PUBLIC HEALTH CONFERENCE 2019

11-13 JULY 2019

BANGKOK

THAILAND

CONFERENCE PROCEEDINGS

Tomorrow People Organization

Dušana Vukasovića 73, Belgrade, Serbia

www.tomorrowpeople.org

Proceedings of international conference:

"PUBLIC HEALTH CONFERENCE 2019"

Editors: Tomorrow People Organization
Dušana Vukasovića 73
11070 Belgrade, Serbia

Secretary: Vladimir Ilić

Producer: Tomorrow People Organization
Publisher: Tomorrow People Organization
Quantity: 200 copies

Table Of Contents:

Index Of Authors:

Characteristics of harmonic indexes of the arterial blood pressure waveform in chronic kidney disease

Chen-Kai Liao[1, 2], Jaw-Shiun Tsai[3], M.D., Ph.D., Liang-Yu Lin[4], M.D., Ph.D., Feipei Lai[1, 5, 6], Ph.D., Chun-Fu Lai[7], M.D., Si-Chen Lee[1, 5] Ph.D.

[1]Graduate Institute of Biomedical Electronics and Bioinformatics, National Taiwan University, Taipei, Taiwan

[2]Lao De Yan Traditional Chinese Medicine Clinic, New Taipei City, Taiwan

[3]Department of Family Medicine, National Taiwan University Hospital, Taipei, Taiwan

[4]Division of Endocrinology and Metabolism, Taipei Veterans General Hospital, Taipei, Taiwan

[5]Department of Electrical Engineering, National Taiwan University, Taipei, Taiwan

[6]Department of Computer Science and Information Engineering, National Taiwan University, Taipei, Taiwan

[7]Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan

Corresponding author: Si-Chen Lee

Mailing address: Room 410 BL Building, No.1, Roosevelt Road, Sec. 4, Taipei 10617, Taiwan

Telephone: (+886) 2-3366-4961. Fax: (+886) 2-3366-3754.

E-mail: sclee0813@gmail.com

Abstract

Introduction: Chronic kidney disease (CKD) is one of the most important public health issues in the world and its prevalence is between 11 to 13% with the majority stage 3. CKD is correlated to cardiovascular disease (CVD) that the arterial stiffness can be thought of as a surrogate marker. The objectives of this study were to investigate whether harmonic indexes can be used to discriminate hemodynamic differences between CKD and non-CKD subjects.

Methods: We enrolled CKD and non-CKD patients according to their eGFR values as experimental and control groups. ANSWatch® Model TS-0411 was used to collect the blood pressure waveform (BPW) from patients after they signed consent form and took break for 10 minutes at least. Amplitudes proportions (Cn values) were calculated from harmonics 1 – 10 of the BPW through fast Fourier transform (FFT).

Results: A total of 42 CKD, 92 non-CKD patients were recruited in the study. CKD patients had significant difference in C_7 ($p = 0.007$), C_8 ($p = 0.011$) and C_{10} ($p = 0.023$).

Conclusion: We demonstrated CKD patients had different harmonic characteristics by a noninvasive and easy-to-perform technique. The present findings can be used to discriminate CKD-induced hemodynamic changes.

Keyword: Chronic Kidney Disease; Harmonic; FFT.

Factors associated with sleep quality among police officers in Mueang District, Phrae Province, Thailand

Watchalawalee Romyen*, Naowarat Kanchanakhan

College of Public Health Sciences Chulalongkorn University, Bangkok, Thailand

**Corresponding author, E-mail: Watchalawalee41@gmail.com*

Objectives: The paper aims to estimate the prevalence of poor sleep quality among police officers of Mueang District, Phrae Province, Thailand and to determine the associate between demographic characteristic, covariate factors and sleep quality among these police.

Design/approach/methodology: This study was a cross-sectional study which approached 244 Thai police officers in Mueang District, Phrae Province, Thailand. The participants were selected from each selected office by proportional random sampling method. Data were collected by self-administrative questionnaire to find the information involving demographic characteristic, covariate factors, and sleep quality during working as police officers. Data was analyzed by used bivariate statistics to find the association between those factors.

Originality/value: The paper presents general data, covariate factors, characteristics of police among police officers in Mueang district, Phare province, Thailand. It also provides the associations between the various factors and sleep quality.

Conclusion: The study found that 50.8 percent of police in Mueang District, Phrae Province, Thailand had reported poor sleep quality with PSQI score > 5. The study found that poor sleep quality was associated with several factors including left over money status, work place, over time work, energy drink, caffeine drink, smoking.

Key words: sleep, sleep quality, and police officer

1. Introduction

Sleep is an important tool that help the body to restore, refresh and maintain the body system. It helps the body to slow down the function after exhausted during day time. Sleep is a condition of body and mind that relax for a several hours at night time with the eyes close and the whole body is immobile posture. The recommend length of sleep is around 7-8 hours for most of the people, but sometime different age group need different sleep length.

Recent studies show that people performance is better when they have a good quality of sleep. They learn thing better and can memorize faster. Having an enough quality of sleep can prevent you from having a mental health, physical health and quality of life problems. Sleep can help to improve human being skill in learning thing or even in making a decision. Lack of sleep may cause people to be mood swing, sad, depressed or even lack of motivation. Thus, sleep quality is an important tool for being healthy (Smith, 2015).

There are many factors that interfere the sleep cycle such as energy drinks, caffeine drinks, smoking, drinking alcohol, and stress. Many studies have shown the link between the covariate factors and sleep quality. One study has done a survey on college in Thailand and found out that stimulant dinks, alcohol consumption and smoking are positively associated with poor sleep quality of the student (V. Lohsoonthorn, 2013). Moreover, doing overtime and shift work will also cause circadian rhythm imbalance by the light exposure schedule (Boivin, 2014). Physical activity it is claim that exercise can promote you to a good sleep. Another covariate factor are education, marital status and monthly income.

