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Abstract

A number of states have adopted certification programs for community health workers (CHWs) to improve recognition of CHWs as members of health care teams, increase oversight, and to provide sustainable funding. There has been little research into the impact of state CHW certification on the diffusion and adoption of CHWs into existing health care systems. This study examined the impact of state CHW certification on the perceptions of team climate among registered nurses (RNs) who work with CHWs in states with and without CHW certification programs. The study recruited RNs using a purposeful sampling method and used an online survey, which included the Team Climate Inventory (TCI), and compared the perceptions of team climate between the two groups. The study found no significant differences in the overall mean TCI score or TCI subscale scores between RNs who work in states with CHW certification programs ($n = 81$) and those who work in states without CHW certification programs ($n = 115$). There was a statistically significant difference on one survey question regarding whether RNs believe state certification of CHWs improved the ability of their health care team to deliver quality care. More research is needed to assess impact of state certification of CHWs and other factors that influence the diffusion and adoption of CHWs into the current health care system.

Keywords: State certification, community health worker, diffusion, registered nurses, team climate.

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Introduction

Nursing workforce studies predict a national shortage of registered nurses (RNs) due to an aging U.S. population and increasingly complex health care delivery system [1, 2]. At the same time the U.S. is becoming more culturally and ethnically diverse, and while the racial and ethnic diversity of RNs continues to increase, the proportion of White, non-Hispanic RNs in the workforce continues to be larger than the U.S. population of working age adults [3]. Racial and ethnic diversity that reflects the populations being served is important in the delivery of culturally appropriate, accessible, and quality health care [4, 5].

Community health workers (CHWs) are community members who provide health and social services to residents of their community. The work of CHWs often involves advocating for underserved communities that suffer disproportionately from disease and unhealthy living conditions. They work in areas such as health education, maternal child health, community organization, and health promotion, and they advocate for community and social change. Because CHWs are from the community, they are thought to possess a greater degree of homophily with many community members than do other health care professionals with more education or who do not share cultural backgrounds. Moreover, CHWs often speak local languages and dialects, allowing them to communicate more effectively, and they have a better understanding of cultural norms and values [5-9].

Community health workers have been proposed as a solution to help meet the increased demand for health care workers in primary health care, public health, and social programs. The Affordable Care Act [10] increases funding to improve access to primary care services through the development of interdisciplinary health care teams that include CHWs. Community health workers are unlicensed in the U.S., and they are not required to be certified in most states. Four states, Massachusetts, New Mexico, Ohio, and Texas have developed statewide CHW certification programs, and Minnesota has developed a CHW certificate program. Other states have statutory or administrative language that includes CHWs as part of community health teams or primary care medical homes that seek to integrate CHWs into their health care delivery systems, and some states allow for payments for CHW services through state Medicaid programs [11].

As state policy makers debate the merits of CHW certification, there is a need for additional research on the diffusion and adoption of the CHWs into existing health care organizations, as well as the development of sustainable and effective interdisciplinary teams that include CHWs [12]. The evidence of the effectiveness, both in cost and health outcomes, of interventions using CHWs continues to increase [13-16], but RNs and other licensed health care workers may be hesitant to delegate duties to unlicensed or non-certified health care workers because of their concerns about quality and safety [17].

State certification programs for CHWs have been proposed as a way to standardize training and improve the professional image of CHWs within health care organizations and teams [11]. The purpose of this study was to assess the impact of state CHW certification programs on RNs perception of team climate, and the impact this may have on the diffusion and adoption of CHWs into existing health care teams.

Diffusion of CHWs into Health Care Organizations and Teams

For the diffusion of CHWs into health care programs to occur there must be a relative advantage over current practices, and CHWs must be compatible with organizational structures and norms. Additional factors that may promote or inhibit the adoption of CHWs into health care teams include the resources available for the organization to implement the innovation, the adaptability of the innovation to be changed to fit the organization's needs, the amount of risk to the organization in adoption of the new innovation, and the transferability of knowledge required to use the innovation [18, 19].

