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Outcome Effectiveness of Community Health Workers: An Integrative Literature Review

Susan M. Swider, Ph.D., R.N.

Abstract Community health workers (CHWs) are promoted as a mechanism to increase community involvement in health promotion efforts, despite little consensus about the role and its effectiveness. This article reviews the databased literature on CHW effectiveness, which indicates preliminary support for CHWs in increasing access to care, particularly in underserved populations. There are a smaller number of studies documenting outcomes in the areas of increased health knowledge, improved health status outcomes, and behavioral changes, with inconclusive results. Although CHWs show some promise as an intervention, the role can be doomed by overly high expectations, lack of a clear focus, and lack of documentation. Further research is required with an emphasis on stronger study design, documentation of CHW activities, and carefully defined target populations.

Key words: community health workers, outcomes, effectiveness, integrative literature review.

The community health worker (CHW) role in the United States dates back to the 1960s and efforts to reach people in underserved communities with health promotion and disease screening programs. This type of worker has been widely used throughout the world for everything from providing immunizations and teaching well construction to acting as clinic workers in areas where health professionals are unavailable. In the United States, the role has waxed and waned in popularity. CHWs have flourished in very remote areas, where they often serve as the only source of health care, and more recently, the role has proliferated in inner city areas and communities of ethnic minorities, where the workers function to reach people who are missed by the traditional health care system (Rosenthal, 1998).

There was a resurgence of interest in the CHW role in the United States in the late 1980s. Much was subsequently written about the goals and philosophy of the role (CDC, 1994; Giblin, 1989; Koch, 1996; Rosenthal, 1998). Despite this interest, there is little consensus about the role itself and where it is most effective. A recent national survey of CHWs and their usage called for a national research and policy agenda, including refinement of CHW roles; development of CHW evaluation guidelines and tools; establishment of a CHW evaluation database; establishment of CHW certification, academic linkages, and core curricula; and development of means to sustain the CHW role through public policy and financing changes (Rosenthal).

Documentation of the effectiveness of such workers in making an impact on important health concerns is a necessity before investing public resources in activities such as curriculum development and certification. The purpose of this article is to explore the extent to which CHWs have demonstrated effectiveness in U.S. health promotion and disease prevention projects. A review of the current research literature provides a starting point for

Susan M. Swider is an Associate Professor, Department of Community and Mental Health Nursing, College of Nursing, Rush University, Chicago, Illinois.

Address correspondence to Susan M. Swider, 600 South Paulina, #1028B, Chicago, IL 60612. E-mail: sswider@rushu.rush.edu

determining common outcome measures, salient research questions, and gaps in the existing studies.

BACKGROUND AND SIGNIFICANCE

CHWs have been a staple in health care delivery in many countries in the world for much of this century. The World Health Organization (WHO, 1987) defined CHWs as workers who live in the community they serve, are selected by that community, are accountable to the community they work within, receive a short, defined training, and are not necessarily attached to any formal institution. Over the past 30 years, the concept has gained more prominence in the United States, and particularly in the past 10 years, CHW programs have proliferated. In the first national survey of such programs, Rosenthal (1998) documented an estimated 10,000 CHWs, of whom 25% are working as volunteers. There are few data to indicate how closely U.S. CHWs conform to the WHO definition; however, most published program descriptions reference CHWs as being from or like the target community in relevant ways (disease status, ethnicity, gender, or risk behavior).

Rosenthal's (1998) national survey of CHWs and those working with them identified seven core CHW roles: cultural mediation, informal counseling and social support, providing culturally appropriate health education, advocating for individual and community needs, assuring that people get the services they need, building individual and community capacity, and providing direct services. The Center for Public Awareness (1999) describes several global functions of CHWs, including decreasing health care costs, increasing health care access, strengthening the local economy, and strengthening the family and community.

Another way of describing the CHW role is by looking at the populations they serve, for example, teens, mothers and babies, ethnic minorities, older persons, and persons with AIDS. As mentioned earlier, CHWs are usually used to reach the underserved. Alternatively, one can describe CHWs by the health conditions with which they are concerned, for example, asthma, cancer, diabetes, injuries/violence, substance abuse, tobacco control, nutrition, and sexual behaviors (CDC, 1994). This latter conceptualization provides the possibility of more concrete outcome measures.

