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# Effectiveness of a community health worker program on oral health promotion

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## ABSTRACT

**OBJECTIVE:** To assess changes of knowledge and attitudes and health service access and utilization after the implementation of a community health worker program for oral health promotion.

**METHODS:** A capacity building project including learning, support, and supervision activities was developed between July 2003 and August 2004. A study to assess changes was conducted including 36 community health workers and a representative sample of homemaker literate women and mothers aged 25 to 39 years living in 3- to 6-room dwelling in the city of Rio Grande da Serra, southeastern Brazil. Data on oral health knowledge, self-reported practices, and personal skills regarding self-examination, oral hygiene, number of people living in the same household, number of individual and collective toothbrushes, and dental service access and utilization were collected using structured interviews. Mean scores measured pre- and post-intervention program were compared for each group studied using Student's t-test. A 5% significance level was set for the analysis.

**RESULTS:** Statistically significant differences between pre- and post-intervention program were seen regarding oral health knowledge among both health workers and women ( $p < 0.05$ ). The number of shared toothbrushes per family decreased. Frequency of toothbrushing and flossing increased. Self-assessment of oral hygiene efficacy increased. Changes in practices and personal skills improved self-efficacy. Women had more access to services ( $p < 0.000$ ) and used them more regularly ( $p < 0.000$ ).

**CONCLUSIONS:** There were seen significant changes of perception regarding oral health, self-efficacy, and health service access and utilization. These changes may show that community health workers play a key role in oral health promotion.

**DESCRIPTORS:** Community Networks. Oral Health. Community Dentistry. Community Health Services. Health Knowledge, Attitudes, Practice.

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## INTRODUCTION

Since 1991 the Brazilian Ministry of Health has been promoting the inclusion of community health workers (CHWs) in primary care services to contribute to health promotion and disease prevention actions.<sup>a</sup> In 2004 more than 176,000 CHWs were working in different communities covering around 35.2 million

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<sup>a</sup> Brazilian Ministry of Health. Fundação Nacional de Saúde. Programa Nacional de Agentes Comunitários de Saúde. Brasília; 1993

families. In the ABC region of Greater São Paulo, an area comprising seven cities (Santo André, Mauá, Diadema, São Bernardo, São Caetano, Ribeirão Pires, and Rio Grande da Serra) with more than two million inhabitants, more than 800 CHWs were carrying out health promotion activities.

To address their need for capacity building, it was held in 2001 a 36-hour workshop for CHWs undertaking activities at least one year in the area with the purpose of developing a training manual. The manual was developed through the following steps: identification of common oral health conditions in the community; formulation of questions about relevant issues to the community; question selection and grouping into thematic blocks; general design of the manual; and CHW evaluation of proposed reading materials and illustrations.<sup>a</sup> There were discussed 164 issues that were grouped into 29 thematic blocks. Reading materials proposed to address these issues were organized into a publication entitled "Promoting collective oral health: a manual for community health workers."<sup>6</sup>

CHW activities have focused on strengthening the relationship between the community and health services as it is believed they can contribute to more effective health promotion, disease prevention, and individual care actions. Studies investigating CHW job characteristics, impact of their work and specific roles played both as an institutional agent and a community worker<sup>a</sup> have been published.<sup>14</sup> However, little is known on the different scopes of their work.<sup>1,14</sup> According to Costa et al,<sup>2</sup> Family Health Program (FHP) and Community Health Worker Program (CHWP) that have included oral health actions have showed deficient team capacity building and have not either been able to involve their communities or to effectively evaluate their actions.<sup>2</sup>

CHWs can disseminate information and knowledge through health education activities and contribute to strengthen people's ability to deal with health problems.<sup>18,23</sup> Their work may also: provide more information and broaden people's health knowledge; contribute to improve people's ability to manage health determinants; help oral health team to identify the most vulnerable families in need of more specific oral health actions; and improve access and utilization of primary care services preventing thus delayed dental care and reducing the need for urgent consultations.<sup>b</sup>

The objective of the present study was to assess changes of knowledge and attitudes and health service access and utilization after the implementation of a community health worker program for oral health promotion.

