

Original Article

Factors associated with public awareness of the Crown Health Program in the Al-Jouf Region

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ABSTRACT

Objectives: A community-based intervention, the Crown Health Project (CHP), was developed by the Ministry of Health. It was implemented on a small-scale in Al-Jouf Region in Northern Kingdom of Saudi Arabia to assess its feasibility and effectiveness so that it can be scaled up. This study primarily aimed at investigating factors associated with the awareness of CHP in order to improve subsequent campaigns for the program in Al-Jouf and other regions. A secondary aim was to assess possible changes of public awareness during intensification of the awareness campaign between October 2011 and May 2012. **Methods:** A pre- and post-questionnaire cross-sectional approach was undertaken, and the intervention was an awareness campaign. Variables collected included demographic characteristics (e.g., age, gender, education, occupation, urban/rural residence) and CHP awareness (its existence, sources of knowledge about CHP, its goals and objectives, its target diseases, location of activities, participation in such activities). Logistic regression was used to analyze the awareness of the program according to participant characteristics, with a time of the survey as a variable. **Results:** Awareness of the program was found to be 11 times higher among postsurvey respondents than presurvey respondents. Respondents of the second survey were better at correctly identifying “health education” as the main goal of the CHP (odds ratio [OR], 4.1; 95% confidence interval [CI], 3.1–5.5), “noncommunicable diseases” as the main diseases targeted (OR, 4.8; 95% CI, 3.6–6.4) and “attention to health” as the purpose (OR, 6.0; 95% CI, 4.0–8.9). **Conclusion:** The different activities of the CHP were successful in dramatically increasing awareness of the CHP program in Al-Jouf.

Key words: Community-based health education, noncommunicable diseases, Saudi Arabia

INTRODUCTION

Major noncommunicable diseases (NCDs), especially cardiovascular diseases, diabetes, cancers, and chronic respiratory disease, have high global morbidity and mortality burdens,^[1-3] and therefore, have an enormous impact on healthcare systems.^[4] However, interventions to reduce common risk factors (including the use of tobacco, physical inactivity, poor nutrition, and obesity) are cost-effective.^[5-12] Thus, programs to reduce the risk of NCDs can achieve major health gains, especially if

key risk factors can be addressed in a well-integrated manner.^[13]

The prevalence of NCD modifiable risk factors is quite high in many Middle Eastern countries.^[14] Moreover, deaths in the region attributed to such NCDs are projected to increase by 25% over the next 10 years. The Kingdom of Saudi Arabia (KSA) is currently undergoing rapid demographic and public health changes, with increased life expectancy at birth and substantial reductions in morbidity and mortality from communicable diseases. However, these changes also mean that the incidence of NCDs is increasing and has now reached epidemic proportions.^[15]

Recent studies reported dramatic increases in NCD modifiable risk factors, including tobacco consumption, unhealthy diets, and physical inactivity as societal change progresses.^[16-22] The best evidence comes from the World Health Organization (WHO) STEP-wise approach to

Access this article online	
Quick Response Code:	Website: www.jfcmonline.com
	DOI: 10.4103/2230-8229.149586

surveillance of chronic NCDs risk factors (STEPS) survey, conducted by the Saudi Ministry of Health (MoH) in 2005.^[23] This survey reported that 13% of adult Saudis were current smokers, 19% suffered from hypercholesterolemia, 34% were physically inactive and 36% were obese. More recent data of the Saudi Health Information Survey reported that the prevalence of diabetes is 15% and 12% for men and women, respectively, and hypertension is 18% and 13% for men and women, respectively. In fact, KSA was reported to be among the top 10 countries with the highest prevalence of diabetes in the world.^[24]

Noncommunicable diseases are most effectively prevented through a combination of community-based and individually focused interventions for risk reduction.^[25,26] Many studies have proved that community-based programs reduce the incidence of NCDs.^[27-32]

A community-based intervention-the Crown Health Project (CHP)-was developed and implemented by the MoH on a small-scale in Al-Jouf Region in Northern KSA, to assess its feasibility and effectiveness so that it can be scaled up if necessary. The objectives of the CHP were to: Estimate the prevalence of common NCDs and their risk factors; raise awareness of the risk factors of NCDs and preventive measures in the public; improve early detection and management of NCDs; build the capacity of health care workers in preventive services for NCDs; and improve diagnostic, curative, and rehabilitative services for patients. The first findings of the implementation of the program have been published elsewhere.^[33] For the target population to make optimum use of this community-based project, they need to be aware of and appreciate its importance, its usefulness and how it may be applied.