Police are the stress occupation because the pressure from job, shift work, personal problem, and they have to face up to violence situation and police easy to reach the weapon or gun. Thus, police always run away from the problem by suicide. The following data from Royal Thai Police in 2016 had been found that the police had committed suicide 279 persons. The data in 2008-2015, police had committed suicide 260 persons. From the estimate 8 years ago, police had committed suicide 33 persons/year and 14 / 100,000 persons. Thus, Thai police have increasing suicide more than other occupation about 2 times (Royal Thai Police, 2016).

The sample of this study is police in Mueang District, Phrae Province because Provincial Police Region 5 or the northern part of Thailand have the highest rate of police committed suicide (Department of Psychiatry and Drug Dependence, Police General Hospital, 2560) and Phrae Province are supervised by Provincial Police Region 5. Mostly the police here tend to have highly stressful with their duty and many conditions of their work. Moreover, Mueang district have a big population group of police and have many police station. It can be the representative of police in local area as a whole. This study aims to investigate the associate between covariate factor with the sleep quality among police officers in Phrae province, Thailand.

2. Objective

2.1 To estimate the prevalence of poor sleep quality among police officers of Mueang District, Phrae Province, Thailand.

2.2 To determine the associate between demographic characteristic, covariate factors and sleep quality among police officers of Mueang District, Phrae Province, Thailand.

3. Methodology

3.1 Study Design

This research was a cross-sectional study.

3.2 Sample size and Sampling technique

The number of sample size calculated by using the Taro Yamane formula (Yamane, 1967). Total population of police officers were 500 persons.

$$n = \frac{N}{1 + N(e)^2}$$

The sample size of this study were 222 persons with estimating 10% of the non-response case, therefor, the final sample size were 244. The participants were selected from the police officers by proportional random sampling method. The inclusion criterias of this study were 1) police officers both male and female who are working in the police station in Mueang District, Phrae Province, Thailand and 2) police officers whose age between 20-60 years old.

3.3 Measurement tools

There were two parts of questionnaires as follow:

3.3.1 Sociodemographic Questionnaire: 18 questions

The sociodemographic questionnaire focused on the demographic characteristic background and covariate factors. The researcher asked the participant by starting a short conversation so that the researcher was able to know whether the participants qualified the inclusion criteria. After that the researcher handed the self-administration questionnaire to the participant to fill out.

3.3.2 Sleep Quality: 19 questions

Pittsburgh Sleep Quality Index (PSQI) was developed by Buysee and colleaques, 1989. It is standardizing self-administered questionnaire to measure the overall sleep quality during the past 1 month of the participant. The questionnaire contains 10 items with 4 questions in each domain consist of Not during the past month-0, Less than once a week-1, Once or twice a week-2, and Three or more times a week-3. The questionnaire score is 0-21. The effective cut off point as 5. The participant who has score more than 5 was consider as poor sleep. Each item of the total 19 questions are belong to 7 components include sleep quality, sleep latency, sleep duration, habitual sleep efficacy, sleep disturbances, sleep

medication use, and daytime dysfunction over the last month. Sum score of all components will be calculated as sleep quality.

In this research will base on PSQI Thai version by Tullaya Sitasuwan and team, 2014. They did the test-retest reliability (intraclass correlation coefficient = 0.89). The researcher did ask the permission to use the PSQI Thai version already.

3.4 Data collection

The design of the data collection was self-administration questionnaire. Before collecting data, the researcher sent the letter to inform each office that the research was collected the data from their officers. Ethical approval obtained from The Ethics Review Committee for Research Involving Human Research Subject, Health Science Group, Chulalongkorn University.

3.5 Data analysis

3.5.1 To describe demographic characteristic, covariate factors, the prevalence of who had stress and poor sleep quality among police officers. The research used the descriptive statistical to analyze the data.

3.5.2 To determine the association between demographic characteristic, covariate factors and sleep quality among police officers. The researcher used the bivariate statistics as inferential statistic to find the association between those factors.

4. Results

In this research, there are 244 participants, 205 were males (84%) and 39 were females (16%). The participant age range in this research conclude as 20-60 years old. The majority age groups are 41-60 years old. Almost participants were about 54.1% graduated in bachelor's degree, 26.2% in high school, 11.1% were higher than bachelor's degree, and 8.6% were diploma. More than 75.4 of participants were married, 13.1% are single, 9% are divorce, and 2.5% are widow accordingly. A major monthly income was more than 30,000 which was about 45.9%, 20,001-30,000 was about 44.3%, 10,001-20,000 was about 9%, and less than 10,000 was 0.8%. Left over money from monthly income found that mostly 77.5% were less than 10,000 and 22.5% more than 10,000. In term financial problem, almost participant trend to have problem about not enough money for collected. Almost of participant don't do over time work (60.5%) and have participant do over time work only 39.5%. Almost of participant that don't do part time work was about 69.3%, but have participant do part time work were 30.7%.

In this research, there are 244 participants, 205 were males (84%) and 39 were females (16%). The participant age range between 20-60 years old. The majority age groups are 41-60 years old. Almost participants were about 54.1% graduated in bachelor's degree, 26.2% in high school, 11.1% were higher than bachelor's degree, and 8.6% were diploma. More than 75.4% of the participants were married, 13.1% are single, 9% are divorce, and 2.5% are widow accordingly. A major monthly income was more than 30,000 bahts which was about 45.9%, 20,001-30,000 bahts (44.3%), 10,001-20,000 bahts (9%), and less than

10,000 bahts was 0.8%. Left over money from monthly income 77.5% were less than 10,000 and 22.5% more than 10,000. In term of financial problem, almost participant trend to have problem about not have enough money for collection. Almost of the participant do no work overtime work (60.5%) and the participant work over time only 39.5%. More than half of the participant do not work part time ,69.3%, however some of the participants need to work part time (30.7%).