## METHODS

The study was conducted in the city of Rio Grande da Serra in the metropolitan area of Greater São Paulo. Rio Grande da Serra has around 43,000 inhabitants (2007) and has autonomously managed primary care services since 1998. In 2003 the Local Health Department, through the Oral Health Unit, developed as a CHWP component a project focusing on CHW capacity building to manage information about common oral health conditions and self-care practices among others. The Local Health Department team comprised seven dentists, three dental assistants, and 36 CHWs assigned to work in six different areas and five family care units. The family care team included a doctor, a nurse, and a nursing aid. Dental care providers were not part of the Family Health Program and their level of involvement varied depending on professional interests and local management decisions. The capacity building project included learning, support, and supervision activities and was developed between July 2003 and August 2004. During a 12-month period, CHWs were involved in various campaigns (vaccination, dengue fever, dog castration) and trainings on epidemiological and health surveillance, children and women health, among others. The oral health component training had 18-hour duration: 12 hours in the first month, three hours in the second and three hours in the seventh month. Additional resources used were the previously mentioned manual,<sup>6</sup> an education movie produced by the Brazilian Ministry of Health, and oral hygiene products. To assess changes in the oral health component, a pre- and post-intervention social survey was carried out based on interview data.

Data were obtained from Primary Care Information System regarding characteristics of the population registered in three out of the five areas with Family Health Program units. The study sample comprised all CHWs and a random sample of local resident women. They were all interviewed before and after the oral health capacity building program.

The sample size estimation is described elsewhere.<sup>7</sup> There were drawn 120 women. After their family and address were identified, data collection was scheduled. The sample of women was larger than that required for allowing comparison between two means using Student's t-test for correlated samples with an estimated standard deviation of 1.2 – a minimum mean difference of 0.5 (alpha error=5% and beta error=5%) supporting the study analysis.

Women included in the study sample came from families with on average 3.8 members. Most families (86.7%) had five members. Of all (N=2985), 98% lived

<sup>a</sup> Brizolara RV, Oliveira AC, Frazão P. Problemas de saúde bucal coletiva: percepções de agentes comunitários de saúde da região do ABC, Estado de São Paulo, Brasil [summary]. *Cien Saude Coletiva*. 2003;8(S-2):104. [Presented at 7th Brazilian Public Health Congress; 2003; Brasília, Brazil]

brick and block houses, and 72.5% lived in three- to six-room dwellings. As for sanitation conditions, 95.1% lived in areas with public garbage collection; 37% lived in areas with adequate sewage systems; 14.8% with septic tank systems; and almost half of them (48.2%) lived in areas with open-air sewage discharge. In regard to transportation, 47.8% reported using public transportation (buses), 10.4% cars, and 19.1% others. A total of 94.7% had access to radio/TV. In the event of disease, families more often reported seeking care in health units (58.9%) than hospitals (28.5%).

In regard to women living in three- to six-room dwellings (N=2435), 29.5% were younger than 25 years; 35.7% were 25 to 39 years and 34.8% 40 years or more. Of all, 93.3% reported being literate. More than two-thirds were homemakers (50.4%), students (10.4%), unemployed (5.9%), retired (1.9%), and day cleaning workers (1.4%). The remaining was distributed over more than 200 different occupations.

To prevent an extremely heterogeneous microsocial background that could confound the effects associated with CHW activities, women in the same life stage and from families with similar characteristics to those of people attending the CHWP were drawn. Hence the reference group comprised literate homemaker women aged 25 to 39 years living in 3- to 6-room brick and block dwellings in two registered areas. No specific action (e.g., training) was taken to change practices of oral health providers (dentists and dental assistants) in the two health units pre- and post-intervention assessments.

