

Efficacy of Medical Legal Partnerships to Address Health Harming Legal Needs: A Systematic Review of Experimental Studies in the Field

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Abstract

Objectives

Medical legal partnerships (MLPs) function by leveraging partnerships between legal and medical entities to holistically target the health harming legal needs (HHLNs) of vulnerable patients. Yet, despite their documented success, robust experimental-based research is still lacking on their efficacy. This review synthesizes the findings of MLP interventions and identifies gaps and opportunities for MLP expansion across vulnerable communities.

Methods

A comprehensive search was conducted across Ovid MEDLINE, PubMed, Google Scholar, Westlaw and LexisNexis databases between January 12th 2021 and April 25th, 2021. Articles were eligible if they used an experimental design, tested the effects of an MLP intervention on HHLNs, and had full text for review, with no restrictions on publication year, place, or population (adult or child). Two reviewers independently screened articles for inclusion in Rayyan QCRI- a systematic review tool and also independently assessed the quality (risk of bias) of each study.

Results

Our search yielded 1267 articles; six studies were ultimately eligible. Populations were largely racially-ethnic minorities, women, of lower socioeconomic status and with HHLNs including food and housing insecurity, unemployment, immigration, and education concerns. All studies' MLPs demonstrated positive effects on primary endpoints including perceived stress, diabetes, immunization rates, and additional child health outcomes. Two experimental studies had low bias, while the four remaining studies (quasi-experimental) had moderate risk of bias.

Conclusion

Studies highlighted the promising ability of MLPs to address HHLNs. However, additional rigorous research in MLPs is needed to establish an evidence-based approach to addressing social needs and health outcomes.

Introduction

An individual's health and mortality is widely influenced by determinants that encompass income, wealth, educational level, race and ethnicity, employment status, and structural environment characteristics.(1–3) Some examples of these upstream determinants of health include insurance access and affordability, food security, access barriers to social and legal services, housing security, transportation, and additional conditions that influence the working and living environment.(1, 2) In particular, communities of color and of lower socioeconomic status face barriers in achieving optimal health because of an uneven distribution of resources and investments.(1, 2) Without intervention, these structural barriers will continue to persist and widen inequities that disproportionately impact marginalized and underserved populations. Research shows that low-income and underserved racial-ethnic individuals in the U.S. experience significant health and social challenges.(4–7) Pointedly, the majority of low income individuals experience two to three health-harming civil needs and inequitable access and unaffordability of quality health and legal services only compound and perpetuate hardships within these communities.(7) Within medicine, the failure to proactively and effectively address these health compromising conditions undermines unprecedented progress in scientific innovation and further widens disparities in clinical and health outcomes for vulnerable communities.(8) Thus, a realignment of traditional medicine to focus on upstream preventative efforts -as part of a comprehensive patient-care approach- is a must in reducing inequities and improving health quality in these communities.(9)

Many clinicians recognize that unmet social and legal needs contribute to poorer health outcomes for the U.S. population; yet, many are uncertain about what strategies are best suited to address these needs.(5, 8, 10, 11) Indeed, with skills that lie outside clinical practice and training, research demands a team science approach to enhance scientific innovation and translational efforts in tackling these complex drivers of health and social inequity. (12) One of these strategies is the concept of “medical legal partnerships,” or MLP: a collaborative approach that has gained substantial traction over the past 40 years in addressing social determinants of health (SDoH) across vulnerable populations.(13, 14) Collaborations between the medical and legal professions to address health inequities are not new. These multisectoral partnerships have been leveraged for decades to address problems around food security and housing, job and training opportunities, and the lasting implications of the HIV/AIDS pandemic.(13) The exact terminology -and its usage thereafter- was formally introduced by the Boston Medical Center, Department of Pediatrics in 1993.(13) Since then, over 300 MLP programs have been instituted across 46 states in the U.S.(15, 16) MLPs within health care settings work by helping clinical staff leverage legal resources to holistically target the health, legal, and social needs of patients.(13, 17) In practice, staff from health care institutions (e.g. clinics, hospitals, and outpatient care centers) work closely with lawyers or legal aides to screen patients for various health harming social and legal needs.(17) Based on eligibility status, patients are connected with legal counsel to address concerns that fall within an MLP's scope of outreach. This partnership and exchange of information between the medical and legal fields can also work to synergistically address, reduce, and/or prevent health inequities and diseases in underserved populations. In particular, children who are most likely to suffer from the lifelong impact of health harming events (injuries, environmental exposure to mold and asbestos, and sickness) may stand to benefit the most from MLPs. (18)

While numerous programs have underscored MLP utilization to address health harming needs, robust peer-reviewed research that provides guidance in determining which programs are most effective is lacking. Thus, with this systematic review, there is opportunity to explore, examine, aggregate, and synthesize the evidence on MLP studies in both adult and pediatric populations. Our primary goal is to identify gaps in the literature and to determine future research opportunities for MLP expansion especially among underserved populations.