CHW roles run the gamut from very specific functions to very global community health and development efforts. Given this breadth, it is challenging to institutionalize and sustain the role through training programs, reimbursement schemes, career ladders, and evaluation, as called for by Rosenthal (1998). One of the first necessary steps in the research and policy agenda for CHWs is to document their effectiveness. This type of documentation would

provide support for efforts to institutionalize the role. A logical starting place for examining CHW effectiveness is a thorough understanding of the existing literature.

METHODS

An integrative review of this literature was conducted to understand the state of the science, critique research questions, look for methodological and conceptual gaps, and determine the design of future studies, taking into full account the findings and weaknesses of the published literature in the field (Broome, 1993; Cooper, 1989).

The first step was to formulate the research question that the review addresses. The question guiding the review is as follows: Are CHWs effective in community health promotion and disease prevention efforts?

The next step in the review was to develop the definitions and criteria for the literature search. The following criteria were used in this search: (1) Definition of CHW: For the studies reviewed here, the terms CHW, community health advocate, promotora de salud, community health promoter, lay health worker, and community outreach worker were used interchangeably. Often in these articles the definitions are not given explicitly, and thus, the definition used by each researcher was allowed to stand, and each study was coded by the functions of the worker. (2) Location: Only studies conducted in the United States were included in this review. Although much work on CHWs has been done in other countries, the differences in health care systems, access to care, health care needs, and cultural practices and behaviors make the role difficult to compare internationally in terms of effectiveness. Thus, this review was restricted to CHW effectiveness research in the United States. (3) Types of studies: For this review, only studies that were listed in a database and that focused on outcomes or effectiveness of CHW work were included. All studies purporting to measure outcomes were included, because the literature on types of outcomes defined them broadly. (4) Health promotion and disease prevention: CHWs are described as functioning across a wide range of populations, diseases, and conditions. Thus, any study with a health focus for the activities of the CHWs was included in this review. (5) Time period: The period was from 1980 to the present.

Computerized databases formed the primary basis in the search for studies (Table 1). The studies identified from these databases were entered into a search chart by relevant characteristics. An initial reading of the studies, in conjunction with the research question, culminated in the development of a codebook to document all relevant variables. This codebook was used to review three studies; it was then revised based on these three reviews

TABLE 1. *Computerized Databases Used in Literature Search*

Database	Dates
Medline	1981–1999
HealthStar	1975–1999
CINAHL	1982–1999
EBM Review Best Evidence	1991–1999 (Sept/Oct)
PsycInfo	1984–1999
NCBI PubMed	1980–1999

and used to review the remaining studies (Broome, 1993).

ANALYSIS

The author coded all data as described previously here, with results displayed in tabular form and examined for frequencies, common themes, weaknesses, gaps, and the need for future studies.

RESULTS

The method produced 275 abstract citations for potential inclusion in this review. Nineteen studies reported in 20 articles (7.3%) met the inclusion criteria and were included in the review (Table 2). All but one study was published in 1989 or later. The articles not meeting the inclusion criteria were primarily not in a database, with a small number being international in focus. Of the included studies, 26.3% ($n=5$) were cross-sectional or survey design, and 10.5% ($n=2$) were retrospective studies. Forty-two percent ($n=8$) were randomized clinical trials, and 26.3% ($n=5$) were quasi-experimental studies. This number totals greater than 19 because one study was described by the authors as a randomized clinical trial, but reported only preliminary descriptive results, and thus is classified as both. Only three of these studies (15.8%) used standardized measures for the outcomes.

One weakness in the studies reviewed was that over one third of them did not measure outcome in relation to a control group; thus, the results were more descriptive than indicative of intervention effectiveness. Because many studies involved community programs and interventions, defining and recruiting an appropriate control group was very challenging. Future work using an experimental design would provide stronger evidence of CHWs' outcome effectiveness.