A questionnaire was developed to guide individual interviews conducted by the researcher with CHWs and women.

The study questionnaire consisted of two parts: questions regarding subjects' sociodemographic characteristics; and items about subjects' perception organized in three indicator domains: 1 – life cycles and oral health-disease: 14 items developed to assess oral health knowledge in different life stages and conditions (childhood, adolescence, adult life, old age, and pregnancy); 2 – self-referred practices and skills: seven items addressing individual or collective toothbrush use, frequency of toothbrushing and flossing, dental self-efficacy, and self-examination skills; and 3 – dental service access and utilization: two items.

The procedures to assure face and content validity of the instrument and other strategies followed are described elsewhere.<sup>7</sup>

For the measurement of attitude changes, most questions were formulated to be answered based on Likert scale. For a question about knowledge on dental hygiene, a visual analog scale (0 to 10) was used for more sensitive measures of changes in subjects' perception levels.<sup>22</sup>

The instrument was tested in individuals with similar characteristics to the target population. Some questions were then revised to make the instrument's language adequate to respondents.<sup>20</sup> Each interview lasted at most 20 to 30 minutes to avoid overwhelming respondents.

The questionnaire was administered twice: pre- and post-CHWP in July 2003 and July 2004, respectively. Schooling and income information and individual nominal scale analysis of answers regarding oral health knowledge are presented elsewhere.<sup>7</sup>

It was opted for visual representations for identifying answer categories in the analysis of many items. For those items based on Likert scale a mean score of answer categories was estimated. Answers were scored 1 to 5 points corresponding to the semantic differential and interval timing and then converted into a percent scale representing semantic poles. Relative frequencies of events were weighed based on the meaning of answer categories and a summary measure ranging between -100 and +100 (200 points) was obtained. This scale provides a better assessment of the event itself rather than its categories of expression. It was considered that the best strategy was to narrow the measurement down to the category of most common event expression obtaining mean estimates.<sup>19</sup> A comparison of mean scores pre- and post-intervention program for each group studied was conducted using the paired Student's t-test. All analyses were carried out using Statistical Package for Social Sciences (SPSS) 11.0, 2001.

The study was approved by the Research Ethics Committee of Guilherme Álvaro Hospital, State Health Department of São Paulo.

