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Community Health Worker Program: Adverse Childhood Experiences and Early Childhood

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Community Health Worker Program: Adverse Childhood Experiences and Early Childhood

Abstract

Background: Adverse childhood experiences (ACEs) negatively affect childhood development and long-term health outcomes. Latino children face multiple adversities and social determinants of health compounded by ACEs. Community Health Workers (CHWs) have access to work with families to improve resilience and mitigate the effects of ACEs in this population.

Local Problem: In the Central Valley of California, CHWs provide support and resources to a largely Latino population with increased poverty rates, low educational attainment, lack of health insurance, and many chronic health issues, putting families at a higher risk for ACEs exposure. CHWs need further training to apply ACEs knowledge to their work in this community.

Methods: CHWs (N=14) were provided with pre- and post-questionnaires to assess knowledge obtained about ACEs. Knowledge obtained was measured by percent of score improvement, with a goal of 20% improvement for each of the five teaching modules. Responses were collected via a free Canvas teaching website, where course materials were made available to CHWs.

Interventions: As a part of a larger group project, University of San Francisco (USF) Doctor of Nursing Practice (DNP) students provided bi-weekly teaching on ACEs and other health topics to CHWs employed by a large international philanthropic organization over a two-month period. Five one-hour, synchronous, online ACEs trainings were designed and presented.

Results: The average percent improvement between pre- and post-questionnaires for each of the five modules ranged from 19% to 46%, primarily exceeding the goal of 20% improvement from baseline.

Conclusions: A nurse-led educational module on ACEs can improve knowledge for CHWs and build their self-efficacy in supporting high-risk Latino families impacted by ACEs. CHWs can

gain skills to promote family resilience and deliver trauma-informed care to vulnerable families and help prevent risk for further ACEs. This community-based intervention also promotes increased CHW competencies while providing a path to future CHW state certification.

Keywords: adverse childhood experiences and ACEs, community health workers, *Promotoras*, home visitors, education, Latin*, low-income, resilience

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Background

Adverse childhood experiences (ACEs) are traumatic events that occur during childhood. They are as wide-ranging as physical, emotional, and sexual abuse, neglect, and parental instability in the household (Soares et al., 2016). A breakthrough study by Felitti et al. (1998) provided evidence of the association between unfavorable childhood circumstances and damaging health outcomes, leading to chronic diseases and earlier death. In a systematic review and meta-analysis of 37 studies, Hughes et al. (2017) substantiated a correlation between 4 or more ACEs and the risk of mental health issues, substance use disorders, and added aggression.

The negative effects of ACEs can also manifest in early childhood. Children as young as 18 months who have experienced multiple adversities can exhibit lower cognitive development, behavioral problems, inability to focus, and signs of anxiety and depression (Kahr Nilsson et al., 2019). Children dealing with more stressors are at greater risk for having lower IQs, substandard academic achievement, inferior socioemotional functioning, developmental impediments, behavioral difficulties, asthma, and nutritional deprivation (American Psychological Association, 2000). Latino children experience more disparities than their White counterparts due to discrimination, poverty, immigration policies, and other social determinants of health, making them more susceptible to the negative effects of ACEs (Claypool & Moore de Peralta, 2021; Slopen et al., 2016).

Community health workers (CHWs) are trusted members of the community who often share the same cultural background and have emerged as leaders in combatting the effects of these social determinants of health, chronic diseases, and in improving healthcare access for vulnerable populations (Early et al., 2016). Their interventions have been shown to improve

patient outcomes and are cost saving in the health delivery system (Capitman et al., 2009). In Latino communities, CHWs may often be referred to as *Promotores de salud*, and their role in mitigating the effects of ACEs is imperative if proper training is designed to meet the needs of the communities they serve (California Health Care Foundation, 2021).

Problem Description

The Central Valley of California is a diverse agricultural region with a large Latino population. Almost 900,000 Central Valley residents are immigrants, of which nearly 20% lack health insurance and often receive support from community health workers (CHWs) to access free or low-cost clinics (Lloyd et al., 2020; Natsoulis & Slootjes, 2020). The region has consistently remained below state averages in per capita income, poverty rates, and unemployment for over 30 years (Center for Continuing Study of the California Economy, 2019; Local Government Commission, 2019). Although the Central Valley comprises 10.8% of the state population, it accounts for 14.9% of California residents who did not attend high school, further associating poverty rates with low educational attainment (Center for Continuing Study of the California Economy, 2019). In a needs assessment of Fresno County, some chronic health issues identified were asthma, diabetes, and obesity, which can be compounded by ACE exposures (Alcala et al., 2020).

Setting

In partnership with a large international philanthropic organization focusing on early childhood education, University of San Francisco Doctor of Nursing Practice (DNP) students provided health education to CHWs on diverse topics. The latter work with a high-risk population in the Central Valley of California. The demographic is a primarily Latino, poverty-stricken, monolingual Spanish-speaking immigrant population with limited access to healthcare,

all of which may be heightened by ACEs exposures (Central Valley Health Policy Institute, 2020). The educational intervention was preceded by a half-day virtual ride-along with CHWs to better understand the needs of the target population and the CHW work environment and responsibilities. Five synchronous online educational courses on ACEs were provided bi-weekly over two months. The lead nursing instructor, CHWs, and the philanthropic organization's representatives then held a listening session in January 2023 to provide feedback on the implementation of the educational program and the value of the intervention after being applied to practice.

Specific Aim (Purpose)

The purpose of this project is to develop, implement, and evaluate an ACEs health education program for CHWs in California's Central Valley. The specific aim of this project is that by December 1, 2022, CHW program participants will have a greater knowledge of ACEs and a higher comfort level with applying ACE awareness in their communities, as evidenced by an average 20% increase in post-test scores over the pre-test baseline.

Available Knowledge

PICO(T) Question

For CHWs (P), how will an educational program on ACEs (I) compared to no education (C) improve knowledge of ACEs and comfort with integrating ACEs awareness and education into their work with high-risk families (O) over three months of implementation (T)?

Search Methodology

A literature search was performed on the Cumulative Index to Nursing and Allied Health Literature (CINAHL) Complete, PubMed, Scopus, and APA Psych Info databases. In PubMed, the primary search terms were *adverse childhood experiences* and *education*, which yielded 32

articles. A search in Scopus with the search terms *adverse childhood experience*s and home visitors generated five articles, while a search in APA Psych Info returned 25 articles. In CINAHL Complete, the search terms in combination with Boolean operators were *community health workers* AND *training* AND *ACEs*; *Promotora* AND *training*; *home health* or *community health"* AND *adverse childhood experiences*. The search combinations yielded 54 articles, which were then further refined.

The literature was constrained to articles published from 2016 through 2021 in English, containing a combination of the terms *adverse childhood experiences* or *ACEs*, as well as *home visitors*, *home visits*, or *Promotoras*. The additional filters added when search results produced more than 200 articles limited the studies to peer-reviewed journals, metanalysis, systematic reviews, or randomized control trials, reducing the number of studies to 54.

The return was then narrowed to 36 articles through a screening process of reviewing the titles and abstracts containing community-based teaching interventions in the United States. Ten articles were selected based on the inclusion of *ACEs* or *trauma-informed* care, *Promotores*, or described CHW training needs.

Integrated Review of the Literature

A review of the literature was conducted to evaluate evidence on the usefulness of nurse-led training for CHWs to improve their ability to provide ACEs awareness and education to high-risk families. Several common themes were identified: (a) motivation to become a CHW; (b) barriers to discussing ACEs with families; (c) training needs of CHWs; (d) higher knowledge and self-efficacy; (e) and higher resilience in families. Most of the studies were performed on small Latino populations, with a focus on evaluating existing models under implementation. Quantitative research studies were largely absent in the literature.

Motivation to Become a Community Health Worker

Understanding the motivations for becoming a CHW or *Promotora* is essential for designing an educational intervention, as motivations to perform community work influence the commitment to learn additional skills. Becoming a CHW or *Promotora* often means accepting unpaid work. In a literature review of 63 studies, Early et al. (2016) found altruism to be the most common reason CHWs became community leaders. Fleming et al. (2018) conducted a *Promotora*-led cervical cancer education intervention for 60 women from a farmworker community. The *Promotoras* were highly trusted by the local community, shared similar cultural traits, and were motivated by improving the health of others. Burns et al. (2019) described *Promotoras* engaged in a five-year quality improvement program as primarily immigrant volunteers from Mexico who felt a personal connection to their work and their communities. In a qualitative study by Manzo et al. (2018), nine *Promotoras* in two focus groups described feeling a powerful sense of responsibility to help their communities and preserve their customs.

In these studies, a common motivation to become a CHW was a sense of altruism driven by cultural ties to their communities. Most CHWs were immigrants and spoke the primary language of the community. These studies showed that CHWs' motivations to help their communities stem from personal and cultural influences and underscore a strong commitment to their work (Burns et al., 2019; Early et al., 2016; Fleming et al., 2018; Manzo et al., 2018).

Barriers to Discussing Adverse Childhood Experiences with Families

Community health workers face multiple barriers in discussing ACEs with families. In a meta-synthesis of eight qualitative, peer-reviewed studies, Albaek et al. (2018) found that the three major barriers for providers in discussing ACEs with families were feelings of incompetency, fear of causing more harm, and emotional discomfort. Davis & Kane (2016)

conducted a qualitative study of 11 home visitors who provided ACEs screenings. The home visitors lacked an understanding of psychosocial factors related to ACEs in a larger social context and undervalued the need to connect families to resources. In a qualitative study, Manzo et al. (2018) found that developing *Promotoras'* skills and continuing their professional development improved support for and acceptance by families, as evidenced by their ability to successfully recruit 265 families and 356 children for a data collection project.

These studies consistently demonstrated the need for additional skills and training among CHWs to overcome barriers to care and better support families at risk, as it would allow for a better understanding of their needs and an improved comfort level with addressing sensitive topics (Albaek et al., 2018; Davis & Kane, 2016; Manzo et al., 2018).

Training Needs of Community Health Workers

It is necessary to meet the training needs of CHWs to support knowledge attainment and comfort in applying their skills in the community. In a pilot study implemented in a farmworker community, Fleming et al. (2018) trained six *Promotoras* to provide cervical cancer education via talking circles called *charlas*. The *Promotoras* successfully delivered the educational intervention to 60 participants who completed pre and post-surveys on cervical cancer knowledge, self-efficacy, beliefs, and intentions. The findings demonstrated gains in knowledge and self-efficacy, supporting the premise of a community-driven intervention delivered by culturally competent, trusted members of the community. The *Promotoras* requested to work in pairs, which boosted their own self-efficacy in offering sensitive health education (Fleming et al., 2018). In a quality improvement study with 24 home visitors, Counts et al. (2017) found that the participants were better equipped to implement ACEs screening and education after training. The participants observed that following the integration of training into their work, the families they

served were more engaged with the services and better equipped to manage their experiences and circumstances.

A literature review of 64 studies by Early et al. (2016) identified shortcomings of a standardized curriculum for CHWs due to each community's individualized needs. The authors suggested that rural CHWs may benefit more from on-the-job training than formal education. Early et al. (2016) also found additional barriers for *Promotoras* in working long hours without compensation, compounded by their desire for ongoing trainings and certifications. Njeru et al. (2019) evaluated an intervention program that partnered three CHWs with eight care coordinators and three primary care providers to improve patient care. Using a theory-based approach to analyze feedback from qualitative interviews and focus groups of clinical team members, the authors suggested that additional training and resources for CHWs would lead to more efficiency in the interactions between CHWs and healthcare providers.