Diffusion or dissemination of innovation and the decision by health care organizations to adopt the innovation can be promoted by a combination of internal and external factors, including team climate [20]. Health care teams with a team climate that is perceived to be safe and supportive environment for change may be more open to adopting CHWs onto their teams. Anderson and West [21] describe two different definitions of climate pertaining to organizational work groups: (a) individual group member's perceptions of their work environment or cognitive schema, and (b) the shared perception of group members of the work environment. The authors contend that work-group climate is an important factor in group effectiveness and innovation. The four major team climate factors include vision, participant safety, task orientation, and support for innovation. The Team Climate Inventory (TCI) was developed to measure the shared perceptions of team members on how they work together, share a single vision, are open to new ideas, and if they feel safe and supported by other team members [22]. The Team Climate Inventory has been shown to be valid with acceptable psychometric quality for use in a variety of organizational types [23].

Methods

The study was approved by the University of New Mexico, Human Research Review Committee. The Internet-based survey was developed using SurveyMonkey that included the TCI questions and demographic questions. The TCI- short form uses 19 questions from the original TCI and includes the following subscales: (a) Participation (b) Support for innovations (c) Team objectives, and (d) Task orientation. Perceptions of team climate are measured using participant responses to questions on a 5 or 7 point ordinal scale [24].

Eligible participants included currently licensed RNs and who had worked with CHWs as part of a health care team within the past year. Contact information for RNs who work in state and local public health offices as well as primary health care clinics was gathered from organizational and state health department websites, and RNs were recruited online through email and at local and national meetings to participate in the online survey between November 12, 2012, and May 1, 2013. Study participants were also recruited through purposeful sampling of RNs from Ohio and Texas, two states with CHW certification programs, and snowball sampling which allowed individuals who received the initial recruitment e-mail about the study to forward it to others who met the inclusion criteria to participate in the survey. The survey was anonymous, and study participants had an option to receive a \$10 gift card for participation in the study through a link to a second online survey not administered by the principle investigator.

The total sample size required for the survey to detect a medium effect size was calculated using G*Power 3.1 [25]. A medium effect size was used for this research because there was no prior research or evidence on the effect of state certification of CHWs on RN team climate perceptions. A priori sample size calculations for an independent samples *t*-test for the differences in means between two groups was calculated for a two-tailed test using an estimated effect size of Cohen's $d = .5$, with $\alpha = .05$, and power = $.80$, and provided a minimum sample size of 128 (i.e. 64 per group).

Results

Participant Demographics

Survey responses from 217 RNs who completed one or more study questions, a 24.0% response rate, were downloaded from the SurveyMonkey site and imported into Stata 12.1 for analysis. The majority of the responses, 73.7% ($n = 160$), were received from RNs working in four states: California ($n = 62$), Ohio ($n = 53$), New York ($n = 17$), and Texas ($n = 28$). Responses from RNs working in Indiana, Massachusetts, and Minnesota, were excluded from the study to prevent confounding because these states have partial or new certification programs (i.e. IN, MA) or a CHW certificates program (i.e., MN). Survey results were then categorized into two study groups: RNs who work with CHWs in states with CHW certification programs, and RNs who work with CHWs in states without CHW certification programs.

Fisher's exact tests were used as the alternative to Pearson's chi-square tests in cases where expected cell counts were less than 5 (i.e., RN race, ethnicity, and education). The majority of survey respondents from both groups were White, 78.4%, non-Hispanic, 79.2% females, 95.4%. Pearson's chi-squared analysis of the categorical demographic information found no significant differences between the two groups in reported gender or ethnic background. However, differences were found in reported race with a higher proportion of RNs from non-CHW certification states reporting race other than White. Significant differences, $p < .001$, were also found in the highest level of education reported by RNs (see Table 1).