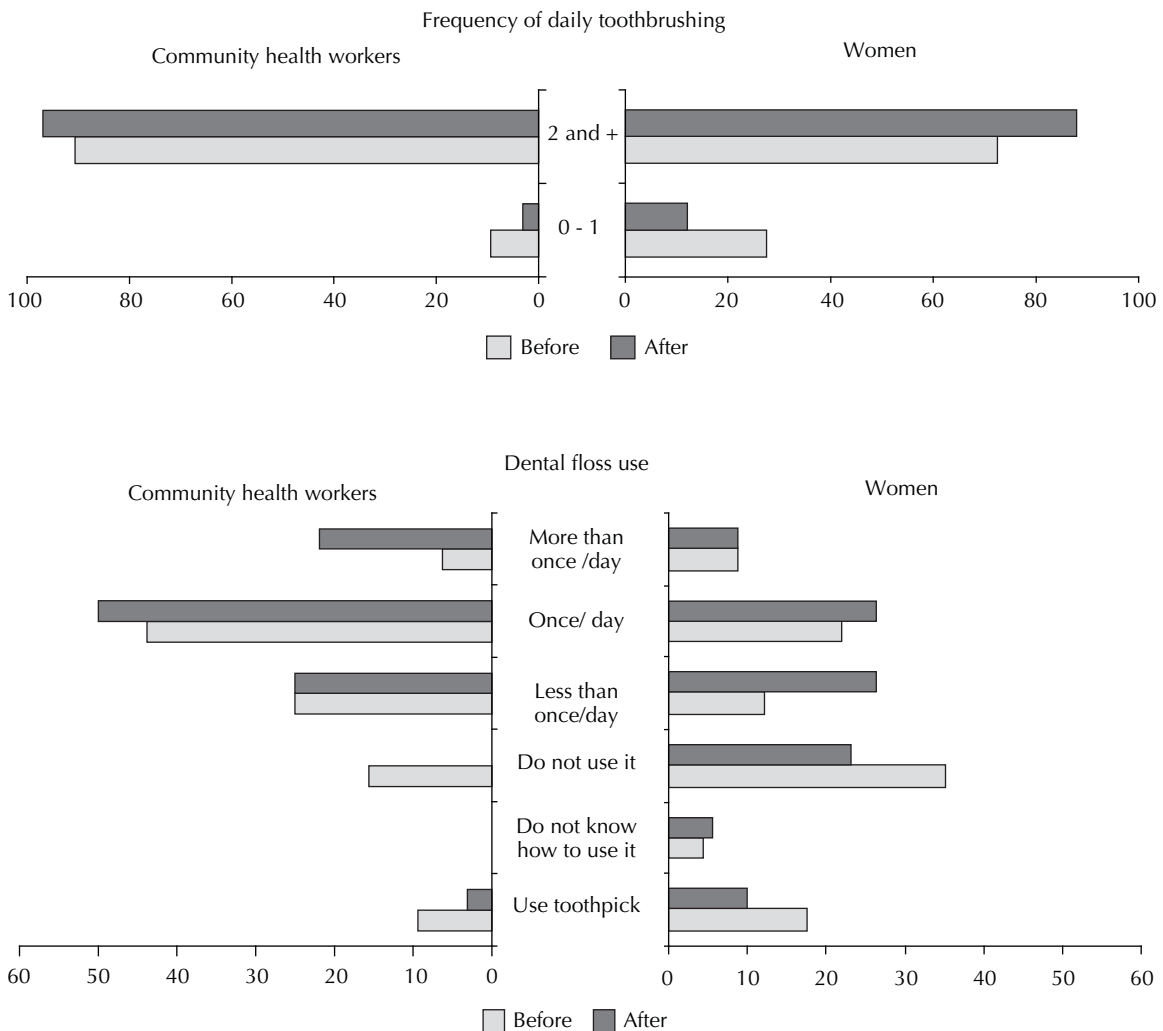
## RESULTS

Four CHWs did not answer the post-intervention questionnaire as they withdrew from the program and 29 women did not answer it due to various reasons (address change, hospitalization, death, among others). As most women (86.8%) had children they are henceforth referred as women and mothers. Most CHWs (93.7%) and women (83.5%) lived in the area for at least five years. The final study sample included 32 CHWs and 91 women.

The first assessment showed that virtually all women used toothbrushes for their oral hygiene, though not on a daily basis, and that the number of toothbrushes were smaller than the number of people in the family. The second assessment showed an even number of people and toothbrushes.

Toothbrushing and flossing increased post-intervention among both CHWs and women (Figure 1).

In regard to questions about oral health knowledge, mean score and standard error of correct answers



**Figure 1.** Self-referred practices of community health workers and women pre- and post-intervention program. City of Rio Grande da Serra, Southeastern Brazil, 2003–2004.

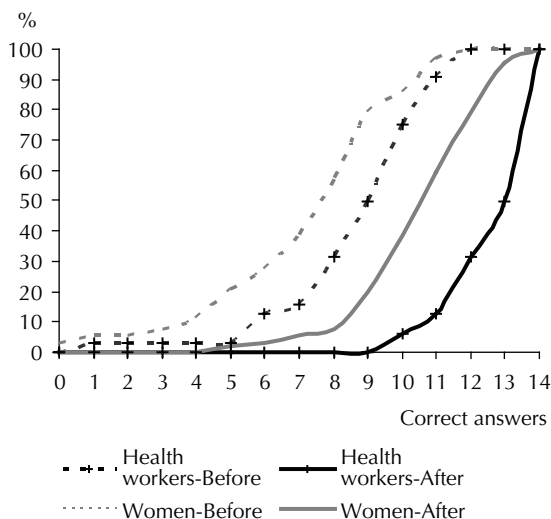
among CHWs increased from  $9.09 \pm 0.76$  to  $13.00 \pm 0.42$  ( $p < 0.000$ ) while among women they increased from  $7.62 \pm 0.56$  to  $10.89 \pm 0.39$  ( $p < 0.000$ ). Figure 2 shows the cumulative frequency of percent scores of correct answers pre- and post-intervention in each group studied. Changes can be visually identified by comparing areas.