Other studies on campaigns for different diseases (e.g. obesity, cervical cancer, salt reduction, glaucoma) have shown that the mass media can impact effectively on awareness and health knowledge, attitudes, and motivations.^[34] Analyzing the results of a campaign by the characteristics of the population might benefit future programs.^[35] The results of small-scale program evaluations provide lessons for use in organizing wider-scale programs.^[36]

This study aimed at assessing possible changes in public awareness of the heightened CHP awareness campaign conducted among Al-Jouf residents over time, between October, 2011 (immediately after the preintervention questionnaire) and May 2012. It was also to determine the characteristics of survey respondents which were associated with a change in awareness.

METHODS

The CHP was conducted in the cities of Sakakah (urban area), Dumat al-Jandal (rural), and Tabarjal (rural) of Al-Jouf, Northern Region of KSA. This region was selected, because most health services are delivered through MoH facilities that include three tertiary hospitals and 35 primary healthcare centers (PHCC). The CHP was delivered through PHCCs, and it was assumed it had reached most, if not all, people in the region. The project was officially launched in mid-2008, during which 6 out of 34 of the PHCC started periodic screening examinations as discussed below. However, there was very little active publicity about the project other than posters. A decision was made to launch an awareness campaign from November 2011 to March, 2012, so that the health behaviors of the community will eventually improve and make use of the health promotion efforts in the primary health care clinics. Activities included the following:

- Public health education and prevention programs provided by health promotion units, to both clients attending the unit, and the general public (intensively during the period November 2011–March 2012). This included: Establishing six permanent health awareness exhibitions (in PHCCs with health promotion clinics), rotating/displaying five mobile exhibitions (in markets, parks, and places where people gather), holding 15 workshops dealing with raising awareness of the CHP, its objectives and activities (in public and private sectors), health education to decrease NCD risk factors, visiting 60 schools in Al-Jouf, and distributing 500,000 CHP brochures.

Five different brochures of about 100,000 each were distributed (introducing CHP program, nutrition, physical activity, healthy behaviors for children, and obesity). A substantial (but not quantified) proportion of the brochures was handed directly to patients visiting the 6 primary health care clinics that had regular health promotion screening (4 in Sakakah, 1 in Dumat Al-Jandal and 1 in Tabarjal), and to participants of the 15 workshops, and to children and their parents when 60 schools were visited. The remaining brochures which constituted the majority were left at the 6 clinics for future visitors.

- Periodic examinations performed by the screening units included: Physical examinations (e.g. arterial blood pressure measurement, anthropometric measurements as weight, height, waist circumference) and laboratory investigations (e.g. lipid profile [total serum cholesterol, low-density lipoprotein, high-density lipoprotein, triglycerides], random and fasting blood sugar)
- Training courses for healthcare workers (e.g. importance of effective communication skills for physicians and health educators); training and applying international

NCD guidelines (for diabetes and cardiovascular diseases, nutrition and physical activity), development of well health guidelines; as well as implementation of new services (e.g., prevention and cessation of the use of tobacco, promotion of physical activity, counseling on nutrition).

In order to assess the possible change in public awareness of what the CHP entails, a survey was carried out in October 2011, and repeated 6 months later in May 2012.

A pre- and post-intervention cross-sectional approach was used for this study. The sample size required for the survey was calculated on the assumption that the adult population in Al-Jouf was around 225,875 (which represented 65% of 350,000 adult Saudis living in the region, based on 2010 census data). The awareness of the people about the CHP was estimated at 30% (based on statistical records and monthly reports of the health promotion clinics). Sample size was calculated as:

$$n = (Z_{\alpha/2} + Z_{\beta})^2 \times \frac{(p_1(1-p_1) + p_2(1-p_2))}{(p_1 - p_2)^2}$$

Where $Z_{\alpha/2}$ is 1.96, the critical value of the Normal distribution at 0.05/2 (for a confidence level of 95% with α is 0.05), Z_{β} is 0.84, the critical value of the Normal distribution at β (for a power of 80% with β at 0.2) and p_1 and p_2 are the expected sample proportions of the two groups (p_1 estimated to be 50% and p_2 estimated to be 60%). The estimated sample size of 385 was increased by 25% to account for nonresponse or recording error, resulting in about 482 participants for each survey. In order to enhance the study, 609 questionnaires were prepared in October of 2011 and 1125 questionnaires in May, 2012.

