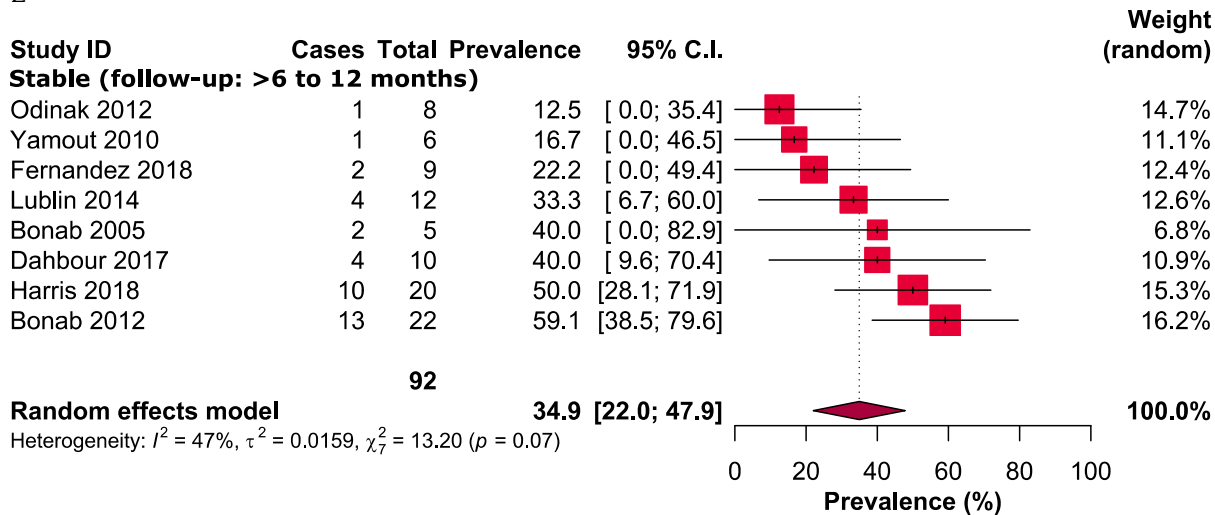
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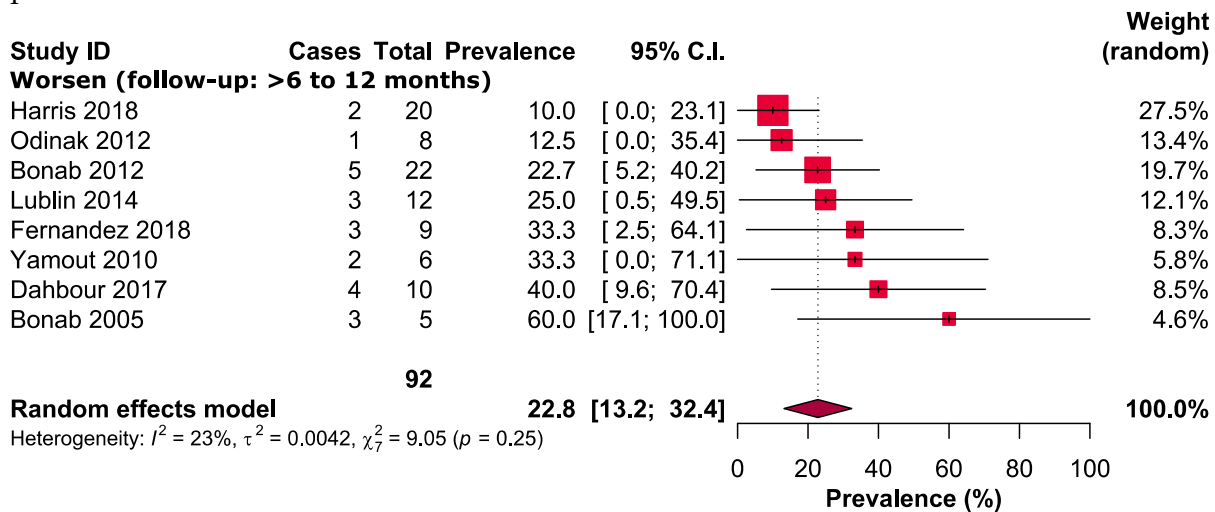
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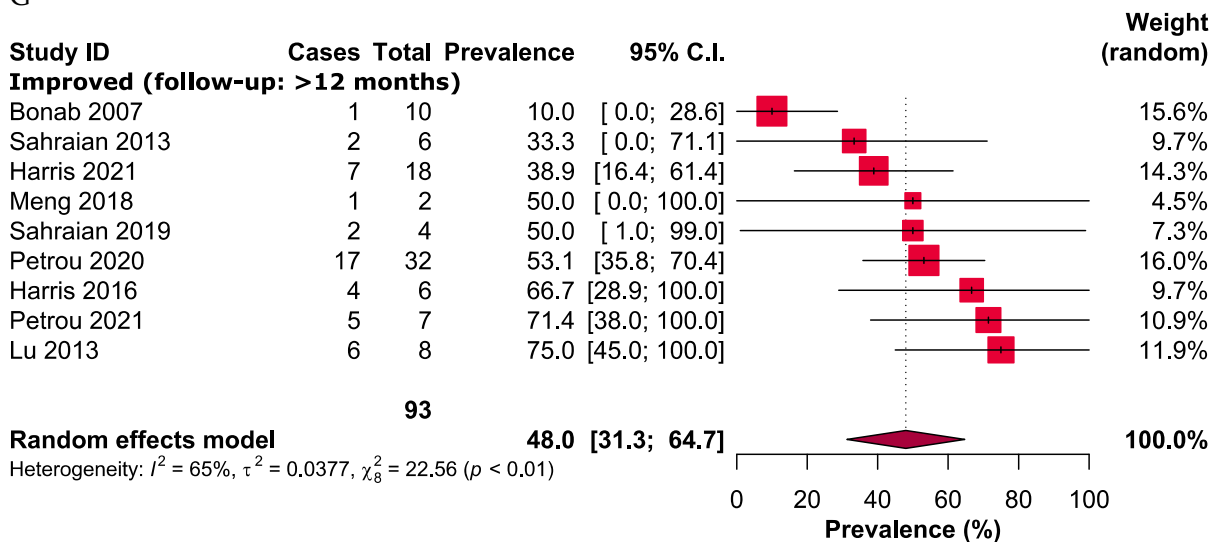
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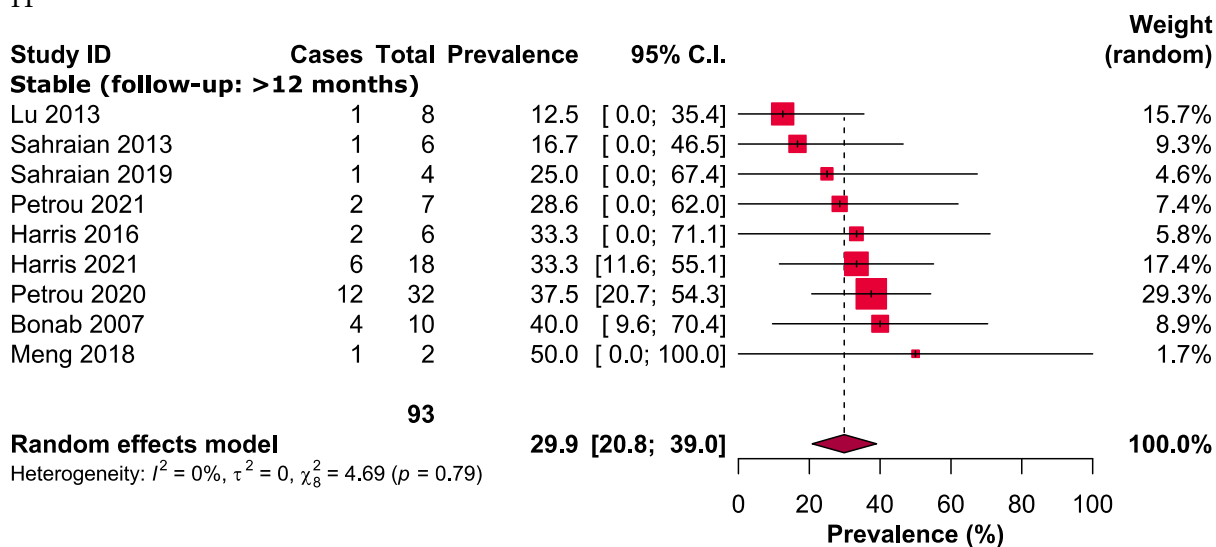