Methods

For this review, we focused our search on all experimental designs including randomized controlled trials and quasi-experimental study designs, which include pre-post studies without a control group. In addition, studies had to have been published in a peer reviewed journal, had the full text for review, and addressed our population and primary research question of interest. In addition, there was no limitation on publication year, place of publication, or population (adult and pediatric populations were both eligible). Articles were carefully screened and were deemed ineligible if they had primary outcomes outside our scope of interest, non-experimental study designs, print language other than English, or were systematic reviews, grey literature, book reviews, letters to the editor, and policy papers that provided recommendations for MLP uptake without presentation of data for pre and post evaluation.

Article Identification and Selection

Between January 12th 2021 and April 25th, 2021, the first author JCJ, completed a search across Ovid MEDLINE, PubMed, Google Scholar, and Westlaw and LexisNexis (legal databases) to identify articles using a combination of terminology, including: MLP*, "medical legal partnership", "medical-legal", pedi*, child*, adolesc*, clinic*, adult*, and parent*. Search terms were combined with Boolean phrases "AND", "OR" to maximize search results. The full list of search terms can be found in Appendix One.

Search criteria

In the last week of April 2021, following completion of the search, all retrieved articles were uploaded into Rayyan QCRI, "the Systematic Reviews web app" to aid in the screening, sorting, and final selection of articles. As part of the overall process, first author JCJ and co-author, EZ independently screened the titles of articles based on the inclusion criteria. Following this process, the authors independently reviewed the remaining abstracts for relevance, and each author narrowed their selection down to a list of articles for full-text reading. Both authors had roughly the same number and title of articles in their folder; as such, any minor differences over eligibility criteria were discussed and resolved without the need of a third author. Once this step was completed, the authors JCJ and EZ reviewed the full texts of remaining articles and came to a consensus on the articles to be included in the final synthesis. Lastly, the two review authors reviewed the reference list of eligible articles to retrieve additional studies that met eligibility criteria. This systematic review was written using *Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)* guidelines as a framework for reporting findings.⁽¹⁹⁾ See the PRISMA flow diagram, Figure One, for a complete description of the identification, screening, and selection process of eligible articles and Table One, which summarizes the main details of each paper including the study design and sample, study purpose, intervention and control measures, and primary findings.

Table One: Characteristics of Experimental Medical Legal Partnership Studies in Systematic Review						
Author and Year Location	Study Design, Duration, & Sample	Study Purpose	Identified MLP for adaptation or intervention (as is)	Top HHLNs	Intervention and Control Methods	Primary Findings
Losonczy et al. 2015 Oakland, California	Quasi-experimental 6 months duration: Baseline 1 month follow-up 6 months follow-up 154 (IG) 305 (CG) 51% female 50% Black 48 years-average (IG) 41 years-average (CG)	To determine patients' social needs who visit the ED and how an MLP integrated component could resolve these needs	Highland Health Advocates (HHA)	Housing concerns Unemployment Financial hardship Health insurance issues Food insecurity	<i>Intervention:</i> The HHA model which was a resource desk with linkages to community resources, social workers, and lawyers (if needed) HHA volunteers made biweekly contact with patients until needs were met <i>Control:</i> Usual care on days with no help desk	At month 1, IG subjects were: More aware that their needs could be met by agencies: (OR 2.37, 95% CI 1.26–4.46), ($P < 0.05$). More likely to seek help (OR 2.45, 95% CI 1.15–5.20), ($P < 0.05$). More likely to have a medical home that was not the ED (OR 3.62, 95% CI 1.13–11.52), ($P < 0.05$). At 6 months, IG subjects were more likely to have a medical home that was not the ED (OR 6.13, 95% CI 1.62–23.17), ($P < 0.05$).
Malik et al. 2018 Seattle, Washington	RCT 9 months duration Follow-up at 12 months 89 youth (IG) 70 (CG) 51% female 78.5% White (non-Hispanic) 13.1 years (average)	To examine the feasibility and efficacy of the (DCCA) Program to support high-risk, type-1 youth with diabetes	The Diabetes Community Care Ambassador (DCCA) Program	<i>Education</i> Lack of urgent diabetes care Truancy disputes	<i>Intervention:</i> 3 home visits on diabetes education and support by DCCAs Phone support from health worker, and legal support from MLP attorney post screening 1 to 2 school visits by DCCAs <i>Control:</i> Traditional care	Greater reduction in A1C for IG over compared to the CG ($P < .01$). Change in glycemic control was significant for participants with public insurance in the 2 groups ($P = .02$).

