

ASSESSMENT OF ORAL HEALTH KNOWLEDGE, PRACTICES, AND ATTITUDES TOWARDS ORAL HEALTH AND PROFESSIONAL DENTAL CARE AMONG RURAL POPULATION IN THE DOMINICAN REPUBLIC: A CROSS-SECTIONAL STUDY

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ABSTRACT:

Background: Assessing oral health knowledge, attitudes and behaviors provide baseline information for developing health education programs. However, knowledge does not always translate into attitudes and practices and there is disconnect between them.

Purpose: This study looked at oral health knowledge, attitudes, behaviors and dental care attendance among adult rural Dominicans, measured the caries prevalence and found the association of knowledge with the study variables.

Methods: Cross-sectional study conducted among 104 participants aged 18-80 years in La Esquina community, Province Maria Trinidad Sanchez in 2013. Distributions of knowledge by demographic, oral health practices and attitudes were analyzed using chi-square test and association between knowledge and other variables was found using binary logistic regression.

Results: About 94% of participants were affected by dental caries and 66.3% (people who answered at least 6 out of 8 knowledge based questions correctly) had high knowledge. Participants with high knowledge had higher odds of being female and using fluoridated toothpaste.

Discussion: Despite a majority had high oral health knowledge levels, behaviors of not seeking regular dental care was not fully explained. Oral health education programs targeted at this population should consider other environmental factors influencing oral health care attitudes and practices.

Key Words: Dental caries (decay), oral health knowledge, oral hygiene behaviors, dental care, barriers

INTRODUCTION:

Dental caries is one of the most prevalent chronic conditions seen in developing countries and contributes to the global oral health burden in treatment and replacement of natural teeth ^[1]. The

Global Oral Health program initiated by the World Health Organization emphasizes both oral health prevention and treatment strategies with a greater emphasis on oral health promotion programs aiming at controlling modifiable

risk factors for caries [2]. One of the most important factors for developing community based oral health education and promotion programs is obtaining baseline data on existing knowledge, behaviors, attitudes and factors for seeking professional dental care.

A knowledge-attitude-practice (KAP) survey undoubtedly helps in assessing participants' opinions on health related aspects for developing health education programs. KAP questionnaires have been used as a tool to gain information regarding knowledge, beliefs, attitudes, opinions and reported behaviors [3,4]. Changing behaviors remains the core of oral preventive and health education programs that have been used extensively in the past few decades. Based on this 'lifestyle' approach, acquiring relevant knowledge and skills results in favorable oral health behaviors [5]. However, it should be kept in mind that behaviors although influential on health, are largely determined by the social, environmental and economic conditions in which people live [6,7]. Relevant and adequate knowledge may be of little importance if the given environment offers limited resources or opportunities to change [5].

The prevalence of dental caries experience shows an increasing trend in developing nations [8]. Globalization enabling easy access to refined food and soft drinks and dietary transitions has contributed to such a trend in developing nations including Latin Caribbean and Central American countries and studies have shown a direct association between

dietary habits and dental caries [9-11]. Based on published literature, there is limited information on oral health in rural areas of the Dominican Republic (DR). A very few community studies that have been conducted so far among rural population in the DR looked at determinants of oral hygiene behaviors and oral health knowledge among children [12,13]. Data remains scarce on oral health knowledge, attitudes and practices among adult rural population in the DR. This study looks at existing knowledge about oral health, oral hygiene behaviors and attitudes/utilization of professional dental care and examines the applicability of KAP surveys. Specifically, the objectives of this study are:

- To assess knowledge, attitudes and behaviors related to oral health among adults in rural Dominican Republic
- To measure the caries prevalence by assessing the DMFT index
- To find the association between knowledge group and DMFT index, oral hygiene behaviors and utilization of professional dental care with knowledge levels.

MATERIAL AND METHODS:

This study was a cross-sectional design that used face-to-face interviews and intra-oral examinations in the community of La Esquina in Province Maria Trinidad Sanchez in July-August 2013. The research protocol was approved by the institutional review board (Protocol #IRB2013-0380D) prior to the data collection period.

An adult who was older than 18 years and a resident of La Esquina community was eligible to be included in the study. Interview protocol was read out to the community members and only after having their permission through a written consent were they allowed to participate in the study. Once enrolled, participants answered the survey questions via face-to-face interviews.

As the second part of this study, intra-oral examinations were carried out by a single trained dental professional. The professional looked for any decayed, missing or filled teeth (DMFT) for caries experience using a mouth mirror and explorer. Caries experience denoted by the DMFT index for a respondent can vary from 0-32 with 0 indicating no caries experience and 32 indicating that all teeth are affected by caries^[14].