As for oral hygiene self-assessment (Figure 3), increased self-sufficiency was seen. Mean score among CHWs increased from  $6.22 \pm 0.51$  to  $8.44 \pm 0.42$  ( $p < 0.000$ ) while among women it increased from  $6.63 \pm 0.48$  to  $8.34 \pm 0.30$  ( $p < 0.000$ ). With respect to self-examination skills, the Table shows a mean score shift post-intervention. Perception improved from 25.0 to 48.5 among CHW and from 20.5 to 37.0 among women. The paired Student's t-test showed that the probability of the average difference of pairs to be zero was very low ( $p = 0.001$ ).

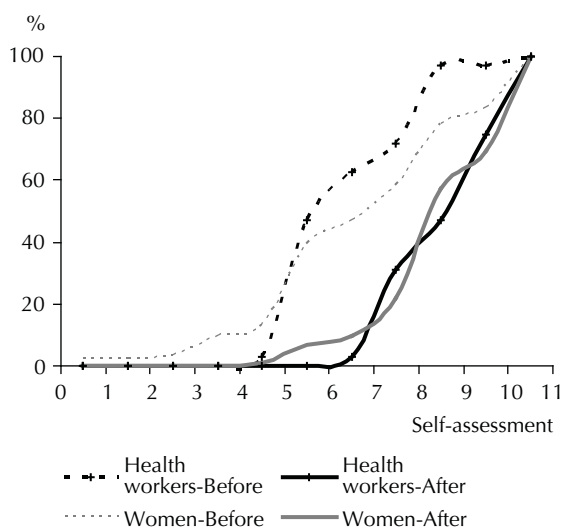
As for dental service access, scale scores ranged in both groups: from  $-6.0$  to  $-14.0$  among CHWs and from  $-44.5$  to  $13.5$  among women, with statistically significant difference only for the women group ( $p < 0.000$ ). As for dental service use, while the mean remained practically the same in CHWs ( $p = 0.712$ ), significant improvement was seen among women, from  $-34.5$  to  $12.0$  in a 200-point scale ( $p < 0.000$ ).

## DISCUSSION

Women are considered primary family caretakers and they can provide strong leadership under adverse conditions. When women are empowered, i.e., develop skills to make decisions and have control over the health-disease process, they can play an effective role for health promotion and are recognizably key agents in the change process.<sup>13</sup> Household and interfamily relationships are usually the heart of a woman and



**Figure 2.** Cumulative frequency of correct answers to oral health questions among community health workers and women pre- and post-intervention program. City of Rio Grande da Serra, Brazil, Southeastern 2003–2004.



**Figure 3.** Cumulative frequency of oral hygiene self-assessment among community health workers and women pre- and post-intervention program. City of Rio Grande da Serra, Southeastern Brazil, 2003–2004.

interventions can produce positive effects on distinct areas of women’s life as well as on families and the community.<sup>10</sup> Women’s social interactions help promoting health practices either during health consultations or by information exchange between mothers and women at the family and community levels.<sup>11</sup>

Age groups were chosen based on family life cycle, which follows a course of development with predominant roles and specific tasks. Difficulties in fulfilling their roles will make certain health conditions more likely to develop. For more effective performance,

health providers have to be able to identify each one of these cycles. They are characterized by movements toward “gaining autonomy” in which new young family growth is followed by contraction of a mature family that is aging. Each cycle has specific tasks family members are supposed to fulfill. The family life cycle is a powerful instrument to help understanding tasks, roles, and behaviors of family members.<sup>16</sup>

As reported in other studies,<sup>3,5,24</sup> the administration of a questionnaire with closed-ended questions addressing the content of the capacity building program allowed to collecting a great deal of observations, and better consistency of data interpretation according to established criteria, and therefore well-managed application pre- and post-intervention.