Table One: Characteristics of Experimental Medical Legal Partnership Studies in Systematic Review

<p>Rosen Valverde et al. 2019 Newark, New Jersey</p>	<p>Quasi-experimental 12 months 167 participants 101 w/ pre-test data only: 67.7% Black & 26.3% Hispanic 66 w/ pre-post data 45.2% Black & 48.4% Hispanic Primary parent ≥ 18 years 94% Female</p>	<p>To examined whether: MLP-involved parents perceived themselves as stressed and If they reported a reduction in stress when their MLP cases were closed</p>	<p>The Health, Education, Advocacy and Law (H.E.A.L.) Collaborative</p>	<p>Special education Social work Public benefits General education Housing Food & nutrition</p>	<p><i>Intervention:</i> Direct assistance from the H.E.A.L MLP <i>Control:</i> N/A</p>	<p>After H.E.A.L. assistance, PSS fell by a mean of 2.5 points ($t = -3.64, P < 0.01$) Compared to pre-test (only) group, pre-post group was: 32% more likely to report a special education need ($P < 0.01$). > 2 times as likely to identify a social work need ($P < 0.01$). 10 times more likely to report an immigration problem ($P < 0.01$).</p>
<p>Ryan et al. 2012 Tucson, Arizona</p>	<p>Quasi-experimental 10 months 104 participants 37 w/ pre-test data only 42.9% White & 37.1% Hispanic 67 w/pre-post data 57% White & 27.3% Hispanic 73% female</p>	<p>To examine whether an MLP program can improve patient wellbeing and reduce levels of perceived stress</p>	<p>The Tucson Family Advocacy Program (TFAP) is an MLP program</p>	<p>Social security Health insurance coverage Advance directive Food stamps</p>	<p><i>Intervention:</i> MLP services offered through the Tucson Family Advocacy Program (TFAP) <i>Control:</i> N/A</p>	<p>Mean wellbeing score decreased (represents improvement) from 4.6 to 2.7, $P < 0.001$. Mean PSS decreased from 26.4 to 18.3 at post-intervention, $P < 0.001$. Mean stress levels from pre- to post-service were mediated by reduction in clients' level of concern related to legal matters, $P < 0.001$.</p>
<p>Sege et al. 2015 Massachusetts</p>	<p>RCT 6 months duration Follow-up at 12 months Parents & newborns 55% Black 167 (IG) 163 (CG) 10 weeks old Primary parent 93% Female</p>	<p>To examine whether the inclusion of a trained family specialist (FS) would better support families and facilitate measurable improvements in health care quality</p>	<p>Adapted framework from Boston University's MLP</p>	<p>Food insecurity Housing issues Income assistance Utility issues</p>	<p><i>Intervention:</i> Intervention group assigned to joint visits with the medical provider and family specialist (FS) Home visits by the FS Contact with the FS via phone, e-mail, or in person. <i>Control:</i> Standard care</p>	<p>Infants in IG more likely to have completed 6-month immunization schedule at 7 months (77% vs 63%, $P \leq .005$) and by 8 months (88% vs 77%, $P \leq .01$). Infants in IG more likely to have ≥ 5 preventive care visits by age 1 year (78% vs 67%, $P \leq .01$). Infants in IG less likely to visit the ED by 6 months (37% vs 49.7%, $P \leq .03$).</p>

Table One: Characteristics of Experimental Medical Legal Partnership Studies in Systematic Review