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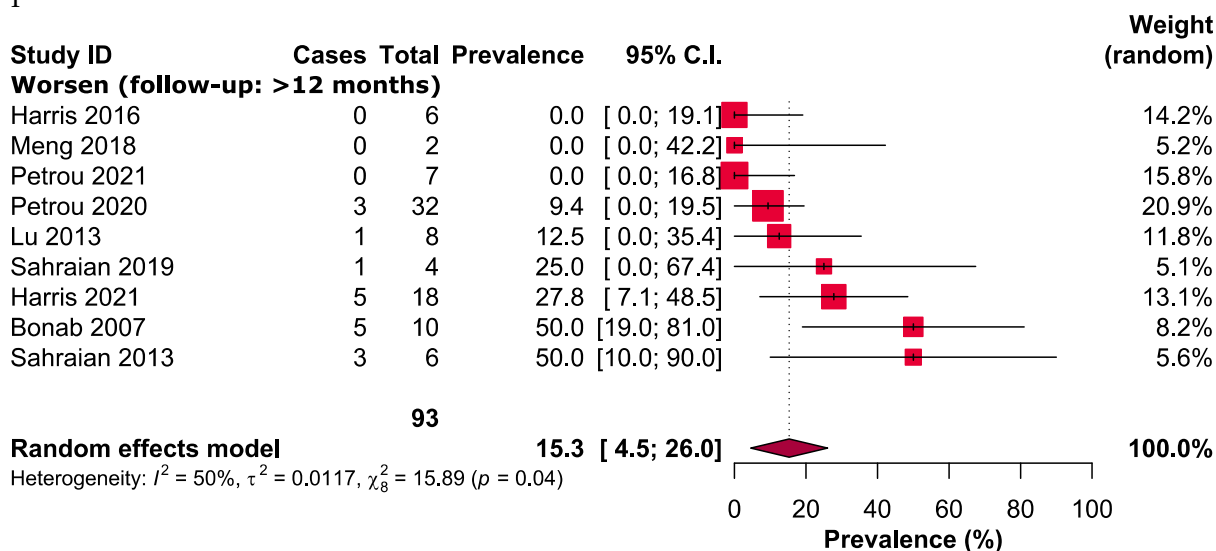
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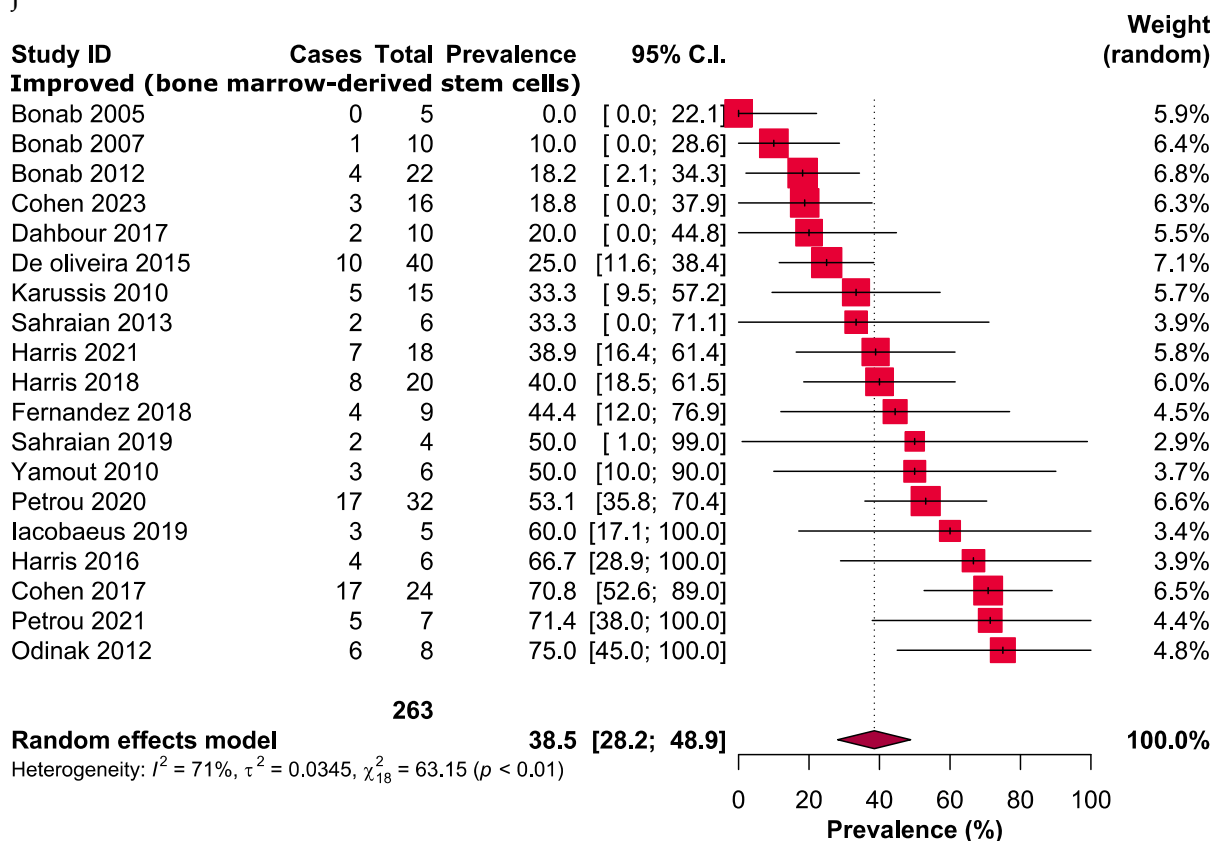
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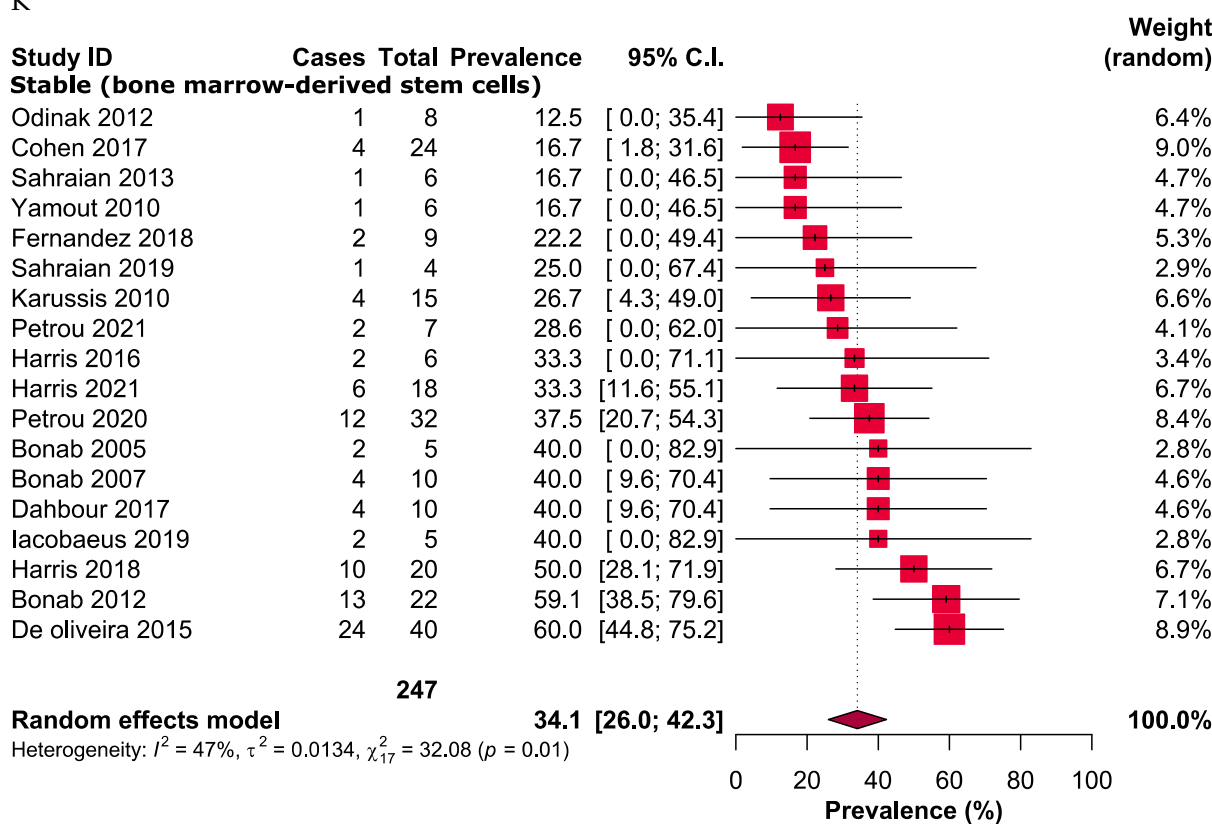