Population Served

Sixteen percent of projects ($n=3$) used CHWs to reach those at risk of HIV, primarily intravenous drug users. One study (5.3%) used CHWs to work with the homeless mentally ill population. Sixteen percent of the studies were focused on hard-to-reach ethnic minority groups

($n=3$). The majority of the CHW studies (63.2%) focused on reaching low-income, underserved women and children ($n=12$) (Table 2). Consistent with the conceptual literature on CHWs, all of the reviewed studies documented the use of CHWs to reach or serve those hardest to reach and often underserved.

Roles

In 63.1% ($n=12$) of reviewed studies, the CHW primary role expectations were not reported, nor were the details of the interventions they provided. It was often difficult to evaluate what CHW role expectations or interventions were measured for effectiveness. Studies were thus classified by the primary role of the CHW, as determined by the study description and the outcomes measured. That is, if the CHW was described as having several roles, but the outcome measures only included the effectiveness of one of these roles, the study was classified by that role.

Using this classification, 40% of the studies reported on CHWs providing health education ($n=8$); 40% ($n=8$) of the studies examined the CHW role in case management, defined as assisting clients to make appropriate use of services, and the remaining 25% ($n=4$) of the studies examined the CHW role in outreach and case finding. These percentages total more than 100% because in one study, the CHWs functioned and were evaluated in two role areas.

Twenty-five percent of the studies with CHWs performing an outreach function demonstrated positive outcomes; 87.5% of the studies with CHWs performing case management documented some positive outcomes, and all of the studies with CHWs performing health education functions documented some positive outcomes (Table 2).

Outcomes

The most critical variable in this review is the outcome measures (i.e., whether CHWs were effective in their work). The studies varied in terms of types of outcomes measured. The outcomes measured corresponded somewhat with the outcomes discussed earlier in the review of the conceptual literature. The two sets of literature agreed that CHW functions/outcomes would include culturally appropriate health education, increasing access to care, and decreasing costs of care. Seventy-nine percent of the studies reviewed ($n=15$) focused on measuring a change in the appropriate use of services (access) by the target population. Thirty-two percent ($n=6$) of the studies measured client behavioral change. Changes in health status outcomes were measured by 21% ($n=4$) of the studies; 11% ($n=2$) measured change in knowledge of the target population, and 11% ($n=2$) measured cost-effectiveness. Several studies measured more than one type of outcome (Table 2).

TABLE 2. Comparison of CHW Effectiveness Studies

Study	Outcome Measured				Study Design				Standard Tools			CHW Role			Target Population				
	Access	Behavior change	Knowledge	Hlth. stat.	Cost	RCT	Q	Exp	Retr	Survey	Yes	No	Outreach	Case management	Health education	Ethnic. minority	Woman/child	HIV	MI
St James et al., 1999		+time to metabolic control		+Bayley development +head circumference			X			X					X				X
Moore et al., 1981	+immunization compliance								X				X						X
Black et al., 1995		-parent -child +home environment		-growth -cognitive/motor development -language Development		X				X					X				X
Bone et al., 1989	+f/u appt						X						X			X			
Bradley & Martin, 1994	+increased enrollment prenatal care/sx							X						X					X
Sung et al., 1992, 1997	-Pap exam (BSE) +mammogram +Paps, clinical breast exam (CBE) those not screen at base. +clinical breast exam (CBE) mammogram in those with f/u +participation					X							X			X			X
Lacey et al., 1991		-quit smok.							X				X						X
Bird et al., 1998	+Paps, clinical breast exam mammo						X								X				X
Krieger et al., 1999	+f/u HPN hypertension across age, sex, race					X						X					X		
Butz et al., 1994	-primary care services					X						X							X
Margolis et al., 1998	+Cancer screening for those due at baseline					X						X							X

TABLE 2. Comparison of CHW Effectiveness Studies (continued)