The present study has some limitations. We did not manage to set a control group for comparison purposes. During the study, CHW activities specifically targeting oral health were carried out together with other training activities and home visits.

Despite that, major changes were seen. In regard to self-reported practices and skills, estimates were consistent in both CHWs and women and mothers in the following items: frequency of toothbrushing, flossing, and oral hygiene self-assessment. When analyzed together, these findings can be suggestive of successful learning and increased self-efficacy in both groups regarding management of proximal determinants and risk factors associated to the health-disease process. Nearly all women interviewed used to brush their teeth, though not on a daily basis, before the intervention program. Assuming that the whole family had the same habit, the gap between the number of toothbrushes and family members may indicate shared toothbrush use. The narrower gap evidenced in the second assessment may be attributed to the inclusion of this resource in working materials made available by CHWP.

With respect to oral hygiene self-assessment, there was a significant increase in both groups suggesting information exchange on this topic. During home visits, CHWs provided information on oral self-care, which may have contributed to develop people’s confidence and skills.

Studies on health workers and promoters in different countries such as Brazil, Mexico, Bangladesh, and Nigeria described several successful experiences.<sup>9</sup> Giuliani<sup>9</sup> reported increased rates of breastfeeding and exclusive breastfeeding and changes in traditional child feeding practices suggesting that community education by CHWs is an extremely valuable action.

As for dental service access and utilization, significant changes were seen among women and mothers. It may be associated to CHW activities which focus on strengthening the relationship between the community and health services.



**Table.** Distribution of the study population according to questions on self-examination ability, and dental service access and utilization pre- and post-intervention program. City of Rio Grande da Serra, Southeastern Brazil, 2003–2004.

Question	Community health workers				Women			
	Before		After		Before		After	
	n	%	n	%	n	%	n	%
<i>You would say that your ability to identify mouth lesions (wounds) is:</i>								
Very poor (1)	–	–	–	–	8	8.8	5	5.5
Poor (2)	–	–	–	–	10	11.0	9	9.9
Satisfactory (3)	15	46.9	6	18.8	17	18.7	13	14.3
Good (4)	15	46.9	22	68.8	39	42.8	48	52.7
Excellent (5)	2	6.2	4	12.4	11	12.1	16	17.6
Do not know/ missing	–	–	–	–	6	6.6	–	–
Mean	3.50		3.97		3.41		3.74	
–100 to +100 scale	25.0		48.5		20.5		37.0	
Paired Student's t-test	p = 0.001				p = 0.001			
<i>You would say that your family access to public dental services is:</i>								
Very difficult (1)	4	12.5	4	12.5	30	33.0	13	14.3
Difficult (2)	2	6.3	10	31.3	32	35.2	10	11.0
Sometimes easy, sometimes difficult (3)	21	65.6	10	31.3	15	16.5	20	22.0
Easy (4)	4	12.5	7	21.9	11	12.1	39	42.9
Very easy (5)	1	3.1	1	3.1	1	1.1	9	9.9
Do not know / missing	–	–	–	–	2	2.2	–	–
Mean	2.88		2.72		2.11		3.27	
–100 to +100 scale	–6.0		–14.0		–44.5		13.5	
Paired Student's t-test	p = 0.378				p = 0.000			
<i>Indicate your perception on your family use of dental services. You would say they use dental services:</i>								
Very often (5)	–	–	–	–	1	1.1	2	2.2
Often (4)	10	31.3	11	34.4	22	24.2	50	54.9
Irregularly (3)	12	37.5	9	28.1	10	11.0	11	12.1
Rarely (2)	8	25.0	9	28.1	28	30.8	22	24.2
Very rarely (1)	2	6.3	3	9.4	29	31.9	6	6.6
Do not know / missing	–	–	–	–	1	1.1	–	–
Mean	2.98		2.88		2.31		3.24	
–100 to +100 scale	–1.0		–6.0		–34.5		12.0	
Paired Student's t-test	p = 0.712				p = 0.000			
Total	32	100.0	32	100.0	91	100.0	91	100.0