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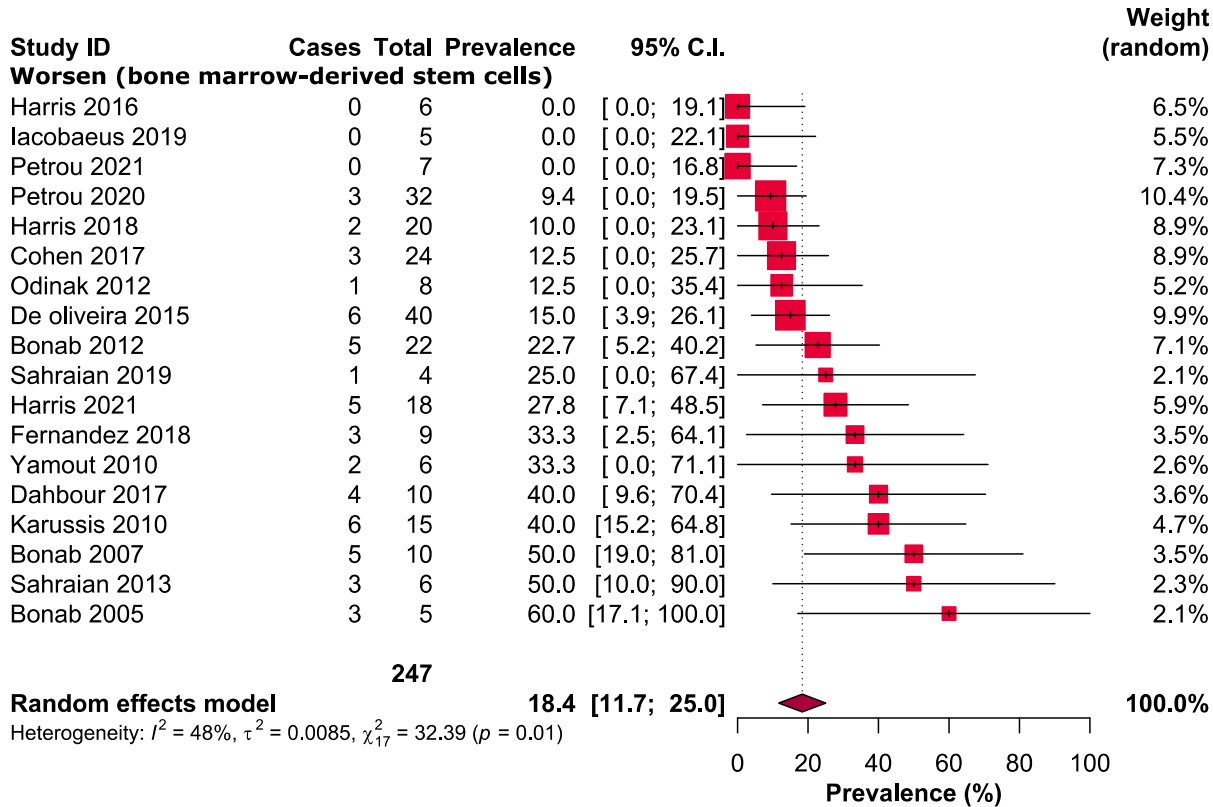
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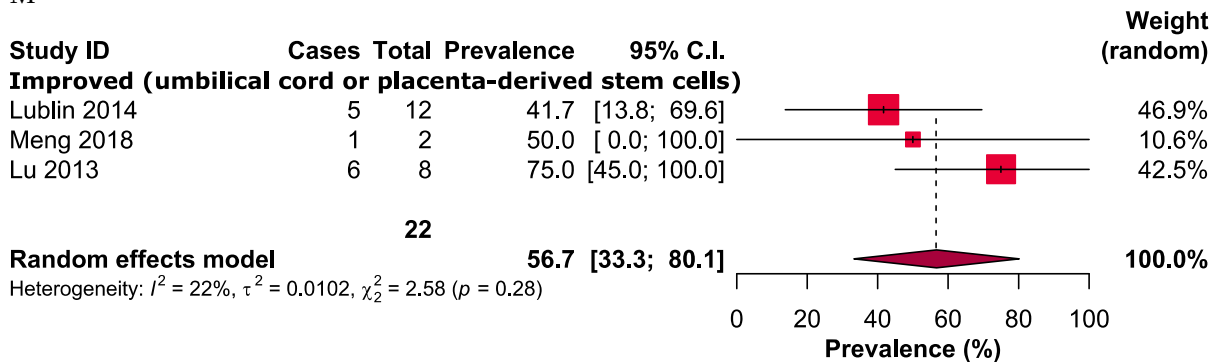
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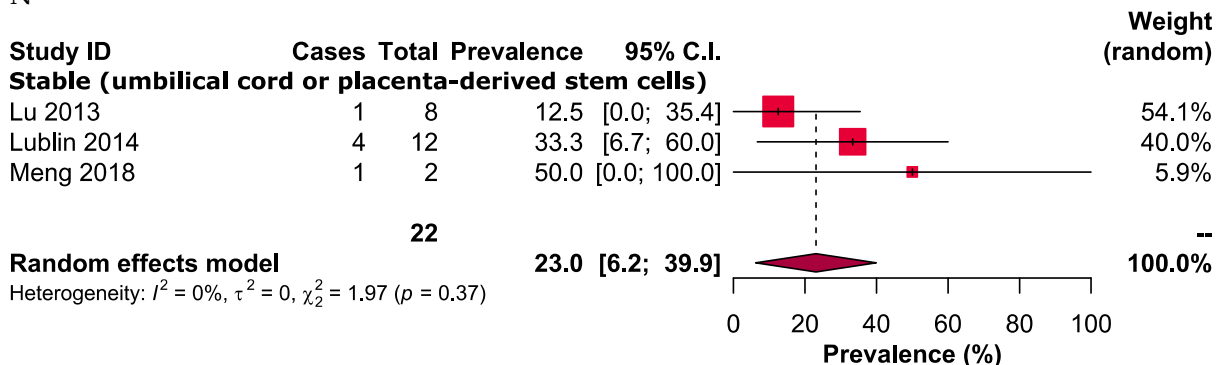
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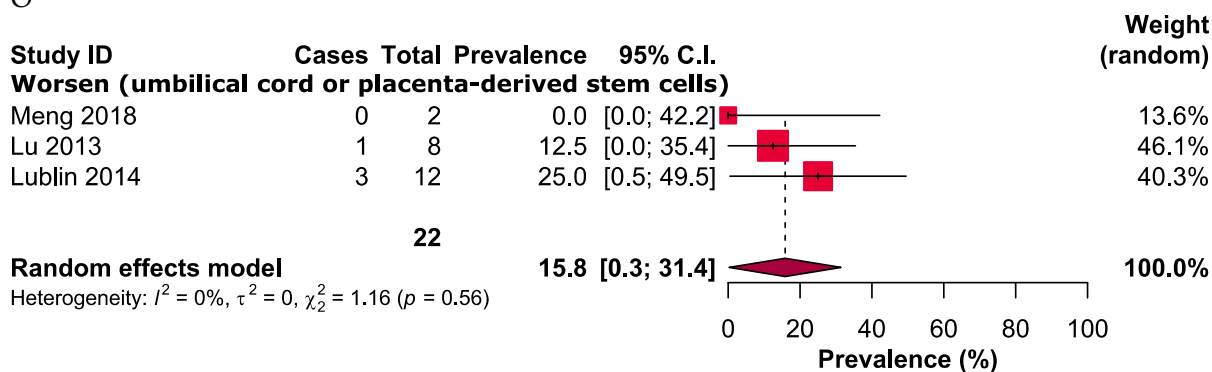