Weintraub et al. 2010	Quasi-experimental	To explore whether integration of legal services into pediatric settings would:	The Peninsula Family Advocacy Program (FAP)	Health insurance	<i>Intervention</i>	Post-intervention responses showed significant ($p < 0.05$) increases in:
Palo Alto, California	28 months duration	Increase families' awareness of and access to legal and social services.		Government benefits	FAP provided MLP assistance with:	WIC uptake (35.2% versus 50.0%)
	Follow-up of 6 months	Decrease barriers to health care for children.		Housing issues	legal counseling,	Food Stamps (13.0% versus 29.6%)
	102 families	Improve child health		Immigration	communicating with landlords	Supplemental income (5.6% versus 16.7%)
	Primary parent			Family violence	childcare services	Child Support (7.4% versus 16.7%)
	34.9 years (average)				affordable health services	At 6 months follow-up, 68% had issues resolved by FAP fully or partially.
	79.6% Hispanic				food and clothing programs	
	92% Female				adult education programs	
					<i>Control</i>	
					NA	

Notes on abbreviations:

RCT: randomized controlled trial; IG: intervention group; CG: Control group; HHLN: health harming legal needs; ED: emergency department; PSS: perceived stress scale; $P = p$ -Value

Risk of Bias assessment

Using the Consolidated Standards of Reporting Trials (CONSORT) tool, (20) which assesses risk of bias, the review authors, JCJ and TN, in the first week of May 2021, reviewed the internal validity of each included study. The methodological quality of each article was assessed on 10 risk of bias indicators. For each study, the reviewer examined whether the studies' authors reported on these dimensions. If yes, a (+) was assigned, if not reported, it was noted as (-), and if unclear or not applicable, then (?) was given. Risk of bias categories included high risk (0 to 3 total score), medium risk (4 to 7 total score), and low risk of bias (8 to 10 total score). The risk of bias scores for each study are shown in Table Two.

Results

Table Two: Risk of Bias Assessment Indicators for Medical Legal Partnership Research Studies											
Study Author and Year	Baseline reporting for each group	Random allocation	Attrition described	Subject and/or assessor blinding	Outcome assessed after baseline	Used ITT Analysis	Assessed confounding effects	Results presented (effect/precision estimates)	Power reported	Outcomes assessed objectively	Total
Losonczy et al. 2017	+	-	+	-	+	?	+	+	?	+	6
Malik et al. 2018	+	+	+	-	+	+	+	+	-	+	8
Rosen-Valverde et al. 2019	+	N/A	+	N/A	+	N/A	+	+	-	+	4
Ryan et al. 2012	+	N/A	+	N/A	?	N/A	+	+	-	+	5
Sege et al. 2015	+	+	+	+	+	+	+	+	-	+	9
Weintraub et al. 2010	+	N/A	+	N/A	+	N/A	+	+	-	+	6
Notes:											
ITT Analysis: Intent to treat Analysis											
Scoring for Studies: Mark present (+), absent (-), Unsure/NA (?) if indicator is mentioned, not mentioned, or unclear											
Total Risk of Bias score: 0-3 (high), 4-7 (medium) 8-10 (low)											