A study assessing health indicators in the state of Bahia, Northeastern Brazil, found an impact on vaccine coverage in CHWP areas.<sup>21</sup> Education activities performed by CHWs seem to make people more familiar with aspects associated to health conditions and its determinants and to increase opportunities and service access, producing a major effect on the relationship between community and health services as well as users' behavior change regarding care.<sup>15</sup>

The present study results were obtained in a context of individual care based on a traditional model of dental care centered on dentists as exclusive providers in the

work process. According to Narvai,<sup>17</sup> dentist training programs do not acknowledge the needs of Brazilian people as these providers are trained to provide care relying on imported technology that are incompatible with Brazil's reality. In addition to preventive and care practices, providers should be required to have a wider perception of social needs. Fernandes<sup>4</sup> claims that the involvement of CHWs should not entail the development of programs perpetuating an unequal discriminatory model of care that at one level attends well-off populations with highly specialized providers and sophisticated technology and the other provides care to poor people using limited resources.

More effective results could be achieved by implementing the CHWP oral component together with changes in the model of care. These changes have been strongly supported and many cities have restructured primary care following a family care strategy.<sup>a</sup> Breaking off with the current dental care model implies providing comprehensive care<sup>8</sup> at its different levels as part of routine of tasks of the health team (including doctors, nurses, dental nursing assistants, dental assistants, dental hygienists, community health workers, and others) and different community organizations.

As part of the health team, CHWs are required to undergo regular capacity building and have access to specialized information for broadening their knowledge on the local reality and improving interventions for promoting better quality of life.<sup>12</sup> CHWs want to be involved in projects of oral health capacity building. Capacity building is required and should be complemented with continuous education activities for the improvement people's oral health.<sup>b</sup>

Besides contributing for the improvement of the community's oral health, it is reasonable to suppose that the CHWP has also an impact on other health areas and domains and on people's knowledge by strengthening their self-efficacy and ability to manage determinants of health and disease.

The present study showed the role of CHWs not only in promoting changes but also in increasing women's and mothers' self-efficacy through actions involving communication, trust, respect, and commitment.<sup>c</sup> They develop a stronger relationship with the community, which help people abandon old beliefs and learn new values.

Some experts advocate that having higher "health literacy," i.e., health information and knowledge, may promote attitude and motivation changes in health behaviors, increasing self-efficacy and personal skills for certain tasks, and thus yielding more effective results in health promotion interventions.<sup>18</sup> Changes in knowledge and practices and self-reported skills seen in the present study support this model evidencing the key role of CHWs for oral health promotion.

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<sup>a</sup> Ministério da Saúde. Secretaria de Políticas de Saúde. Departamento de Atenção Básica. Área Técnica de Saúde Bucal. A reorganização da saúde bucal na atenção básica. *Divulg Saude Debate* 2000;(21):68-73.

<sup>b</sup> Fajardo AP. Agentes comunitários de saúde: discurso e prática em saúde bucal coletiva [master's dissertation]. Porto Alegre: Universidade Federal do Rio Grande do Sul; 2001.

<sup>c</sup> Carvalho VLM. A prática do Agente Comunitário de Saúde: um estudo sobre sua dinâmica social no município de Itapacerica da Serra [master's dissertation]. São Paulo: Faculdade de Saúde Pública da USP; 2002.

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