The two surveys were carried out among adults aged 15 years and older. Participants who were either PHCC attendees or their accompanying persons (during October, 2011 for the presurvey and May, 2012 for the postsurvey) were requested by the receptionist to complete the questionnaire while they were waiting to be seen or after they were seen by the health care provider. Thus, this was a convenient sample. After discarding questionnaire responses with missing data and restriction to those with full data for all covariates, the number of participants included in the presurvey was 569, and 1024 for the postsurvey.

The tool included questions about demographic characteristics (e.g., age, gender, marital status, nationality, education, occupation, income) and CHP awareness (its existence, sources of knowledge about it, its goals and

objectives, its target diseases, location of activities, participation in such activities). Both surveys were prepared by MoH staff, including physicians and epidemiologists. The survey was supervised by a physician in each of the 34 centers included in the survey. The respondents were requested to fill out the questionnaire themselves, but the physician was on hand to respond to any questions the respondents had.

Data were entered into MS Excel. Frequency distributions were created for responses to each question on both surveys. To assess awareness accurately, three possible outcomes were considered for each question: “right answer,” “wrong answer,” or “does not know.”

Appropriate statistical analysis tests were applied using the Statistical Package for Social Sciences (IBM Company, copy right 1989,2010 SPSS version 19, USA). Bivariate analyses were used to identify characteristics associated with changes in the proportion of responses to any of the questions (adjusted odds ratios [AORs] and corresponding confidence intervals). We analyzed the characteristics of respondents according to correct and incorrect responses to questions pertaining to awareness of the program, and adjusted for the variables listed below with logistic regression analysis:

- Time of survey: Presurvey, postsurvey (reference)
- Center of data collection: Sakakah (reference); other centers
- Age: 15–24 yes or no; 25–49 yes or no (chosen as a reference category); 50 or more yes or no
- Sex: Male (reference); female
- Education: Up to secondary; college or higher (reference)
- Occupation: Not working or housewife; government employee, nongovernment employee or student (reference).

Each answer dealing with awareness was dichotomized to get ORs corresponding to one of the three possible proportions: Right answer versus other answers; wrong answer versus other answers; does not know versus other answers.

RESULTS

Table 1 compares sociodemographic characteristics of respondents between the pre- and post-survey. There were significantly more male respondents in the postsurvey (67%) compared to the presurvey (55%). This difference was found to be statistically significant ($P = 0.000$). Similarly, there were significantly more older (50+) respondents in the postsurvey than in the presurvey. For occupation, there were significantly fewer working respondents, and there were also fewer respondents from the urban area, that is Sakakah, in the postsurvey.

Table 1: Demographic characteristics of respondents to two surveys on the awareness of the CHP in Al-Jouf, KSA

Characteristic	n (%)			P
	First survey (n=569)	Second survey (n=1024)	Total	
Sex				
Male	313 (55.0)	686 (67.0)	999 (62.7)	<0.001
Female	256 (45.0)	338 (33.0)	594 (37.3)	
Age, years				
15-24	125 (22.0)	143 (14.0)	268 (16.8)	<0.001
25-49	374 (65.2)	681 (66.5)	1055 (66.2)	
50+	70 (12.3)	200 (19.5)	270 (16.9)	
Education				
Up to secondary	321 (56.4)	606 (59.2)	927 (58.2)	0.28
College or higher	248 (43.6)	418 (40.8)	666 (41.8)	
Occupation				
Employed	486 (85.4)	743 (72.6)	1229 (77.2)	<0.001
Unemployed, housewife, student	83 (14.6)	281 (27.4)	364 (22.8)	
Living area				
Urban	348 (61.2)	558 (54.5)	906 (56.9)	0.01
Rural	221 (38.8)	466 (45.5)	687 (43.1)	

CHP: Crown health project; KSA: Kingdom of Saudi Arabia

Table 2 shows the responses to six questions dealing with awareness and knowledge of the CHP with respect to covariates, including the time of the survey. The proportions corresponding to response options ranged from 4.1% to 93.3%.

