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Review article

Co-located specialty care within primary care practice settings: A systematic review and meta-analysis

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ABSTRACT

Background: Co-location of specialists in primary care has been suggested as an approach to reduce care fragmentation, inefficiency, and cost. We conducted a systematic review and meta-analysis evaluating the impact of co-located specialty care models in primary care settings.

Methods: Ovid Medline In-Process & Other Non-Indexed Citations, Ovid MEDLINE, Ovid EMBASE, Ovid Cochrane Central Register of Controlled Trials, Ovid Cochrane Database of Systematic Reviews, and Scopus was conducted through February 2015. A manual search of the included studies' bibliographies was conducted. Randomized controlled trials (RCTs) and observational studies reporting physically co-located specialties in primary care on the following outcomes were included: patient satisfaction; provider satisfaction; health care access and utilization; clinical outcomes, and costs.

Results: Of 1620 articles, 22 studies met inclusion criteria, including 9 RCTs and 13 observational studies. Co-located care was observed to be associated with increased patient satisfaction (OR 2.04; 95% CI 1.04–3.98), primary care provider satisfaction (OR 6.49, 95% CI 4.28–9.85), and outpatient visits (OR 1.94; 95% CI 1.13–3.33). Co-located care was associated with reduced appointment wait time (OR 0.20, 95%CI 0.10 – 0.41). Reduced costs and improvement in quality of life and selected diabetes related outcomes were also observed. Evidence quality was limited by few studies, high risk of bias, and heterogeneity.

Conclusions: Co-located specialty care in primary care settings may support the aims of high value care delivery. However, additional studies are needed to further evaluate the value of co-location of specific specialties and stronger data on impact to health outcomes and cost.

1. Introduction

National healthcare expenditures continue to rise driven predominantly through increased healthcare spending on older Americans, particularly those with multiple chronic conditions[1], and spending attributed to inefficient care delivery.[2] The average Medicare beneficiary visits multiple primary care providers (PCPs), specialists, and care venues each year which impedes the ability to deliver coordinated quality care.[3] Despite increased demand for care, geographic variation exists in access and physician supply for both primary and specialty care.[4,5] Moreover, suboptimal communication between primary and specialty care adversely affects collaboration, contributing to inefficiencies.[6] As insurers begin shifting away from traditional fee-for-service toward value-based payment, a critical need exists for identifying healthcare models that can address these challenges.

Co-locating specialty care within primary care settings has been suggested as a strategy to address healthcare delivery fragmentation.[7] Co-location is an approach placing multiple services in the same physical space under a defined model outlining organizational characteristics, patient care responsibilities, coordination mechanisms, and data systems and policies.[7] Co-location leverages proximity among providers to improve communication, collaboration, and coordination.[6–8]

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However, co-located strategies may be varied with respect to provider type, duration of on-site presence, and the degree to which the strategy leverages opportunities for coordination and collaboration via curbside interactions and communication through a shared electronic health record (EHR). The most commonly applied model leveraging co-location is integrated behavioral health, in which co-location may be a feature within the collaborative chronic care model paradigm.[9] This model has demonstrated a positive impact.[9,10] However, the impact of co-locating other specialties in primary care settings is not known.[7,8] Understanding the potential benefits of co-located specialty care models in primary care would inform key stakeholders about practice redesign approaches that may help achieve the aims of high value care delivery.

To address the aforementioned knowledge gap, we conducted a systematic review and meta-analysis of the literature to evaluate the impact of co-located specialty care services in primary care practice settings.

2. Methods

This review was conducted based on an *a priori* protocol and PRISMA guidelines.[11] Randomized controlled trials (RCTs) and observational studies were included that evaluated physically co-located specialists in primary care assessing the following outcomes: patient satisfaction; provider satisfaction; health care access and utilization; clinical outcomes, and costs. No limitations were placed on specialty type for inclusion. Full-time presence of specialists in the primary care practice setting was not required for inclusion. Non-original studies were excluded. Databases searched included Ovid Medline In-Process & Other Non-Indexed Citations, Ovid MEDLINE, Ovid EMBASE, Ovid Cochrane Central Register of Controlled Trials, Ovid Cochrane Database of Systematic Reviews, and Scopus through February 2015. A manual bibliographic search was also conducted. The detailed search strategy is described in Appendix A.

Two independent reviewers led screening of abstracts and full text studies for eligibility inclusion. Any disagreements were reconciled by consensus and arbitration by the principal investigator. A Kappa (κ) level statistic was calculated to measure agreement between reviewers. Two independent reviewers evaluated each study for risk of bias. The Cochrane risk of bias[12] and modified Newcastle tools[13] were used for randomized controlled trials (RCT) and observational studies, respectively. The following variables were extracted using an online reference system (Distiller SR; Evidence Partners, Inc.): study population, setting, interventions, and outcomes.

