Journal of Community Medicine & Public Health
Rodgers K, et al. J Community Med Public Health 9: 497
www.doi.org/10.29011/2577-2228.100497
www.gavinpublishers.com

Review Article

The Impact of Screening for Social Determinants of Health on Diabetes and Hypertension Outcomes: A Systematic Review

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Citation: Rodgers K, McTernan K, Fiddler K, Nobiling B, Reid T, et al. (2025) The Impact of Screening for Social Determinants of Health on Diabetes and Hypertension Outcomes: A Systematic Review. J Community Med Public Health 9: 497. DOI: https://doi.org/10.29011/2577-2228.100497

Received Date: 17 January, 2025; **Accepted Date:** 27 January, 2025; **Published Date:** 30 January, 2025

Abstract

Social determinants of health (SDoH) play an integral role in an individual's health status, life expectancy, and overall wellbeing. Due to the influence of SDoH factors on a person's health status, U.S. healthcare regulatory bodies issued standards for hospitals to screen and address SDoH to reduce disparities. In this systematic review, we analyze and discuss the implications of existing peer-reviewed published research that investigates the impact(s) SDoH screening has on chronic disease management of diabetes, hypertension, and healthcare utilization. We queried PubMed, Scopus, Web of Science, and CINAHL using the keywords "health-related social needs" OR "social determinants of health" AND screening publication year > 2019 AND < 2025 AND "diabetes" OR hypertension." The search identified 889 studies. Utilizing PRISMA methodology, three articles were identified that met our specific inclusion criteria (i.e., assessment of SDoH, developed a targeted intervention, and provided intervention linked outcomes) and underwent data extraction and analysis.

Each study assessed the impact of an intervention that included an SDoH screening and chronic disease interventions. None of the studies presented statistically significant improvement in clinical health outcomes because of the SDoH screening intervention. The paucity of peer-reviewed literature provides evidence of the nascency of this area of research. Additional studies are needed to develop best practices for screening and addressing SDoH to impact positive health outcomes. The researchers expected to find more literature related to this specific topic considering the new SDoH standards became effective in 2023 because of significant evidence of SDoH impact on health status.

Keywords: Social determinants of health; Chronic disease management; Diabetes; Hypertension; Population health; Systematic; Review

Introduction

Social, behavioral, and environmental contexts, also referred to as social determinants of health (SDoH), significantly influence an individual's health status and wellbeing. Where you live, the color of your skin, your age, your income, and education affect how healthy you are and how long you are likely to live [1]. SDoH may contribute as much as 80 percent toward a person's health versus 20 percent through medical care [2]. Healthy People 2030, a national health initiative of the U.S. Department of Health and Human Services, groups SDoH across five domains including economic stability, education access and quality, health care access and quality, neighborhood and built environment, and social and community context [1]. The World Health Organization defines SDoH as "non-medical factors that influence health outcomes."

They are conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life [3]. Examples include housing, food and nutrition, transportation, Internet access, education, job opportunities, income, language, literacy, clean air, and water.

Since these factors are known to have significant impact on one's health, there is a tremendous push among health care quality and regulatory bodies to incentivize health care providers to screen and address SDoH. The Centers of Medicare and Medicaid Services (CMS), Centers of Disease Control and Prevention (CDC), U.S. Department of Health and Human Services (HHS), the Joint Commission, and other health care regulatory entities have issued new requirements, standards, and guidelines mandating SDoH screening initiatives. By addressing SDoH, these initiatives are expected to reduce disparities, improve health outcomes, and advance health equity.

The literature supports the link between SDoH and health care outcomes and the need for health care providers to consider interventions that address social risks. Numerous studies show the association between SDoH factors, health disparities, and poor health [4-10]. Research in this arena has accelerated dramatically over the past two decades providing substantial evidence for the interrelationship between SDoH, healthcare disparities, and barriers to care.

Healthcare providers recognize the influence SDoH factors have on a patient's well-being and primary care health indicators such as breast cancer screening, chronic disease management, and use of health services [7]. Type II diabetes and hypertension are two commonly preventable chronic health conditions affected by lifestyle factors such as diet and exercise. SDoH contributes to development and management of chronic diseases such as diabetes and hypertension by affecting a person's ability to consume a healthy diet and achieve recommended daily physical activity.