Recommendations in the above studies pointed to the importance of tailoring CHW training to the needs of each community. These studies addressed different populations with unique needs and CHWs with diverse backgrounds and levels of education and were consistent in supporting customized training to enhance CHW competency (Counts et al., 2017; Early et al., 2016; Fleming et al., 2018; Njeru et al., 2019).

Higher Knowledge and Self-Efficacy

Several studies focused on knowledge and self-efficacy in CHW preparation to address ACEs in the communities they serve. Burns et al. (2019) provided study findings on a five-year review of a *Promotora*-led, trauma-informed community education plan implementation. The findings demonstrated that higher levels of self-efficacy changed the *Promotoras*' leadership patterns over time and enabled them to provide parents with individualized care strategies. A

pilot study by Fleming et al. (2018) of *Promotora*-led talking circles demonstrated that both *Promotoras* and project participants expressed more knowledge and self-efficacy regarding HPV cancer screening after receiving their respective trainings, supporting community-based interventions to promote health screenings.

In a theory-based evaluation of a CHW program at a large primary care facility, Njeru et al. (2019) observed that CHWs helped improve the health knowledge and autonomy of the community by facilitating communication with providers while building CHW self-worth over time. Early et al. (2016) described a cycle of positive reinforcement where *Promotoras* reinforced their feelings of worth by contributing to the health of their communities, motivating them to help further, and doing so with a higher level of self-efficacy.

These studies described the benefit of providing training and support to raise knowledge and self-perceptions of CHWs in their community work (Burns et al., 2019; Early et al., 2016; Fleming et al., 2018; Njeru et al., 2019). Providing ACEs training for CHWs will lead to higher levels of self-efficacy in applying ACEs knowledge to support families.

Higher Resilience in Families

The following studies support providing home and community-based ACEs education to vulnerable families as a strategy to enhance their resilience. In a prospective observational pilot study with 10 participants, Johnson et al. (2017) compared parental acceptance of home ACEs screenings by two home visiting programs composed of social workers and public health nurses. Parents decided how to complete the ACEs screens independently or with support, with referrals and resources provided to families. Acceptance rates were 96% and 100% for the programs. The results supported ACEs screening in the home as practical and beneficial to families, especially if the screener has a positive rapport with the family (Johnson et al., 2017).

In a systematic review of 22 randomized controlled trials, Marie-Mitchell & Kostolansky (2019) found that most interventions with families of young children that combined parental teaching, referrals to outside sources, and social backing demonstrated improvements in child health outcomes and parent-child relationships. Improvements in the parent−child relationship, such as positive parenting practices, a decrease in severe punishments, improved interactions between mothers and children, and more compassion from the mother, appeared in 12 of 14 studies. Burns et al. (2019) conducted a program review of a *Promotora*-led trauma-informed education intervention for an underserved Latino community and observed more parental resilience after participation. Parental self-efficacy was higher after learning about strategies to support their children and incorporating them into their daily practices.

These studies demonstrated that higher parental and family resilience could be gained through CHW interventions that support ACEs screening in the homes, parental teaching on positive parenting practices, and prompt referrals to outside resources (Burns et al., 2019; Johnson et al., 2017; Mitchell & Kostolansky, 2019). Families received ACEs education and showed improved parent-child relationships, which led to higher resilience when faced with challenging situations.

Summary/Synthesis of the Evidence

The ten research articles selected were evaluated using the Johns Hopkins Appendix E Research Evidence Appraisal Tool or Appendix F Non-Research Evidence Appraisal Tools (Dang & Dearholt, 2017, pp. 282-295). Two studies were found to be qualitative and Level III (nonexperimental, including qualitative studies and mixed methods) and of good quality (B rating). One quantitative study was also found to be Level III with a B rating (good quality). Four were quality improvement studies rated at a level V (literature reviews, quality

improvement, case reports, and expert opinion) and deemed of good quality. Two systematic reviews were selected and rated of good quality (B) at a level V. The one meta-analysis selected for the review was found to be Level V and of good quality (B). The selection of studies provides a good overall assortment of evidence and consistent results, indicating support for targeted training and utilization of CHWs to improve health outcomes in community settings, especially regarding ACEs (see Appendix C).

Gaps and limitations in this literature review included small sample sizes and questionable generalizability to other populations, as these studies were primarily performed on small Latino populations. The need to find more research studies versus non-research studies is evident in the lack of comparison groups and quantitative measures found in these studies. Another limitation included a lack of literature that focused specifically on interventions to provide ACEs education to CHWs, while a plethora of studies examined the effectiveness of chronic disease management with CHW interventions.

The implications for nursing of the evidence for CHW education on ACEs is the design of an intervention that will target their training needs, as this project intends. Community health workers are trusted members of the community and can provide targeted education on the impact of ACEs in vulnerable populations, such as the underserved, Latino, and immigrant communities that were the target populations in most of these studies. The studies in this review demonstrated that CHWs can experience improved self-efficacy after receiving training tailored to meet their needs. They can then utilize this knowledge in providing ACEs screenings and education to families in a trauma-informed manner. Nurses have the knowledge and skill set to provide this teaching, which evidence indicates will improve resilience in families and help prevent further

ACEs. The studies reviewed provided evidence to answer the PICOT question and support the proposed project implementation.

Rationale

The PRECEDE-PROCEED Model is the conceptual framework selected for this intervention due to its use in various public health endorsement programs (Green & Kreuter, 1991). Its strengths include supporting community involvement and providing clear guidelines for developing and effectively implementing different health agendas (Rural Health Information Hub, 2018). This model has been executed productively in an array of public health support practices, such as engaging intergenerational Latinos to identify childhood obesity risk factors and determining the usefulness of a community program on hypertension (Calano et al., 2019; Garcia et al., 2019).

The PRECEDE-PROCEED model was created by Lawrence W. Green and Marshall Kreuter (Green & Kreuter, 1991). The model is applicable for this intervention due to its ecological standpoint, population focus, involvement of community participation, emphasis on improving quality of life, and strong evidence-based support (Green et al., 1980; Porter, 2016). This project aims to establish whether providing nurse-led training on ACEs to CHWs will increase their skills, knowledge, and comfort with applying ACEs research in working with high-risk families. The PRECEDE-PROCEDE model served as a valuable guide in the design, execution, and assessment of the intervention.

In the PRECEDE phase, planning transpired to identify community needs and recruit CHWs. An evidence-based intervention for the training was selected, and existing environmental and behavioral risk factors were identified. The PROCEED phase included collecting materials, implementing ACEs training, and evaluating post-tests to determine knowledge attainment.

The expectation after the intervention was that CHWs would demonstrate more knowledge about providing ACEs education to high-risk families and the skills required to do so. The intent is for CHWs to apply trauma-informed skills to educate families about ACEs risk factors, help support resiliency, and prevent further ACEs.

Methods

Context

This intervention involves an interprofessional collaboration between the University of San Francisco (USF) and a large humanitarian aid organization that was founded over 100 years ago and has worked in over 100 countries with a mission to provide health, education, and protection to vulnerable children worldwide (Save the Children, n.d.). This philanthropic organization hires CHWs through an early childhood home visitation program to teach parents valuable tools to help their children succeed. This partnership between USF and the organization involves the planning, formulation, and implementation of a teaching module by USF DNP nursing students on ACEs and other pertinent health topics, explicitly designed for this population of CHWs to provide them with tools that can be applied in their work with families on home visits.

Important stakeholders directly affected and benefitting from positive outcomes of this project include patients, caregivers, medical providers, mental health providers, hospitals, health care systems, community clinics, federally qualified health centers, and health insurance companies. Also, CHWs themselves will benefit from additional training and knowledge. The risks of patients seeking medical care would potentially decrease, as at-risk families would become more resilient and overall health would improve. Appropriate utilization of healthcare services will benefit all the above stakeholders.

Additionally, if children are experiencing less trauma and their families feel supported, it would benefit stakeholders such as early childhood educators, preschools, and K-12 schools that work towards meeting children's educational goals. Public health and local law enforcement agencies would also experience less need to intervene with high-risk families when they are well-supported by CHWs.

Interventions

The interventions included creating and implementing five synchronous online ACEs training modules designed specifically for the participant population. Teachings were provided over five bi-weekly sessions (1 hour per session) over a 2-month implementation period. The first session began on September 5, 2022, and the last on November 10, 2022. The participants included 14 CHWs from the philanthropic organization, their supervisor, three additional DNP student instructors, and a USF nursing faculty. The course content consisted of PowerPoint presentations that included short videos, small and large group discussions, case studies, and additional exercises in addition to the course content. The course modules and learning objectives, which included an introduction to ACEs, screening methodology, and providing trauma-informed care, are outlined in Appendix D. The content taught in each module was derived from multiple evidence-based resources related to ACEs, adapted to meet the knowledge level of the CHW students, and resources are cited at the end of each PowerPoint lecture.

All course content was housed in a free Canvas website for teachers, which CHW students accessed during the implementation period and may continue to utilize. In addition to lecture materials, the Canvas module also includes access to pre and post-quizzes, links to resources, post-discussion topics, and take-away discussions completed after each session. All

teaching materials and the Canvas online module will continue to be available to the partner organization for future use.

Gap Analysis

By targeting underserved communities, CHWs have already been effective in improving healthcare access for low-income Latinos and in reducing costs and risks associated with chronic disease management, cancer, and mental health issues (Capitman et al., 2009; Lloyd et al., 2020). However, these CHWs had not received formal ACEs training prior to this intervention, leaving families without the benefit of ACE-specific trauma-informed care from those they rely upon for essential services.

The State of California does not yet recognize CHW certification for purposes of Medicaid reimbursement but is moving towards this goal. If approved by the Centers for Medicare and Medicaid Services, employers who utilize CHWs with state certification will be eligible for Medi-Cal reimbursement to support sustainable funding (California Department of Healthcare Services, 2022). State CHW certification will also lead to more thorough oversight of CHW education, training, experience, credentialing, supervision, and registration, leading to the development of more highly skilled CHWs capable of performing a larger range of preventive services (California Department of Healthcare Services, 2022).

Implementing a health education program for CHWs on ACEs will help the philanthropic organization come closer to reaching its goal of future CHW certification by preparing them in the required competencies (see Appendix E for the Gap Analysis). In addition to securing a reliable stream of funding for CHW programs, state certification may also allow for an additional Medi-Cal reimbursement of $29 for each ACE screening provided (Department of Healthcare Services, 2020).

GANTT Chart

A timeline for the project can be visualized on a GANTT chart (see Appendix F). The implementation date was from September 2022 through November 2022, with curriculum preparation and planning meetings with the DNP student team occurring in the prior months. Data analysis occurred in the Spring of 2023 prior to the DNP final paper submission and presentation of the qualifying DNP project. The project's sustainability will depend on future cohorts of USF nursing students who will revise educational content and update the Canvas website.

