Supplement 1. Table of evidence on included studies

No.	Author	Country (year)	Study design	Intervention	No. of participants involved	Key findings
1.	Martínez-Mardone et al.[38]	Chile (2023)	Cluster randomized controlled trial	Polaris MRF in 4 visits over 12 months, identify DRPs, consultations included goal-setting and collaboration.	324 Elderly patients randomly assigned (usual care or usual care + MRF) for 12 months.	• Increased medication adherence (P=0.022).
2.	Faton et al.[39]	France (2022)	Observational study	Pharmacist-led medication review	439 Patients over 65 years old who had completed their SMR at community pharmacies in France.	• 47% of these patients (n=88) have and increased adherence after completing the review.
3.	Okuyan et al.[35]	Turkey (2021)	Pilot study	Medicine bag assessments, medication reviews, patient medicine cards, and education/counseling (motivational interviewing) to improve medication adherence in older adults.	52 Older self-managing adults who chronically used at least one medication.	• Medication adherence rate was significantly increased from 51.9% to 75%. • The mean of total QoL score rose significantly from 51.7 to 53.4 (P<0.05).
4.	Wuyts et al.[11]	Belgium (2020)	Before–after study	Medication use review, combining interviews and records, identifies issues using a 6-step process based on the STRIP tool.	83 Patients living in primary care over the age of 70 years, using 5 or more drugs for chronic disease.	• No significant difference in medication adherence (P=0.974). • The number of patients with hospitalization is noted to have no significant difference. • No significant effect on falls.
5.	Meyer et al.[34]	USA (2021)	Pre–post study	Customized medication safety and management intervention: identified older adults' DRP, provided personalized support through in-home assessments by geriatric experts.	Community-dwelling adults residing in Los Angeles and Orange Counties.	• Significant increment in adherence to three types of medications. • Non-adherence declined significantly (P<0.001).
6.	Kari et al.[40]	Finland (2022)	Randomized controlled trial	Home interview, health review, pharmacist-led medication review, interprofessional team meeting, and nurse-led care coordination.	277 Home-dwelling outpatients aged over 75 years with more than 7 prescribed medications.	• No statistically or clinically significant differences in the QoL between the groups.
7.	Ramsbottom et al.[41]	England (2022)	Feasibility pilot study	Post-discharge medication reviews involving twenty intervention including information provision, medicines reconciliation, compliance aids, patient monitoring referrals, and lifestyle advice.	59 Participants consisting of elderly over the age of 65 years.	• In this study, mean physical HR-QoL score at 6 months was significantly higher in the intervention group.
8.	Bonnerup et al.[33]	Denmark (2020)	Randomized controlled trial	Stratified admission medication reviews by clinical pharmacists and pharmacologists targeted high MERIS score patients.	369 Elderly patients with least one drug on a regular basis.	• No significant differences in QoL. • No significant difference in ED visit.
9.	Bosch-Lenders et al.[15]	The Netherlands (2021)	Cluster randomized controlled trial	6-Step medication review, developed by the authors, involving home visits, record extraction, medication history, recommendations formulation, and specialist consultation.	770 Patients aged mean 75 years old with polypharmacy.	• No significant effects were found on all included QoL domains. • No significant effects on medication adherence.
10.	Gemmeke et al.[42]	2023	Implementation study	Medication adaptations, lifestyle recommendation, patient information leaflet, referral, and fall consultation.	91 Patients aged ≥70 years, using ≥5 drugs of which ≥1 fall risk-increasing drug were included.	• FES-I scores were significantly higher after follow-up.
11.	Kua et al.[29]	Singapore (2021)	Randomized controlled trial	5-Step deprescribing approach during routine nursing home visits, involving criteria-based medication review and collaborative decision-making with physicians and nurses.	295 Residents in 4 nursing homes aged 65 years and above and currently on % and above medications.	• No significant effect on falls. • Decreased number of hospitalized residents (P<0.001).
12.	Blalock et al.[36]	USA (2020)	Randomized controlled trial	Screened eligible patients for fall risk using STEADI questions and provided medication reviews. Positive screenings triggered pharmacist recommendations, including referrals for gait, balance, and strength evaluations.	10,565 Adults (age ≥65 years) using either four or more chronic medications or one or more medications fall-increasing risk medication.	• Risk of falling did not change significantly (P=0.58). • PIMs were reduced by almost 20%. • No difference in emergency hospital admissions.