Logistic regression models were computed for each considered response option to each of several questions. The respondents were instructed to choose as many of the response options as they deemed correct for the given question. The strength of the statistical association between determinants included in the logistic model and response options was measured by AORs.

For a positive answer to the question: “Are you aware of the CHP?” The proportion of 51.6% corresponds to 293 of the 569 presurvey respondents, and the proportion of 91.0% (932 of 1024) of the postsurvey respondents as being aware of the CHP. The AOR is 10.9, that is, the rate of the odd (number of yes/number of no) of the respondents aware of the CHP in the postsurvey divided by the corresponding odd of the respondents to the presurvey.

As expected, the pre-post-survey variable was the most often selected by the logistic regression procedure as a significant determinant of right response options. It was a significant determinant of response options to all questions and appeared 12 times among a total of 40 determinants.

Awareness of the program had the strongest association with about 11 times more of the postsurvey respondents compared to presurvey respondents answering that they were aware of the program. Postsurvey respondents were also more likely to choose the correct responses related to the program’s overall goal, objectives, and target diseases. In addition, the odds of participation in the program were 8 times higher in postsurvey respondents in comparison to presurvey respondents. However, postsurvey respondents were more likely to incorrectly choose hospitals as the setting for the program, but make the correct choice of primary care clinics.

Rural respondents were more likely to give wrong answers about the location of the program, and about the content of the program; however, they were more likely to participate in the program.

Women were about twice more likely to give correct responses than men. Respondents with lower educational level (qualification) were less likely to be wrong about the goal of the program with respect to treatment of patients. They were also more likely to be right about disease prevention. Fewer of the less educated were wrong to assume the program was for all diseases, but were more correct to recognize that it was for chronic diseases. They were less likely to answer correctly and indicated that the program called for the participant to take charge of his/her own health.

Respondents who did not have a regular income gave more incorrect and fewer correct responses. Older respondents (age 50+) were better at identifying that the goal of the program was disease prevention and that it was run in primary care centers. On the other hand, respondents aged 15–24 were less likely to identify primary care centers, and were more likely to give the wrong answer to the goal of the program as having to attend the clinic.

Table 3 shows the associations between socio-demographic determinants with the source of knowledge of the program. It provides clues to the understanding of the medium through which the public was informed of the program. In the rural areas, less mention was made of brochures than attendance at the health center, friends or neighbors as a source of information of knowledge of the program.

Less-educated respondents got less information from posters, but more from attending the health center, friends or neighbors. People without income generating occupations were less likely to be informed by brochures.

Table 2: Factors significantly associated with awareness and knowledge of the CHP in Al-Jouf, KSA