Work Breakdown Structure

The work breakdown structure (WBS) allowed for easier management of a multi-step project (see Appendix G). The initiation phase included conducting a gap analysis and completing the project plan proposal. The planning phase involved researching current practices in the ACEs curriculum and creating a curriculum plan based on evidence. The execution phase included administering a pre-test questionnaire to CHWs, teaching the online modules, and a post-test evaluation. The control phase encompassed obtaining feedback from all participants and analyzing the pre-and post-test evaluations to determine the increase in ACEs knowledge obtained by CHWs.

After each module, a debriefing session was held between the DNP students, the lead nursing faculty, lead CHW, and the partner organization supervisor. A focus group was also held two months post-intervention to obtain feedback from the partner organization supervisor and the lead CHW about ongoing use of learned skills. The online training materials were provided on the Canvas website for use by future DNP students. All findings were integrated into the final DNP manuscript and submitted for approval.

Responsibility/Communication Matrix

The communication plan played a crucial role in improving understanding with team members/fellow DNP students, the nursing faculty members, the CHWs, and the philanthropic organization's point-of-contact, so that all aligned with the project's goals (see Appendix H). The communication plan helped ensure that the appropriate communications were being delivered to the right people at the right time during the project. By separating the communication plan by item/event and by person (stakeholder), the plan appeared simpler, easier to visualize, and the people responsible for each item knew exactly what they needed to do and when. Since the ACEs education project involved collaboration between the various entities, having a persuasive communication plan allowed information flow between the corresponding parties and clear roles for each person to enact.

SWOT Analysis

An analysis of strengths, weaknesses, opportunities, and threats (SWOT) assesses the internal and external attributes that may influence the project (see Appendix I). Strengths and weaknesses analyze internal qualities of a project, while opportunities and threats analyze external traits. Strengths for this project consisted of the accessibility of healthcare experts to the CHWs, the sustainability and ongoing evidence-based applicability of the project, and the collaborative relationship between USF and the philanthropic organization, allowing for future collaboration. Weaknesses were travel barriers for in-person learning and the readiness of DNP students to provide the intervention due to the level of course progression in the program. Opportunities consisted of the implementation of a cost-effective program with a public health focus that will pave the way for CHW certification, the applicability of the intervention to other settings, and providing evidence to promote further health screenings by CHWs. Threats were

ongoing COVID-19 safety concerns for in-person meetings and discomfort by community members and CHWs if cases of child abuse are identified in the process of screening for ACEs.

Comprehensive Financial Analysis

The proposed budget encompasses the total cost for the training intervention if it were to be implemented over a three-year period, which would total $7,004.70, or an average of $292 per CHW per year. This includes fringe benefits (health insurance, use of computers/tablets, other benefits) using the average 30% fringe benefit rate, mileage from USF to Fresno County using standard mileage rates, training supplies (e.g., handouts, writing materials, copies, writing utensils), and one free lunch meal for the in-person component (Internal Revenue Service, 2021; U.S. Bureau of Labor Statistics, 2020; U.S. Bureau of Labor Statistics, 2021). This amounts to a cost of $875.59 for each CHW that attended the training (see Appendix J).

A needs assessment of Fresno County found that some of the prominent chronic health issues are asthma, diabetes, and cardiovascular disease, which are also chronic disease health outcomes related to ACEs (Central Valley Health Policy Institute, 2020). Prior to determining the return on investment (ROI) for this intervention, other interventions utilizing CHWs were reviewed to compare their prior ROIs related to chronic disease management. Studies on CHW interventions for diabetes, coronary heart disease, and asthma management yielded ROIs of 1.12, 1.8, and 1.9, respectively (Campbell et al., 2015; Jacob et al., 2019). It has also been demonstrated that the return on investment with utilizing CHWs in healthcare utilization projects is around $2 for every $1 spent, or specifically an ROI of 1.8 (Nevada Department of Health and Human Services, 2017; Wilder Research, 2012).

To determine the ROI of the current ACEs educational intervention, the assumption is that each CHW will serve 55 patients per year, based on a similar model used by Kangovi et al.

(2020). As described in the budget, the cost of the teaching intervention per CHW is $875.59. Therefore, the cost of the training intervention per CHW per patient per year is $5.31 (see Appendix K). The ACEs materials will be integrated into the CHWs' current work with their existing patients, and additional costs will not be incurred.

According to The California Surgeon General's Report on adverse childhood experiences, ACEs exposure can increase healthcare expenses by an average of $589 per person per year (Bushan et al., 2020; Miller et al., 2020). A median change in healthcare costs for CHW interventions yields a cost savings of approximately $82 per patient per year (Centers for Disease Control and Prevention, 2020). With a cost savings of $82 per patient per year and an intervention cost of $5.31 per CHW per year, an ROI of 15.4 per CHW trained is obtained (see Appendix K).

In a separate ROI calculation, it was projected that the ACEs education intervention will yield a 1444% return for every dollar spent (see Appendix K). The ROI for this intervention is much higher than the previous examples of CHW interventions for chronic diseases, illustrating an appreciable financial benefit for the philanthropic organization.

A cost benefit analysis is also useful for this intervention because in comparing the project's estimated costs versus its benefits, it becomes clear that this is a cost-reducing intervention. In Appendix L, total intervention costs over three separate years are compared to their respective net cost benefit. A net cost benefit ratio of 15.93, 15.45, and 15.0 are obtained for each year, with a mean net cost-benefit ratio of 15.5, meaning that for every one dollar spent on CHW teaching, $15.50 will be saved from the average of $82 in additional healthcare costs incurred by ACEs per patient per year (Centers for Disease Control and Prevention, 2020). A

cost-benefit ratio of greater than one is affirming because it demonstrates that an intervention produces more benefits than it costs, and a cost-benefit ratio of 15.5 is exceedingly favorable.

After the first training program on all health topics covered by DNP students has been completed, the sustainability plan is to utilize BSN to DNP non-masters students as teachers for future trainings. These students will provide evidence-based updates to the course material, work directly with the partner organization to coordinate future trainings, and receive practicum hours for this work. However, the training program is anticipated to be sustainable with minimal financial cost.

Study of the Intervention

This project is the culmination of a desired collaboration between the partnering organization and USF nurse practitioner students which has been in discussion for many years. The desire for an increased knowledge base by CHWs will provide them with skills to better serve the families in their communities and provide ongoing professional development that could pave the way for future CHW certification in the State of California (California Healthcare Foundation, 2021).

A pre-intervention meeting between the DNP students and the CHWs was held via Zoom to discuss and agree on topics that are relevant to their work and that would help them to achieve the above goals. Their suggestions were utilized to create course modules and to gather relevant content. Furthermore, a pre and post-test questionnaire based on content obtained from each of the five modules was collaboratively chosen as the preferred method to measure knowledge gained by the CHWs. Pre- and post-test models have been shown to be more effective for students in achieving learning outcomes from a lecture as compared to a post-test only model (Rabail Alam, 2019).

Outcome Measures

The outcome being measured was CHW knowledge of content presented in each of the five ACEs educational modules. For each module, questions were developed based on the course matter. Pre- and post-tests with the same questions were administered immediately before and after each training session, although a maximum time frame of 2 weeks was given to CHWs to complete the post-knowledge assessment to ensure ample time for completion. Knowledge improvement is expressed as a percent change from pre- to post-scores, with a target of 20% change from baseline.

Feedback from the lead CHW was also requested after each module to assess satisfaction and learning value, which includes perceived knowledge gain and applicability to their daily work. Solutions for improvement were requested, and comments were collated and reviewed for ongoing improvement of the modules. A discussion question was added after each module in response to feedback obtained in which CHWs could reflect on key take-aways from each session.

CQI Method and/or Data Collection Instruments

Data was collected for pre- and post-questionnaires in each module. The questionnaires were administered online through the Canvas learning management system. Five questions were included on each questionnaire and the total number of correct answers for each pre and post questionnaire was calculated through Canvas.

The data was then aggregated manually to assess overall improvement for each student and collectively utilizing descriptive statistics. Qualitative data was also collected about the perceived usefulness of the training from the CHWs after the training was completed and at two months post-intervention.

Analysis

Data was exported into an Excel spreadsheet. Results are expressed as percent improvement for each individual and as an average for the group per module. Means, medians, modes, variances, and standard deviations are reported with the results for each module.

The pre and post-test evaluation method has test-retest reliability due to the participants answering the same questions at the beginning and at the end of the intervention. For this pilot project, the validity of the assessment tool will not have been determined, as questions for the evaluation were extracted from the training material presented.

Ethical Considerations

This project abides by American Nurses Association (ANA) ethical standards outlined in the Code of Ethics for Nurses (American Nurses Association, 2016). Provision three focuses on nurses promoting, advocating for, and protecting patients' rights, health, and safety. Specifically, nurses also agree to maintain the privacy and confidentiality of all patients. This project will protect the names and statements made by all CHW participants. Identifying information will not be revealed through the data analysis and reporting process. By maintaining confidentiality, the psychological safety of all participants was preserved and respected.

In alignment with Jesuit values, each participant was treated with the highest level of respect and dignity, as were their individual beliefs and cultural background. Personal preferences and ideologies were recognized. The statement of determination (see Appendix A) affirms that this intervention is a quality improvement project and is not subject to Institutional Review Board (IRB) review. It has been approved by the philanthropic organization which employs the CHWs, as demonstrated in a written letter of support (see Appendix B). This project

ultimately aims to help people in marginalized communities have a better quality of life, and nurses can be agents of this change for the greater good (University of San Francisco, n.d.).

Results

The quantitative results of the data collected showed overall improvement in scores between pre- and post-tests in all five ACEs teaching modules (see Appendix M). The mean percent change in score improvement ranged from 19% to 46%, with a target of 20% change from baseline (see Table M7, Figure M1). Only the scores from Module 4 did not reach the 20% improvement goal by a 1% deficit. In Module 1, results showed an average of a 40% improvement between pre- and post-test scores. Module 2 reflected a mean 45% score improvement. Module 3 showed an average 46% increase in scores, and Modules 4 and 5 reflected average increases of 19% and 28%, respectively.

Modules 4 and 5 also began with higher pre-test scores averaging 3.3 and 3.4 out of a possible 5 points, illustrating high CHW competency in these topics prior to the training while diminishing the magnitude of a score increase in the post-module quiz (see Tables M5 and M6). Modules 1-3 began with average quiz scores of 2.57, 2.55, and 1.85, allowing for a greater potential for score improvement.

Most pre- and post-tests were completed by N=14 CHWs. Only Module 5 was completed by N=12 CHWs, as students G and M were not present for the entirety of the last lecture and their scores were omitted. This discrepancy does not significantly change the overall results of the observed data.

A focus group convened via Zoom approximately two months after the intervention to provide qualitative feedback about perceived usefulness of the learning intervention, as well as positive attributes and suggestions for improvement. The focus group included participating

CHWs, the supervisor of the partnering organization, and the lead USF nursing faculty member. The recording was made available to DNP student instructors for viewing of relevant feedback. The overall feedback was positive, and several CHWs reflected upon the effectiveness of the ACEs training and ways in which they have applied knowledge obtained to their everyday work with families since the intervention ended. Several expressed increased comfort with applying ACEs knowledge in working with high-risk families and, consequently, they feel better prepared to provide trauma-informed care.