The survey questionnaire consisted of 8 questions on their knowledge levels. Questions on their oral hygiene behaviors included questions on how often and how long they brushed, when they brushed, what they used for brushing, daily habits, frequency of eating sweets and use of fluoridated toothpaste.

The other 10 items included questions on their last dental visit, treatment sought, what motivated them to the dentist, their gum bleeding management, barriers that prevented them from going to the dentist and their self-reported oral health status. There were also questions that asked respondents on whether or not they held

favorable attitudes towards professional dental care.

The questionnaire prior to data collection was translated to Spanish and evaluated for cultural relevance. Content validity of the questionnaire was checked by a Dominican professional who was not associated with our study but was familiar with the socioeconomic and cultural contexts of rural populations in DR. Few terminologies that were unheard of or unfamiliar were eliminated or rephrased.

Knowledge level questions had three answer choices and people who answered either "no" or "I do not know" were assigned the value of 0 and participants who gave the correct response were assigned 1 for grouping participants into knowledge categories.

Intra-examiner reliability on the caries prevalence using DMFT scores was assessed using kappa statistics. A total of 12 participants were re-examined for consistency and accuracy for DMFT scores and complete agreement was found (kappa statistic=1).

The questionnaire was administered by a research assistant and a translator who was a regular visitor to that community. Respondents answered the questions in their front yards/porches of their houses. Although the research personnels tried their best to ask questions in private, privacy in the rural DR is viewed differently than in some other cultures; most houses are commonly swamped by extended family members or neighbors.

However, this was not an issue as oral health is not considered a very private matter or a sensitive issue in the DR.

After having collected the data, data were entered into SPSS statistics 22 and descriptive statistics were obtained. Demographic, self-oral care practices and attitude related variables were analyzed using Pearson Chi square and their associations with knowledge levels were analyzed using binary logistic regression.

RESULTS:

The total number of participants in our study was 104 aged 18-80 years. The mean age of participants was 42.3(17.9) years; 49 were males and 55 were females. About 55 (60.4%) of the respondents had less than 8 years of formal education while 39.6% had some level of high school or college education.

There were 8 knowledge-based questions with three answer choices- yes, no, I don't know. The mean knowledge score was 5.7(1.5), out of a possible range of 0-8. Depending on their knowledge scores, participants were grouped as high and low knowledge groups. Respondents who gave at least 6 correct responses were categorized as high knowledge groups and those who answered less than 6 were grouped as low knowledge groups.

Table-1 shows the knowledge based questions and the percentage distribution of responses by each question. 69 (66.3%) participants had high knowledge while 35(33.9%) respondents had low knowledge.

About 61% of the females in the sample answered at least 6 knowledge based questions correctly while only 39% males had high knowledge. There was a statistical significant difference between the two gender groups with the knowledge levels ($\chi^2=5.25$; p value=.02). Participants older than 35 years possessed high knowledge when compared to participants younger than 35 years. There was also a statistical significant difference between the two groups with the knowledge levels ($\chi^2= 4.28$ (p value= .03)) (Table: 2).

Out of the 104 participants, 98 had at least one tooth affected by caries and the mean DMFT among high knowledge group was higher than the DMFT score found in low knowledge group (Table: 3). The dental caries prevalence was high affecting 94.2% of the sample.

Table-4 shows the percentage distribution of oral hygiene practices according to the knowledge levels. A majority of the respondents (94.2%) brushed ≥ 2 a day out of which 51% brushed 3 times during the day including morning, night and after lunch. Participants usually brushed while taking their bath in the evening and brushing was not necessarily after dinner. Only 5.8% of the sample population brushed only once daily. There was no statistical significance with brushing frequency between the knowledge groups, however bivariate analysis showed statistical significant relationship between the time of the day respondents brushed with their knowledge levels ($\chi^2 =8.07$, p value=.01). About half of the

respondents (49%) were unsure about the role of fluorides on teeth but 84.6% were knowledgeable about their toothpaste being fluoridated. There was a statistically significant difference found between the use of fluoridated toothpaste and the knowledge groups. Slightly more than half of the sample population used toothpaste and brush for cleaning their teeth, while the remaining supplemental cleaning materials such as used toothpicks, or mouthwash in addition to toothbrush and paste. According to the self-reported data on consumption of cariogenic food items, only 5.8% of the participants consumed sweets ≥ 2 in a given day with no statistical difference between the two knowledge groups with this dietary habit. Respondents, however, drank sweetened beverages and about 94.2% of them reported doing so. There was also a statistical significant difference between their consumption of sweet beverages across knowledge groups ($\chi^2=11.74$, p value=0.008).

