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INTRODUCTION AND OBJECTIVES

- Poor adherence of patients may contribute to the excessive utilization of limited medical facilities, thereby causing substantial escalations in healthcare expenditures¹.
- However, limited data based on quantitative estimates, such as the proportion of days covered (PDC), are required to substantiate the impact of pharmacist assistance on enhancing patients' medication adherence.
- This study aims to thoroughly review the available data on pharmacist intervention measured by PDC and pool the included results using meta-analysis.

METHODS

- PubMed, Web of Science, Cochrane Library, ScienceDirect, and Embase were systematically searched from inception to March 2024.
 - The protocol was registered in the international Prospective Register of Systematic Reviews database (PROSPERO: CRD42024558571). The revised Cochrane Risk of Bias Tool and the Newcastle-Ottawa Scale were used to assess the quality of the studies.
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 - The weighted mean difference (MD) and the risk ratio (RR) for the PDC and the percentage of adherent patients (defined as PDC≥80%) were estimated to conduct Meta-analysis.
- Heterogeneity was assessed using the I² statistic, and a random-effects model was used when I² exceeded 40%.
- Subgroup analyses were conducted based on various evaluation time frames and types of pharmacist interventions, and the sensitivity analysis was also performed.

RESULTS SUMMARY

Table 1 Characters of included studies

Author Year	Study design	Diseases & Treatments	Sample size	Outcomes*		Evaluation time frames
				Intervention group	Standard group	
Bacci 2023	Randomized controlled trial	Type 2 diabetes treated with statins	555	Adherent: 45.4%	Adherent: 44.1%	1 year
Schnoor 2022	Observational study	Asthma and chronic obstructive pulmonary disease treated with inhalation medication	9452	PDC mean (SD): 0.7726(0.25)	PDC mean (SD): 0.7053(0.298)	2 years
Zongo 2021	Observational study	Hypertension treated with lipid-lowering drugs	27318	Baseline non-adherent patients: Adherent: 44.9% Baseline adherent patients: Adherent: 83.0%	Baseline non-adherent patients: Adherent: 38.5% Baseline adherent patients: Adherent: 82.4%	2 years
Rinehart 2021	Observational study	Diabetes, hypertension, or cardiovascular disease treated with at least one prescription for medication related to these conditions	881	PDC mean (SD): 0.844 (0.186) Adherent: 71.0%	PDC mean (SD): 0.799 (0.223) Adherent: 62.3%	9 months
Bingham 2020	Observational study	Diabetes with mental health conditions treated with psychotropics	8167	PDC mean (SD): 0.79 (0.19)	PDC mean (SD): 0.66 (0.12)	6 months
Samir Abdin 2020	Observational study	No disease restricted	60	PDC mean (SD): 0.90 (0.12)	PDC mean (SD): 0.844 (0.14)	6 months
Mikuls 2019	Randomized controlled trials	Gout treated with allopurinol	1463	PDC mean (SD): 0.68(0.29) PDC≥0.8: 50%	PDC mean (SD): 0.61 (0.29) PDC≥0.8: 37%	1 year
Yeung 2017	Randomized controlled trials	Heart failure, hypertension, and diabetes	68	Adherent: 35.3%	Adherent:14.7%	6 months
Taitel 2017	Randomized controlled trial	No disease restricted	735218	PDC mean (SD): 0.558 (0.003) Adherent: 34.5%	PDC mean (SD): 0.567 (0.003) Adherent: 33.5%	1 year
Park 2016	Randomized controlled trials	Hypertension treated with antihypertensive medication	1126	PDC mean (SD): 0.805 (0.22) Adherent: 64.8%	PDC mean (SD): 0.761 (0.259) Adherent: 59.5%	6 months
Abughosh 2017	Observational study	Diabetes with hypertension treated with ACEIs(angiotensin-converting enzyme inhibitor) or ARBs(angiotensin II receptor blockers)	743	PDC mean (SD): 0.6606 (0.3376)	PDC mean (SD): 0.5650 (0.3822)	6 months
Abughosh 2016	Observational study	Diabetes with hypertension treated with ACEIs(angiotensin-converting enzyme inhibitor) or ARBs(angiotensin II receptor blockers)	186	PDC mean (SD): 0.58 (0.26)	PDC mean (SD): 0.29(0.17)	6 months
Pawloski 2016	Randomized controlled trial	Hypertension treated with antihypertensive medication	240	Adherent: 90%	Adherent: 77%	1 year
Blackburn 2016	Randomized controlled trial	Patients treated with statins	1906	PDC mean (SD): 0.716 (0.33) Adherent: 57.3%	PDC mean (SD): 0.709 (0.33) Adherent: 55.9%	1 year
Ho 2014	Randomized controlled trial	Acute coronary syndrome treated with cardioprotective medication	241	PDC mean (SD): 0.94 (0.11) Adherent: 89.3%	PDC mean (SD): 0.87 (0.15) Adherent: 73.9%	1 year