Study	Outcome Measured			Study Design			Standard Tools		CHW Role			Target Population							
	Access	Behavior change	Knowledge	Hlth. stat.	Cost	RCT	Q	Exp	Retr	Survey	Yes	No	Outreach	Case management	Health education	Ethnic. minority	Woman/child	HIV	MI
CDC, 1999	+ across age, insurance status -Cancer screening on those up to date at baseline	+use of bleach +condom use main partner +condom use other partners +condom carrying						X			X				X			X	
McCormick et al., 1989	-enroll in prenatal Care							X											X
Brooks-Gunn et al., 1989	-enroll in prenatal care				-cost difference due to small #s				X										X
Wolff et al., 1997	+program Contact -stable housing +short hospitalization	+fewer psych. symptoms			-cost difference but different type costs	X					X			X					X
Corkery et al., 1997	+program Completion	+self care, all program completion	+knowledge, all program completion	+glyco-hemoglobin levels for program completers		X					X			X					X
Cunningham-Williams et al., 1999	-no comparison in # contact								X										X
Birkel et al., 1993		+reduction needle risk +test for HIV +sex risk reduction	+knowledge of risks +personal risk percep.					X							X				X
Navarro et al., 1998	+breast self exam +mammogram +clinical breast exam for those older than 40 -clinical breast exam for others -Paps					X									X				X

Overall, CHWs were found to result in some positive outcomes in 79% ($n=15$) of the reviewed studies (Table 2). Differences in role types, populations targeted, and outcomes measured make it difficult to draw sweeping conclusions about the overall effectiveness of CHWs. Further analysis was done looking at the studies grouped by type of outcomes.

Access

Fifteen studies (79%) measured changes in access to health care services in the target population. These studies generally involved using CHWs to encourage proper use of screening or follow-up services. Of these studies, 11 (73%) documented at least partial effectiveness of the CHWs. Seven of these studies were randomized clinical trials. Two were quasi-experimental designs. One was a retrospective study, and five were surveys (Table 2).

The majority of these studies measured the effect of interventions targeted at underserved women and children ($n=10$, 67%). Four studies addressed the issue of encouraging women to obtain cancer-screening tests on a recommended schedule. In this area, the CHW services were demonstrated to be effective in terms of increasing women's use of such screening. In a randomized clinical trial of low-income African American women, the CHWs were found to be effective at increasing rates of mammograms. For those in need of screening, the CHW services also had a statistically significant impact on women receiving clinical breast exams. However, the participation and follow-up rates for this study were poor, which the researchers attributed to the relative unimportance of prevention in this population and to the population's suspicion of research (Sung et al., 1992, 1997).

In a similar randomized clinical trial with a Latino population, the CHWs were found to be effective in increasing the numbers of women having a mammogram and reporting performance of breast self-examination; there was a trend toward the CHW groups having an increase in Pap tests, as well, but this was not statistically significant. This study was also limited by low rates of completion of pretests and posttests and by use of self-report data (Navarro, Senn, McNicholas, Kaplan, Roppe, & Campo, 1998).

In a quasi-experimental study of CHW education with a population of Vietnamese immigrant women, the intervention was found to be effective in increasing the women's recognition, receipt and maintenance of Pap tests, clinical breast exams, and mammograms. The intervention was CHW-led educational sessions, health fairs, and distribution of culturally appropriate health education literature in local doctor's office. Attendance at health fairs alone showed no relationship with later recognition or receipt of screening tests, and attendance

at only one education session showed a significant increase in recognition of tests, but not of receipt. The researchers acknowledged that their study was limited by self-report data and that the CHW services were labor intensive. They suggest that their results, along with results from their previous work, indicate that mass media are good for raising awareness, but that multiple, face-to-face CHW contacts are required for behavior change. In addition, the CHW intervention was multifaceted, and there was limited ability to distinguish the effectiveness of different components (Bird et al., 1998).

Another study examining the effectiveness of CHWs on helping low-income women access care for basic screening services such as mammography and Pap tests found that the CHW group had higher rates of screening follow-up for those who were overdue for screening, across age and insurance status. The increases in mammography were significant for Native American women, but not for African American or White women. White women did increase their Pap test completion in the CHW group. The increases overall were most significant for African American women with no private health insurance. Some of the outcome data were from chart records, and some were self-report; there was a baseline difference in need for screening between the treatment and control groups (Margolis, Lurie, McGovern, Tyrell, & Slater, 1998).