Table 5 demonstrates dental care utilization and attitudes of the respondents towards oral health and dental care according to knowledge groups. Gum bleeding management was not statistically different across knowledge groups. The last dental visit was more than one year back for 68.1% of the respondents and fewer than 30 people (31.9%) went to the dentist in the past year. There was statistically no significant difference between the two knowledge groups with respect to their dental visit. This behavior did not reflect the attitude most of the respondents held

when they were asked whether or not they believed going to the dentist was necessary. A vast majority of the respondents, 95.2% said it was necessary and there was a statistical significant difference between the two knowledge groups ($\chi^2=10.36$, p value $<.05$). Dental pain was the main driving factor for seeking professional care; there was statistical significant difference between the two groups ($\chi^2=8.60$, p value= .014). The other reasons for which people sought professional dental care were to get fillings, or prostheses. Most of the dental visits in this group were for treatment purposes and only 15.1% of the sample population went to the dentist for their regular check-up or routine cleaning; no statistical significant differences were observed between the two knowledge groups. Among the reasons that prevented participants to seek dental care, about 55% of the people cited none as the reason followed by being afraid of the instruments (24%), no dental pain (11.5%) and costs (5.8%). About 5.8% of the respondents cited other reasons such as fear of anesthesia, no clinics nearby, and lack of time. There was no statistical difference between barriers for dental attendance and the two knowledge groups.

Binary logistic regression was carried out with knowledge scores as the dependent variable and demographic, dental caries prevalence, oral hygiene practices, daily habits, attitudes and utilization of professional dental care as independent variables. Participants with higher knowledge had higher odds of being

female and using fluoridated toothpaste than participants with low knowledge scores (Table: 6).

DISCUSSION:

The present study is one of the very few studies that looked at knowledge, behaviors and attitudes towards oral health and professional dental care among adult rural population in DR.

The survey had basic knowledge-level questions on tooth brushing, dental plaque, tooth decay and effects of sweets and carbonated drinks on teeth to which a majority of the participants knew the correct responses. Nearly 60% of participants had limited formal school education suggesting that they had received health information in other ways, perhaps through communicating with other community members and health care professionals. Oral health education is not a component of yet-to-be-implemented school health program in this area. Community-based health education programs that occasionally take place in this region predominantly focus on chronic and zoonotic diseases.

The results of the study showed that participants with high knowledge had higher odds of being female and using fluoridated toothpaste.

Gender differences were found in previous studies where females showed higher oral health knowledge than their male counterparts, although the results were not statistically significant^[15-17]. Health information in this community is usually passed down generationally where

women teach their children, especially daughters, about basic health facts and they often know more than men on health related matters^[18].

Nearly half of the sample population lacked knowledge on the preventive action of fluorides on caries. Previous studies have also found that most of the people were unaware of the role of dental fluorides^[15,19]. However, 85% of the sample population reported using fluoridated toothpaste for brushing. Participants with high oral health knowledge had higher odds of using fluoridated toothpaste was found in one of the studies done in India^[20].

Despite a majority of participants had high knowledge scores and positive attitudes towards professional dental care, their behavior of not seeking preventive or regular treatment care was not fully explained in this study. Fear of dental instruments followed by no dental pain were the top barriers among one-third of the study population to not utilize professional routine or restorative care and slightly more than half cited no reason that prevented them from seeking routine dental care. The unmet treatment needs cannot be overlooked and some of the study participants had excruciating pain associated with untreated decayed teeth that limited their ability to function optimally.

It may be speculated that although participants were aware of the importance of timely restorative care, the socio-economic environment in which the respondents had to make choices

prevented them from doing so. Seeking restorative and endodontic treatment is expensive and most of the dental hospitals and clinics that provide such treatment are distant from the community. Public mode of transportation is limited and cost prohibitive to a majority of the community members. In addition, dental treatment is currently sought only at advanced stages of caries when tooth extraction remains the only less expensive option. Either members fail to recognize the early signs of caries or perceive it to be less serious in the initial stages. Most of the people consider treatment options only when caries has advanced to more severe stages with accompanying pain. In this community, like elsewhere, tooth loss is seen as a natural consequence of ageing.