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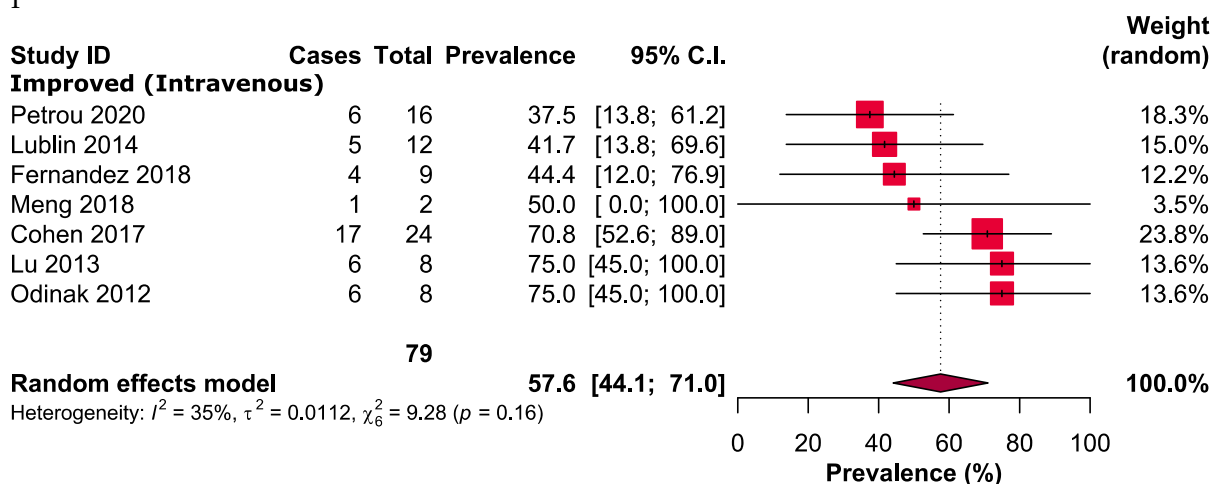
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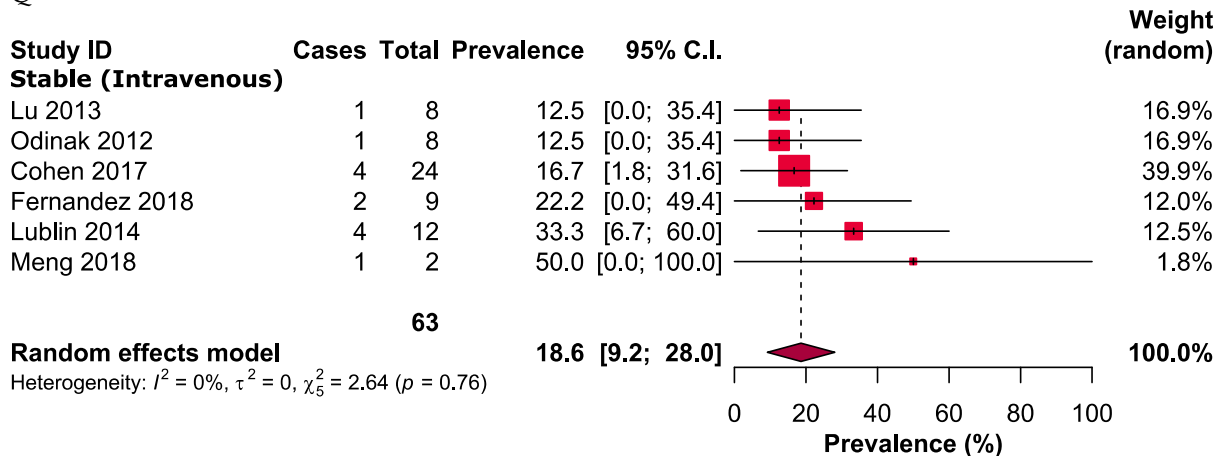
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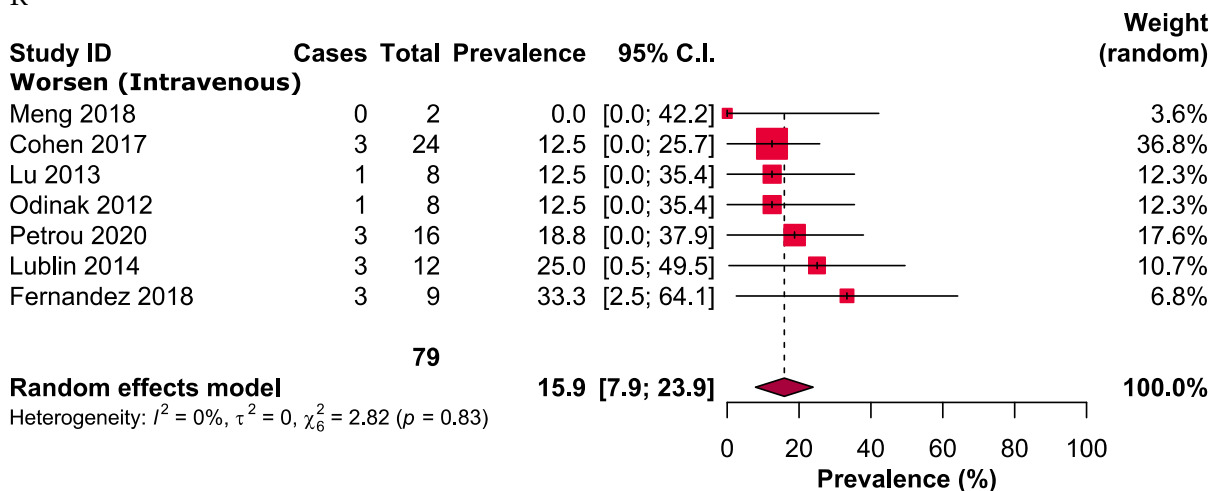