The covariate factor that effect to sleep quality of 244 police, found that almost of participant don't drink energy drink (67.2%) but drink energy drink (32.7%). The frequency of energy drink, almost of participants drink energy drink 1 week/time was about 15.2%, followed by drink energy drink 2-3day/time (13.9%), and drink every day (3.7%). For quantity of energy drink, most of the participant drink energy drink 1-2 bottle/time (27.9%) and drink energy drink 3-4 bottle/time (4.9%). In caffeine drink part, most of participant drink caffeine was about 81.9% and don't drink caffeine was about 18.1%. For the frequency of caffeine drinks, majority if participants drink caffeine drink every day was 57.8%, followed by drink caffeine 2-3 day/time (13.9%), and drink caffeine 1 week/time (9%). The quantity of caffeine drink, most of participants drink 1 glass/day (71.3%), drink 2 glass/day (7%), drink 3 glass/day (2.9%). For the time to drink caffeine drink that almost participants drink in morning (58.2%), followed by drink in afternoon (18.9%), drink in night (2.6%), and drink in evening (0.8%). Type of caffeine drink, almost of participants drink coffee (70.5%), drink tea was about 9.8%, and drink sparkling water was 0.8%. In smoking behavior part, majority of participants don't smoke 81.6% and smoke was 18.4%. The frequency of smoke, most of them smoke every day was about 7.8%, Often smoke but not every day (6.6%), smoke less than 1 week (2.5%), and smoke 1-2 day/week (1.6%). The quantity of smoke, most of participants smoke 2-5 roll/day (6.6%), followed by smoke more than 20 roll/day (4.9%), smoke 11-20 roll/day (3.3%), smoke 6-10 roll/day (2.8%), and smoke 1 roll/day (0.8%). Alcohol drinking behavior part, most of participants occasionally drink alcohol was 65.2%, often drink alcohol was about 9%, and don't drink alcohol was 25.8%. The frequency of alcohol drinking that showed almost of participant often drink alcohol but not every day was about 27%, followed by drink alcohol 1-2 days (24.2%), drink alcohol less than 1 week (21.3%), and drink alcohol every day (0.8%). The quantity of alcohol drinking, most of participant drink 2-5 glass was 28.7%, drink alcohol 1 glass (16%), drink alcohol more than 10 glass (15.2%), and drink alcohol 6-10 glass (10.7%). In exercise part, showed result almost participants exercise was 83.2% and don't exercise was 16.8%. The frequency of exercise of participants, majority of them exercise 3-4 day/week (41.8%), exercise 1-2 day/week (28.3%), exercise 5-7 day/week (13.1%). Most of participants exercise more than 30 minute/day (61.9%) and less than 30 minute/day (21.3%).

The result from sleep quality assessment (Sleep Quality Index (PSQI)). An estimate 50.8% mentioned that they had a poor sleep quality and 49.2% had a good sleep quality.

Subjective sleep quality

Table 1 Subjective sleep quality of police (N=244)

Sleep quality	Number	Percent
Very good	219	89.8
Fairly good	13	5.3
Fairly bad	9	3.7
Very bad	3	1.2

Most of participants was assesses subjective sleep quality indicated that 89.8%, very good sleep quality, 5.3% fairly good, 3.7% fairly bad, and 1.2% very bad as Table 1.

Subjective sleep latency

Table 2 Subjective sleep latency of police (N=244)

Sleep latency	Number	Percent
No difficulty	85	34.8
Mild difficulty	112	45.9
Moderate difficulty	41	16.8
Severe difficulty	6	2.5

For subjective of sleep latency, it refers to the length of time that it takes to accomplish the transition from full wakefulness to sleep. This subjective was measured by the duration that it takes you to falls asleep each night and during the past month, how often have you had trouble sleeping because you cannot get to sleep within 30 minutes. As descriptive analysis found that mild difficulty (45.9%) to sleep latency was presented among police officers, 34.8% no difficulty, 16.8% moderate difficulty, and 2.5% severe difficulty to sleep latency as shown Table 2.

Subjective sleep duration

Table 3 Subjective sleep duration of police (N=244)

Subjective sleep duration	Number	Percent
>7 hours	115	47.1
6-7 hours	77	31.6
5-6 hours	35	14.3
<5 hours	17	7.0

Sleep duration was measured by the duration of actual sleep did you get at night during the past month. Mostly of participants sleep duration more than 7 hours with 47.1%, 31.6% sleep 6-7 hours, 14.3% sleep 5 – 6 hours, and sleep < 5 hours as 7% Table 3.

Subjective habitual sleep efficiency

Table 4 Subjective habitual sleep efficiency of police (N=244)

Subjective habitual sleep efficiency	Number	Percent
No difficulty (> 85%)	235	96.3
Mild difficulty (75 – 84%)	8	3.3
Moderate difficulty (65 – 74%)	0	0
Severe difficulty (< 65%)	1	0.4

For subjective habitual sleep efficiency was calculated by number of hours slept/Number of hours spent in bed) x 100. Mostly 96.3% no difficulty of habitual sleep

efficiency (>85%), 2.9% mild difficulty (75 – 84%), 0.4% severe difficulty (65 – 74%) and no one have severe difficulty habitual sleep efficiency (<65%) as Table 4.

Subjective sleep disturbances

Table 5 Subjective sleep disturbances of police (N=244)

Sleep disturbances	Number	Percent
No difficulty	16	6.6
Mild difficulty	168	68.9
Moderate difficulty	51	20.9
Severe difficulty	9	3.7

Sleep disturbances was measured by during the past month, how often have you had trouble sleeping because you cannot get to sleep within 30 minutes, wake up in the middle of the night or early morning, have to get up to use the bathroom, cannot breathe comfortably, cough or snore loudly, feel too cold, feel too hot, have bad dreams, and have pain. Mostly 68.9% mild difficulty to sleep, 20.9% moderate difficulty to sleep, 6.6% no difficulty and 3.7% have severe difficulty sleep disturbances as Table 5.