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13.	Lexow et al.[43]	Germany (2022)	Prospective controlled intervention study	Medication review by a trained pharmacist identified and resolved DRP through a standardized process involving record analysis, checklist use, and interprofessional communication.	21 Participants age ≥65 years, long-term/chronic medicines.	• Hospital admissions, falls, and deaths showed no differences.
14.	Gross et al.[44]	USA (2021)	Prospective case-crossover study	Reviewed medications for fall risk, assessing drugs, effects, interactions, and nonpharmacologic causes, offering recommendations to reduce future risks.	20 and 15 residents of the SLC and LNR, making up a total of 35 participants.	• There was a 12.4% reduction in recurrent falls after pharmacy intervention (P=0.0336).
15.	Hashimoto et al.[12]	Japan (2020)	Non-randomized, parallel-group, controlled study	Weekly nursing home visits, optimizing prescriptions through interdisciplinary collaboration, physician consultations, and staff follow-up.	55 Participants of the study were residents of nursing homes with polypharmacy.	• The mean number of falls was significantly lower in the intervention group. • The number of PIM decreased significantly (P=0.032).
16.	Sluggett et al.[8]	Australia (2022)	Retrospective cohort study	Multidisciplinary medication review	113,909 Individuals were included. 55,021 received the RMMR.	• A significant decrease in the use of statins and proton pump inhibitors in the intervention group compared to control.
17.	Khera et al.[13]	Canada (2019)	Pre–post study	Pharmacist-led review using criteria (Beers, STOPP/START) to identify inappropriate prescribing.	54 Community-dwelling patients aged 65 years who had pol-pharmacy and had more than one chronic condition.	• No significant changes in total number of medications taken by patients before and after. • It significantly decreased number of inappropriate medications (P=0.006).
18.	Mekdad & Alsayed[14]	Saudi Arabia (2019)	Observational study	Medication reviews addressed DRP and inappropriate medications in polypharmacy patients, evaluating prevalence and assessing improvement rates.	375 Geriatric cardiology patients aged over 65 years old were included from Geriatrics Cardiac Clinic.	• DRPs decreased from 29.6% to 14.9% of patient. • PIMs decreased from 19% to only 9.6% of patients.
19.	Choukroun et al.[15]	France (2021)	Single-center prospective study	Pharmaceutical consultation, ergotherapist and geriatrician CGA, medication analysis, and multidisciplinary medication review.	51 Patients over 75 years old who were referred for a geriatric oncology and underwent medication review.	• A significant decrease was observed in prevalence of PIM.
20.	Dumlu et al.[9]	Turkey (2021)	Non-randomized controlled study	Pharmacist-led medication review with medication reconciliation service	197 Patients aged 65 years and older, admitted to the hospital for any reason and was prescribed with proton-pump inhibitor during their stay.	• The rate of potentially inappropriate proton pump inhibitor use at discharge was significantly lower (P<0.05) in the intervention group.
21.	Leguelinel-Blache et al.[16]	France (2020)	Before–after pilot and paired study	Pharmacist in CGA identified PIM, DRP, and ADE risks, proposing prescription changes to doctor after multidisciplinary review.	49 Patients over the age of 65 years were recruited in a nursing home in France.	• Potentially inappropriate medication decreased from 30.6% before to 6.1% after intervention (P=0.005).
22.	Stuhec & Zorjan[17]	Slovenia (2022)	Retrospective observational pre–post study	Pharmacist-led review covered potential DDIs, adverse events, drug indications, PIMs, providing final recommendation.	246 Patients aged 65 years and above, who were receiving excessive polypharmacy (10 or more medications.	• The total number of prescribed PIMs is reduced by 21.8% (P<0.05). • Improved treatment guidelines adherence for antidepressants and antipsychotics (P<0.05).
23.	Liou et al.[10]	Taiwan (2021)	Randomized controlled trial	Pharmacist-led medication review with medication reconciliation service	100 Participants aged 65 years or older with at least 5 oral medicines daily, and more than one chronic disease.	• The mean number of DRP was significantly lower after the intervention (P<0.01).
24.	Stuhec et al.[18]	Slovenia (2019)	Retrospective observational medical chart review study	Pharmacist-led medication review with medication reconciliation service and interprofessional communication.	91 Patients aged 65 years who received 10 or more medications at once.	• The number of prescribed PIMs decreased by 20% (P=0.069).
25.	Pearson et al.[19]	USA (2021)	Retrospective, descriptive analysis	Medication reviews by a pharmacist aimed to address cognitive impairment in "Memory Clinic" and "Living with Dementia" program for dementia patients.	150 Elderly patients were included if they received a Memory Clinic pharmacist review or a LWD program pharmacist review.	• No statistically significant difference in PIMs was recorded.