Response options	Proportion, %		Factor	P	AOR (95% CI)
	Pre	Post			
Are you aware of the CHP?					
Yes versus no	51.6	91.0	Second survey versus first survey		10.9 (8.2, 14.6)
			Unemployed versus employed		0.49 (0.35, 0.68)
What is the goal of the program?					
Disease prevention (correct)	68.2	74.4	Age 50 or more versus age 25-49	0.000	2.3 (1.5, 3.5)
			Female versus male	0.000	1.98 (1.5, 3.1)
			Up to secondary versus college	0.001	1.6 (1.2, 2.1)
			Second survey versus first survey	0.029	1.4 (1.1, 1.9)
			Rural versus urban center	0.027	0.69 (0.50, 0.96)
Health education (correct)	40.8	70.1	Second survey versus first survey	0.000	4.2 (3.1, 5.6)
			Female versus male	0.000	1.8 (1.4, 2.4)
			Unemployed versus employed	0.000	0.52 (0.38, 0.71)
Treatment of patients (incorrect)	27.4	25.5	Unemployed versus employed	0.018	1.5 (1.1, 2.1)
			Up to secondary versus college	0.000	0.41 (0.40, 0.72)
			Female versus male	0.000	0.51 (0.38, 0.69)
What are the diseases which the program is working to prevent?					
Noncommunicable disease (correct)	31.5	66.4	Second survey versus first survey	0.000	4.8 (3.6, 6.5)
			Female versus male	0.000	2.0 (1.5, 2.6)
			Age 50 or more versus age 25-49	0.046	1.4 (1.0, 2.0)
			Up to secondary versus college	0.000	1.7 (1.3, 2.2)
All diseases (incorrect)	53.4	31.0	Female versus male	0.000	0.60 (0.46, 0.78)
			Unemployed versus employed	0.027	0.69 (0.41, 0.67)
			Second survey versus first survey	0.000	0.36 (0.27, 0.47)
Infectious disease (incorrect)	16.8	7.0	Second survey versus first survey	0.000	0.38 (0.25, 0.57)
Where does the program hold its activities?					
Primary care centers (correct)	18.8	12.2	Age 50 or more versus 25-49	0.029	1.9 (1.1, 3.5)
			Second survey versus first survey	0.021	1.5 (1.1, 2.1)
			Age 15-24 versus 25-49	0.007	0.58 (0.39, 0.86)
Hospital (incorrect)	26.7	50.8	Rural versus urban center	0.032	0.69 (0.49, 0.97)
			Rural versus urban center	0.000	4.5 (3.5, 5.9)
			Second survey versus first survey	0.000	3.2 (2.3, 4.4)
			Age <25 versus 25-49	0.003	1.7 (1.2, 2.4)
Private center or clinics (incorrect)	4.1	7.0	Rural versus urban center	0.000	3.2 (1.9, 5.3)
Did you actively participate in any of the program activities?					
Yes versus no	31.8	79.2	Second survey versus first survey	0.000	8.4 (6.2, 11.4)
			Rural versus urban area	0.013	1.4 (1.1, 1.9)
			Female versus male	0.015	1.4 (1.1, 1.9)
The program calls for					
Attention to own health (correct)	75.0	93.3	Second survey versus first survey	0.000	6.0 (4.0, 9.0)
			Female versus male	0.041	1.6 (1.1, 2.4)
			Rural versus urban	0.005	0.6 (0.4, 0.9)
			Unemployed versus employed	0.007	0.5 (0.3, 0.8)
Need to attend the clinic (incorrect)	32.5	19.4	Rural versus urban	0.001	1.6 (1.2, 2.1)
			Second survey versus first survey	0.000	0.51 (0.38, 0.70)
Providing treatment for patients (incorrect)	20.5	14.1	Rural versus urban	0.000	3.3 (2.2, 4.6)
			Second survey versus first survey	0.001	0.6 (0.4, 0.8)

AOR: Adjusted odds ratio; CI: Confidence interval; CHP: Crown health project; KSA: Kingdom of Saudi Arabia

DISCUSSION

Awareness of the CHP was substantially greater in the second survey than in the first, presumably because its

activities were more intense during the 6 months between surveys. However, awareness of the program differed greatly according to the characteristics of the respondents, suggesting that it would be profitable to explore new

Table 3: Factors associated with sources of information about the CHP in Al-Jouf, KSA

Response options	Pre %	Post %	Comparison	P	AOR (95% CI)
Health center	67.1	64.2	Rural versus urban area	0.000	3.0 (2.3, 3.9)
			Up to secondary versus college	0.000	1.8 (1.4, 2.4)
			Female versus male	0.000	1.6 (1.3, 2.1)
Brochure	17.1	43.9	Second survey versus first survey	0.000	5.1 (3.6, 7.2)
			Rural versus urban area	0.000	0.3 (0.2, 0.4)
			Unemployed versus employed	0.000	0.6 (0.4, 0.8)
Friends or neighbors	8.6	20.3	Rural versus urban area	0.000	4.6 (3.3, 6.6)
			Second survey versus first survey	0.000	2.5 (1.6, 4.0)
			Up to secondary versus college	0.000	2.4 (1.6, 3.4)
			Age 50 or more versus age 25-49	0.006	1.8 (1.2, 2.7)
Radio or TV	8.6	3.8	Age 50 or more versus age 25-49	0.035	0.21 (0.05, 0.90)
			Up to secondary versus college	0.006	0.44 (0.24, 0.79)
			Second survey versus first survey	0.005	0.45 (0.26, 0.79)
Poster	14.4	22.5	Age 50 or more versus age 25-49	0.008	0.5 (0.3, 0.8)
			Up to secondary versus college	0.000	0.6 (0.4, 0.8)
			Second survey versus first survey	0.001	1.9 (1.3, 2.8)
			Rural versus urban area	0.000	1.9 (1.4, 2.6)