Subjective use of sleeping medication

Table 6 Subjective use of sleeping medication of police (N=244)

Subjective use of sleeping mediation	Number	Percent
Not during the past month	220	90.2
Less than once a week	18	7.4
Once or twice a week	6	2.5
Three or more times a week	0	0

Mostly of participants use sleeping mediation not during the past month with 90.2%, 7.4% use sleeping medication less than once a week, 2.5% use sleeping medication ones or twice a week, and no one use sleeping mediation three or more times a week Table 6.

Subjective daytime dysfunction

Table 7 Subjective daytime dysfunction of police (N=244)

Daytime dysfunction	Number	Percent
No difficulty	88	36.1
Mild difficulty	133	54.5
Moderate difficulty	21	8.6
Severe difficulty	2	0.8

Daytime dysfunction was assessed by the sum of How often have you had trouble staying awake while driving, eating meals, engaging in the social activity and How much of a problem has it been for you to keep up the enthusiasm to get things done during the past month. Most of participants 54.5% mild difficulty to sleep, 36.1% no difficulty to sleep, 8.6% moderate difficulty to sleep, and 0.8% severe difficulty to sleep because of daytime dysfunction.

Overall sleep quality

Table 8 Overall sleep quality of police (N=244)

Sleep quality	Number	Percent
Good	120	49.2
Poor	124	50.8

Part 5 is about the sleep quality assessment. An estimate 50.8% mentioned that they had a poor sleep quality and 49.2% had a good sleep quality as Table 8.

The socio-demographic and sleep quality of the present sample were listed. Among 244 study participants, 205 (84%) were male and 39 (16%) were female which were assessed poor sleep quality by PSQI indicating more than 5 score. However, gender was not significantly associated to sleep quality. The majority of age were 41-60 years old was about 199 (81.5%) and 20-40-year-old was 45 (18.4%). There were police that age 41-60 years old have poor sleep quality about 52.8% and have good sleep quality was about 47.2%. Police who age 20-40 years old have good sleep quality about 57.8% and have poor sleep quality 42.2%. Age was not significantly associated to sleep quality. For education level, there were 217 police had education in bachelor's degree or lower were 124 police, 111 police (51.2%) was assessed to good sleep quality but have 106 police (48.8%) was assessed to poor sleep quality. There were 27 police had education in higher than bachelor's degree level, 9 police (33.3%) was assessed to good sleep quality and 18 police (66.7%) was assessed to poor sleep quality. In marital status, married people were assessed poor sleep quality 94 people (51.1%) and good sleep quality 90 people (48.9%). While unmarried 30 police (50.0%) were assessed good sleep quality and 30 police (50.0%) as poor sleep quality. Marital status was not significantly associated to sleep quality. In financial part, the majority of monthly income were less than 10,000-30,000 baht, 72 police (54.5%) was assessed to good sleep quality but 60 police (45.5%) was assessed poor sleep quality. 112 participants have monthly income more than 30,001 baht. 64 police (57.1%) was assessed to poor sleep quality but 48 police (42.9%) was assessed to good sleep quality. Thus, monthly income was not significantly associated to sleep quality. Most of the left-over money was 0-10,000 bath, 100 police (52.9%) was assessed to poor sleep quality but 89 police (47.1%) was assessed to good sleep quality. The participants who have left over money was more than 10,000 baths, 31 police (56.4%) was assessed to good sleep quality but 24 police (43.6%). Left over money status, there were 90 police (57.7%) that had enough left-over money was assessed to good sleep quality but there were 66 police (42.3%) that had enough left-over money was assessed to poor sleep quality. There were 58 police (65.9%) that had not enough left-over money was assessed poor sleep quality but there were 30 police (34.1%) that had not enough left-over money was assessed good sleep quality. Left over money was significantly associated to sleep quality.

The covariate factor and sleep quality that showed result from participants 244 people that showed almost of participant don't do over time work was 155 (63.5%) and do the overtime work 89 (36.5%). There were police that do over time 1-2 days/week have poor sleep quality about 28 (60.9%) and have poor sleep quality about 18 (39.1%). Police who do over time more than 2 days that have poor sleep quality was about 27 (58.7%) and have good sleep quality was 19 (41.3%). There were police that do over time work 3 hours or more than