*adherent defined as PDC≥80%

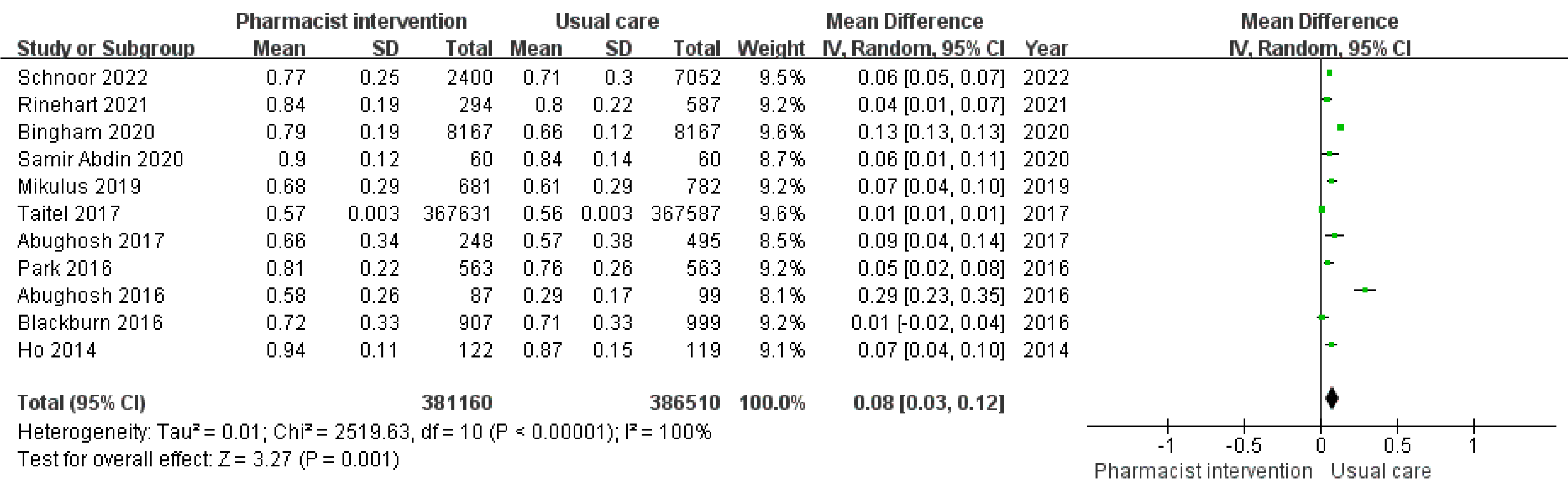


Figure 2 Meta-analysis results of weighted mean difference in PDC

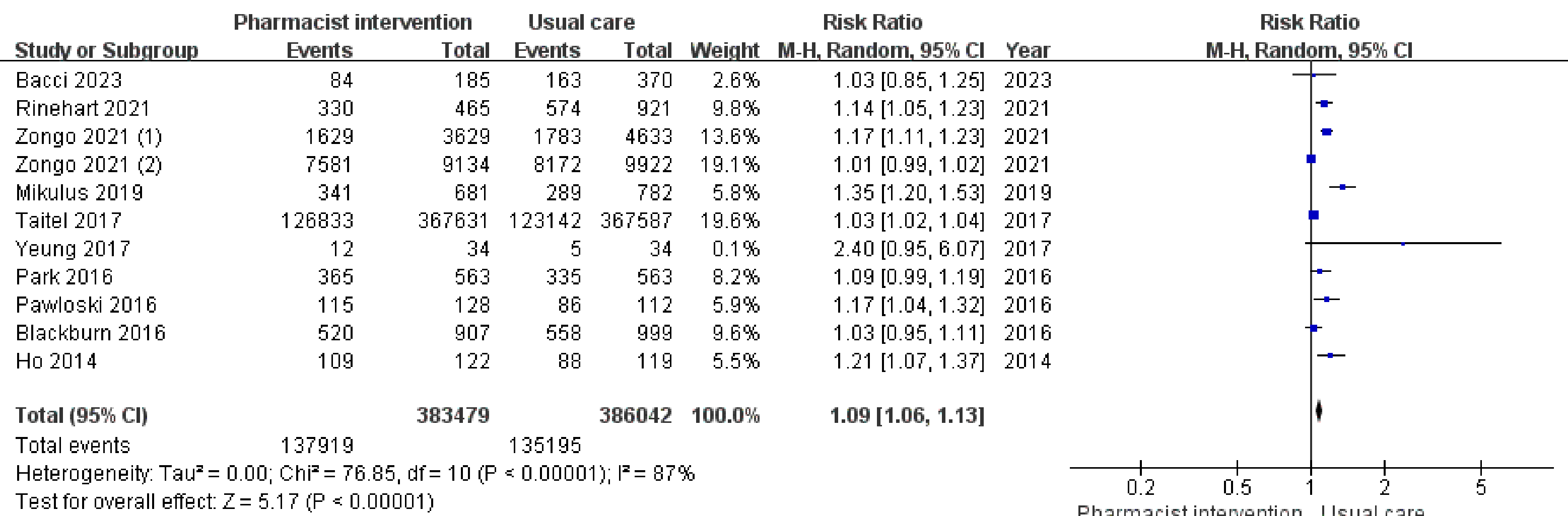


Figure 3 Meta-analysis results of risk ratio for adherent patients

KEY FINDINGS

- Based on the Newcastle–Ottawa Scale Quality assessment scale, 6 included studies were of high quality, while only one study was classified as low quality. The average quality score of the 7 studies was 6.86. The result of the Risk of bias assessment showed that three studies were evaluated to be at low risk of bias, two studies to be at high risk of bias, while the remaining two studies were evaluated to have some concern.
- The meta-analysis found that the pharmacist intervention group generated higher PDC with MD of 0.08 (95% CI: 0.03-0.12, p=0.001, I²=100%) and higher percentage of adherent patients with RR of 1.09 (95% CI: 1.06–1.13, p<0.001, I² = 87%) compared with the usual-care group.
- Considering different evaluation time frames, pharmacist intervention improved adherence at both 6-month (MD=0.12(95% CI: 0.06-0.18, p < 0.001, I² = 94%) and 12-month (MD=0.05 95% CI: 0.00-0.10, p=0.05), p=0.02, I² = 93%), with greater improvement at 6-month. After excluding the observational studies, sensitivity analysis shows that the result is still robust with MD=0.04 (0.01-0.07), p=0.007, I² = 89%),, RR=1.12 (1.04-1.21) , p=0.002, I² = 81%).

CONCLUSIONS

- Pharmacist interventions can enhance medication adherence by either increasing the mean value of adherence or improving the percentage of high adherent patients compared to usual care.