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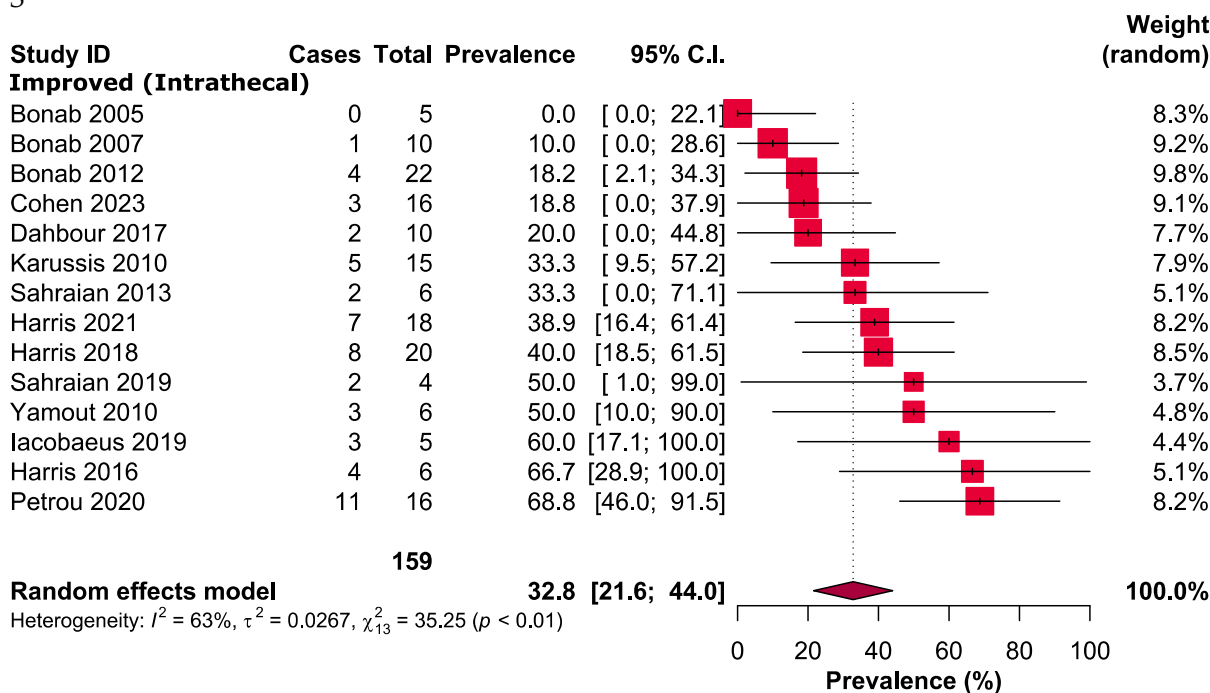
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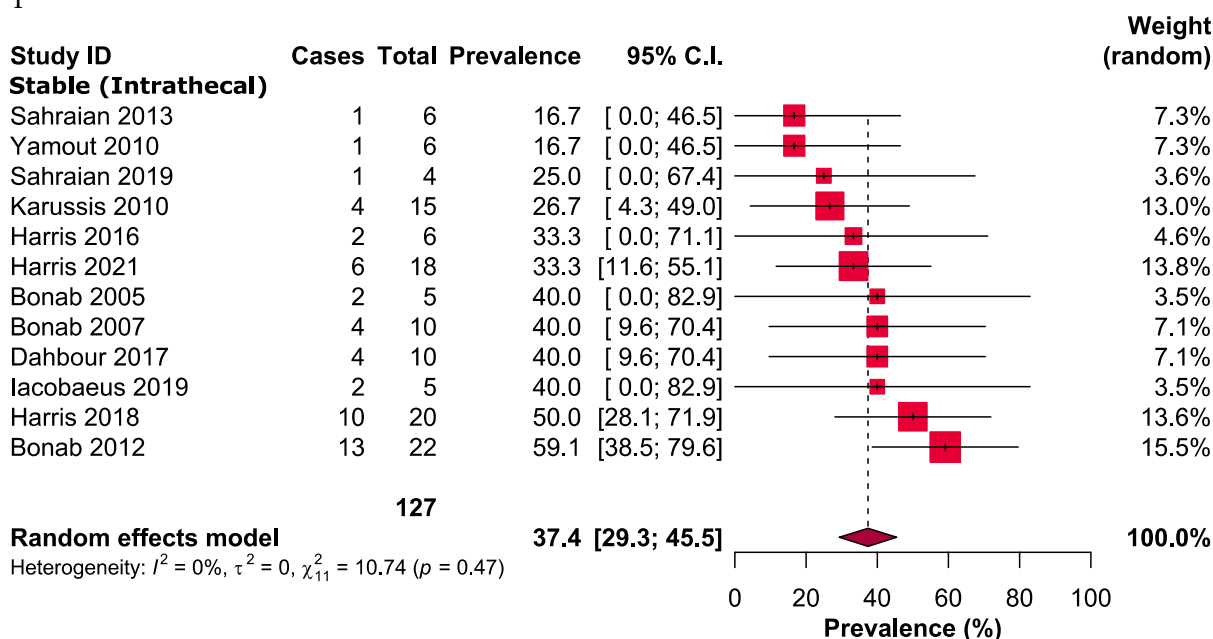
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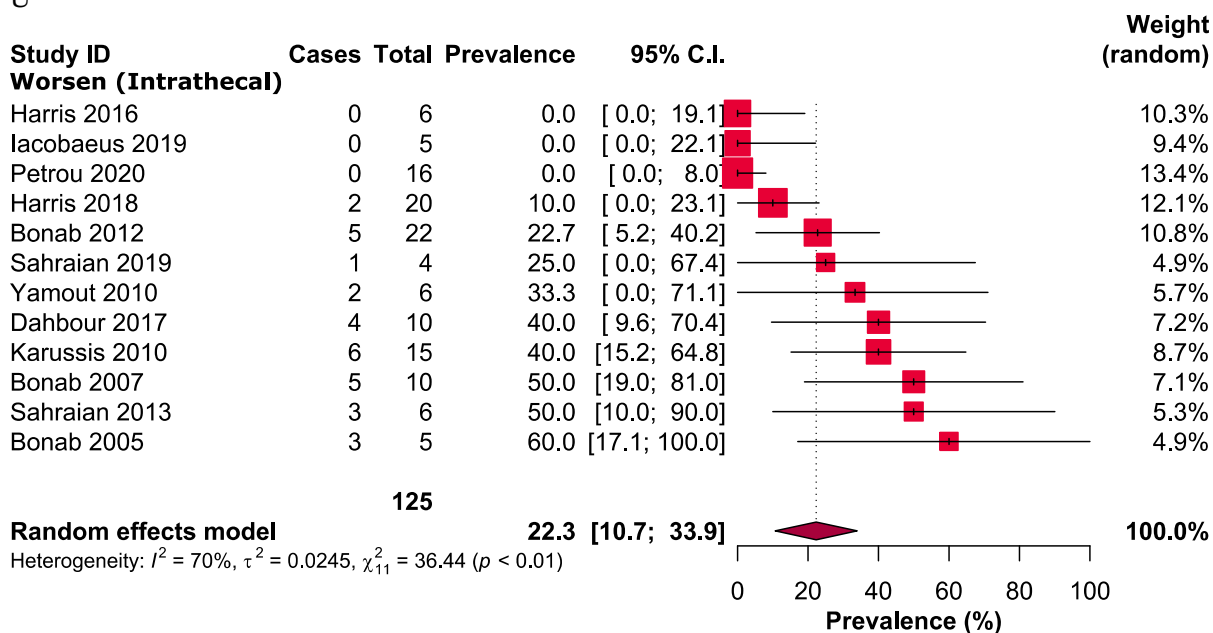
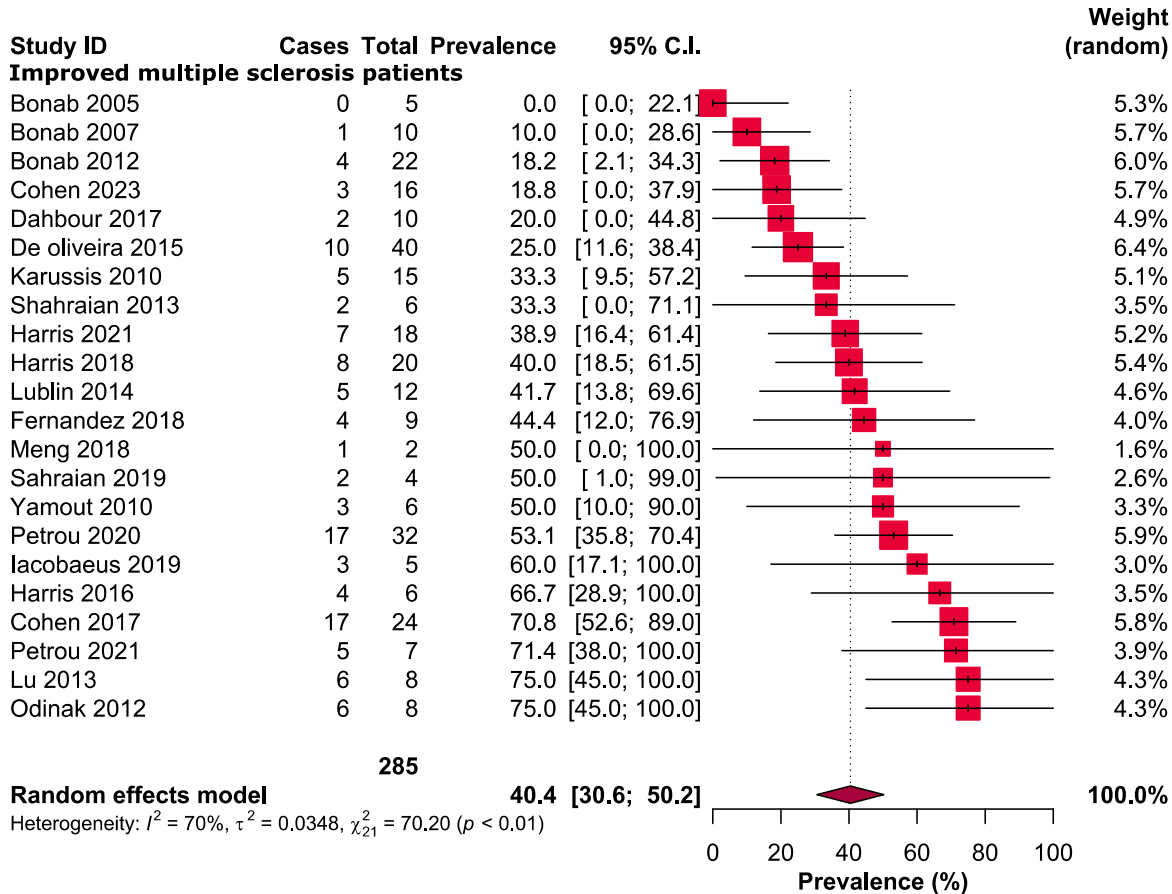