Discussion

Summary

This project demonstrates the effectiveness of providing ACEs training and education to CHWs to increase their knowledge and ability to support high-risk Latino families in building resilience. In doing so, this could decrease future ACEs and allow for more optimal early child developmental outcomes. The results from this intervention showed marked improvements in ACEs knowledge obtained by CHWs and an increase in self-efficacy with applying this knowledge to their work. The widespread value of CHWs in promoting health and well-being in individuals, families, and in their communities has been well-researched. Enhancing CHW training and competencies can lead to a heightened capacity to improve population health outcomes when training is tailored to meet the specific needs of their communities.

Interpretation

Providing a nurse-led educational module on ACEs improves the knowledge and self-efficacy of CHWs to provide trauma-informed care and better support vulnerable families in building resilience. By nurturing resilience in high-risk families with young children, future

ACEs may be prevented, thereby reinforcing a healthy growing environment in which children can thrive and leading to improved long-term health outcomes.

Limitations

Some limitations included the small sample population of 14 CHWs, restricting the generalizability of the project design on a larger scale. The fourteen participating CHWs were also all Latina women working in paid positions for the same organization, making this a homogenous sample population. There was variability in the years of experience in the CHW role for this sample, with some participants being completely new to their positions and others having extensive experience. These differences in knowledge, training, and experience could have influenced the pre-test scores and allowed for a lower margin of improvement when compared to post-test scores.

Another limitation is that there is not sufficient outcome data for comparison between this intervention and other studies. There is a plethora of literature related to CHW outcomes as it relates to chronic health disease maintenance and access to care but limited studies on the effectiveness of ACEs education, to which this intervention may compare. Furthermore, it is difficult to measure the long-term health outcomes of ACEs education provided to CHWs because of the lack of longitudinal studies implemented thus far.

The subsequent potential shortcoming is in the difficulty of measuring how much direct impact this intervention will have on improving family resilience and health outcomes, as ACEs is multifaceted and influenced by multiple familial and environmental factors over time. There are many psychosocial stressors that could influence a change in ACEs-related incidences. This teaching intervention supports the provision of an ACEs health education intervention for CHWs

so that they may then implement trauma-informed care and increase resilience in families, but its direct impact on ACEs exposures and outcomes cannot be quantified.

Additionally, the outcome of this intervention is measured only as knowledge gained from the training based on pre- and post- questionnaires that were provided immediately after each teaching module. If the same questionnaires were to be provided several months later, it would better indicate how well the information was retained over the long term. Further assessment of how well new skills are applied and improve health outcomes in the community would provide a broader perspective of the success of the intervention.

Conclusions

A multitude of reliable clinical studies demonstrate the potential impact of a nursing intervention that provides evidence-based training to CHWs to increase their knowledge and comfort in discussing ACEs with families. Latino children have a higher likelihood of experiencing traumatic events and suboptimal health outcomes due to impactful social determinants of health. By providing ACEs education to CHWs, they will be better equipped to provide trauma-informed care to support families with needed resources to help build family resilience.

The short-term implication is that nurses can utilize their skillset and expertise to design and implement an ACEs training module for CHWs with successful learning outcomes. Nurses can empower CHWs to provide culturally sensitive, trauma-informed education on the negative effects of ACEs to families and make appropriate referrals for identified needs. The long-term implications of this health promotion module include the cost-effective and widespread applicability to other community organizations to enhance CHW workforce competency and to provide a path to sustainable funding via the attainment of state CHW certification. Moreover,

this teaching intervention may lead to lower exposure to ACEs in high-risk Latino families in the Central Valley, giving their children a brighter opportunity to lead long, healthy, and productive lives.

Funding

This DNP student did not obtain or utilize any funding for implementation of this project. Additional project costs were not incurred as educational materials were provided solely in an online format. Costs related to paid hours worked by employed CHWs during training implementation were assumed by the partner organization.

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Appendix A

Statement of Determination

UNIVERSITY OF SAN FRANCISCO | School of Nursing and Health Professions

Doctor of Nursing Practice
Statement of Non-Research Determination (SOD) Form

The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E

General Information

Last Name:	Sandoval	**First Name:**	Arelis
CWID Number:	20622570	**Semester/Year:**	Summer 2022
Course Name & Number:	Nurs 749: Qualifying Project		
Chairperson Name: Second Reader Name	Dr. Elena A. Capella	**Advisor Name:**	Dr. Jo Ann Loomis

Project Description

1. **Title of Project:** Implementing Adverse Childhood Experience Education for Community Health Workers to Build Family Resilience

2. **Brief Description of Project** *(Clearly state the purpose of the project and the problem statement in 250 words or less):*

   The purpose of this project is to determine whether providing nurse-led training on adverse childhood experiences (ACEs) to community health workers (CHWs), as compared to CHWs not receiving a training, will increase their skills, knowledge, and comfort with applying ACEs research in working with high-risk families. In the Central Valley of California, the population is largely composed of Latino, monolingual Spanish-speaking, immigrants with many existing health disparities, such as asthma, diabetes, and cardiovascular disease, all of which may be attributable and/or compounded by lack of knowledge towards ACEs. Studies support the effectiveness of CHW interventions in reducing costs and risks associated with chronic disease management, cancer, and mental health issues, as well as in improving parental resilience and child developmental health outcomes. By increasing CHW's knowledge of ACEs, they can then educate and enhance resilience in families experiencing multiple adversities to help prevent further ACEs, thereby improving long term health outcomes.

3. **AIM Statement: What are you trying to accomplish?**

Provides a clear, well-defined, and concise statement regarding the purpose of the project and describes the specific aim in the IHI format: What?; How much?; For whom?; Where?; By when? The Aim Statement needs to follow the SMART guidelines: specific, measurable, achievable, realistic, and timely.
To improve (your process) from (baseline)% to (target)%, by (timeframe), among (your specific population)

Complete the AIM statement by answering the following elements: What?; How much improvement?; For whom?; Where?; By when?:

The aim of this project is that by December 1, 2022, CHW program participants will have a higher knowledge and comfort level with applying ACE awareness in their communities, as evidenced by a 20% increase in pre- and post-test scores.

4. Brief Description of Intervention (150 words)**:**

In partnership with the A large international philanthropic organization, USF DNP students will provide ACEs teaching to CHWs working with a high-risk population in the Central Valley of California. The intervention will include a full-day in-person training for the CHWs on the USF campus, followed by 3 additional synchronous online courses over a three-month period. The training content will be designed and implemented by the DNP students based on literature reviews and evidence-based practice models that support effective ACEs teaching. The intervention will be evaluated via pre- and post-training questionnaires, as well as by qualitative feedback produced by CHWs, nursing faculty, and partner organization representatives.

4a. How will this intervention be implemented?

- **Where will you implement the project?**

  The in-person full-day ride-along session will take place in the Central Valley with CHWs. Due to travel time and distance, the remaining five training sessions will be offered via asynchronous online Zoom meetings (4 hours each) on predetermined dates and times.

- **Attach a letter from the agency with approval of your project.**

  See attached letter (Appendix B)

- **Who is the focus of the intervention? (Needs to match population [for whom?] in Aim statement.)**

  Community health workers in the Central Valley of California who are employed by a large philanthropic organization are the focus of the intervention.

- **How will you inform stakeholders/participants about the project and the intervention?**

  Participants will be recruited by the Senior Specialist of Early Childhood at the partner organization and will also serve as project site preceptor for the DNP students. A formal invitation to participate and/or observe the training sessions will be developed and sent via email to all participants, stakeholders, students, and faculty at least one month prior to the first session.

5. Outcome measurements: How will you know that a change is an improvement?

- **Measurement over time is essential to QI. Measures can be outcome, process, or balancing measures. Baseline or benchmark data are needed to show improvement.**

Benchmark knowledge will be obtained in a pre-training questionnaire that will be emailed to all participants at least 2 weeks prior to the first in-person meeting. Verbal feedback will be obtained from CHWs after each subsequent session and a debriefing session will occur between the DNP students, nursing faculty, and Ms. Mitchell after each training. Finally, a post-training questionnaire will be provided to all participants at the conclusion of the last training session, which will be compared to the benchmark data. A final debriefing session will be conducted between students and faculty once data has been collected and analyzed to discuss effectiveness of the intervention and solutions for improvement.

- **Align your measure with your problem statement and aim.**
  The goal is to see at least a 20% improvement between pre and post-test scores on knowledge gained relating to ACEs.

- **Try to define your measure as a numerator/denominator.**
  (Posttest – Pretest score)/post-test score= 20% improvement or higher

- **What is the reliability and validity of the measure? Provide any tools that you will use as appendices.**
  The pre and post-test evaluation method has test-retest reliability due to the participants being asked to answer the same questions two times (once at the beginning and once at the end of the intervention). As this is a pilot project, the validity of the assessment tool will have limitations, as questions for the evaluation will be taken directly from the training material presented. As a clarification, the evaluation is aimed to assess the levels of knowledge and awareness of CHW's following the ACEs training intervention. The evaluation will not aim to measure the impact of ACEs training on outcomes for children.

- **Describe how you will protect participant confidentiality.**
  Participant confidentiality will be protected by having a number assigned to identify each participant, which will then be utilized to match the pre and posttest questionnaires. Names of participants will not be utilized on any of the evaluation tools.

UNIVERSITY OF SAN FRANCISCO | School of Nursing and Health Professions

DNP Statement of Determination

Evidence-Based Change of Practice Project Checklist*

The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E

Project Title:

Implementing Adverse Childhood Experience Education for Community Health Workers to Build Family Resilience

Mark an "X" under "Yes" or "No" for each of the following statements:	**Yes**	**No**
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	X	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. All participants will receive standard of care.	X	
The project is **not** designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does **not** follow a protocol that overrides clinical decision-making.	X	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment, or evaluation of the organization to ensure that existing quality standards are being met. The project does **not** develop paradigms or untested methods or new untested standards.	X	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **not** seek to test an intervention that is beyond current science and experience.	X	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	X	
The project has **no** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	X	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	X	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board."*	X	

Answer Key:

- If the answer to all these items is "Yes," the project can be considered an evidence-based activity that does not meet the definition of research. IRB review is not required. Keep a copy of this checklist in your files.
- If the answer to any of these questions is "No," you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used: http://answers.hhs.gov/ohrp/categories/1569

UNIVERSITY OF SAN FRANCISCO | School of Nursing and Health Professions

DNP Statement of Determination

Evidence-Based Change of Practice Project Checklist Outcome

The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E

☒ This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). **Student may proceed with implementation.**

☐ This project involves research with human subjects and **must be submitted for IRB approval before project activity can commence.**

Comments:

Student Last Name:	Sandoval	**Student First Name:**	Arelis
Student Signature:		**Date:**	
Chairperson Name:			
Chairperson Signature:		**Date:**	
Second Reader Name:		**Date:**	
Second Reader Signature:			
DNP SOD Review Committee Member Name:			
DNP SOD Review Committee Member Signature:		**Date:**	

Appendix B

Letter of Support from Agency

rom: **Mitchell, SaRonn** smitchell@savechildren.org
ject: Save the Children and USF Partnership
Date: October 31, 2021 at 5:32 PM
To: Jo Ann Loomis (jaloomis2@usfca.edu) jaloomis2@usfca.edu

SM

To Whom it May Concern:

It gives me great pleasure to be in partnership with USF and its students to bring much needed support and training to Save the Children's partner staff and the communities we serve. Our new and bold endeavor of building a Community Health Worker program, for example, will not only support families with understanding the importance of identifying a medical home, but will support our Early Childhood Coordinators/home visitors with a variety of interventions that will improve the overall quality of life and productivity for the communities they serve.