Three studies of CHW effectiveness in helping pregnant women access prenatal care in a timely fashion demonstrated mixed results. One study, a cross-sectional, secondary analysis of entry into prenatal care for women with CHW contact, showed significant increases in enrollment, particularly clustering near the time of the CHW contact. However, this was not an experimental study and only indicated a strong correlation (Bradley & Martin, 1994).

Another study compared the numbers of pregnant women reached via CHW outreach with literature reports of results from direct mail marketing campaigns and found the CHW outreach was similarly effective in terms of numbers of the target group reached per numbers of contacts made. However, there was no significant increase in timely initiation of prenatal care for those women contacted by CHWs (Brooks-Gunn, McCormick, Gunn, Shorter, & Wallace, 1989). The third study looking at effectiveness of outreach to pregnant women found that CHW contact did result in women receiving prenatal care earlier, but the difference was not clinically or statistically significant (McCormick, Brooks-Gunn, Shorter, Holmes, Wallace, & Heagarty, 1989).

Of the remaining three studies targeting women and children, one study investigated CHW effectiveness in getting women into a program to stop smoking. This survey found that although the CHWs were more

effective than a general mass media campaign overall, the impact of both was negligible (Lacey, Tukes, Manfredi, & Warnecke, 1991).

Two studies focused on access to care for children. One study compared immunization rates of a population contacted by CHWs to a statistical model of no contact and estimated that 44% of the clients following up on their needed immunizations did so in response to the CHW contact. The study suggested that CHWs were most effective when contact was made as close as possible to the appointment date (Moore, Morris, Burton, & Kilcrease, 1981). Butz et al. (1994) reported that CHWs helped get access to care information to children with asthma; however, they provided no data to support this finding. This study was designed as a randomized clinical trial to investigate models of care for children with asthma in a school setting. The published results are preliminary and provide only descriptive data about numbers of families served by the CHWs. With no comparison group, conclusions about CHW effectiveness are unwarranted.

Three of the studies on CHW effectiveness in increasing access to care targeted minority, low-income, chronic illness populations, that is, hypertensives and newly diagnosed diabetics. In two studies, hypertensive subjects were found to significantly increase their follow-up appointment rate after being contacted by a CHW (Bone et al., 1989; Krieger, Collier, Song, & Martin, 1999). These were both experimental studies, although one of them did not have a randomly selected sample. These studies were limited by use of self-report data and neglecting to look at long-term outcomes related to the CHW efforts.

The other study was a randomized clinical trial focused on a group of newly diagnosed diabetics who attended a nurse-led diabetic education class. All who completed the class showed significant improvement in knowledge, self-care, and glycohemoglobin levels, regardless of CHW services. Those receiving CHW services demonstrated a higher rate of completion of the class. Thus, the CHWs were effective in keeping clients in a program, and the program showed effectiveness at increasing knowledge, changing health behaviors, and improving health status indicators. The use of a convenience sample and measurement of outcomes via self-report limited interpretation (Corkery, Palmer, Foley, Schecter, Frisher, & Roman, 1997).

The last two studies examined access to care outcomes (Cunningham-Williams et al., 1999; Wolff et al., 1997). One project studied homeless, mentally ill clients and compared three treatments: brokered case management (contracting out for needed services), community treatment, and community treatment with a CHW. Both

community treatments showed more positive outcomes than the brokered case management in the areas of client satisfaction, program contact, number of psychiatric symptoms, and the use of inpatient psychiatric care. However, there were no significant differences on housing stability or costs of care (Wolff et al., 1997). This study had a large attrition rate across all three treatment groups and mixed results in terms of CHW effectiveness.

The last study targeted the effectiveness of CHWs conducting outreach to the intravenous drug-using population in a multisite comparison (Cunningham-Williams et al., 1999). This study was descriptive in design, with no comparison data; thus, it is difficult to draw any conclusions about the effectiveness of the CHWs.

These studies indicated preliminary support for CHW effectiveness in increasing access to care. This was particularly true for those in need of cancer screening and follow-up visits for chronic illness care. This is a useful outcome, particularly in those populations where lack of follow-up is very costly to the target population or to those around them, such as for those at risk of HIV or for those with a serious chronic illness. However, more randomized clinical trials are needed with specific definitions of the intervention and standardized outcome measures, to provide stronger support for CHW effectiveness in this area.