A person's ability to access, afford, and consume healthy foods known to prevent diabetes and aid in chronic disease self-management may be hindered by adverse SDoH such as food insecurity, limited income, lack of transportation, unstable housing, low literacy, lack of education, or other factors. The inability to meet recommended physical activity levels may also be deleteriously influenced by negative social, economic, and environmental factors such as housing, crime, transportation, income, and others.

Currently a variety of tools and methodologies exist for screening and addressing SDoH. Health care organizations may apply several conceptual and theoretical frameworks to the practice of screening and addressing SDoH as part of a clinical care plan. There is an important knowledge gap in the literature identifying SDoH screening activities and specific health outcomes in diabetes and hypertension. To this study authors' awareness, this is the first systematic review designed to synthesize existing published data addressing the influence screening for the presence of SDoH and its effect on chronic disease management of diabetes, hypertension, and healthcare utilization.

Methods

Journal Database Interrogation

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) methodology [11]. Published literature databases used for this review included PubMed, Scopus, Web of Science, and CINAHL. The key word search strategy used included (health-related social needs OR social determinants of health) AND screening publication year >2019 AND <2025 AND (diabetes OR hypertension).

Article Inclusion/Exclusion Criteria

To be included in the review, the study had to include screening for SDoH, a targeted intervention for individuals with a diagnosis of hypertension or diabetes, and documented health outcomes as a result of the intervention(s). Studies must have been available in English language and limited to study participants aged ≥18. Study participants could not participate in palliative or hospice care or be institutionalized. Participants could be unhoused.

Article Selection

Covidence® (Covidence, Melbourne, Australia) systematic review software was utilized in study tracking. 889 studies were identified (521 from PubMed, 199 from Scopus, 118 from Web of Science, and 51 from CINAHL). Of the 889 studies, 217 were identified as duplicates.

The remaining 672 studies were screened for relevance through title and abstract review by two of the authors to include or exclude the article from our study. A unanimous agreement was required for article selection for further review or exclusion from the systematic review. Voting conflicts were handled through adjudication and required unanimous decision by all authors to include or exclude from the systematic review.

This process resulted in 597 studies being determined as irrelevant to this systematic review and were then excluded. The remaining 75 articles underwent full-text review that mirrored the process described for the title and abstract review. The full-text review resulted in the exclusion of an additional 72 studies that did not meet inclusion criteria (Table 1). The three studies that remained were the only studies identified that met our specific inclusion criteria of assessment of SDoH, a targeted intervention, and outcomes because of the intervention. These three studies underwent data extraction and analysis (Figure 1 and Table 2).

Exclusion Criteria	Definition
Wrong setting	Study did not take place in the United States
Wrong outcomes	Outcomes did not include hypertension of diabetes
Wrong intervention	Screening was not included as an intervention
Wrong study design	Outcomes were not patient/cohort specific
Wrong patient population	Participants were not ≥ 18, or were on palliative care, hospice care, or institutionalized

Table 1: Reasons Identified for Study Exclusion.

Study ID	Study design	Population	Social needs assessed	Results	Conclusion
Joseph, et al. (2023)	Non-randomised experimental study	Non-Hispanic Black men (70 participants), age 18+, poor or average cardiovascular health, English speaking	Living situation, food insecurity, transportation, utilities, safety, financial strain, employment, family and community support, education, physical activity, substance abuse, mental health and disabilities	Cardiovascular health scores improved by 0.94 points (p=0.013) and 0.87 points (p=0.022) in the group without and with social needs respectively. No differential effect by baseline social needs status existed (interaction p-values for the interaction effect between social needs and time was p=0.895)	Both the group with social needs and the group without social needs has improvements in cardiovascular outcomes. No significant difference was observed.
Roth, et al. (2023)	Cohort study	Non-Hispanic, White, Black, Asian, clinic patients with type 2 diabetes, Age 18-65 (1220 participants, treatment=740, control=480)	Food, housing, utilities, transportation	Patients at DCII clinics compared to control clinics saw an increase in diabetes education (15.5%, p<0.001), were more likely to receive SDoH screening (4.4%, p<0.087), and had an increase in the average number of virtual primary care visits of 0.35 per member, per year (p<0.001)	No differences in HbA1C, blood pressure or hospitalization were observed
Gold, et al. (2023)	Other: stepped-wedge trial (type of RCT)	Age 24-57, Hispanic, Black, White, non-Hispanic (31 clinics)	Child/family care insecurity, education, employment, financial strain, food insecurity, health insurance, health literacy, housing instability, inadequate physical activity, relationship safety, social isolation, stress, transportation needs, and utilities insecurity	Social risk screening was 2.45 times (95% CI, 1.32-4.39) higher during the 6-month intervention period compared to pre-intervention period. Overall, the analysis showed no intervention impact on diabetes outcomes.	Social risk screening rates were significantly higher during 6-month intervention period compared with the pre-intervention period. This increase was not sustained in the post intervention period.