3 hours that have poor sleep quality was about 29 (58%) and have good sleep quality was 21 (42%). Police do over time work less than 3 hours have poor sleep quality was about 26 (61.9%) and have good sleep quality 16 (38.1%). The majority of participants don't do part time work was about 169 (69.3%), 88 police (52.1%) was assessed to good sleep quality but 81 police (47.9%) was assessed to poor sleep quality. There were 75 (30.7%) do part time work, 43 police (57.3%) was assessed to poor sleep quality but had 32 police (42.7%) was assessed to good sleep quality. Part time work was not associated with sleep quality. For energy drink, there were 164 participants (67.2%) don't drink energy drink but there were 80 participants (32.8%) drink energy. Frequency of energy drink, most of participant drink energy drink 1 week/time 46 (64.8%) was assessed to poor sleep quality and 25 (35.2%) was assessed to good sleep quality. The quantity of energy drink, most of participant drink energy drink 1-2 bottle/week 45 (66.2%) was assessed to poor sleep quality and 23 (68%) was assessed to poor sleep quality. There were 12 police drink energy drink 3-4 bottle, 7 (58.3%) was assessed to poor and good sleep quality. Smoking, the majority of participants don't smoke 199 (81.6%) and smoking 5 (41.7%). For smoking frequency, most of participants often smoke was about 26 police, 14 (53.8%) was assessed to good sleep quality and 12 (46.2%) was assessed to poor sleep quality. There are 19 police that smoke every day, 15 (78.9%) was assessed to poor sleep quality but 4 (21.1%) was assessed to good sleep quality. The quantity of smoke, almost of participants smoke 1-10 roll was about 24 police, 14 (58.3%) was assessed to good sleep quality but 10 (41.7%) was assesses to poor sleep quality. There are 21 police smoke more than 10 roll/day, 17 (80.9%) was assessed to poor sleep quality but 5 (23.8%) assessed to good sleep quality. That showed who smoking high quantity was associated to poor sleep quality. Alcohol consumption, the majority of participants drink alcohol 181 (74.2%) and don't drink alcohol about 63 (25.8%). The frequency of alcohol drinking, most of them drink less than 7 days/week was about 112 (50%), 72 (64.3%) was assessed to good sleep quality and 40 (35.7%) was assessed to poor sleep quality. The participant that often drink alcohol or drink 7 days/week about 68 (27.8%), 41(60.3%) was assessed to poor sleep quality and 27 (39.7%) was assessed to good sleep quality.The quantity of alcohol drinking, most of them drink 1-5 glass/time was about 109 (44.6%), 64 (58.7%) was assessed to good sleep quality and 45 (41.3%) was assessed to poor sleep quality. The participant that drink more than 5 glass was 63 (25.8%), 34 (54%) was assessed to poor sleep quality but 29 (46%) was assessed to good sleep quality. In exercise part, majority of participants exercise 203 (90.6%) and 41 (16.8%) don't exercise. Most of participant exercise more than 30 minute/day was about 151 (61.9%), 76 (50.3%) was assessed to poor sleep quality, 75 (49.7%) was assessed to good sleep quality. Almost participants exercise more than 2 days/week was about 134 (54.9%), 70 (52.2%) was assessed to good sleep quality but 64 (47.8%) was poor sleep quality.

5. Conclusion

The study found that 50.8 percent of police in Mueang District, Phrae Province, Thailand had reported poor sleep quality with PSQI score > 5. The study found that poor sleep quality was associated with several factors including left over money status, work place, over time work, energy drink, caffeine drink, smoking. Therefore, public health should

have strategic development policy by promoting for health behavior to prevent health effects among these police officers.

Reference

Akololo, J. (2011). Kenya Police Demoralized. Kenya Broadcasting Corporation. Nairobi Kenya

Anshel, M. H. (2000). A conceptual model and implications for coping with stressful events inpolice work. Criminal Justice and Behavior, 27 (3), 375.

Atkinson, G., & Davenne, D. . (2007). Relationships between sleep, physical activity and human health. Physiology & Behavior. 90(0), 229–235

Better-Sleep-Guide.com. Benefit of Sleep. Retrieved from http://better-sleep-guide.com/benefits-of-sleep

Buysse DJ, R. C. (1990). Insomnias. In: Thorpy MJ, ed. Handbook of Sleep Disorders. New York. Marcel Dekker Inc (375-433).

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry research, 28(2), 193-213., 28(2), 193-213.

Drake, C., Roehrs, T., Shambroom, J., & Roth, T. (2013). Caffeine effects on sleep taken 0, 3, or 6 hours before going to bed. J Clin Sleep Med, 9(11), 1195-1200.

Gresham, S. C., Webb, W. B., & Williams, R. L. . (1963). Alcohol and caffeine: effect on inferred visual dreaming. Science, 140(3572), 1226-1227.

MacGregor ID, B. J. (1988). Bedtimes and sleep duration in relation to smoking behavior in 14 year old English schoolchildren. J Biosoc Sci, 20, 371-376.

Smith, A. (2015). US Smartphone Use in 2015. Retrieved from http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/

V. Lohsoonthorn, e. a. (2013). Sleep Quality and Sleep Patterns in Relation to Consumption of Energy Drinks, Caffeinated Beverages and Other Stimulants

Thai Health Promotion Foundation. Insomnia in Thai people Retrieved from http://www.thaihealth.or.th/Content/

Washington, D. C. U. S. D. o. H. a. H. S., National Institutes of Health, National Heart, Lung, and Blood Institute. (2011). Your guide to healthy sleep.

Palmer, C. D., Harrison, G. A., & Hiorns, R. W. . (1980). Association between smoking and drinking and sleep duration. Annals of human biology, 7(2), 103-107.

Penolazzi, B., Natale, V., Leone, L., & Russo, P. M. (2012). ., 58(3), 971-977. (2012). Individual differences affecting caffeine intake. Analysis of consumption behaviours for different times of day and caffeine sources. Appetite, 58(3), 971-977.

Phillips, B. A., & Danner, F. J. . (1995). Cigarette smoking and sleep disturbance. Archives of internal medicine, 155(7), 734-737.

Pierceall, E. A., & Keim, M. C. . (2007). Stress and coping strategies among community college students. Community College Journal of Research and Practice, 31(9), 703-712.

Pietrangelo A., W. S. (2014). Effects of Sleep Deprivation on the Body. Retrieved from http://www.healthline.com/health/sleep-deprivation/effects-on-body

Factors influencing Physicians' Decision to Join the Doctors to the Barrios Program: A Case Study

Louella Patricia D. Carpio, Sivill Anan L. Gelera, Daniel C. Villarico, RMT
Department of Epidemiology and Biostatistics, University of the Philippines – College of Public Health, Philippines

ABSTRACT

Understanding the motivations of physicians for rural deployment will potentially address workforce shortages in remote areas. Hence, this study explored the factors influencing the decision of physicians to apply to the Doctors to the Barrios (DTTB) program. This is a descriptive, exploratory mixed-method study. A total of 44 DTTBs responded to the self-administered online questionnaire. Almost all participants cited fulfillment and meaning (93.2%), desire to serve country (93.2%), and need for experience and adventure (90.9%) as their reason for joining the program. By contrast, family (13.6%), return service (13.6%), and financial benefits (27.3%) were the least agreed on reasons for joining the program. These results were compared with the qualitative data from FGD which elicited the following themes: uncertainty after medical school, medical education, peer influence, future career opportunities, and social media promotion. Similar to strategies of many nations, the DTTB program focuses on extrinsic factors of motivation, such as higher pay and benefits and postgraduate allowances. However, the current study showed that factors attracting physicians to the DTTB program are primarily non-monetary. Thus, medical institutions and policy makers should address a mix of factors that cultivate both the intrinsic and extrinsic factors of motivation.