Furthermore, high oral health knowledge, favorable oral hygiene practices and attitudes did not appear to translate participants' oral health status. About 94% of the population had caries experience and the mean DMFT index was 9.56 ± 8.0 of which the missing teeth followed by untreated decayed teeth accounted for higher proportion of the mean DMFT score. The severity of dental caries also increased with the increase in age of the participants.

Whilst this investigation provides preliminary data on study variables in rural DR, our study had several limitations:

One of the drawbacks our study saw was social desirability. Participants may have

answered in socially desirable ways, potentially incorporating some information bias into the study. Self-reported data is an imperfect predictor of human behavior^[21]. While brushing twice or more was self-reported among 94% of the sample, this oral hygiene behavior seemed questionable as 45% of the participants had soft deposits on teeth on examination.

The cross-sectional study design does not explain the cause and effect of knowledge levels with caries prevalence and oral hygiene behaviors or attitudes.

The sample size is small restricting some of the inferences that can be drawn from the data. Further research should be done with large sample sizes from different rural locations in the DR to build upon the study findings.

The KAP model in assessing the knowledge, attitudes and behaviors seems insufficient in explaining the interconnectedness among the variables. While KAP surveys yield information on what community knows about a health topic, other methods of data collection should have been included for a thorough understanding of the socio-economic and cultural context in which attitudes and behaviors are shaped^[4]. However, the study gives baseline information on study variables and the possible association of the existing knowledge with the study variables in rural population in the DR.

CONCLUSION:

Health professionals should find means to translate community's existing oral health

knowledge and positive attitudes to behaviors that favor regular dental care attendance and maintaining good oral hygiene. Comprehensive oral health prevention and promotion programs targeted at this population should also consider socio-economic and environmental constraints that deprive this segment of population from making choices to improve their oral health status.

Acknowledgement:The authors are grateful to Elizabeth Tavárez for her advice and support; Juan Lopez Arias and Jillian McConville for recruitment of participants and data collection.

This investigation was partially funded by the College of Education and Human Development, Texas A&M University, College Station, Texas.

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TABLES:

Table: 1 Percentage distribution of responses to questions on knowledge level:

| Question | Yes (%) | No (%) | I do not know (%) |
|--|-----------|-----------|-------------------|
| Does dental plaque mean soft deposits on teeth? | 56 (53.8) | 15 (14.4) | 33 (31.7) |
| Dental plaque leads to gum problems | 73 (70.2) | 21 (20.2) | 10 (9.6) |
| Are sweets bad for your teeth? | 96 (92.3) | 6 (5.8) | 2 (1.9) |
| Fizzy drinks are bad for your teeth | 59 (56.7) | 28 (26.9) | 17 (16.3) |
| Does brushing prevent tooth decay? | 88 (84.6) | 13 (12.5) | 0 |
| Does using fluorides strengthen teeth? | 53 (51.0) | 31 (29.8) | 20 (19.2) |
| General body health has a relationship with oral and dental health | 85 (81.7) | 10 (9.6) | 9 (8.7) |
| Does going to the dentist reduce your risks for dental problems? | 88 (84.6) | 12 (11.5) | 4 (3.8) |

Table: 2 Distribution of knowledge level according to gender, age and educational levels:

| Variable | High knowledge (%) (Answered 6-8 questions correctly) | Low knowledge (%) (Answered 5 or less questions correctly) | N (%) | χ^2 (p) |
|----------------------------|--|---|----------|--------------|
| Gender | | | | 5.25(.02)* |
| Male | 27(39.1) | 22(62.9) | 49(47.1) | |
| Female | 42(60.9) | 13(37.1) | 55(52.9) | |
| Age | | | | 4.28(.03)* |
| ≤ 35 years | 24(35.8) | 18(58.1) | 42(42.9) | |
| >35 years | 43(64.2) | 13(41.9) | 56(57.1) | |
| Educational Level | | | | 1.35(.245) |
| Elementary school and less | 40(64.5) | 15(51.7) | 55(60.4) | |
| Some High school education | 22(35.5) | 14(48.3) | 36(39.6) | |

*p≤0.05

Table: 3 Distribution of knowledge according to the prevalence of caries:

| Dental caries | High knowledge (%) (Answered 6-8 questions correctly) | Low knowledge (%) (Answered 5 or less questions correctly) | N (%) |
|---------------|--|---|-----------|
| DMFT≥1 | 66(95.7) | 32(91.4) | 98(94.2) |
| DMFT=0 | 3(4.3) | 3(8.6) | 6(5.8) |
| Mean DMFT | 10.5(8.6)* | 7.7(6.1)* | 9.6(8.0)* |