Table 2: Study Data Table.

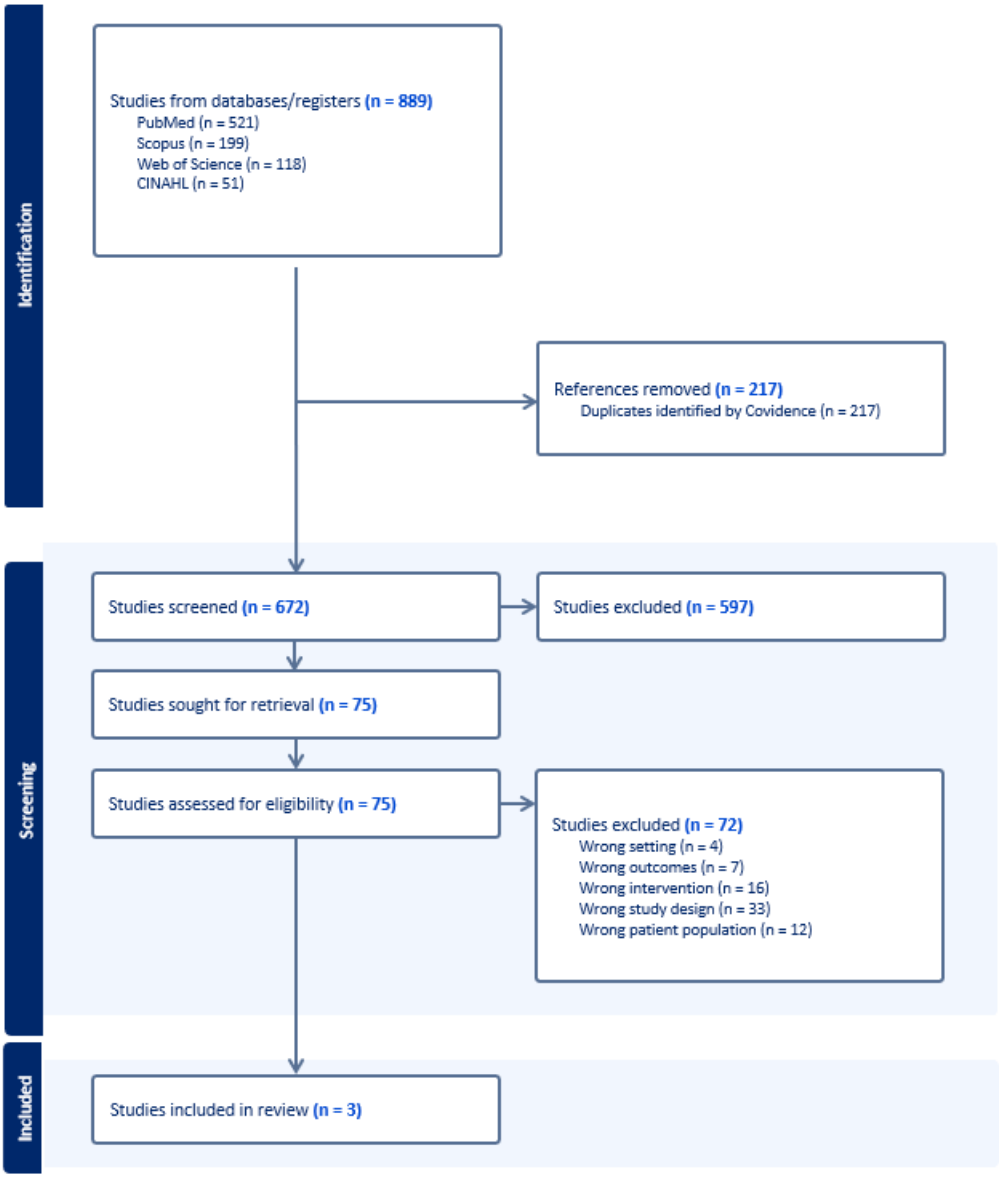

Figure 1: PRISMA diagram.