Introduction

Health workforce shortages exists globally – in both developed and developing countries – which has potential serious implications for the health of people across the world. [1-2] In 2009, an estimated 7.2 million health workforce is lacking. In the Philippines, there are only 2,955 doctors, 4,374 nurses, and 16,857 midwives in public health facilities.[3] These numbers, when proportioned to the Philippine population, fail to meet the target ratios. Aside from workforce shortages, there are growing disparities of maldistribution of workforce. Three regions, NCR, Region III and IVA – all of which are highly urbanized – have higher proportions of health workers than remote regions like those in Mindanao.[3]

On the background of the devolution of health services in 1991, Local Government Units (LGU) with low annual incomes were unable to recruit and hire doctors to work in their municipalities. Hence, in 1993, the Doctors to the Barrios (DTTB) was created to address the lack of physicians in remote rural areas in the Philippines.[4] The DTTB program aimed to deploy doctors to doctorless municipalities to work as Municipal Health Officers (MHO) or Rural Health Physicians (RHP). The benefits of the program include a competitive salary (17,125.14 USD annually); allowance for board, lodging, and food from assigned municipality; Master's degree in public management with a major in health systems and development; opportunities for further training on public health updates; benefits enumerated in the Magna Carta for Health Workers; hazard pay; representation and transportation allowance; and opportunities for travel and service.[4] As of present, there are 35 batches of doctors deployed to various remote communities.

Though there are programs to alleviate the workforce shortages in LGUs, there still are many unfilled government positions for physicians in rural and low-income areas. Some doctors will find these areas unattractive due to long and irregular working hours, isolation from medical colleagues, and the absence of incentives to stay in these areas.[3] New doctors face different choices of practices – where to practice, what specialty to practice, or how to practice. The Philippine Department of Labor and Employment noted that new doctors are more likely to take salaried jobs in group medical practices, clinics and health networks.[5]

The decisions made by new physicians where to establish their career are influenced by personal, economic, familial, cultural, and environmental factors. A review from developed countries showed that health professionals from a rural background are more likely to practice in rural areas.[6] In low- and middle-income countries, the factors influencing physicians to work in rural and remote areas include: a rural background, training in rural areas with a community-based curriculum, early exposure to community during medical training, and rural location of medical school.[7] In the Philippines, a former study conducted among former DTTBs cited the return service requirement as the main reason for joining the program.[8]

Overall, there is no single intervention that could adequately address the effective recruitment of physicians because factors vary over regions and countries. It is then suggested that further evaluation of interventions is needed in order to specifically target the needs of physicians in different countries.[9-10] While there are available pieces of evidence on geographical maldistribution of health workers and factors influencing health worker preferences, understanding the motivations of physicians will further assist medical educators, researchers and policy makers to more effectively structure the educational

experiences of future physicians. Furthermore, addressing the known attraction factors will potentially address human resource shortages in remote areas. Hence, this study aims to explore the factors influencing the decision of physicians to apply to the Doctors to the Barrios Program. Specifically, it aims to describe the characteristics of physicians who were recruited in the DTTB program and to enumerate the factors influencing the decisions of physicians to apply under the program.

Methodology

This is a descriptive, mixed-method study which explored the factors influencing attraction to the DTTB program. A cross-sectional study was utilized for the quantitative data, while a focus group discussion (FGD) was conducted for the qualitative data. DTTBs from Batch 34 and 35 (2016 and 2017 recruitment) were recruited for the study through purposive sampling.

The development of the questionnaire was based on the review of literature. In addition, an explorative FGD was conducted among former DTTBs. Three (3) former DTTBs who were graduates from 2013, 2014 and 2015 participated in the FGD. They also provided inputs on how the questionnaire can be improved. After considering the responses from the FGD, a revised questionnaire was pre-tested to a group of another DTTB alumni. A reliability resting done through STATA 12.0 resulted to a Cronbach's alpha of 0.6866. The questionnaire may be answered in 5 – 10 minutes and has a part for introduction and instruction. It has three parts: a Likert scale to score their agreement to the factor being studied as an influencing, a ranking among 10 selected factors, and an open-ended question on other factors they considered. The pre-tested questionnaire was then fielded to the DTTB through online invitation through their course coordinators.

The qualitative data was derived from the focus group discussions of former DTTBs. A focus group discussion guide with inquiries on factors affecting physician recruitment was developed by the investigators. The results of the quantitative data were substantiated by excerpts from the qualitative data.

Subsequent descriptive statistics was done for the quantitative data, while content analysis and frequencies were done to analyze the quantitative data.

Ethical considerations

A permission from the Department of Health – Health Human Resource Development Bureau was obtained prior to pre-testing and fielding the questionnaire. The online survey is answered voluntarily. An informed consent was obtained from the participants of the FGD prior to recording of responses.

Results

A total of 44 out of 207 DTTBs responded to the self-administered questionnaire by google docs (Table 1). The mean age of the participants was 29 years old. Most were male (61.36%) and single (93.18%). Although almost of their residences are from provinces (72.73%), majority had education in NCR (72.73%). Only one fourth of the participants had a

return service requirement (27.27%). Since the participants are the most recent DTTBs, most are deployed for 1-2 years only (97.62%), and have no previous employment (61.36%).

When the participants were asked to agree on which factors influenced their decision to join the program, almost all participants cited fulfillment and meaning, desire to serve country, and need for experience and adventure as their reason for joining the program. By contrast, family, return service, and financial benefits were the least agreed on reasons for joining the program (Table 2).