Knowledge

Two studies assessed the effectiveness of CHWs in increasing client knowledge related to health maintenance and disease prevention. One of these was the aforementioned study of a group of newly diagnosed diabetics who were all attending a diabetic education class with a nurse (Corkery et al., 1997).

The other study documented knowledge improvement and decreased needle and sexual risk behaviors among those receiving the CHW intervention in a population at risk for HIV (Birkel, Golaszewski, Koman, Singh, Catan, & Souply, 1993). The exception to this was female partners of intravenous drug users who did not change their sexual risk behavior. All of those receiving the intervention increased their perception of personal risk, except in one site/city, where the HIV-positive rates were exceptionally high, and the authors suggested that these high rates may make personal risk perception irrelevant. All of those in the intervention group also increased their willingness to be tested for HIV. This study was a quasi-experimental design and was limited by its lack of randomization. The authors acknowledge that the intervention was affected by the CHW service delivery to all people, whether or not they were enrolled in the study, and by its reliance on self-report data for behavior change.

There is limited evidence of the CHW effectiveness with knowledge improvement outcomes. However, several other studies documented behavior change and health outcome changes from CHW health education interventions. Thus, further research is warranted to document both CHW effectiveness in knowledge improvement and behavior change related to this change in knowledge.

Health Status

Of the four studies in this area, three documented positive results. This is an important outcome measure in that a positive change in a health status indicator is the ultimate goal of all health interventions. Two studies had a target population of women and children with special conditions. One study was targeted at Latinos with diabetes, and the remaining study targeted the homeless mentally ill. Three of these studies were randomized clinical trials, and one was a quasi-experimental design.

One study, discussed earlier, assessed the effectiveness of CHW interventions in a population of newly diagnosed Latino diabetics (Corkery et al., 1997). The benefit of CHW care in this program was keeping people in the intervention.

Another previously discussed study looked at homeless, mentally ill clients and documented that the two community treatments, one of which was provided by a CHW, resulted in a significant decrease in number of psychiatric symptoms, as compared with the traditional case management (Wolff et al., 1997).

Two studies examined CHW effectiveness on child health outcomes in low-income families. In a quasi-experimental study of pregnant women with PKU, CHW families demonstrated a statistically significant increase in standardized measures of infant head circumference at birth and infant developmental scores, as well as a decrease in time required for the mothers to achieve metabolic control (St James, Shapiro, & Waisbien, 1999).

In a randomized clinical trial of low-income African American families with an infant with nonorganic failure to thrive (NOFTT), workers were selected for their knowledge of community and commitment to families. All children were receiving clinic services for NOFTT. The CHWs provided additional home visiting and health education to the treatment group. All infants had significant growth increases and decreases in cognitive development and language development, but the CHW group showed fewer declines in language development. The researchers suggest that the declines in cognitive development for the entire sample are consistent with the literature on development for low-income children. There was no difference in parent-child interactions between the two groups, but the CHW families had a more child centered environment, as measured by the HOME tool,

with two raters and high interrater reliability. The researchers suggest that the intervention might be more effective if more time were given to develop a relationship between the CHW and the primary caregiver (Black, Dubowitz, Hutcheson, Berenson-Howard, & Starr, 1995).

The results from these studies are mixed. The CHW intervention did not appear to be related to the health status changes in two of the studies. Of note is the fact that in the two studies focused on low-income families, the pregnant women with PKU and the families with a child with NOFTT, the results were very different. Assuming that these results are valid and reliable, it is important to examine why CHWs could be effective with one population and/or health concern and ineffective with the other. Further research to examine the process of CHW interactions and what populations are most amenable to CHW activities is warranted.

Behavior Change

Six studies measured outcomes in terms of behavior change on the part of the target population, and five of these studies documented positive results. Two of these were randomized clinical trials. Three were quasi-experimental designs, and one was a cross-sectional study. Three studies targeted women and children; two targeted those at risk for HIV, and one targeted an ethnic minority population.