Quality Assessment

The quality of each article was assessed using the Downs and Black checklist [12]. This tool contains 27 items, allowing a maximum score of 27. These items are intended to capture the quality of reporting, external validity, internal validity, and power of the study. A score <7 indicates a poor-quality study, 7-13 a limited-quality study, 14-20 a moderate-quality study, and greater than or equal to 21 a strong-quality study.

Results

Below is a summary of the three studies determined to be appropriate for in-depth analysis by the authors. Each of the three studies occurred during the COVID-19 pandemic and were published in 2023.

Roth et al. conducted a study to assess the impact of a multi-pronged strategy to influence both clinical outcomes and social determinants of health (SDoH) that affect type 2 diabetes. The project, called the Providence Diabetes Collective Impact Initiative, included multiple interventions such as outreach, diabetes self-management education, screening and addressing SDoH [13]. The study comprised of 1,220 people (740 in the treatment group and 480 in the control group), aged 18 to 65 years old with pre-existing type 2 diabetes diagnosis who visited one of seven clinics in the tri-county area of Portland, Oregon between August 2019, and November 2020.

This pre/post interventional study measured SDoH screenings, participation in diabetes education, HbA1c test results, blood pressure, primary care utilization, inpatient and emergency department hospitalization. The data demonstrated patients in the treatment group had an increase in receiving diabetes education (15.5%, $p<0.001$), SDoH screening (4.36%, $p<0.087$), and average number of primary care visits ($p<.001$); however, there were no pre- post-intervention differences in HbA1c, blood pressure, or hospitalizations [13].

Gold et al. evaluated a six-month intervention of technical assistance and coaching with electronic health records to improve the documentation of social risk screening and subsequent social service referrals in community health centers. The intervention was carried out in 31 clinics [14].

The data demonstrated the monthly clinic rate of social risk screening was 2.45 times (95% CI, 1.32-4.39) higher during the six-month intervention period compared to the preintervention period. However, this improvement was not sustained after the intervention period had stopped (rate ratio, 2.16; 95% CI, 0.64-7.27). The second outcome was the monthly clinic rate of social risk-related referrals which showed no statistical difference during or after the implementation of the intervention, even when patients had social risks documented.14 A secondary analysis of the study measured if the intervention affected diabetes control and diabetic care assessed by lipid panel checks, HbA1c screening, and blood pressure measurements. The intervention had no impact on diabetes outcomes.14 The article suggests the COVID pandemic, and the short intervention period may have impeded sustainability and statistical significance.

Joseph et al. (2023) evaluated the effect of a 24-week community-based healthy lifestyle program on change in social needs and change in American Heart Association's (AHA) Life Simple 7 (LS7) score. A total of 70 Black men from a large Midwestern city participated in the program. Researchers assessed social needs at 12 weeks and 24 weeks and changed the LS7 score from baseline to 12 and 24 weeks. More than half of the participants had at least one social need identified at baseline via the Centers for Medicare and Medicaid Services (CMS) Accountable Health Communities Health-Related Social Needs Screening tool. While the percentage of participants with social needs was reduced during the program, there was no statistically significant association between social needs status and improved LS7 score [15].

Discussion

These authors set out to synthesize the published data connecting social determinants of health (SDoH) screening in patients with a diagnosis of hypertension or diabetes, and measured clinical outcomes related to chronic disease status and/or healthcare utilization. Our systematic review revealed a paucity of data with only three articles meeting our inclusion criteria. The inclusion criteria were developed to be broad enough to obtain the relevant research, but did not result in extensive unassociated articles. The scarcity of evidence found is a demonstration that this is a new area of research. This does not come as a surprise to the authors as the Joint Commission and CMS have only recently established quality standards related to SDoH screening as of 2023. This appears to be a very new approach to population health for healthcare systems and hospitals. Each of the studies reviewed had a multi-pronged intervention with a process for screening for SDoH, a pathway for referrals and/or resources to address adverse SDoH indicated from the screening, and the provision of medical care that incorporated social care.