Table 1. Demographic Characteristics of Participant Doctor to the Barrios in the Philippines, 2018

Variables	Frequency, (%) N = 44	Mean (SD)
Age		28.97 (3.76)
Sex		
Male	27 (61.36)	
Female	17 (39.53)	
Civil Status		
Married	3 (6.98)	
Single	41 (93.18)	
Residence		
NCR	12 (27.91)	
Non-NCR	32 (72.73)	
Medical School		
NCR	32 (72.73)	
Non-NCR	12 (27.27)	
Return Service		
With	12 (27.27)	
None	32 (72.73)	
Years Deployed		
1	17 (40.48)	
2	24 (57.14)	
3	1 (2.38)	
Previous employment		
With	17 (38.64)	
Without	27 (61.36)	

Table 2. Factors Influencing Recruitment to the Doctors to the Barrios Program Among Participant Doctor to the Barrios, 2018

Factors	Number who agree or strongly agree n, (%)	Number who disagree or strongly disagree (n, %)
Family	6 (13.6%)	38 (86.4%)
Peers	14 (31.8%)	30 (68.2%)
Proximity to Residence	19 (43.2%)	25 (56.8%)
Fulfilment and meaning	41 (93.2%)	3 (6.8%)
Medical School	28 (63.6%)	16 (36.4%)
Serve country	41 (93.2%)	3 (6.8%)
Financial benefits	12 (27.3%)	32 (72.7%)
Return service	6 (13.6%)	38 (86.4%)
Master's Degree	30 (68.2%)	14 (31.8%)
Future Career	33 (75.0%)	11 (25.0%)

Public Health Interest	35 (79.5%)	9 (20.5%)
Experience and adventure	40 (90.9%)	4 (9.1%)

Table 3. Ranking of Factors Influencing Recruitment to the Doctors to the Barrios Program

Factor	Average Rank	Ordered Rank
Fulfillment and Meaning	3.59 (3.20)	1
Desire to Serve Country	4.28 (3.15)	2
Financial Benefits	4.81 (2.36)	3
Master's Degree	4.83 (2.38)	4
Need for Experience	4.88 (2.60)	5
Medical Education	5.55 (2.54)	6
Proximity to Residence	6.14 (3.10)	7
Family and Peer Influence	6.51 (2.91)	8
Prestige	6.63 (2.92)	9
Return of Service	7.25 (3.50)	10

In contrast, on the overall ranking of factors, fulfillment and meaning and the desire to serve the country remained as most influential. However, compared to the previous table, financial benefits and master's degree were ranked third and fourth respectively. Family and peer influence, prestige, and return service were ranked least. The other factors ranked in the middle include the need for experience, medical education and proximity to residence.

When probed on other factors of DTTB attraction in the questionnaire, 4 responded that they need a break from the hospital, 2 responded that DTTB is at least a compromise of community medicine with decent pay, and 2 were then undecided on which residency program to take.

From our qualitative data, we noted the following themes: uncertainty after medical school, medical education, peer influence, future career opportunities, and social media promotion (Table 4). However, these factors which were noted with the qualitative data did not match that of the quantitative data. It may be possible that the participants in the FGD vary in characteristics compared to the study population of the questionnaire. This is likely because 2 out of the 3 participants in the FGD have return service requirements as compared to the study population of the questionnaire. Furthermore, even the qualitative data showed inconsistencies such as one responded that her medical school was influential to exposing her to community medicine, while the two other respondents their medical school was not influential. They most agreed on DTTB as an edge, or a stepping stone for future career plans like a residency in the Philippine General Hospital, an item in the Department of Health, or for application in an international NGO like Medicine Sans Frontier.

We conducted a cost analysis to compare the possible benefits of a DTTB compared to a new physician who decided to take a residency training program in a government facility (Table 5). The financial benefits of DTTBs are further highlighted in Table 5, with a notable difference in the salaries and lesser monthly expenses. The salaries were based on the payment slip of a Philippine General Hospital first year resident and the memorandum by DOH for DTTB application. For the estimates on monthly expenses, a current DTTB and a current first year resident in PGH were both interviewed. The marked difference in the salary is a form of financial incentive for recruitment. On the other hand, the lower monthly expenses were attributed to the lower cost of living for those living in provinces, and the provision of basic needs by the municipality leaders, patients and other health workers.

However, based on the previous result from both the quantitative and the qualitative data, the financial benefit of the program is not one of the main factors attracting physicians.

Table 4. Themes on factors Influencing Recruitment to the Doctors to the Barrios Program Among Focus Group Discussion Participants, 2018

Themes	Excerpts
Uncertainty	"instead of getting moonlight jobs, I'd rather be a DTTB"
Medical education	"When I was a student, there was a community medicine coordinator who encouraged us to immerse in remote areas"
	"I had batchmates who had early immersion since first year of medical school so they were probably encouraged"
	"school did not influence me that much (on my decision)"
Peers	"I only learned it from my classmates"
Future career opportunities	"there was a part of me who wants to be an MSF (Medicin Sans Frontier) in the past, and then I realized that DTTB is good for the 2-year requirement in public health"
	"there is an edge if they know you were a DTTB and you applied in DOH (Department of Health)"
	"I thought that if will apply as DTTB, there is a higher chance for me to be accepted in PGH (Philippine General Hospital residency program) because they'll know we have a higher level of stress tolerance"
Social media promotion	"I was able to recruit through Facebook posts"
	"it really helped that there is a website available for everyone"

Table 5. Cost difference (in USD) of a DTTB versus a Medical Officer III physician in a Government Facility, 2018