Odds ratios (OR) and 95% confidence intervals (95% CI) were calculated using binomial distribution. Log transformed risk ratios were pooled using the DerSimonian and Laird random-effect models with the heterogeneity estimated from the Mantel-Haenszel model. When the number of studies was less than three and between study variance was unstable, we used the fixed effects model.[14] All statistical analyses were conducted using STATA, version 13 (StataCorp LP, College Station, Texas). In order to reduce heterogeneity, subgroup analysis was planned based on the type of study design (randomized controlled trial vs. observational studies) and location of the study (United States [US] vs. international).

3. Results

The initial search generated 1620 references from which 22 studies met inclusion criteria, including nine RCTs[15–23] and thirteen observational studies.[24–36] Five RCTs utilized patient randomization,[15,19–21,23] three utilized practice site randomization,[16–18] and one utilized practice firm randomization.[22] Practice characteristics were not controlled with respect to patient randomization. Fig. 1 describes the selection process and results of search strategy. The average weighted Kappa (κ) for study selection was 0.7.

Most of the studies (14) were conducted in the US.[17,19–23,26,28–31,33,34,36] Co-located specialty services included behavioral health (15 studies)[15–23,25,26,30–32,34] , diabetes care (3 studies),[24,35,36] cardiology (1 study),[27] geriatrics (1 study),[29] nephrology (1 study),[28] and infectious diseases (1 study).[33] The summary of the included studies and baseline characteristics are provided in Appendix B-Table B1.

3.1. Risk of bias in included studies

The risk of bias in the included RCTs was considered moderate to high. Two studies did not report the randomization method, eight studies did not report allocation concealment, and five studies did not report blinding of participants. None of the RCTs reported on outcomes blinding. For observational studies, most studies did not report on cohort selection, comparability, outcome assessment, and adequacy of follow up. A detailed risk of bias assessment for included studies is described in Appendix B-Tables B2 and B3.

3.2. Effect of co-located specialty care on patient satisfaction

Four studies (3 RCTs[18,22,23] and 1 observational[30]) reported on patient satisfaction. Overall, meta-analysis (Fig. 2) showed that co-located models were associated with increased patient satisfaction (OR 2.04; 95% CI 1.04–3.98, I^2 = 93.8%).

Three studies[22,23,30] were conducted in the US and one in the Netherlands.[18] Meta-analysis of the US studies showed that co-located behavioral/mental health care was associated with higher patient satisfaction (OR 3.16, 95% CI 1.49–6.68), I^2 = 84.2%). The Dutch study showed no statistically significant difference in patient satisfaction.

3.3. Effect of co-located specialty of care on provider satisfaction

Two studies[18,27] reported on primary care provider satisfaction with co-location. One Dutch RCT[18] study involved behavioral health and one Spanish observational study[27] involved cardiology. Meta-analysis using fixed effect model demonstrated increased provider satisfaction associated with co-located specialty care (OR 6.49, 95% CI 4.28–9.85, I^2 = 95.5%).

3.4. Effect of co-located specialty care on health care access and utilization

Five studies (2 RCTs[19,23] and 3 observational[26,29,33]) conducted in the US reported on number of outpatient primary care and specialty visits. The co-located models included infectious disease,[33] geriatric care,[29] and behavioral health.[19,21,23,26] Pooled analysis (Fig. 3) demonstrated that the frequency of primary and specialty outpatient visits were significantly increased for co-located specialty care (OR 1.94; 95% CI 1.13–3.33, I^2 = 96.5%).

Subgroup analysis based on the type of outpatient visits was conducted. Two observational studies[29,33] reported on the impact of co-located specialty care on the frequency of primary care physician outpatient visits. One study involving geriatric specialty care[29] showed significant association between co-location and an increased frequency of primary care physician outpatient visits. In contrast, a study involving a co-located infectious diseases HIV practice showed no association[33]. Pooled analysis of both studies using fixed effect model showed significant association between co-located specialty care and increased frequency of primary care physician outpatient visits (OR 4.16; 95%CI 3.73 – 4.63; I^2 = 97.8%).

Five studies (2 RCTs[19,23] and 3 observational[26,29,33]) reported on the impact of co-located specialty care on the frequency of specialty outpatient visits. Pooled analysis showed no significant association between co-located model of care and specialist outpatient visits (OR 1.83; 95% CI 0.9–3.38, I^2 = 93.9%).

Three studies[18,19,25] reported on the association between co-location and appointment wait time (Fig. 3). Individually, each study