Independent sample *t*-tests of demographic information found no significant difference in mean RN age, mean number of years working in their current position, and mean number of years working on current team between RNs in CHW certification states and non-CHW certification states. Pearson's chi-squared tests found no significant difference in reported metropolitan or nonmetropolitan work location with the majority, 86.0%, of RNs from both groups reporting their worksite was located in a metropolitan area with more than 250,000 residents. Significant differences, $p < .001$, were found in the types of organizations that RNs reported working for, with 94.5% of RNs from non-CHW certification states reporting working for state, county or local health departments, and 37.0% of CHWs from certification states reporting working for not-for-profit health care organizations.

Significant heterogeneity of variance between groups and indications of large positive skewness were found for the variables of organizational size, team size, and number of CHWs on the RNs team, and nonparametric analyses were completed for these independent variables. The Wilcoxon Rank-sum test found significant differences, $p = .01$, in the size of the organizations that RNs reported working in. Almost half, 48.2%, of RNs from non-CHW certification states reported working in organizations with between 100 and 499 employees while over half, 54.5%, of RNs from CHW certification states reported working in organizations with fewer than 100 employees. Significant differences, $p = .03$, were found in the reported team size, although the majority of RNs from both groups reported working in teams of less than 20 people. No significant difference was found in the number of CHWs RNs reported working with as part of their team.

Pearson's chi-squared tests and Fisher's exact tests found significant differences between the groups in RNs' responses to questions about the race, $p < .01$, and ethnicity, $p < .001$, of the CHWs the RNs worked with. A higher proportion of RNs from CHW certification states reported working with Black or African American CHWs, and a higher proportion of RNs working in non-CHW certification states reported working with multiracial or other race CHWs. A higher proportion of RNs from non-CHW certification states reported working with CHWs whose ethnic background was Hispanic or Latino.

For the variables of types of CHWs RNs reported working with in the past year and the types of CHWs RNs are currently working with, response categories with fewer than 5 responses in both groups were combined into an "Other" category. Pearson's chi-squared tests did not show any significant differences in the types of CHWs that RNs reported working with in the past year, but did show a significant difference in the types of CHWs RNs reported working with on their current team. A higher proportion of RNs from non-CHW certification states reported they worked with Community Health Workers, Outreach Educators, and Peer Health Educators.

Team Climate Inventory *t*-test

Analysis of survey results using independent samples *t*-test to compare overall mean TCI survey scores or mean scores for TCI subscale variables (i.e. partnership, support, objectives, and style) found no significant differences between RNs from states with CHW certification and states without CHW certification. Two additional survey questions regarding RNs' perceptions of state certification on their confidence in working with CHWs (i.e. question 24: State certification of CHWs increases or would increase my confidence in working with them), and the ability of their team to provide quality care (i.e. question 25: State certification of CHWs increases or would increase the ability of my team to provide quality care) were analyzed for differences in mean scores between the two groups. A significant difference, $p = 0.02$, was found in the mean score of nurses to survey question 25 with RNs from states with CHW certification having a higher perceived increase in their team's ability to deliver quality care, than to RNs from non-CHW certification states (see Table 2).

Discussion

Efforts to clarify the role that CHWs will have in the delivery of health care services, including legislative and policy efforts for CHW certification, continue to be debated [26]. Team climate can act as a mediator on patient care outcomes [27], and it may impact the innovativeness and ability of health care teams and organizations to adopt new ways of delivering health care [28]. This study found no significant differences in the overall mean TCI score or TCI subscale scores between RNs who work in states with CHW certification programs and those who work in states without CHW certification programs. However, a significant difference was found in the mean score of nurses on the survey question regarding whether state certification on CHWs impacts the ability of their team to deliver quality care. The mean Likert score (i.e. strongly agree = 5, agree = 4, neither agree or disagree = 3, disagree = 2, strongly disagree = 1) among RNs who work with CHWs in states with CHW certification programs was significantly higher, $p < .05$, than among RNs who work in states without CHW certification program. It would appear from the results of this question that state certification of CHWs does impact the perceptions of RNs who work with them to some degree, but not to the extent that it impacts overall team climate as measured by the Team Climate Inventory – short form survey. Further research on the relationship between perceived quality of care and CHW certification is needed.