Since 2012, Save the Children and University of San Francisco have worked together in partnership to promote positive health outcomes for families and children in California's Central Valley. The USF students have provided health education and training for Early Childhood Coordinators/home visitors on topics such as breastfeeding education, oral health, child and family nutrition, and the effects of toxic stress and violence on children. The USF students were able to accompany the home visitors to provide nursing support with early childhood developmental screenings. These home visits were highlights of the experiences for USF students with the intention of providing them with deeper insight into some of the health needs of the families we serve, in rural America. This learning experience was vast in its approach as it included meeting program families and working with them on a one-to-one basis helped teach the need and create the 'heart' for many of the students to consider living and working in rural California. Working with the early childhood coordinators was an important part of these experiences, as they provided insight into the community needs to the USF students who many live and attend school in urban San Francisco.

Today, as we continue our work together, we will co-design a Community Health Worker training program for our local Early Childhood Coordinators/home visitors. Like our Early Childhood Coordinator, Community Health Workers literally meet families where they live, and see their economic, physical, and related mental health struggles on a daily basis. The Early Childhood Coordinators will be strategically positioned to provide support for the whole person as they assess the wide array of environmental, economic, and social determinants of health for this population. They visit with parents in their homes and see first-hand the effects of poverty, language barriers, and other social disadvantages that affect physical and mental health. This educational program will be designed to equip and enlarge the skills, attitudes, and behaviors of the early childhood coordinators as CHW to assess the whole person, in respect for the individual circumstances and needs of parents and families in the community, especially those families who experience traumatic and adverse determinants of health.

We are committed to creating new approaches to support systemic and collaborative community health-based initiatives that promote among other things, optimal birth outcomes and positive family and child outcomes. Furthermore, our early childhood coordinators will be better equipped during regular home visits to support families. Early Childhood Coordinators will provide families with health-related knowledge and tools to be better advocates for themselves as parents and for their children.

Again, I'm excited and look forward to working with USF and the USF students, so that these opportunities can continue to benefit USF students, Save the Children's partner staff but most importantly benefit the many families and children in the Central Valley our collective efforts will touch.

Warmly,
SaRonn Mitchell

SaRonn Mitchell
SENIOR SPECIALIST, EARLY CHILDHOOD
Save the Children.
CA & WA—Rural Education
Mobile: 559•313•7070

Appendix C

Evidence Evaluation Table

Purpose of Article or Review	Design / Method / Conceptual Framework	Sample / Setting	Major Variables Studied (and their Definitions)	Measurement of Major Variables	Data Analysis	Study Findings	Level of Evidence (Critical Appraisal Score) / Worth to Practice / Strengths and Weaknesses / Feasibility / Conclusion(s) / Recommendation(s) /
APA Reference: Albaek, A.U., Kinn, L.G., & Milde, A.M. (2018). Walking children through a minefield: How professionals experience exploring adverse childhood experiences. *Qualitative Health Research*, 28(2), 231-244. https://doi.org/10.1177/1049732317734828							
To analyze findings from qualitative studies to determine experiences providers have when dealing with childhood adversities.	Meta synthesis of 8 qualitative studies; peer-reviewed, empirical, qualitative studies chosen	Literature search of 3 studies that were conducted in the U.S., 2 in the Netherlands, 2 in Sweden, and 1 in Great Britain. Responses from N=172 professionals, with diverse capabilities and different education levels were synthesized.	Themes were extracted from interviews describing professionals' efficiency in exploring child abuse and how they feel their efficiency can be improved.	Authors gathered common themes and significant words from multiple studies. The data consisted of in-depth and semi structured interviews, focus groups, questionnaires, and small group sessions with questions and discussions.	Meta ethnographic comparative method utilized to analyze qualitative results from different settings. Data was analyzed using interpretive translation and thematic analysis.	Three overarching themes resulted: outside barriers, concern for the child well-being, and contributors' emotional uneasiness. A predominant metaphor was created, "walking children through a minefield," with 3 themes of feelings of lacking, fear to make the situation unhealthier, and confronting malevolence.	*Level of Evidence:* V *Critical appraisal score:* B *Strengths*: the diversity of organizations and countries in the studies makes results transferable. *Weaknesses*: The quality of the articles did not contain evaluation checklists. *Conclusions*: Professionals described opposition to their principles and requested knowledge, coaching, and enhanced resources from their organizations to facilitate their work with ACEs. Findings suggest necessity for attention to emotional hardship for professionals in managing abuse cases over simply offering guidelines for assessment.

Definition of abbreviations: None

Purpose of Article or Review	Design / Method / Conceptual Framework	Sample / Setting	Major Variables Studied (and their Definitions)	Measurement of Major Variables	Data Analysis	Study Findings	Level of Evidence (Critical Appraisal Score) / Worth to Practice / Strengths and Weaknesses / Feasibility / Conclusion(s) / Recommendation(s) /
APA Reference: Counts, J.M., Gillam, R.J., Perico, S., & Eggers, K.L. (2017). Lemonade for life- A pilot study on a hope-infused, trauma-informed approach to help families understand their past and focus on the future. *Children and Youth Services Review*, 79, 228-234. https://doi.org/10.1016/j.childyouth.2017.05.036							
To study how Lemonade for Life is incorporated into the work of home visitors who utilize ACEs in their work, and how resources provided have affected their work. Lemonade for Life is a training developed to empower professionals to use ACEs to strengthen families.	A quality improvement (non-research) study utilizing a developmental approach to evaluate Lemonade for Life, a pilot program. A developmental evaluation is based on the theory of complexity, and it is helpful with developing programs where context is needed to interpret results.	N=24 home visitors and parent educators, of which 17 completed all phases. Setting takes place in Kansas and Iowa in 2014. All participants had to have at least 6 months of home visiting experience. All participants were women and 83% had a bachelor's degree or higher.	*Surveys*: 1) Demographic information 2) participant involvement with ACEs; 3) the Hope Scale and 4) feelings from use of ACEs with families. *Focus groups:* Participant response to education provided, information used with families, and supplementary concerns around using ACEs.	Trainings consisted of a 3-hour online course about ACEs, then a 6-hour in-person Lemonade for Life module. Surveys were completed before and after the training. Coaching calls occurred after the training, as well as online surveys utilizing a Likert scale.	SPSS 22 was used to calculate mean and frequencies. Mean scores were compared between pre to post tests. Analysis of focus group data used qualitative methods to find related themes.	Home visitors stated they felt more comfortable introducing ACEs after the training. Three themes were extracted: 1) Improved communication 2) Families better understood how to make better choices to avoid ACEs and 3) training was easy to understand and provided useful tools.	*Level of Evidence:* V *Critical appraisal score:* B *Strengths:* Uses a realistic approach to test training materials. Considered an adjunct to existing home visiting programs and helpful in converting ACEs research into work with families. *Weaknesses*: Small sample size, tool limitations, and results focused on home visitor only. *Conclusions:* The Lemonade for Life training provides helpful resources for home visitors working with ACEs. The training allows for focus on one's own experience with ACEs. Home visitors can help stop continued ACEs utilizing this trauma-informed practice.

Definition of abbreviations: ACEs= Adverse childhood experiences

Purpose of Article or Review	Design / Method / Conceptual Framework	Sample / Setting	Major Variables Studied (and their Definitions)	Measurement of Major Variables	Data Analysis	Study Findings	Level of Evidence (Critical Appraisal Score) / Worth to Practice / Strengths and Weaknesses / Feasibility / Conclusion(s) / Recommendation(s) /
APA Reference: Davis, S.M., & Kane, E.W. (2016). Home visitors' perceptions of structural constraints, family resilience, and adverse childhood experiences. *Families in Society*, 97(1), 23-31. https://doi.org/10.1606/1044-3894.2016.97.6							
To explore whether using the ACEs research during home visits directs focuses more on individual factors rather than broad social factors.	Qualitative interviews were provided, and data was interpreted by college student researchers collaborating with the Maine Families Program. A reciprocally engaged approach was utilized during the interviews.	N=11 home visitors (all women) who served 130 families in the Maine Families Program, which serves pregnant women and their newborns. The home visitors had at least bachelor's degrees.	Home visitors are considered knowledgeable in ACEs and in how preventing future ACEs is beneficial. Interview questions explored home visitors' experiences of using in working with families.	The interviews focused on emphasizing the value of the home visitors' skills in using ACEs research and how to help build resiliency in the context of the home visiting model.	Rubin and Rubin's (2011) coding strategies were used to interpret data. The coding of the interviews allowed for the extraction of obstacles determined by home visitors to create ACEs, as well as suggestions for how to overcome them. Transcripts of interviews were entered into NVivo coding system was used for data analysis of transcripts.	Interview investigations showed that home visitors need to understand broader social factors that contribute to ACEs and not just attribute ACEs to individual factors.	*Level of Evidence:* III *Critical appraisal score:* B *Strengths:* Aligns with literature showing that home visitors using ACEs research merge household factors with acknowledgement to social factors. *Weaknesses*: Small interview sample. Unable to determine how home visitors' responses depend on background. Possibly not generalizable in a wider setting- different agencies use varying frameworks. *Conclusions:* It is highly recommended that agencies and educational institutions work together to implement CBR projects. Coordination of services is extremely important.

Definition of abbreviations: ACEs= Adverse childhood experiences; CBR= Community-based research

Purpose of Article or Review	Design / Method / Conceptual Framework	Sample / Setting	Major Variables Studied (and their Definitions)	Measurement of Major Variables	Data Analysis	Study Findings	Level of Evidence (Critical Appraisal Score) / Worth to Practice / Strengths and Weaknesses / Feasibility / Conclusion(s) / Recommendation(s) /
APA Reference: Johnson, K., Woodward, A., Swenson, S., Weis, C., Gunderson, M., Deling, M., Cristiani, V., & Lynch, B. (2017). Parents' adverse childhood experiences and mental health screening using home visiting programs: A pilot study. *Public Health Nursing*, 34(6), 522-530. https://doi.org/10.1111/phn.12345							
To assess the ability of home visitors to conduct parental ACE screenings in the home. Another goal was to determine if more ACEs in the mother was linked with mental health concerns.	A pilot study that is observational and prospective. Two distinct home visiting programs were examined: the Olmsted County Public Health Home Visiting Program (OCPHS) and Early Head Start (EHS). These programs use well-know, proven curriculums.	N=110 (EHS: N=20; OCPHS: N=90). Children in Minnesota were enrolled in the EHS and OCPHS Home Visiting Programs from referrals obtained from social services, community agencies, and healthcare providers. Parents were offered the ACE screening on routine visits by home visitors.	The ACEs questionnaire was presented by both programs, along with other routine screenings (i.e., Edinburgh Postnatal Depression Scale for postpartum depression). The ACEs questionnaire is composed of 10 items, with one point given per question. The EPDS has been shown to be dependable to detect postpartum depression. It also consists of 10 items asked of the mother and scores can fall between 0 and 30, with those over 10 being suggestive for depression.	Total ACE scores were evaluated and combined between the 2 programs. The EPDS was provided while pregnant and in the postpartum period.	Data analysis consisted of the Wilcoxon nonparametric test to contrast ACE scores between the two programs. JMP Pro, Version 12.2.0 was used to obtain logistic models to compare ACE scores with EPDS results.	A high acceptance rate was noted for parents' willingness to complete the screen (100%, 96%). Findings show maternal depression is associated with higher ACEs score ($p = .05$). Higher scores were observed in EHS program in relation to OCPHS.	*Level of Evidence:* V *Critical appraisal score:* B *Strengths:* Both programs allowed parents to choose how to fill out screens (alone or with assistance). Immediate referrals and resources were provided. *Weaknesses*: Small sample size. Differences in programs- One used social workers and the other used public health nurses; one program conducted screenings at initial intake and the other varied. Correlations were drawn from total ACE scores and cannot identify individual questions that affected mental health scores. *Conclusions:* Providing ACEs questionnaires in the home is feasible and parents are accepting. Prior to screening, rationale should be explained to parents and screener should have rapport with family when possible. It is also important to link families to resources, especially during the child's infancy stage.