AOR: Adjusted odds ratio; CI: Confidence interval; CHP: Crown health project; KSA: Kingdom of Saudi Arabia

ways of giving them information. Such variations across different characteristics were similarly demonstrated in the USA^[26,27] and Finland^[28] projects, even during much longer periods of time.

The fact that women knew more about the program than men may be because there is better communication between health providers and women. If that is the case, special training should be given to health providers in communicating with male patients. The difference between older and younger respondents with respect to understand the purpose of the program indicates some possible weaknesses in the way the message was delivered in secondary schools and universities. A more enhanced school education program may stimulate the children to increase discussions about the program with their parents and siblings. Such interaction would improve the exchange of information and clarify the goals of the program to children.

The higher percentage of correct responses to questions in the urban area of Sakakah is most likely due to the fact that 4 out of 20 of the clinics received the brochures while only 1 of the 8 clinics in Tabarjal and 1 out of 6 in Dumat Al-Jandal received them. This study shows that direct hand delivery of brochures or dialog worked much better than posters, radio, and TV announcements and should, therefore, be encouraged.

It was also impressive to learn that in comparison to respondents in the first survey, respondents to the second survey significantly identified “health education” as the main goal of the CHP, “NCDs” as main diseases to be prevented by CHP activities, and that the program called

for “attention to health.” Such results indicate that the CHP activities and efforts were more often identified and appreciated by the target community in Al-Jouf.

Community-based projects to raise awareness and prevent risk factors of NCDs, especially cardiovascular diseases, are not unique to CHP. They have been successfully carried out in several parts of the world. The leading ones include the Stanford Five-City^[27] and Minnesota Heart Health^[28] projects in USA, and the North Karelia Project in Finland.^[29] In addition, some projects have been carried out as WHO demonstration projects, such as CINDI and MONICA (by the WHO Regional Office for Europe),^[37] CARMEN (WHO Regional Office for the Americas), and inter-health (WHO headquarters).^[38]

Results of such long-standing projects indicate that such programs are not only cost-effective, but also may be applied generally and can influence health policy-making.^[31,32,39] This approach is now receiving growing attention in developing countries, where the prevalence of NCDs is increasing.^[39] Projects implemented in some Gulf Cooperation Council nations such as Oman’s Nizwa Healthy Lifestyle Project^[40] and the current CHP in KSA are good examples.

The CHP has been piloted in Al-Jouf and is now ready to be implemented throughout the country. Nevertheless, evaluation is a fundamental part of any program. Measuring the impact on awareness of the pilot project initiated in Al-Jouf was essential for the development of a vibrant and durable program. Awareness is the first prerequisite for impact because residents of the community can only consider participating fully in any program if they are aware and appreciative of its importance.

LIMITATIONS

Our study has some limitations. The questionnaire was not administered by a health professional, but self-administered. However, the questions were considered relatively easy to understand. The questionnaire was not done randomly in the community, and there could have been selection bias between the pre and post questionnaire that was not completely accounted for by the logistic regression.

CONCLUSION

Results obtained provided evidence that age, sex, education, occupation, and place of residence were strongly associated with most of the investigated items. Of the 34 clinics, many had not introduced periodic screening. Thus, we highly recommend the conduct of a cohort knowledge, attitude, and practice study with pre- and post-survey of the same individuals in order to assess the impact of the intervention over a 6 months period. In addition, we believe that it is time to expand implementation of the CHP to other regions of KSA, because of the strengths and weaknesses described in this paper.

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How to cite this article: Memish ZA, Saeedi MY, Al Madani AJ, Junod B, Jamo A, Abid O, Alanazi FM, Alrewally FG, Mandil AM. Factors associated with public awareness of the Crown Health Program in the Al-Jouf Region. J Fam Community Med 2015;22: 31-8.

Source of Support: Nil, **Conflict of Interest:** None declared.