The integration of CHWs into health care organizations is likely to have a disruptive effect on health care teams, and the ability of health care organizations to monitor and adapt to changes in team climate will be critical to the success and sustainability of these new models of health care delivery. In a review of programs that have successfully integrated CHWs into existing health care systems, the Urban Institute [29] examined case studies from Minnesota, North Carolina, Ohio, and Texas. The authors noted that the development of a state CHW certification program did not necessarily translate into increasing employment opportunities for CHWs. While the number of state certified CHWs working in Texas has grown steadily in the past decade, there have been few studies that have examined the impact of state CHW certification on the adoption of CHWs by employers. A survey of employers found that funding and return on investment were the most important criteria in their decision whether to increase the use of CHWs [30].

Efforts to increase the adoption of CHWs into the primary health care system will require additional resources as well as strong leadership and organizational support. Developing team processes, including clear goals and objectives, and ensuring communication between team members are both necessary for teams to function effectively [21]. How current health care teams adopt and redesign the delivery of health care services that include CHWs will impact patient care outcomes and quality.

Limitations

This research has a number of limitations. Large differences in the highest level of education reported by RNs in the survey (i.e., Master's Degree or higher), and Hispanic ethnicity were seen between RNs who participated in the survey and national survey data [3], and therefore the results are of limited generalizability. This study did not examine the impact of state certification of CHWs on the patient care or health outcomes, and assessed only one factor, team climate, in the complex system of interdisciplinary team based health care delivery. Previous research on team climate has shown it is affected by a variety of internal and external factors not assessed in this study including: leadership, electronic health record capability, organizational culture, organizational tenure, support from new roles, and professional role conflicts [31-32]. In addition, the survey questions did not address potential mediating and moderating variables including: payment options available for CHW services [26], team training, and organizational resources available for innovation and adoption of new models of health care delivery.

Conclusion

As health care organizations adapt and innovate to changes in health care, including an increased use of CHWs in the delivery of primary health care, the factors that promote or inhibit the diffusion and adoption of innovative health care delivery models need to be considered. Registered nurses are the largest part of the professional health care workforce, and their ability to collaborate and work with CHWs is critical to the integration of CHWs into existing health care teams. Team climate can affect team performance and quality of care as well as the ability of teams to innovate and change. There remains a lack of consensus on the affect state certification programs have in the diffusion and dissemination of the CHWs into health care teams, and more research is needed to examine if state certification programs improve the adoption and integration of CHWs into health care organizations and teams.

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Table 1
Demographic Information for RNs in CHW Certification and Noncertification States