Definition of Abbreviations: Adverse childhood experiences (ACEs)= hurtful occurrences that take place as a child that can affect physical, mental, and emotional health; EHS= Early Head Start; OCPHS= Olmsted County Public Health Home Visiting Program; EPDS= Edinburgh Postpartum Depression Scale

Purpose of Article or Review	Design / Method / Conceptual Framework	Sample / Setting	Major Variables Studied (and their Definitions)	Measurement of Major Variables	Data Analysis	Study Findings	Level of Evidence (Critical Appraisal Score) / Worth to Practice / Strengths and Weaknesses / Feasibility / Conclusion(s) / Recommendation(s) /
APA Reference: Marie-Mitchell, A., & Kostolansky, R. (2019). A systematic review of trials to improve child outcomes associated with adverse childhood experiences. *American Journal of Preventive Medicine,* 56(5), 756-764. https://doi.org/10.1016/j.amepre.2018.11.030							
To summarize evidence from randomized control trials to determine how additional involvement of resources during child can counteract inadequate health measures related to ACEs.	Systematic literature review. All studies involved pediatric health care, were published between 1990 and 2017 and involved experience with C-ACEs.	N=22 articles and consisted of twenty RCTs. Final articles involved were determined by independent screening by investigators with a consensus on final studies to be utilized. A valid rating guideline was utilized for evaluation.	Common C-ACEs categories were extracted, as well as interventions. Different measures were used to determine health effects in the studies utilized, which consisted of parental responses, assessment tools, medical records, and healthcare evaluations.	Interventions were labeled as low, medium, or high intensity interventions. Types and number of C-ACEs used in studies were tabulated and varied from 1 to 5 items.	The management software utilized to review the studies was called EndNote.	The most frequent C-ACE found is having a parent dealing with mental health issues and was found in sixteen articles. The next common C-ACE that appeared was substance use. Remarkable improvements in health measures were found in more than half the studies.	*Level of Evidence:* III *Critical appraisal score:* B *Strengths:* Findings from broader literature imply that providing knowledge to parents about the development of their children and how to form a positive relationship with them, as well as providing social support, remarkably improved health measures in their children *Weaknesses*: Gaps in the literature; there may be other effective interventions not included because only RCT's were chosen; results skewed towards interventions demonstrated to be effective. *Conclusions:* Utilizing interventions with multiple supports is related to improved child health measures and can reduce C-ACEs in young children. The most beneficial interventions include those that utilize nurses in home visits and include assistance from mental health providers.

Definition of Abbreviations: RCT= Randomized control trials; C-ACEs= Childhood ACEs; DV= Domestic violence

Purpose of Article or Review	Design / Method / Conceptual Framework	Sample / Setting	Major Variables Studied (and their Definitions)	Measurement of Major Variables	Data Analysis	Study Findings	Level of Evidence (Critical Appraisal Score) / Worth to Practice / Strengths and Weaknesses / Feasibility / Conclusion(s) / Recommendation(s) /
APA Reference: Burns, B.M., Merritt, J., Chyu, L., & Gil, R. (2019). The implementation of mindfulness-based, trauma-informed parent education in an underserved Latino community: The emergence of a community workforce. *American Journal of Community Psychology*, 63, 338-354. https://doi.org/10.1002/ajcp.12342							
To review the SSL program, which focuses on adverse experiences and providing parents with tools to strengthen resilience. It was a 5-year collaboration between academic researchers and *Promotoras* at a nonprofit agency to educate immigrant families from Mexico.	QI program review. The Implementation Science (IS) framework was used for guidance through interviews, which consisted of four separate stages.	The location was in San Jose, CA and involved a sizable nonprofit agency. The volunteer members from the community were women who had recently arrived from Mexico and many of whom had co-led another SSL program for preschoolers previously.	Emergent themes for each program review stage were identified: mutual objectives and theoretical framework (stage 1); significance of self-reflection and community (stage 2); cross-communication, empathy, program outlook, and acknowledgment of *Promotoras* (stage 3); leadership, development of teaching methods and backing of the organization (stage 4).	Two researchers gathered information from agency staff and the *Promotoras* using questionnaires on the computer and live discussions at various stages of the 5-year intervention.	Thematic synthesis and meta-ethnography were utilized to select converging responses from each phase of the responses.	Preliminary findings demonstrate improved strength and resistance learned by parents after intervention. *Promotoras* became more comfortable with skills and knowledge in providing education, which provided them with stronger guidance and direction of the group.	*Level of Evidence:* V *Critical appraisal score:* B *Strengths:* A powerful framework that is applicable to other interventions where *Promotoras* work with families in the community. *Weaknesses*: Generalizability limited by small sample size, possible sample bias, and intervention only concentrates on strengthening families. Not enough understanding of reasons influencing *Promotoras*' community engagement. *Conclusions:* Further interventions to support low-income communities are necessary to support healthy family functioning. *Promotoras* can also benefit from opportunities to coach peers on improving lifestyle habits, making it beneficial for all.

Definition of Abbreviations: SSL= Safe, Secure and Loved; IS= Implementation Science

Purpose of Article or Review	Design / Method / Conceptual Framework	Sample / Setting	Major Variables Studied (and their Definitions)	Measurement of Major Variables	Data Analysis	Study Findings	Level of Evidence (Critical Appraisal Score) / Worth to Practice / Strengths and Weaknesses / Feasibility / Conclusion(s) / Recommendation(s) /
APA Reference: Fleming, K., Simmons, V.N., Christy, S.M., Sutton, S.K., Romo, M., Luque, J.S., Wells, K.J., Gwede, C.K., & Meade, C.D. (2018). Educating Hispanic women about cervical cancer prevention: Feasibility of a *Promotora*-led charla intervention in a farmworker community. *Ethnicity and Disease*, 28(3), 169-176. https://doi.org/10.18865/ed.28.3.169							
To gather assessment information about an educational program regarding cervical cancer which is taught by *Promotoras* and provided to women in an agricultural community.	A pilot program with pretest-posttest design. *Promotoras* received educational instruction in 3 gatherings. The theoretical frameworks that were applied were the Social Cognitive Theory and the Health Belief Model.	N=60 *charla* participants, N=6 *Promotoras*. The study took place within a 7-month period in the year 2014. It was based on a previously existing partnership between two community groups.	Assessment of health knowledge, understanding of the type of cancer, opinions about being evaluated, self-value, and plans to be assessed were measured before and after the intervention.	Health literacy was assessed by the Single Item Literacy tool; a survey from the Cancer Institute's Health Information National Trends was utilized to measure cancer knowledge; pap test beliefs was measured by a survey that had been used in past studies; a validated screening for cancer self-efficacy was used.	The SAS software was utilized for data analysis. ANOVA measures evaluated fluctuations in skillset, opinions of health and self-value. ANOVA was also used to assess changes from before and after the intervention.	Findings show more skills and self-value among intervention group members (P<.0001). Results back an educational program for the community utilizing *Promotoras* to deliver health information regarding cancer examinations.	*Level of Evidence:* V *Critical appraisal score:* A *Strengths:* The application of a *Promotora* intervention to provide cancer screening knowledge to women is effective in its distribution method. *Weaknesses*: Generalizability: small sample size. Study was conducted among a small agricultural group in a relatively modest area. Post-charla screenings were conducted in groups and responses cannot be attributed to specific contributors. *Conclusions:* The health education provided by *Promotoras* in the talking circles provided improvements in comprehension about cervical cancer and more independence about how to get tested.

Definition of Abbreviations: HPV= Human papilloma virus

Purpose of Article or Review	Design / Method / Conceptual Framework	Sample / Setting	Major Variables Studied (and their Definitions)	Measurement of Major Variables	Data Analysis	Study Findings	Level of Evidence (Critical Appraisal Score) / Worth to Practice / Strengths and Weaknesses / Feasibility / Conclusion(s) / Recommendation(s) /
APA Reference: Early, J.O., Burke-Winkelmann, S., & Joshi, A. (2016). On the front lines of prevention: *Promotores de salud* and their role in improving primary care for Latina women, families, and communities. *Global Journal of Health Education and Promotion*, 17(2), 58. https://doi.org/10.18666/GJHEP-2016-V17-I2-7130							
A review of the scholarly literature published from 2005–2015 to evaluate the features that influence *Promotores'* function as dependable contributors to prevention and primary care.	A literature search of N=64 articles.	Articles were extracted from 4 databases (CINAHL, PubMed, Ovid, and Medline) limited to peer-reviewed works available in full text.	Common themes were extracted from the search in relation to factors that describe the *Promotora* role.	The number of articles found under each theme were counted and the content from the articles was discussed at length.	Eight topics emerged: 1) motivational factors 2) descriptive characteristics 3) health issues most addressed 4) effectiveness of programs 5) influence of community health teaching on improving self-value 6) role of *Promotores* 7) job-related difficulties and 8) preferred coaching methods.	There is ample evidence in the literature search to support that lay health models which include *Promotores* can achieve positive results in preventive education.	*Level of Evidence:* V *Critical appraisal score:* B *Strengths:* An ample number of articles were utilized in this literature search, both empirical and non-empirical. *Weaknesses*: Only articles published in English were consisted of and limited to peer-reviewed works. *Conclusions:* The contributions of *Promotores* to improving the health of Latina women, their families, and their communities is widely accepted. *Promotores* should be included as essential partners in preventive care, primary care, cultural humility, and an expanded team-based attitude towards health promotion.