Four of these studies were discussed earlier in terms of other outcome measures (Birkel et al., 1993; Black et al., 1995; Corkery et al., 1997; St. James et al., 1999).

One study looked at changes in HIV risk behavior in a large sample. The CDC study, a quasi-experimental design, documented progression along a continuum of change toward increased use of bleach and condoms for those in the CHW group. The study was limited by lack of randomization of subjects and the self-report nature of the stages of change measure (CDC, 1999).

The last study with this type of outcome was the study of CHW effectiveness with inner city women in a smoking cessation program. The CHWs had little to no documented effect on smoking cessation, which the authors attribute to the lack of motivation on the part of those recruited into the program (Lacey et al., 1991). This study documented effectiveness of the CHWs in recruiting subjects to the intervention, but not with the desired behavior change.

These studies are limited by lack of control of the intervention and of the subjects. Also, most of the behavior change measured here was self-report and lacked standardized measures for this, thus raising questions about the reliability and validity of the results.

Cost

Although the conceptual literature on CHWs discusses the importance of CHWs as cost-effective providers, only two studies measured the costs of care (Brooks-Gunn et al., 1989; Wolff et al., 1997). The study of community care for the mentally ill found that of the three different interventions studied, the costs did not differ among them. However, the researchers documented that the types of costs differed across interventions, with the CHW intervention having less hospitalization costs, but greater housing costs. The researchers contend that the measurement of costs in this type of study should be broadened to include family costs and criminal justice system costs (Wolff et al., 1997).

The study of early entry into prenatal care measured cost savings in terms of low birthweight births avoided and found no difference (Brooks-Gunn et al., 1989). However, they also did not document any difference in time of entry to prenatal care and had small numbers in their sample. The researchers here also contended that the cost-avoidance category should be broadened to include other sequelae of lack of prenatal care.

Several studies mentioned the labor intensiveness of CHWs; thus, further work is needed to look overall at cost-effectiveness for CHW services, with comprehensive measures of both costs of care and costs avoided through prevention.

CONCLUSIONS AND AREAS FOR FURTHER STUDY

In summary, the research reviewed here documents that CHWs are used in hard-to-reach populations, primarily low-income, ethnic minority groups. If CHWs are going to be used with these populations, further work is needed on what characteristics make the CHW effective with these groups. Does the CHW need to live in their community, be of similar class or ethnicity, or share behavioral risk factors, or are the most effective CHWs any person who works in roles requiring little skill, but who takes time to reach out and listen to underserved groups on a regular basis?

To date, CHWs demonstrate their effectiveness best in the area of increasing access to care. Access to care is a logical outcome to attempt to influence, particularly for CHWs, whose role was developed to reach the underserved. However, further work is needed to cost out these services and determine whether the CHW effect on access to care is cost-effective. In addition, better designed studies are needed to fill the design gaps reported here. These gaps include high attrition rates, a lack of standardized measures, reliance on self-report data, and

a poorly defined intervention. The latter is especially problematic. Even though the majority of these studies documented some positive outcomes, it would be difficult to replicate the studies because of lack of information on the intervention. Little is known about specifically what CHWs do that produces the desired outcome. Further study into the process of CHW work and what elements are necessary for a CHW to be effective would be helpful for future program development.

Behavior change, health status outcomes, and knowledge changes are measured in a smaller number of studies; thus, the results require replication before large-scale CHW programs in these areas are supported.

Finally, it is not clear whether the CHW is the most effective means for delivering these interventions, or even the least costly. Further studies comparing the same intervention delivered by different types of health care workers would help determine whether the CHW adds a unique benefit to the health care delivery system. If a unique benefit is attained, another area of inquiry is the types of supports needed to maximize CHW effectiveness. Do CHWs need to be salaried? What kind of training and supervision are required? What organizational elements are required?

The CHW may offer a way to increase community involvement in health promotion and disease prevention efforts and to reach traditionally underserved populations. However, the role can be doomed by overly high expectations, lack of a clear focus, and lack of documentation. Current knowledge of CHW health promotion effectiveness serves to support a research agenda that includes an emphasis on stronger study design, documentation of CHW activities, and carefully defined target populations.

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