Gender	Non-CHW Certification (n = 115)		CHW Certification (n = 81)		Total (n = 196)	
Female	111	96.5%	76	93.8%	187	95.4%
Male	4	3.5%	5	6.2%	9	4.6%
$\chi^2 (1) = 0.79, p = .38$ Fisher's exact = .49						
What is your race?	Non-CHW Certification (n = 114)		CHW Certification (n = 80)		Total (n = 194)	
White	82	71.9%	70	87.5%	152	78.4%
Black or African American	7	6.1%	5	6.3%	12	6.2%
Asian	15	13.2%	1	1.3%	16	8.2%
Native Hawaiian or other Pacific Island	1	0.9%	0	0.0%	1	0.5%
Multiracial	6	5.3%	1	1.3%	7	3.6%
Other race	3	2.6%	3	3.8%	6	3.1%
$\chi^2 (2) = 12.53, p = .28$ Fisher's exact = .01						
Which best describes your ethnicity?	Non-CHW Certification (n = 111)		CHW Certification (n = 81)		Total (n = 192)	
Not Hispanic, Latino, or Spanish	85	76.6%	67	82.7%	152	79.2%
Hispanic, Latino, or Spanish	7	6.3%	7	8.6%	14	7.3%
Mexican, Mexican American	6	5.4%	4	4.9%	10	5.2%
Another Hispanic or Latino	1	0.9%	0	0.0%	1	0.5%
Puerto Rican	1	0.9%	0	0.0%	1	0.5%
Other Ethnicity	11	9.9%	3	3.7%	14	7.3%
$\chi^2 (2) = 4.53, p = .48$ Fisher's exact = .48						
What is the highest level of education you have completed?	Non-CHW Certification (n = 113)		CHW Certification (n = 81)		Total (n = 194)	
Associate Degree	5	4.4%	15	18.5%	20	10.3%
Diploma in Nursing	1	0.9%	9	11.1%	10	5.2%
Bachelor's Degree	68	60.2%	34	42.0%	102	52.6%
Master's Degree	32	28.3%	14	17.3%	46	23.7%
Doctorate or professional degree	3	2.7%	5	6.2%	8	4.1%
Other degree	4	3.5%	4	4.9%	8	4.1%
$\chi^2 (5) = 25.70, p < .001^{***}$ Fisher's exact = < .001 ^{***}						
What is your highest degree in nursing?	Non-CHW Certification (n = 115)		CHW Certification (n = 81)		Total (n = 196)	
Associate Degree	7	6.1%	17	21.0%	24	12.2%
Diploma in Nursing	2	1.7%	11	13.6%	13	6.6%
Bachelor's Degree	72	62.6%	33	40.7%	105	53.6%

Master's Degree	29	25.2%	12	14.8%	41	20.9%
Doctorate in Nursing	1	0.9%	4	4.9%	5	2.6%
Other Nursing degree	4	3.5%	4	4.9%	8	4.1%

$\chi^2 (5, N = 196) = 28.70, p < .001^{***}$

Fisher's exact = $p < .001^{***}$

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 2
TCI – Short Form Survey Result and Survey Questions 24^b and 25^c

TCI survey overall	Obs	Mean	SD	95% CI
p = .72				
State CHW certification = No	115	18.67	3.20	18.08 - 19.26
State CHW certification = Yes	80	18.85	3.81	18.00 - 19.70
TCI Partner subscale ^a				
p = .41				
State CHW certification = No	115	4.08	0.73	3.95 - 4.21
State CHW certification = Yes	81	3.98	0.96	3.76 - 4.19
TCI Support subscale ^a				
p = .50				
State CHW certification = No	115	3.78	0.74	3.64 - 3.91
State CHW certification = Yes	81	3.86	0.88	3.66 - 4.05
TCI Object subscale				
p = .45				
State CHW certification = No	115	5.57	1.07	5.37 - 5.77
State CHW certification = Yes	80	5.69	1.11	5.44 - 5.94
TCI Style subscale				
p = .47				
State CHW certification = No	115	5.24	1.25	5.01 - 5.47
State CHW certification = Yes	81	5.38	1.29	5.09 - 5.66
Survey Question 24: Confidence in working with CHWs				
p = .10				
State CHW certification = No	115	3.63	1.00	3.44 - 3.81
State CHW certification = Yes	81	3.86	0.97	3.65 - 4.08
Survey Question 25: Ability of team to provide quality care				
p = .02				
State CHW certification = No	115	3.56	1.01	3.37 - 3.74
State CHW certification = Yes	81	3.90	0.93	3.70 - 4.11

^a Unequal variance test.

^b Survey question 24: State certification of CHWs increases or would increase my confidence in working with them.

^c Survey question 25: State certification of CHWs increases or would increase the ability of my team to provide quality care.