Supplement 1. Continued

No.	Author	Country (year)	Study design	Intervention	No. of participants involved	Key findings
26.	Gutiérrez-Valencia et al.[20]	Spain (2019)	Present prospective study	Pharmacist-led CGA and medication review	234 Patients aged ≥75 years who were admitted to an AGU in a tertiary hospital.	• DRP decreased significantly (P≤0.001 for all).
27.	Zhang et al.[21]	China (2022)	Prospective study	Pharmacist's review assesses for DRPs, adherence, proposes interventions, and measures HR-QoL outcomes.	412 Elderly patients from 2 community health service centers in Shanghai.	• A statistically significant reduction in the mean number of DRPs was observed (0.4 vs. 0.88, P<0.001) • There is an increase in medication adherence (1.42 vs. 0.85, P<0.001). • Both HRQoL indicators also improved (P<0.001 for both).
28.	Ponjee et al.[22]	The Netherlands (2020)	Pre–post study	Inpatient medication review: hospital pharmacist, geriatrician, clinical records, consultations, patient interviews, and multidisciplinary evaluation for recommendations.	179 Patients that are 65 years old and above with polypharmacy. They have risk factor(s) for frailty, and was admitted to orthopedic or surgical wards	• Significantly lesser DRP compared to usual care: 2.8 vs. 3.3 per patient.
29..	Molist-Brunet et al.[23]	Spain (2022)	Pre–post study	Interdisciplinary medication review by primary care, pharmacist, and consultant teams, aligning treatment with Patient-Centered Prescription model for care goals.	428 Participants aged 65 years or older with multimorbidity who was deemed in need of medication review	• The mean chronic medications per patient decreased by 17.96%.
30.	Chen et al.[24]	USA (2019)	Retrospective electronic medical chart review	Pharmacist medication review	60 Patients 65 years of age or older who were already enrolled and newly enrolled with an initial visit to HBPC or geriatric primary care.	• Number of PIMs increased non significantly after the intervention.
31.	Van Der Linden et al.[25]	Belgium (2019)	Non-randomized controlled trial	Medication review using the RASP list, evaluating drug use on admission and discharge for PIMs.	61 Dutch-speaking geriatric patients who were admitted from home or a nursing home.	• A significant robust reduction of 1.56 PIMs (P<0.001) was observed in the intervention group.
32.	Wuyts et al.[11]	Belgium (2020)	Longitudinal pre–post intervention	6-Step medication use review based on the STRIP approach: patient recruitment, preparation, interview, pharmacotherapeutic analysis, discussion, and follow-up.	453 Ambulatory patients who used five or more chronic medications who were 70 years or older were included.	• A significant reduction of 42.6% of DRPs.
33.	Garland et al.[26]	Canada (2021)	Quasi-experimental study	Multidisciplinary medication review	409 Residents aged 65 years or older and residing in included care facilities.	• PIMs decreased from 0.79 to 0.56 in the intervention-exposed group (P=0.002).
34.	Stuhec et al.[27]	Slovenia (2019)	Retrospective observational medical chart review study	Medical review inclusive of DRP, potential drug-drug interactions, and PIMs	24 Patients (mean age, 80.6 years) with at least one mental health problem with at least one psychotropic drug. Participants must possess intellectual and cognitive ability to fill out the needed forms.	• The total number of PIMs was reduced (P<0.05). • QoL was also significantly higher (P<0.05).
35.	Zwietering et al.[31]	The Netherlands (2023)	Retrospective observational study	Multifaceted medication review in older patients in the outpatient setting	200 Patients, mean age of 82 years, who presented to the outpatient clinic geriatric medicine.	• Reduced the number of potentially medication-related ED visits (38.9% vs. 19.6%, P<0.01). • Rate of hospitalization as a whole did not differ.
36.	Visade et al.[45]	France (2022)	Interventional randomized controlled trial	Multidisciplinary medication review with medication reconciliation service in the hospital and post-discharge	109 Patients (mean age, 87.5±6.1 years) were included.	• The rehospitalization rate was 30% in the intervention group and 15.2% in the control group. The difference was non-significant before and after adjustments (P=0.27 and 0.28, respectively)