Definition of Abbreviations: None

Purpose of Article or Review	Design / Method / Conceptual Framework	Sample / Setting	Major Variables Studied (and their Definitions)	Measurement of Major Variables	Data Analysis	Study Findings	Level of Evidence (Critical Appraisal Score) / Worth to Practice / Strengths and Weaknesses / Feasibility / Conclusion(s) / Recommendation(s) /
APA Reference: Manzo, R.D., Rangel, M.I., Flores, Y.G., De la Torre, A. (2018). A community cultural wealth model to train *Promotoras* as data collectors. *Health Promotion Practice*, 19(3), 341–348. https://doi.org/10.1177/1524839917703980							
To examine the role of *Promotoras* in a data gathering study.	A qualitative study based on a theoretical framework by Yosso called Community Cultural Wealth (CCW), which stipulates that middle class White populations are more valued culturally than other populations.	The *Niños Sanos, Familia Sana* experiment included N=9 *Promotoras*, in which they participated in the 2 focus groups, each lasting 1.5-2 hours.	Statements were collected to determine reasons for *Promotoras* wanting to engage in community work, as well as to discuss some of their difficulties and achievements.	Statements provided by *Promotoras* during focus groups were collected and were then coded based on emerging themes.	Focus group transcripts were analyzed in Spanish. A deductive method was utilized for examination of data based on Strauss' approach and was completed in two phases.	*Promotoras* can successfully work to gather data for a larger study by utilizing their cultural competency, skills, and implement their cultural values, knowledge, and customs to enlist members of the community.	*Level of Evidence:* III *Critical appraisal score:* B *Strengths:* Supports evidence of past studies that validates the effectiveness of *Promotoras* in recruiting community participation. *Weaknesses*: A relatively small, homogeneous sample size was utilized, as the *Promotoras* mostly hailed from a similar area of Mexico. There was also and lack of a contrast with other individuals who were doing similar work. There was an absence of quantitative measures. *Conclusions:* Identifying *Promotora* characteristics and productive approaches they can practice for community involvement. This study suggests there is a benefit for training *Promotoras* in populations that are largely from Mexico.

Definition of Abbreviations: CCW= Community Cultural Wealth; *Niños Sanos*, *Familia Sana*= Healthy Children, Healthy Family

Purpose of Article or Review	Design / Method / Conceptual Framework	Sample / Setting	Major Variables Studied (and their Definitions)	Measurement of Major Variables	Data Analysis	Study Findings	Level of Evidence (Critical Appraisal Score) / Worth to Practice / Strengths and Weaknesses / Feasibility / Conclusion(s) / Recommendation(s) /
APA Reference: Njeru, J.W., Ridgeway, J.L., Asiedu, G.B., Radecki Breitkopf, C., Gunderson, J.M., Quirindongo-Cedeño, O., O'Brien, M.W., Nelson, T.M., Buzard, R., & Wieland, M.L. (2019). Evaluating a community-placed and clinically integrated community health worker program: A realist approach. *The Journal of Ambulatory Care Management, 42*(2), 116-127. https://doi.org/10.1097/JAC.0000000000000268							
To evaluate the implementation of an intervention that partners community health workers and primary healthcare providers.	A theory-based evaluation was utilized called the realist approach, which defines a program's successful factors.	This research took place at a substantial primary care site in the midwestern U.S. All CHWs had appropriate certifications based on college credits and supervision completed. N=3 CHWs, 8 care coordinators & 3 primary care providers.	Phase 1: Appraisal of records; Phase 2: Interview conclusions to identify stakeholder perceptions on purpose of CHW program and components that work well; Phase 3: Suggestions for improving program components.	An outside source was contracted to obtain and analyze data. It consisted of document review and CHW observation, as well as interviews and focus groups of CHWs, physicians, and patients.	Data was analyzed in three stages and utilized the realist approach to advance the intervention principles.	Home visits provided by CHWs are deemed essential to establishing trust and determining necessities. The need for additional CHW training was evident, as was expanding their knowledge of resources available.	*Level of Evidence:* V *Critical appraisal score:* B *Strengths:* A realist evaluation allowed for a better grasp of CHW performance beyond expenditures or healthcare needs. *Weaknesses*: Limited to the appraisal of one program but may be adaptable to other programs. *Conclusions:* Home visiting is a successful tool for CHWs. Additional instruments are needed in addition to technology for use by CHWs to communicate with the healthcare team. Also, healthcare providers need clarity about the role of the CHWs as a support service for their patients.

Definition of Abbreviations: CHW= Community health worker

Appendix D

Course Content and Learning Objectives

Course Title	Learning Objectives
Module I: Adverse Childhood Experiences (ACEs)	1) Define Adverse Childhood Experiences (ACEs), their prevalence, and related impacts on health. 2) Recall major findings of the ACEs study. 3) Identify (2) health outcomes associated with ACEs. 4) Identify (2) risk factors for ACEs and which populations are the most vulnerable.
Module II: Biology of ACEs	1) Understand how Adverse Childhood Experiences (ACEs) affect biological and physiological mechanisms, including brain development. 2) Recognize how stress response system activates fight, flight or fear and becomes conditioned over time especially in high stress situations. 3) List three effects of ACEs on children that impact learning and behavior in school. 4) Identify ways to incorporate teaching about brain development with families in the community.
Module III: ACEs Screening	1) Discuss the use of the ACEs survey in the home/community and how this may assist home visitors to better engage and care for their clients. 2) Identify how to introduce and integrate ACEs and toxic stress screening into home visiting, aligning with trauma-informed care principles. 3) Apply the ACEs and Toxic Stress Risk Assessment Algorithm for assessing risk for toxic stress. 4) Review key components of successful screening efforts.
Module IV: Protective Factors & Using a Strengths-Based Approach	1) Review protective factors that help keep families strong and prevent child abuse and neglect. 2) Identify key strategies and concrete everyday actions that help families build protective factors. 3) Explore what it means to work with families in a strength-based way. 4) Share protective factors resources for providers and families. 5) Utilize a combination of screening for aces and identifying protective factors in determining an appropriate follow-up plan.
Module V: Promoting Resilience	1) Discuss the impact of resilience on mitigating the negative health consequences of ACEs. 2) Identify at least 2 ways to help promote family resilience to stressors. 3) Define and recognize parental resilience. 4) Identify everyday actions you use to help parents build their resilience in your work. 5) Identify steps you will take to integrate building resilience into your work.

Appendix E

Gap Analysis

Best Practice	Best Practice Strategies	How Your Practices Differ from Best Practice	Barriers to Best Practice	Implementation Will Implement Best Practice (Yes/No)
CHWs have improved healthcare access and management of chronic conditions in rural communities.	Providing training to CHWs has enhanced their ability to assist high-risk families with obtaining healthcare access and can be utilized with other healthcare prevention strategies with proper training. CHW certification is offered in some states and will provide enhanced training for CHWs. Certification will allow for more sustainable funding through Medi-Cal reimbursement if approved in California.	Comprehensive education to CHWs on ACEs, and other CHW competencies, will better prepare them for future CHW certification. Increasing ACEs knowledge will allow them to better support families, increase their resiliency, and reduce the potential for future ACEs.	Lack of current CHW certification in California, sustainable funding issues, lack of understanding of how ACEs further contributes to health disparities in high-risk communities.	Yes. Implementation of ACEs training for CHWs will prepare them for future CHW state certification, which will allow for sustainable funding once it is approved. CHWs will have more knowledge on how ACEs contributes to health outcomes which will better prepare them to support families who have experienced trauma.

Appendix F

Gantt Chart

DNP GANTT-Responsibility-Status Chart

	C		2022												2023												2024						
ID #	DNP Phases (may use framework or practicum emphasis) and Steps	Responsible Party(ies)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Status & Date
1	**Assessment Phase****																																
1.1	Courses: N7230, 7240, 7005, 7008	Arelis																															
1.2	Conduct gap analysis	Arelis																															
1.3	Work on and complete Project Plan Proposal																																
2	**Design Phase**																																
2.1	Courses: N7250, 7260, 749	Arelis																															
2.2	Create curriculum plan	Arelis																															
2.3	Complete PowerPoint slides and handouts	Arelis																															
3	**Implementation Phase**																																
3.1	Courses: N7270, 7280, 7009	Arelis																															
3.2	Meet with DNP teaching team to finalize curriculum	Arelis/DNP team																															
3.3	Make final modifications to PowerPoint slides	Arelis																															
3.4	Print handouts for in-person session	Arelis																															
3.5	Conduct in-person teaching session to CHW's	Arelis/DNP team																															
3.6	Roll-out first, second online modules	Arelis/DNP team																															
3.7	Roll-out third, fourth, fifth online modules	Arelis/DNP team																															
3.8	Post-evaluation	Arelis/DNP team																															
3.9	Courses: N7290, 795P, 7006	Arelis																															
4	**Analysis Phase**																																
4.1	Review pre- and post-evaluations	Arelis/DNP team																															
4.2	Data analysis based on evaluations	Arelis/DNP team																															
4.3	Interpret data and integrate into DNP manuscript	Arelis																															
4.1	Courses: N789 DNP Project	Arelis																															
4.2	Complete DNP Manuscript	Arelis																															
4.3	DNP final presentation	Arelis																															
4.6	**Culmination/Sustainability Phase**																																
4.7	Provide health education materials to advising faculty	Arelis/faculty																															
4.8	Debriefing with Project team; handoff to DNP students	Arelis/DNP team																															
5	Graduation	Arelis																															
5.1	Revision of project materials for future cohorts	BSN DNP students																															Ongoing

Appendix G

Work Breakdown Structure

Level 1	Level 2	Level 3
Implementing Adverse Childhood Experience Education for Community Health Workers to Build Resilience	1.1 Initiation	1.1.1 Conduct gap analysis 1.1.2 Complete Project Plan Proposal 1.1.3 Meeting with Project Manager/Supervising Faculty/team members 1.1.4 Review materials already presented for continuity of curriculum pattern
	1.2 Planning	1.2.1 Research evidence-based ACEs curriculum 1.2.2 Create curriculum plan for intervention 1.2.3 Complete PowerPoint slides and handouts 1.2.4 Obtain team feedback on proposed content and structure of teaching curriculum
	1.3 Execution	1.3.1 Conduct final meeting with team members prior to implementation 1.3.2 Provide pre-test questionnaire 1.3.3 Conduct in-person teaching session to CHWs 1.3.4 Roll out first online module 1.3.5 Roll out second online module 1.3.6 Conduct post-test evaluation
	1.4 Control	1.4.1 Obtain verbal feedback from CHWs post training 1.4.2 Review and analyze pre- and post-test evaluations 1.4.3 Obtain feedback from faculty and point-of-contact at partner organization
	1.5 Closeout	1.5.1 Debriefing with team manager and project team 1.5.2 Hand-off and online modules/training materials to supervising faculty 1.5.3 Meeting with continuing DNP students to present findings and future recommendations 1.5.4 Integrate data findings into final DNP manuscript

Appendix H

Responsibility/Communication Matrix

Communication	Purpose	Medium	Frequency	Audience
Meeting with partner organization's coordinator	Obtain information on CHW requests for training and organizational goals. Review project objectives.	Zoom	Monthly	Philanthropic organization staff, DNP students
DNP Student Team Meetings	Discuss necessary content, education modality and schedule, and evaluation technique.	Zoom or in person on teaching weekends	Monthly, then bi-weekly as implementation date approaches	DNP Student Team members
Training Sessions	Provide ACEs education and training to CHWs utilizing evidence-based practice.	Zoom or in person; online modality	Biweekly	Philanthropic organization CHWs
Training Evaluation, Data Collection, and Update Meetings	Evaluation of training efficacy and any potential changes, collection of pre- and post-evaluation data for analysis.	Zoom or in person	Post trainings, biweekly after each online training	Philanthropic organization, DNP students, and USF nursing faculty

Appendix I

SWOT Analysis

	Favorable/Helpful	Unfavorable/Harmful
Internal (attributes of the organization)	**Strengths** • The collaboration between USF and A large international philanthropic organization will give CHWs access to healthcare experts. • The CHW project is designed for: continuity, sustainability, and to provide ongoing opportunities for DNP students. • Constantly update the online ACEs module for CHWs with evidence-based research by future nursing students. • Strong partnership between USF nursing students and a large philanthropic organization, which could lead to further collaboration in the future.	**Weaknesses** • Long driving distance between USF and Central Valley allows for limited in-person teaching opportunities. • DNP students are all at different points in their course curriculum and may not be prepared for project implementation.
External (attributes of the organization)	**Opportunities** • A low-cost intervention with a public health focus with a pathway to CHW state certification. • Spread the intervention model to other settings and organizations. • Provide evidence for the value of screenings that could be implemented by CHWs for health promotion.	**Threats** • Ongoing pandemic safety concerns if training will be conducted in-person; unable to predict virus surge. • Both CHW and community concerns over identifying cases of abuse.