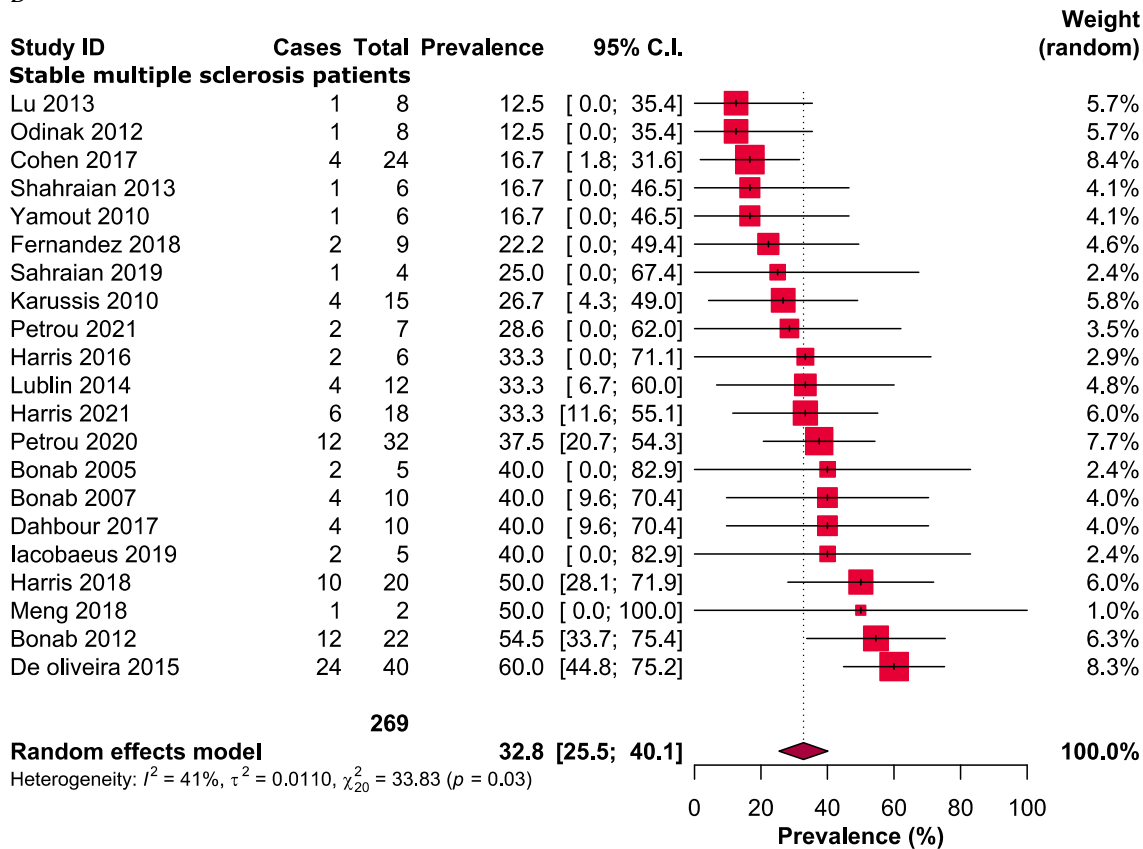


Figure S2. Subgroup analyses on improved, stable, and worsen after follow-up of ≤ 6 months (A-C), follow-up of > 6 to 12 months (D-F) and follow-up of > 12 months (G-I); bone marrow-derived stem cells (J-L) and umbilical cord or placenta-derived stem cells (M-O); and intravenous administration (P-R) and intrathecal administration (S-U) in multiple sclerosis patients following mesenchymal stem cell therapy.

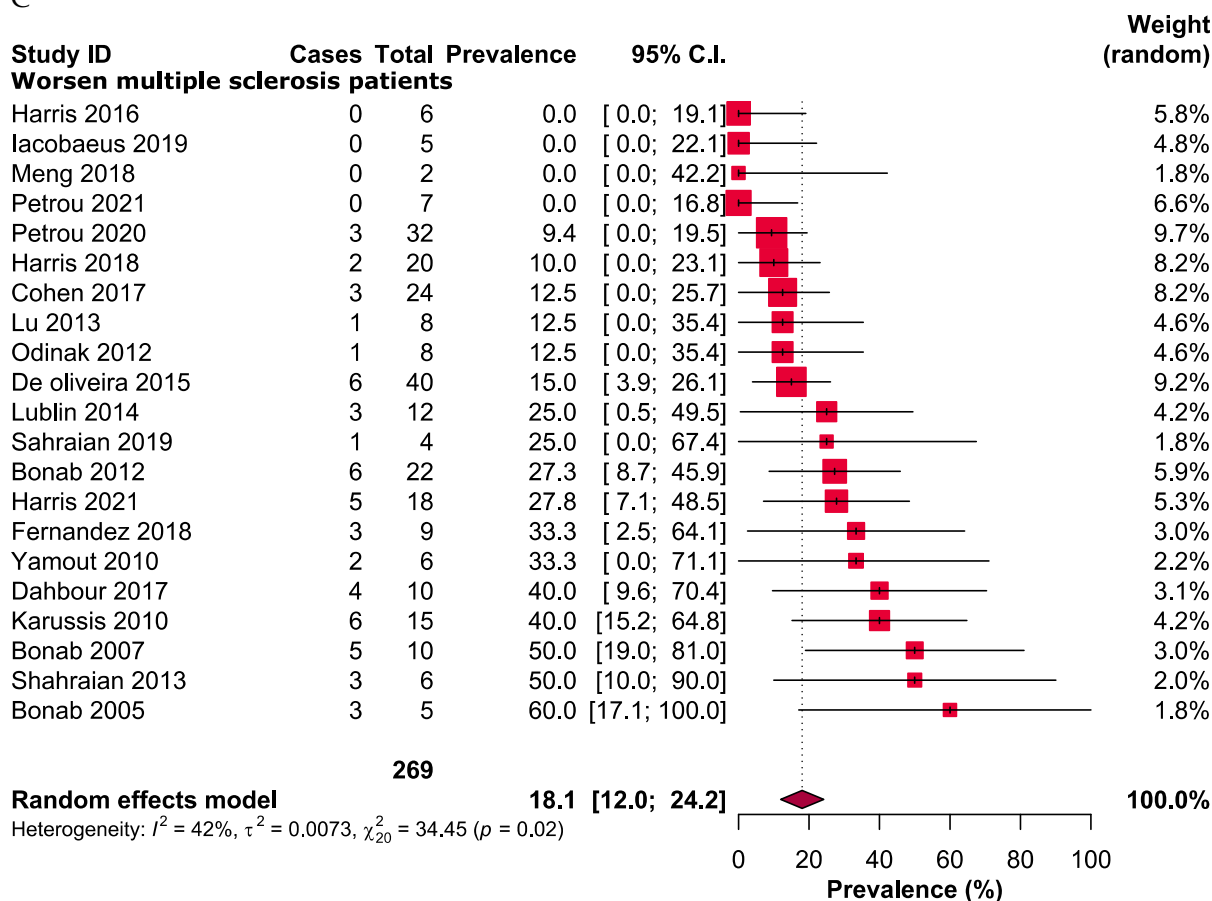
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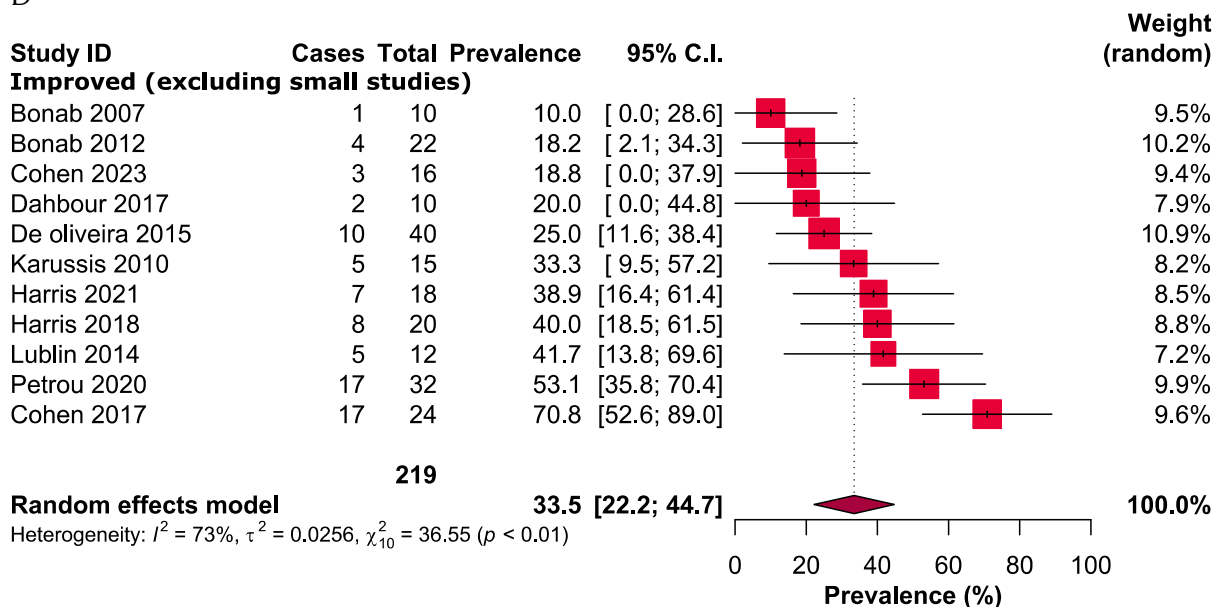
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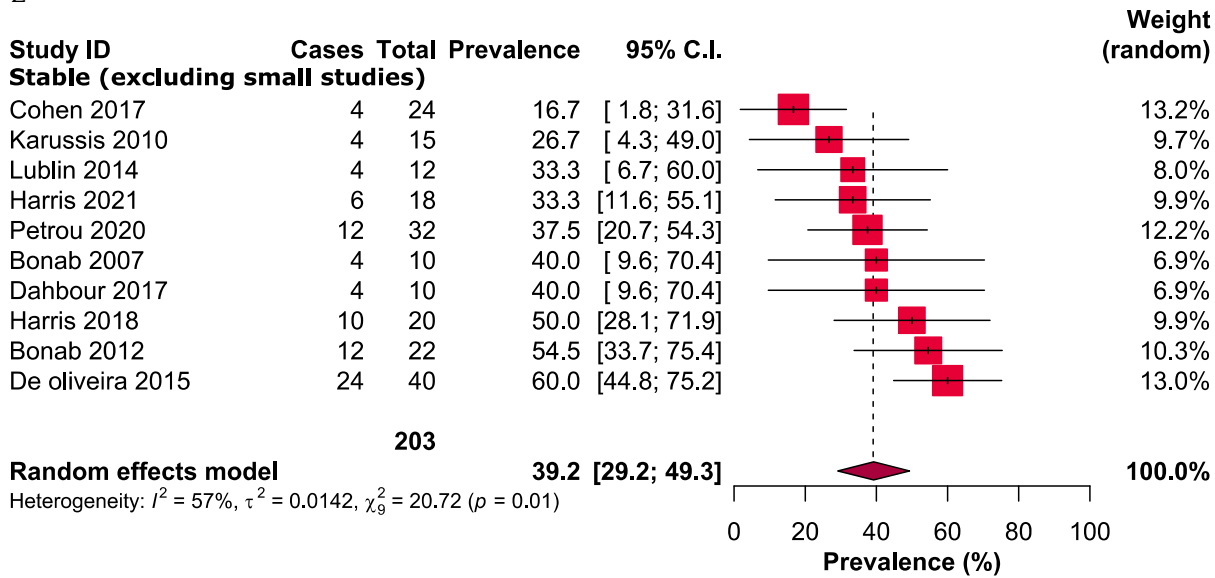