Table Three: A Report on Secondary Outcomes and Measurement tools in Each Study			
Study	Secondary points of interest	Results	Measurement tools (if mentioned)
Losonczy et al. 2015	1. Whether the patient felt helped	1. More than 75% of intervention subjects felt HHA was helpful.	Follow-up calls/visits with patients using modified Likert Scales
Oakland, California	2. number of self-reported ED visits at 6 months 3. Whether primary need was met by 6 months, (yes or no) 4. report of a primary doctor or medical home by 6 months; and 5. improvement in general self-rated health	2. No difference in monthly ED utilization between groups 3. IG patients were more likely to have a medical home (OR 6.13, 95% CI 1.62 to 23.17). 4. In both groups, roughly half had needs resolved. 5. Self-rated health was lower in IG but not statistically significant.	General Self-Rated Health question
Malik et al. 2018	1. DCCA Program completion rate and 2. MLP referral and acceptance rates for the intervention group. 3. Caregiver experiences	1. 80% of enrolled participants who met with their DCCA completed the study. 2. 62% reported ≥ 1 unmet legal need, of whom 29% accepted legal counsel. 3. 29% of caregivers who were offered an MLP referral accepted legal counsel. Caregiver experiences 1. Caregivers rated their DCCA "9.74" 0 to 10 scale (0.47 SD) 2. Caregivers felt they could trust their DCCA (9.65 \pm 0.74 SD). 3. On a 4-point scale, caregivers thought that DCCAs communicated effectively with participants (3.87 \pm 0.23 SD) and were caring (3.84 \pm 0.22 SD). 4. 96% of caregivers would recommend the MLP to other families.	Pediatric Quality of Life Inventory 1Diabetes Module (Diabetes PedsQL) <i>Scale (0-100)</i> Consumer assessment of healthcare providers and systems (CAHPS) survey
Rosen Valverde et al. 2019	Sources of stressors (16 examined) *Did not assess MLP satisfaction	After H.E.A.L. services, participants self-reported reductions in stress from: 1. Child's school and education, 2. Worries about the child's future, 3. Financial issues 4. Legal matters 5. Housing 6. Mental health issues	Sources of Stress questionnaire (created by study interventionists)
Ryan et al. 2012	Factors influencing perceived stress *Did not assess MLP satisfaction	Negative stressors: 1. Death of a loved one 2. Divorce battles 3. Transportation issues Positive stressors: 1. Meditation/mental health support 2. Employment opportunities 3. Drug/alcohol abstinence	MYCaW questionnaire (open ended prompts)

Sege et al. 2015 Massachusetts	1. Program completion rate and 2. MLP referral and acceptance rates for the intervention group *Did not assess MLP satisfaction	1. 92% of families had at least 1 collaborative health care visit. A median of 3 reported for most families. 2. 52% of families had home visits. 3. 5 median contact hours between family specialist (FS) and family: spread over 14 visits. 4. 75 intervention families had MLP consults. 5. Active MLP consultation was 2 calls on average per family between the FS and MLP. 6. 72 (96%) of cases were solved without direct MLP involvement (legal intake and representation)	Screening and referral forms EHR Data
Weintraub et al. 2005 California	1. Satisfaction with FAP MLP services 2. Prior knowledge of, and use of MLP services	1. 66% of parents believed that the FAP helped to improve their children's health and well-being. 2. Of those who completed follow up assessments, 90.4% thought it helpful to have FAP at the clinic or hospital. 3. All participants felt comfortable speaking with FAP about their needs. 4. 87% reported the FAP resources to be beneficial and 89% said they would continue to use the MLP services. 5. Only 50% reported spreading information about the MLP. 6. 92% of participants reported that the FAP-MLP needed no improvements; highlights included location convenience in clinics.	No mention of survey instruments, except for referencing telephone calls and home visits to conduct interviews

The search from electronic databases and secondary sources (e.g. referrals, reference lists of eligible articles) yielded 1267 records. After removing 21 duplicates, 1246 unique records remained. A total of 720 records were excluded after titles were reviewed; following which, 526 abstracts were reviewed. From these 526 records, 494 records were further excluded with reason. The 32 remaining records' full text were screened, and six studies were determined to be eligible for final inclusion. In addition to Table One which presents a summary of these eligible studies, Table Three (above) presents additional results on studies' secondary endpoints.

Characteristics of Included Studies

As shown in TableOne, of the six studies that were included in our review, 100% were conducted in the United States, all with the exception of Weintraub et al. 2010 were published within the past 10 years, all had populations that were predominantly female, and all had majority low-income populations. Three of the studies specifically recruited families, and of these family-focused studies, the majority of caregivers were female.(21–23) Regarding the racial/ethnic makeup of the six studies, three were majority Black,(21, 24, 25) one was largely Hispanic,(22) and the last study, Ryan et al. was mainly Black and Hispanic at the pre-test phase but had a majority Non-Hispanic White population at post-test phase. Most studies had a duration of six months, with a range of six months to 28 months. Of the studies, only Malik et al. 2018 and Sege et al. 2015 were randomized controlled trials (RCTs).(21, 23) The remaining four were quasi-experimental in study designs; of which, three were pre-post studies without control groups. (22, 25, 26) Participant samples consisted of individuals who expressed various health harming needs, chief of which included housing concerns,(21, 22, 24, 25) public benefits, (22, 25, 26) unemployment and income assistance,(21, 24, 26) and food insecurity. (21, 24–26)