Supplement 1. Continued

No.	Author	Country (year)	Study design	Intervention	No. of participants involved	Key findings
37.	Kempen et al.[46]	Sweden (2022)	Cluster randomized crossover trial	Multidisciplinary medication review	2,644 Patients aged 65 years or older who had been admitted to 1 of the study wards for at least 1 day were included. December 10, 2019, to September 9, 2020.	• The incidence of unplanned hospital visits within 12 months did not differ in the intervention groups compared with usual care. • There was no difference in the incidence of ED visits within 12 months between the CMR group and control group.
38.	Santolaya-Perrín et al.[30]	Spain (2019)	Randomized controlled trial	Pharmacist reviewed chronic medication, identified potential issues using STOPP/START criteria, discussed cases with emergency specialist, and recommended treatment modifications to GPs.	665 Patients over 65 years of age presented to the ED of the participating sites and were seen in the observation unit.	• The adjusted rate ratio of emergency visits and hospital admissions was not statistically significant different. • Significant reduction at 3 months in two of the hospitals that participated in the study.
39.	Sluggett et al.[8]	Australia (2022)	Retrospective cohort study	Multidisciplinary medication review	57,719 Individuals aged from 65 to 105 years old taking at least one medicine, who entered a care facility in three Australian states	• Of those with an RMMR in the 6–12 months after RACF entry, 42.5% (95% CI, 41.6–43.4) had at least one ED presentation or unplanned hospitalization at 12-month follow-up, compared with 43.1% (95% CI, 42.6–43.6) without an RMMR.
40.	Sloeserwij et al.[47]	Netherlands (2019)	Controlled intervention study	Medication reviews, reconciliations, and consultations. Organized quality improvement projects and provided tailored interventions.	A total of 11,928 high-risk patients was included in the analysis.	• The rate ratio of medication-related hospitalizations in the intervention group compared to usual care was 0.68 (95% CI, 0.57–0.82) and 1.05 (95% CI, 0.73–1.52) compared to usual care plus.
41.	Johansen et al.[48]	Norway (2022)	A non-blinded parallel group randomized controlled trial	Pharmacist-led intervention: reconciliation, review, counseling, information transmission, and oral communication with primary care.	516 Acutely admitted patients over the age of 70 years old patient consented, 257 were randomly assigned to the control group and 259 to the intervention group.	• No statistically significant difference was observed in rate of emergency ED visit between the groups.
42.	Graabæk et al.[49]	Denmark (2019)	Randomized controlled trial	Pharmacist-led medication review on admission (intervention ED) or throughout inpatient stay, with counseling at discharge.	600 Patients, 65 years of age or above, acutely admitted in a Danish hospital, medical patients.	• No statistically significant difference on medication-related admission between the groups.
43.	Desborough et al.[28]	Spain (2020)	Cluster randomized controlled trail	Clinical pharmacist, GP, and staff provided medication reviews, with a follow-up 6 months later for action plan implementation.	135 Participants with a mean age of 73.4 years were randomly selected and participated in the implementation program.	• Significant decrease of 63.2% in hospitalizations. • Statistically significant differences in QoL in all samples, with an increase of 6.74±18.7 was observed.
44.	Lapointe-Shaw et al.[32]	Canada (2020)	Cohort study	Pharmacist medication review with medication reconciliation service	Patients who were over 66 years of age at discharge and filled a prescription at a community pharmacy within 7 days of discharge. Was eligible for MedsCheck	• There is a decreased rehospitalization (11.0% vs. 11.4%).

MRF, medication review with follow-up; DRP, drug-related problem; SMR, shared medication review; QoL, quality of life; STRIP, Systematic Tool to Reduce Inappropriate Prescribing; HR-QoL, health-related quality of life; MERIS, Medication Risk Score; ED, emergency department; FES-I, Fall Efficacy Scale-International; STEADI, Stopping Elderly Accidents, Deaths, and Injuries; PIM, potentially inappropriate medication; LNR, LECOM Health Nursing and Rehabilitation; SLC, Senior Living Center; RMMR, Residential Medication Management Review; STOPP, screening tool of older people's prescriptions; START, screening tool to alert doctors to right treatment; CGA, comprehensive geriatric assessment; ADE, adverse drug events; DDI, drug-drug interaction; LWD, Living with Dementia; AGU, acute geriatric units; HBPC, home-based primary care; RASP, Rationalization of Home Medication by an Adjusted STOPP list in Older Patients; CMR, comprehensive medication review; GP, general practitioner; RACF, residential aged care facility; CI, confidence interval.