Roth et al. [13] incorporated outreach and chronic disease self-management education along with a process to screen and address SDoH. The study found the treatment group had an increase in receiving diabetes education, SDoH screening, and average number of primary care visits; however, there were no differences in HbA1c, blood pressure, or hospitalizations. This study was innovative as it examines the effectiveness of SDoH-related interventions in managing and improving outcomes associated with chronic conditions such as diabetes. The interventions were designed to address both clinical issues and social risk factors particularly among low-income Medicaid population of patients. The data from this study provides important insight into how to effectively improve diabetes management in a particular population. The researchers took a multi-pronged approach that included not just medical care, but also care coordination and chronic disease self-management education. Efforts to improve diabetic control are critically important to note given the prevalence, costs, and negative health outcomes associated with type 2 diabetes.

Another strength of the study was the use of the Electronic Medical Record system (EMR) to proactively identify patients with type 2 diabetes who had clinical care gaps. The SDoH screening was also built into the EMR. While the revised EMR included order sets to standardize diabetic care including referrals for additional clinical and social supports, the study does not address the extent to which the prompts are used by providers. The article suggests that primary care teams screened patients for SDoH using the questionnaire embedded in the EMR, but it is unclear whether a standardized screening process was followed. For example, there is no explanation about what stage during an appointment a patient is screened for SDoH and by whom. The article also contends that patients could self-refer to the community resource desk but does not share what proportion of patients self-refer versus are referred because of identified needs or referred by a member of the healthcare team for some other reason.

While the study assesses the rate of SDoH screening and referrals to the community resource desk, it does not consider whether those adverse SDoH identified in the screening are addressed, or whether the SDoH gap is closed. If patients receive referrals for a community-based resource, it does not necessarily mean that their need is met. This could be an explanation for why few clinical outcomes were observed.

Gold et al. [14] studied how providing technical assistance and coaching healthcare providers about SDoH screening and referrals affected the completion rate of SDoH screenings and diabetes control and care. While the data demonstrated an increased rate of SDoH screening during the six-month intervention period, the improvement was not sustained after the intervention stopped. There was no statistically significant difference in the rate of social risk-related referrals nor any measurable impact on diabetes outcomes.

Similar to the Roth et al. [13] study, the Gold et al. [14] study integrated the SDoH screening and referral process into the EMR. This integration provided access to discrete data and the ability to analyze screening rates and any associated clinical outcomes. The fact that documentation of the SDoH screening and referral workflows were not sustained post intervention indicates the process was not universally adopted or standardized across the clinics. Due to clinics being in under-resourced communities and serving a high population of low-income Medicaid recipients, it is likely that screening and referrals continued to take place, but clinical team members may not have accurately documented these activities in the necessary EMR fields.

The coaching and technical assistance intervention was clearly effective as it resulted in almost 2.5 times more SDoH screening compared to the six-month pre-intervention. The fact that this improvement was not sustained post intervention may mean that the intervention did not occur over a long enough period to be routinely adopted by the clinical care teams. It could be inferred that the clinical care team members responsible for the SDoH screening and referrals reverted to old, pre-intervention processes once the coaching and technical assistance ceased. The aforementioned may also indicate a failure in the administration of effective change management.

Significant to note that despite the increase in screening rates, the rate of social service referrals did not increase regardless of patient status and social risks identified. This could indicate a lack of attention to the referral process and knowledge about community-based resources available to meet needs; or it could be indicative of an under-resourced community that lacks adequate support for social service referrals.

The intervention included a five-step implementation process: 1) leadership buy in; 2) set goals; 3) develop workflows; 4) orient staff; 5) implement and iterate. It is unclear which step(s) failed once the intervention ended. Further research is needed to understand exactly where the breakdown occurred so that effective change management processes can be improved and sustained.

In addition to analyzing the screening and referral rates, the researchers also conducted secondary analysis of clinical measures including cholesterol, HbA1c, and blood pressure. While it appears that the patients who received the SDoH screening had improved blood pressure control, the lack of effect on cholesterol or HbA1c could mean the time for data collection and analysis was too short to see measurable results and effects on these other clinical outcomes.