Summary of evidence

Each of the studies had uniquely different primary endpoints around effectiveness of MLPs to address variously targeted social and health harming legal needs. The MLP was used to i) examine changes in perceived stress levels,(25, 26) ii) broaden improvements in patients' identified social needs,(21, 24) iii) support high risk diabetic youth,(23) and iv) increase uptake in family social services and improvements in newborns' health.(22) In addition, MLP intervention approaches for the six studies additionally featured biweekly contacts with patients through use of a resource desk,(24) home visits,(21, 23) phone calls from health and social workers,(21, 23) and in person sessions with family specialist.(21) Of the three studies that used control groups, all provided usual clinical care as their control.(21, 23, 24) Given that the RCT study design is considered the gold standard for research, we discuss the findings of the two RCT studies in greater detail below.

In Malik et al. 2018, the authors primary aim was to assess the feasibility and acceptability of a diabetes-designed MLP program that included the support of lay health workers and an MLP attorney to address the unmet legal needs of youth living with type 1 diabetes (average age: 13.1 years).(27) The most significant health harming needs included failure to seek urgent care for type 1 diabetes and truancy disputes (education). The intervention which consisted of three home visits by program specialist and phone support by social workers and MLP attorneys lasted nine months in duration.(27) Overall, researchers observed that compared to the control group, which received standard clinical care, the intervention group experienced a statistically significant greater reduction in Hemoglobin A1C ($P \leq 0.01$).(27) In the second RCT, Sege et al. 2015 sought to examine whether the inclusion of a trained

family specialist (FS) would better support families with newborns (average age: 10 weeks old) and facilitate improved quality of care.(21) The study, which lasted six months, included clinical visits with the physician and family specialist, home visits, and ongoing follow up calls and emails with the family specialist to ensure that infants completed immunization and preventive care visits.(21) The authors reported that compared to the control group, infants in the intervention group were more likely to complete immunization schedules at 6th and 8th months ($P \leq 0.01$), more likely to have five or more primary care visits by year one ($P \leq 0.01$), and lastly, less likely to visit the emergency department compared to the control group ($P \leq 0.03$).(21)

Table two shows the risk of bias assessment for all included studies. Quality scores ranged from low to medium bias. All the medium risk of bias scores were associated with the quasi-experimental study design, which inherently has a higher risk of bias due to absence of random allocation, intent to treat analysis, use of controls, blinding, and other bias-reduction indicators. The two RCTs, Sege et al. 2015 and Malik et al. 2018 presented low risk of bias scores.(21, 23) All the remaining studies presented medium risk of bias. The risk of bias assessment indicators were examined for all of the included studies and are detailed as such: i) all studies reported results that included either effect or precision estimates; ii) all studies reported baseline measures; iii) two studies used random allocation; (21, 23) iv) all studies assessed for confounding; v) five (83%) studies assessed outcome measures during a follow-up period;(21–25) vi) two (33%) studies used intent to treat analysis;(21, 23) vii) no study reported use of power estimates to determine sample size; viii) all studies measured one or more outcome objectively; ix) one study, Sege et al. 2015, reported subject and/or assessor blinding (21) and all studies described attrition (loss to follow-up) over time.

Discussion

The use of MLPs to meaningfully address hardships that compound quality of life has been recognized across many peer-reviewed publications.(15, 28–35) However, little research has been done to evaluate the impact of MLPs in making measurable effects on the health harming needs of vulnerable, underserved populations. Thus, the primary goal of this systematic review was to synthesize the evidence on experimental MLP studies that have been conducted to date in adult and pediatric populations. This is the first systematic review to narrow in on the existence of MLP experimental studies and explore gaps in literature that could inform and shed ideas for successful MLP implementation and expansion across underserved populations. In this study, six experimental studies met the eligibility criteria, of which, most were of the quasi-experimental study design, having had no randomization to control group(24) or no control group at all.(22, 25, 26) Seen as the gold standard in establishing evidence of impact, experimental studies may test a treatment under rigorous standards to determine *its* potential effectiveness within preventative and clinical care settings.(36) The absence of many metrics, including lack of random allocation, lack of intent to treat analysis, and failure to report study power resulted in medium risk of bias for all, except the two RCT studies.(21, 27) Another challenge is that these studies were multi-modal and involved activities, like home visits and diabetes education, which complement legal services. While these programs offer a more holistic delivery of services, their well-integrated nature makes it difficult to isolate the effect of the provision of legal services. This review demonstrates that MLP interventions is not only a developing area of research that presents significant promise for implementation of innovative approaches, but an area that still demands high quality, rigorous RCTs to test the efficacy of MLPs for populations that need them the most. These findings highlight the need for organizations to transform into learning health systems, where delivery, training, and research activities are integrated, such that rigorous MLP evaluations are routinely incorporated into the implementation process.(37)