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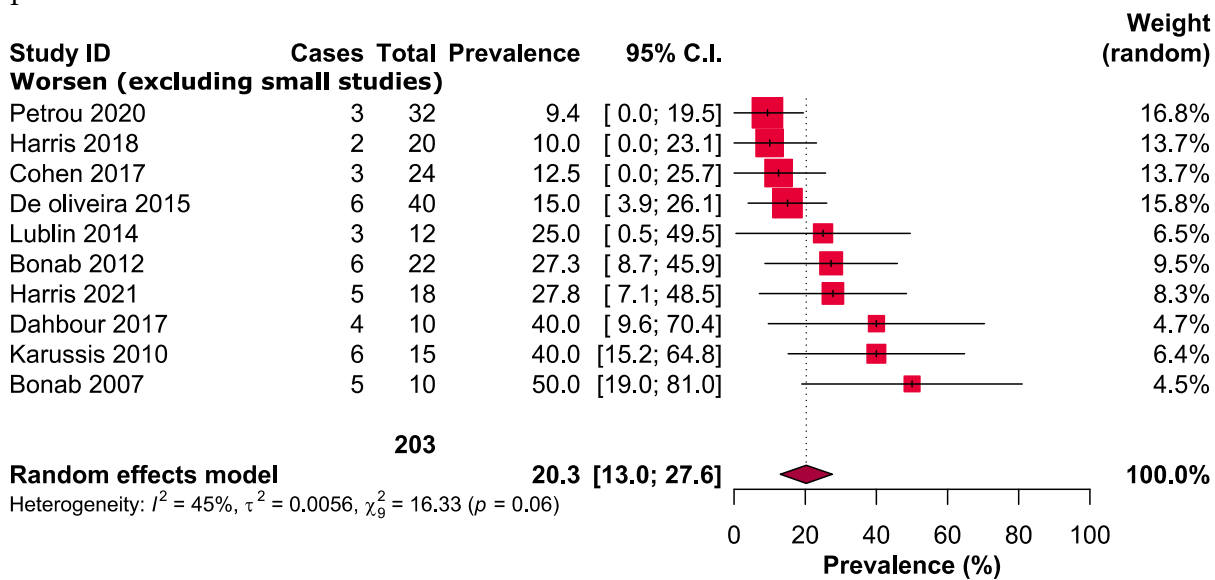


Figure S3. Sensitivity analyses assessing the effectiveness of mesenchymal stem cell therapy in patients with multiple sclerosis excluding low-quality studies (A-C) and excluding small studies (D-F).