*Mean (Standard Deviation)

Table: 4 Percentage distributions of oral hygiene practices according to the level of knowledge:

| Variable | High Knowledge (%) | Low Knowledge (%) | N (%) | χ^2 | p |
|---|--|--------------------------------|--|-----------------|---------|
| Tooth brushing frequency per day ≤once a day ≥Twice a day | 3(4.3) 66(95.7) | 3(8.6) 32(91.4) | 6(5.8) 98(94.2) | 0.762 | .383 |
| When do you brush? Morning Morning and night After lunch, morning and night | 3(4.3) 24(34.8) 42(60.9) | 3(8.6) 21(60.0) 11(31.4) | 6(5.8) 45(43.3) 53(51) | 8.08 | .018* |
| Time spent on tooth brushing Less than two minutes Two minutes and more | 34(49.3) 35(50.7) | 11(31.4) 23(65.7) | 45(43.3) 58(55.8) | 4.616 | 0.09 |
| Materials used for cleaning Toothbrush and paste only In combination (Mouthwash, toothpicks) | 35(50.7) 34(49.3) | 19(54.3) 16(45.7) | 54(51.9) 50(48.1) | 0.12 | .73 |
| Type of toothpaste Fluoridated Non-fluoridated/Do not know | 66(95.7) 3(4.3) | 22(62.9) 13(37.1) | 88(84.6) 16(15.4) | 19.19 | <0.001* |
| Frequency of sweet intake Less than or equal to once a day Twice or more than twice per day | 65(94.2) 4(5.8) | 33(94.3) 2(5.7) | 98(94.2) 6(5.8) | NC [^] | .986 |
| Any daily habits Drink sweetened coffee/fruit juices Drink sodas In Combination None | 34(49.3) 1(1.4) 28(40.6) 6(8.7) | 9(25.7) 0 26(74.3) 0 | 43(41.3) 1(1) 54(51.9) 6(5.8) | 11.75 | .008* |

NC[^] Not computed

*p≤0.05

Table: 5 Dental care utilization /attitudes towards oral health and professional dental care:

| Variable | High Knowledge (%) | Low Knowledge (%) | N (%) | χ^2 | P value |
|---|--------------------|-------------------|----------|----------|---------|
| What do you do when your gums bleed? | | | | 1.20 | .549 |
| Self-care | 27(65.9) | 15(62.5) | 42(64.6) | | |
| Go to dentist | 1(2.4) | 2(8.3) | 3(4.6) | | |
| Do nothing | 13(31.7) | 7(29.2) | 20(30.8) | | |
| Dental visit in the past one year | | | | .02 | .887 |
| Yes | 21(32.3) | 8(30.8) | 29(31.9) | | |
| No | 44(67.7) | 18(69.2) | 62(68.1) | | |
| Reason for my last dental visit | | | | 8.608 | .014* |
| Dental pain | 47(68.1) | 20(57.1) | 67(64.4) | | |
| Other | 18(26.1) | 6(17.1) | 24(23.1) | | |
| Treatment sought in my last dental visit | | | | .357 | .550 |
| Preventive/routine | 9(13.6) | 5(18.5) | 14(15.1) | | |
| Restorative | 57(86.4) | 22(81.5) | 79(84.9) | | |
| Is going to the dentist necessary? | | | | 10.36 | .001* |
| Yes | 69(100) | 30(85.7) | 99(95.2) | | |
| No | 0 | 5(14.3) | 5(4.8) | | |
| Reasons for not visiting dentist | | | | 4.339 | .362 |
| Afraid of the instruments | 19(27.5) | 6(17.1) | 25(24.0) | | |
| No pain or dental problem | 7(10.1) | 5(14.3) | 12(11.5) | | |
| Costs | 2(2.9) | 4(11.4) | 6(5.8) | | |
| Other reason | 4(5.8) | 2(5.7) | 6(5.8) | | |
| None | 37(53.6) | 18(51.4) | 55(52.9) | | |

*p \leq 0.05

Table 6: Odds ratio for binary logistic regression between knowledge scores and independent variables

| Variable | B | Odds ratio | 95% CI | p |
|---------------------------|------|------------|-----------|-------|
| Gender | 1.35 | | | .017* |
| Male | | 1.0 | Reference | |
| Female | | 3.9 | 1.3, 11.6 | |
| Type of toothpaste | 2.0 | | | .007* |
| Non-fluoridated | | 1.0 | Reference | |
| Fluoridated | | 8.0 | 1.8, 36.8 | |

*p \leq 0.05