Most of our study populations were of lower socioeconomic status, belonged to a racial-ethnic minority group, belonged to families receiving governmental assistance for income and nutritional support, and were from homes headed by single parent households – in particular, women. In addition, most participants across the six studies presented numerous health harming needs; the most pressing and commonly mentioned included food and housing insecurity, unemployment, and government benefits. These findings are not any different from previous studies – both observational and experimental. (5, 10, 15, 28–35) Yet, despite the need for health and legal concerns to be addressed, the majority of the six studies –especially Ryan et al.2012 and Rosen et al. 2019- experienced significant loss to follow up particularly among Black and Hispanic participants.(25, 26) Studies targeting vulnerable populations are keenly aware of their populations' exigent circumstances as well as their feelings about health care and legal providers.(38–42) Some of these circumstances and concerns may encompass the inability to schedule time off work, socioeconomic vulnerabilities (e.g. transient populations, lack of support, cultural and language barriers) and overall mistrust in the medical and legal communities.(11, 14, 38–42) The inability to retain participants not only impacts an intervention's power to observe a desired effect but also hinders replication of ideas in larger scale studies that have the potential for broad and meaningful impact in vulnerable populations.(5) Furthermore, lack of retention in MLP implementation by these populations not only limits generalizability of results to the most intended and relevant populations, but also stymies the advancement of research and broadscale implementation that could ideally reduce health and social disparities in these communities. Indeed, interventionists must balance the provision of clinical and legal care with impactful community-based participatory research approaches that integrate the voices of community stakeholders and the very people who are recipients of these interventions.(5, 10) Finally, using implementation science methodologies and hybrid study designs to understand the predictors of implementation success of MLPs is warranted.(43)

One significant observation made about the selection of studies was their location. Specifically, none of these studies were conducted in southern or midwestern states. Research shows that the South, comprised of seventeen states (including Texas) and which is home to a significant share of the U.S. BIPOC population (Black, Indigenous, and People of Color), fares disproportionately poorer in health and socioeconomic metrics than northeastern and midwestern states.(44) Indeed, Southern U.S. residents are more likely to be overweight and obese, suffer from higher rates of chronic diseases, cancer, and infant mortality. These residents are also more likely to be uninsured, underinsured, and of lower socioeconomic status.(44) Given that this region of the country suffers disproportionately from health harming and social needs, MLPs have the potential to make transformational impacts in addressing population needs that may manifest as legal needs. Our research study speaks to the need to address the burden of care and legal needs that specific groups experience. Expanding the scope of MLPs will require rigorous scientific testing, greater interdisciplinary partnerships, investment of financial and

social capital, advocacy, higher-level teaching across medical and legal institutions, and the support of community voices to tackle key determinants that contribute to widening health and socioeconomic disparities across the southern United States region.

Strengths and Limitations

This systematic review did have limitations that we must acknowledge. First, we only considered studies that were printed in English. Thus, it is possible that we may have overlooked medical legal partnership experimental studies that were conducted in other countries. Second, our review only included experimental studies; and while these designs are more scientifically rigorous in conduct, it is also probable that we may have neglected research studies that could have added to the richness of our systematic review. Despite these weaknesses, the strengths of our review are very much evident.

Strengths include an explicit focus on peer-reviewed experimental studies -both RCT and quasi-experimental, which are more superior in design and are more predictive of a treatment's efficacy. Second, this study conducted an extensive search for peer-reviewed articles across multiple clinical, public health, and legal databases, with no limitation to place and year of publication. Third, we used the PRISMA guidelines to conduct our systematic review; additionally, this study is the first MLP systematic review to assess the methodological quality of studies using the CONSORT checklist. Lastly, this study used two independent reviewers to conduct, review and determine eligibility, and assess the quality of studies.