Appendix J

Budget

	FY 2022-2023	FY 2023-2024	FY 2024-2025	Totals
Hourly wage of 8 CHWs x 8 hrs.	$1,415.68	$1,447.68	$1,479.68	$4,343.04
Fringe benefits (30%)	$424.70	$434.30	$443.90	$1,302.90
Mileage	$209.44	$216.92	$224.40	$650.76
Supplies	$50.00	$60.00	$70.00	$180.00
Food (lunch)	$165.00	$176.00	$187.00	$528.00
Total/year	$2,264.82	$2,334.90	$2,404.98	$7,004.70
Total/CHW/year	$283.10	$291.86	$300.63	$875.59
Mean/CHW/year				**$291.86** (mean)

Hourly wage of 8 CHWs:

- **Year 1:** $22.12 (mean hourly wage) x 8 hrs.= $176.96 x 8 CHWs= $1,415.68
- **Year 2:** $22.62 (estimated mean hourly wage) x 8 hrs.= $180.96 x 8 CHWs= $1,447.68
- **Year 3:** $23.12 (estimated mean hourly wage) x 8 hrs.= $184.96 x 8 CHWs= $1,479.68

Mileage:

- **Year 1:** $.56 x 187 miles= $104.72 x 2 cars = $209.44
- **Year 2:** $.58 x 187 miles= $108.46 x 2 cars = $216.92
- **Year 3:** $.60 x 187 miles= $112.20 x 2 cars = $224.40

Food:

- **Year 1:** $15/person x 11 people (8 CHWs, 3 instructors) = $165.00
- **Year 2:** $16/person x 11 people = $176.00
- **Year 3:** $17/person x 11 people = $187.00

Total/CHW/year:

- **Year 1:** $2,264.82/8 CHWs= $283.10
- **Year 2:** $2.334.90/8 CHWs= $291.86
- **Year 3:** $2,404.98/8 CHWs= $300.63
- **Mean:** ($283.10+$291.86+$300.63)/3= $875.59/3= $291.86 per CHW/year

Appendix K

Cost Avoidance Analysis

Return on Investment (ROI) for CHW Intervention

	Diabetes	Cardiovascular Disease	Asthma	ACEs Training
Cost of Intervention (CHW) per patient per year	$1225	$283	$707	$5.31
Cost per patient per year	$16,750	$2,700	$3,100	$589
Cost with Intervention per patient per year	$15,375	$2,194	$1,760	$507
Cost savings	($1,375)	($506)	($1,340)	($82)
Return on investment (ROI)	1.12	1.8	1.9	**15.4**

Cost per CHW/patient/year:

$291.86/55 patients per year= $5.31

ROI = Cost savings/Cost of intervention:

- **Diabetes:** $1,375/$1,225= 1.12
- **CVD:** $506/$283= 1.8
- **Asthma:** $1,340/$707= 1.9
- **ACEs Training for CHWs**: $82/$5.31= **15.4 to 1 ROI**

OR

ROI= (Cost Savings-Cost of intervention)/Cost of intervention x 100:

- **Diabetes:** ($1,375-$1,225)/$1,225= 12.2%
- **CVD:** ($506-$283)/$283= 78.8%
- **Asthma:** ($1,340-$707)/$707= 89.5%
- **ACEs Training for CHWs**: ($82-$5.31)/$5.31 =**1,444%**

Appendix L

Cost Benefit Analysis

Proposed Cost Benefit Analysis (CBA) for CHW Intervention

Projected Costs 2022-2025	**2022-2023**	**2023-2024**	**2024-2025**
CHW Training Cost	$2,264.82	$2,334.90	$2,404.98
Projected Benefits			
Total patients receiving services/yr.	440	440	440
Lower cost per patient/yr. with CHW intervention	($82)	($82)	($82)
Total Benefits	$36,080	$36,080	$36,080
Net Cost Benefit	$33,815.58	$31,769.44	$33,675.02
Cost Benefit Ratio	**15.93**	**15.45**	**15.0**

Total patients receiving services by CHW/year:

8 CHWs/year x 55 patients/yr. = 440 patients/year

Lower cost per patient/yr. with CHW intervention:

440 patients/year x ($82) reduced cost/patient/yr.= $36,080

Net Cost Benefit= Total Benefits-Total costs:

- **Year 1:** $36,080 - $2,264.82= $33,815.18
- **Year 2:** $36,080 - $2,334.90 = $31,769.44
- **Year 3:** $36,080 - $2,404.98 = $33,675.02

Cost Benefit Ratio= Total benefits/Total costs:

- **Year 1:** $36,080/$2,264.82 = 15.93
- **Year 2:** $36,080/$2,334.90 = 15.45
- **Year 3:** $36,080/$2,404.98 = 15.0
- **Mean:** (15.93 + 15.45 + 15.0)/3= **15.5**

Appendix M

Data Analysis Tables

Table M1. Individual CHW Student Scores in Pre- and Post-Knowledge Quizzes obtained from Canvas

Student	Module I: Pre-knowledge Quiz	Module I: Post-knowledge Quiz	Module II: Pre-knowledge Quiz	Module II: Post-knowledge Quiz	Module III: Pre-knowledge Quiz	Module III: Post-knowledge Quiz	Module IV: Pre-Knowledge Quiz	Module IV: Post-Knowledge Quiz	Module V: Pre-Knowledge Quiz	Module V: Post-Knowledge Quiz
A	3	5	3.75	5	2.67	4	3.67	5	2.67	4.83
B	2	5	4	5	2.17	4	4.5	5	4.8	5
C	2	4	2	5	2.67	5	2.08	4.5	2.27	4.6
D	2	4	3	5	0.33	5	3.42	4.75	4	4.83
E	4	5	1.75	5	0	4	1.75	5	1.67	4.67
F	3	4	3	5	2.25	3	3.5	5	3.5	5
G	4	4	3	3.75	1.33	2.17	1.92	2	-	-
H	2	4	3	5	1.58	5	2.08	4.5	3.83	4
I	3	4	2	5	2.67	4.75	4.25	5	3.63	5
J	1	5	0.5	5	2	5	4.5	5	4.5	5
K	4	5	1.75	5	1	4.5	4.5	3.67	2.27	4.83
L	3	5	3.75	4.75	1.92	3.17	3.75	4.5	3.8	5
M	1	2	1.5	2.75	2.5	1.42	2.42	1.83	1.67	-
N	2	4	2.75	5	2.75	5	3.92	4.17	3.83	4.83

Table M2. Module 1: Percent Improvement in Scores (N=14)

Student	Pre-knowledge Quiz	Post-knowledge Quiz	% increase
A	3	5	.4
B	2	5	.6
C	2	4	.5
D	2	4	.5
E	4	5	.2
F	3	4	.25
G	4	4	0
H	2	4	.5
I	3	4	.25
J	1	5	.8
K	4	5	.2
L	3	5	.4
M	1	2	.5
N	2	4	.5
Mean	2.57	4.23	.4
Median	2.5	4	.45
Mode	2	4	.5
Standard deviation (s)	1.02	.83	.20
Variance (s^2)	1.03	.68	.04

Table M3. Module 2: Percent Improvement in Scores (N=14)

Student	Pre-knowledge Quiz	Post-knowledge Quiz	% increase
A	3.75	5	.25
B	4	5	.2
C	2	5	.6
D	3	5	.4
E	1.75	5	.65
F	3	5	.4
G	3	3.75	.15
H	3	5	.4
I	2	5	.6
J	0.5	5	.9
K	1.75	5	.65
L	3.75	4.75	.21
M	1.5	2.75	.45
N	2.75	5	.45
Mean	2.55	4.73	.45
Median	2.88	5	.43
Mode	3	5	.4
Standard deviation (s)	1.0	.66	.21
Variance (s^2)	1.0	.44	.05

Table M4. Module 3: Percent Improvement in Scores (N=14)

Student	Pre-knowledge Quiz	Post-knowledge Quiz	% increase
A	2.67	4	.31
B	2.17	4	.46
C	2.67	5	.45
D	0.33	5	.93
E	0	4	1.0
F	2.25	3	.25
G	1.33	2.17	.39
H	1.58	5	.68
I	2.67	4.75	.44
J	2	5	.6
K	1	4.5	.78
L	1.92	3.17	.39
M	2.5	1.42	-.76
N	2.75	5	.45
Mean	1.85	4	.46
Median	2.09	4.25	.45
Mode	2.67	5	.45, .39
Standard deviation (s)	.89	1.16	.42
Variance (s^2)	.8	1.35	.17

Table M5. Module 4: Percent Improvement in Scores (N=14)

Student	Pre-knowledge Quiz	Post-knowledge Quiz	% increase
A	3.67	5	.27
B	4.5	5	.1
C	2.08	4.5	.54
D	3.42	4.75	.28
E	1.75	5	.65
F	3.5	5	.3
G	1.92	2	.04
H	2.08	4.5	.54
I	4.25	5	.15
J	4.5	5	.1
K	4.5	3.67	-.23
L	3.75	4.5	.17
M	2.42	1.83	-.32
N	3.92	4.17	.06
Mean	3.3	4.28	.19
Median	3.59	4.63	.16
Mode	4.5	5	.1, .54
Standard deviation (s)	1.04	1.08	.27
Variance (s^2)	1.08	1.16	.08

Table M6. Module 5: Percent Improvement in Scores (N=12)

Student	Pre-knowledge Quiz	Post-knowledge Quiz	% increase
A	2.67	4.83	.45
B	4.8	5	.04
C	2.27	4.6	.51
D	4	4.83	.17
E	1.67	4.67	.64
F	3.5	5	.3
G		-	-
H	3.83	4	.04
I	3.63	5	.07
J	4.5	5	.1
K	2.27	4.83	.53
L	3.8	5	.24
M	1.67	-	-
N	3.83	4.83	.21
Mean	3.4	4.8	.28
Median	3.72	4.83	.23
Mode	2.27, 3.83	5	.04
Standard deviation (s)	.96	.29	.21
Variance (s^2)	.93	.08	.04

Table M7. Percent Improvement from Pre-test to Post-test Scores by Module

Module	Mean	Median	Mode	Standard deviation (*s*)	Variance (s^2)
1	.4	.45	.5	.20	.04
2	.45	.43	.4	.21	.05
3	.46	.45	.45, .39	.42	.17
4	.19	.16	.1, .54	.27	.08
5	.28	.23	.04	.21	.04

Figure M1. Graphical Representation of Percent Improvement from Pre-test to Post-test Scores by Module