Joseph et al. [15] evaluated the effect of a closed-loop community-based referral pathway in reducing social needs among Black men participating in a lifestyle change program to improve diabetes and cardiovascular health. The study analyzed both change in social needs and change in American Heart Association's (AHA) Life's Simple 7 (LS7) score during the intervention period. The intervention resulted in statistically significant reduction in social needs, but no discernable effect on health status as indicated by the LS7. The study's results are important for determining whether social care coordination directly correlates with improved health outcomes.

Study participants were diverse in terms of education and socioeconomic status. More than half of the participants had at least one social need prior to intervention and the number with a social need reduced throughout the program. While social needs were addressed during the program, there was no direct association between social needs and health status as the change in social needs did not affect the LS7 score. The health score improved throughout the healthy lifestyle program regardless of the social needs being identified or addressed.

The study reveals the necessity of larger studies to evaluate community-integrated strategies to improve health and address social needs. There is no evidence of similar community-based participatory research approaches focused on LS7 in Black men. The population studied was extremely narrow and small as it only included 70 Black men who enrolled at a local health fair event. A total of 40 had at least one identified social need and 31 accepted a referral to the community resource hub, but only eight enrolled into services.

The combination of having a limited number of study participants and no control group limits understanding about the role social needs have on cardiovascular disease. It also limits any understanding of how of an intervention that involves social care coordination impacts health status. More research is needed to discern whether there are particular social needs that are more strongly associated with health indicators for specific chronic conditions. It is also important to evaluate when and how social needs screenings and referrals are incorporated into care delivery.

Conclusion

Healthcare regulatory entities such as Centers for Medicare and Medicaid Services (CMS) and the Joint Commission began requiring SDoH screening and referral programs to meet new quality and safety standards of care in 2023. The impetus for these new requirements was the role SDoH play in a patient's ability to access equitable health care and manage health conditions. While it is common knowledge that social and behavioral factors contribute 80 to 90 percent of a person's health status, the literature reviewed is insufficient to determine whether an intervention including screening and addressing SDoH in a healthcare setting results in improved health outcomes or health status for diabetes or hypertension.

Each of the three studies examined in this systematic review included interventions that combined healthy lifestyle programming, health education with care management and routine screening and referrals for SDoH. These studies were conducted in a limited period overlapping with the COVID-19 pandemic. The lack of statistically significant improvement in clinical health outcomes may indicate the interventions need to take place over a longer period to influence health status. None of these studies provided data showing whether an improvement or change in SDoH influenced health status; the studies only investigated correlations between screenings, education, and health outcomes. The evidence did not clearly demonstrate how closing the gap or addressing adverse SDoH affects health.

While healthcare providers can screen and refer for SDoH and should consider SDoH as they develop a treatment plan with a patient, they do not necessarily have the resources, ability, or capacity to address adverse SDoH during a visit or health program. Individual issues of food insecurity, transportation, housing, income, education and other SDoH factors cannot easily be addressed in a single visit or even several visits. To address SDoH, a community must have services and resources and providers must have knowledge about these resources to make appropriate and impactful referrals.

Incorporating a process for screening and addressing SDoH as part of a healthcare intervention is a new concept for healthcare providers. While regulatory entities have issued new standards for screening and addressing SDoH, they have not provided clear guidance or best practices for how healthcare organizations can effectively integrate an SDoH screening and referral program into a healthcare delivery model. Also, there are no known benchmarks or expectations for the extent to which a screening and referral intervention, even with other strategies, can improve health status and outcomes.

These three studies included in the final stage of the systematic review aim to assess whether screening for SDoH can improve social needs among specific patient populations. Future research should evaluate how SDoH screening and referral programs can address adverse social risks or needs. If research indicates that existing screening and referral programs cannot improve social risk factors, then more analysis is warranted to understand the barriers providers face in addressing SDoH. If research reveals that screening and referrals do improve social risks and needs, then researchers should study which specific health outcomes are directly impacted by improved social risk factors.

Limitations and Strengths

This review is limited by the inclusion criteria of hypertension and diabetes in the database search which may have reduced the number of articles applicable for the review. This is an indication of the need for a broader search to determine whether any health outcomes are associated with an intervention that includes SDoH screening for other diseases or conditions. A strength of the study was the evidence-based approach the researchers took to obtain, review, and critically analyze studies appropriate for the research question. Another strength of the study is how it informs the direction for future research in this burgeoning area of study.

Acknowledgements

The authors would like to acknowledge the TidalHealth library staff in helping with online web searches.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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