Conclusion

In summary, strategies such as MLP can be successful in impacting key health outcomes among those at highest risk. However, the results of our review underscore the need for additional rigorous research studies across diverse populations using stringent, but pragmatic study designs as well as implementation science methodologies to i. establish the evidence-base for the impact of MLPs on social needs and health outcomes, and ii. understand the factors informing implementation success of MLPs in vulnerable populations.

Declarations

Ethics approval and consent to participate in study:

Given that this is a systematic review of the evidence on medical legal partnerships' impact on adverse social determinants of health, consent and approval was deemed irrelevant.

Consent for publication:

This systematic review prevents evidence on medical legal partnerships' impact on adverse social determinants of health. As such, consent for publication was not applicable.

Availability of data and materials

As the corresponding author, I assert that I can provide full access to all research material (review files from Rayyan software, selection manuscripts, and writings) tied to this paper.

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- i. Jemima John: First author, co-reviewer of articles, and primary writer of all sections with contributions from authors. Also corresponding author on the manuscript.
- ii. Co-mentors, Drs. Thomas Murphy and Shreela Sharma played a major role in the planning, assisting with writeup, formatting, and final revisions of manuscript contents.
- iii. Emily Zeintek co-reviewed eligible articles. Also framed introduction section, aggregated key references that support the manuscript's narrative, and helped to format and review final product of this paper.
- iv. Dr. Thien-An was co-reviewer for the risk of bias evaluation (assessing methodological quality) of eligible articles. He also reviewed and provided critical feedback on the writeup of the methods section of the paper.
- v. Drs. Winston Liaw, Catherine Burnett, and Mary Aitken reviewed and edited the paper. They provided medical and legal expert perspectives for the discussion, provided references to support paper's narrative (Dr. Liaw and Burnett), and truncated paper's length to improve readability and ensure suitability for journal. Lastly, they provided written revisions and added additional arguments to support the case for MLP research.

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Figures

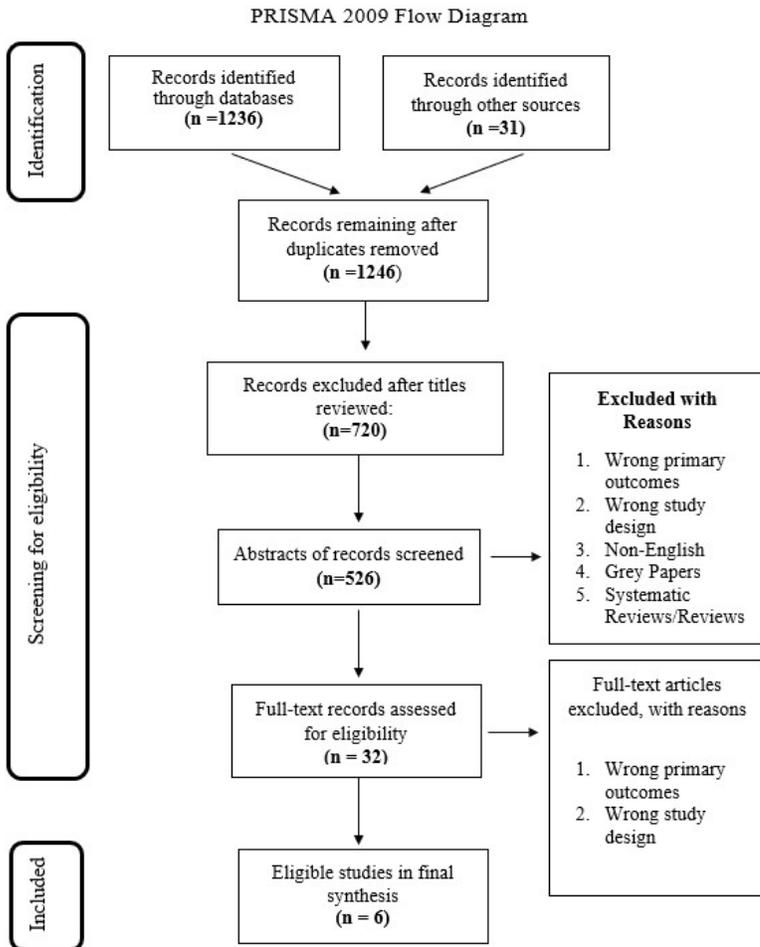


Figure 1

Flow diagram for final selection of articles- informed by PRISMA guidelines

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