		DTTB	MO III
Salary (monthly)		1,427.09	1023.01
Magna carta benefits[11]	Hazard Pay (10% of monthly)	142.71	102.3
	Subsistence	29.20	29.20
	Laundry allowance	2.92	2.92
P.E.R.A.[a]		38.94	38.94
R.A.T.A.[b]		97.35	97.35
Total monthly compensation		1,738.22	1,072.01
with tax deductions		1,485.15	1,023.01
Additional per year compensation			
Mid year bonus		1,427.09	1,023.01
Year end bonus		1,427.09	1,023.01
Performance Enhancement Incentive		97.35	97.35
cash gift		97.35	97.35
clothing allowance		97.35	97.35
Total other income		3,146.23	2,338.05
Total Annual Income		24,004.84	16,694.40
with tax deductions		20,968.07	15,202.17
Monthly Spending			
Transportation		9.73	58.41
Lodging		-	233.63
Food		38.94	116.82
Communication		19.47	19.47
		68.14	408.86

Additional Expenses			
Masters	24 units per year	Free	467.27

[a]Personnel Economic Relief Allowance, [b]Representation and Transportation Allowance

Discussion

A new physician is faced with questions on what to practice, where to practice, and how to practice. New doctors are much less likely to enter solo practice and more likely to take salaried jobs in group medical practices, clinics, and health networks.[5] While financial and existential considerations matter, studies on motivation may account for their commitment to a decision for a practice. Motivation are forces coming from within the person that account, in part, for the willful direction, intensity and persistence of the person's efforts towards achieving specific goal[28]. On the other hand, work motivation psychological processes that direct, energize, and maintain action toward a job, task, role, or project[12].

Furthermore, there are many different theories and models coming from different disciplines which attempt to explain the factors impacting workforce mobility. Some of this include the Neoclassic Wage theory[29], which suggest that the choice is driven largely by financial motives and by the probability of finding employment. Behavioral theories, such as that of Maslow and Herzberg point an emphasis on job satisfaction. Herzberg used the term motivators for factors that cause job satisfaction at work and hygiene as job factors which are merely maintenance factors to avoid dissatisfaction at work. In health workforce mobility relating to international migration, factors have been categorized into "pull" and "push" factors which attract individuals to a new destination. Pull factors are identified as those which attract individuals to a new destination, which may include higher income, better living conditions[30].

In our study, we identified that fulfillment and meaning, and the desire to serve the country are the primary reasons for joining the DTTB program. These are both intrinsic motivational needs. These factors are very much expressed in Maslow's hierarchy of needs, which suggests that people eventually work to satisfy increasingly complex longings from physiologic to that of a need of morality, creativity and truth. Furthermore, this is consistent with a study among medical officer recruitment in rural areas of India. In this study, the medical officers place significantly more importance to intrinsic factors than extrinsic factors. Among the intrinsic factors are job security, respect and recognition[31].

In contrast to previous studies, our study results did not show "rural upbringing" as the most influential factor in physician choice for rural recruitment[32]. However, the qualitative data enumerated that shorter-term experiences such as rural immersions and an early exposure to community training may have encouraged physicians to consider the program. This is supported by international literature, in which clinical rotations in rural setting may influence the medical students' subsequent decision to work in the rural area. This, accordingly, creates more interest to work in the area[32].

Our study results also differed from a previous study in 2012 conducted among DTTBs, which identified factors on rural retention. Back then, more than half of DTTBs are in the program due to a return service requirement, and fulfillment and meaning in life was only answered by a few (4.2%)[33]. This discrepancy may have resulted from the difference in the study participants of the previous batch with the current batch. According to our FGD, most of the current DTTBs willfully joined the program without a return service or

scholarship. In addition, they also noted that the latest recipients of the PinoyMD and First gentlemen scholarships was batch 2015.

Another consideration, although not well studied, is that the current study participants may be part of the generation of millennials, which are branded as a purposed-driven generation. This may again be traced to the need for self-fulfillment based on Maslow's hierarchy of needs[32]. This is further supported by the fact that despite of the remarkable financial benefits of the program based on the costing conducted, this was not the main driver for attracting physicians to the DTTB.

We recognize, however, that there were potential systematic biases in our study design. First, there is a potential information and representation bias with the participants of the FGD. The FGD participants were only 3, and 2 of which had a return of service requirement. They may then have different views with the current participants of DTTBs. In addition, the limited number of FGD may be inadequate to exhaust all possible factors. Third, only 44 out of the 207 current DTTBs responded, which may present as selection bias. Fourth, the costing analysis was based on interviews with close contact DTTB and MO III resident. Hence, the cost may not be representative of the current DTTB or MO III expenses. Furthermore, the benefits received by DTTBs and residents vary per LGU or per hospital. There are benefits from the national insurance or allowances from LGU which may not have been considered.

Conclusion

There is limited evidence in literature on strategies that work best to address the health workforce shortage in the Philippines. Similar to strategies of many nations, the DTTB program focuses on extrinsic factors of motivation, such as higher pay and benefits and postgraduate allowances. However, the current study showed that factors attracting physicians to the DTTB program are primarily non-monetary. Thus, addressing the motivations of physicians will require a mix of factors to cultivate the intrinsic and extrinsic factors of motivation. Hence, medical educators and policy makers may consider restructuring their program to be more rural-oriented.

References

1. World Health Organization. Global health workforce shortage to reach 12.9 million in coming decades. [Online] 2013 [cited 2018 November 30]. Available from: https://www.who.int/mediacentre/news/releases/2013/health-workforce-shortage/en/.

2. Joint Learning Initiative. Human resources for health: overcoming the crisis. Cambridge, MA: Harvard University Press; 2004.

3. Romualdez AG, dela Rosa JFE, Flavier JDA, Quimbo SLA, Hartigan-Go KY, Lagrada LP et al. The Philippines health system review. World Health Organization, Regional Office for the Western Pacific; 2011

4. Doctors to the Barrios (DTTB). [Online] *nd* [cited 2018 November 30]. Available from: http://doctorstothebarrios.com/about/

5. Department of Labor and Employment. Career Guide: Occupational Information on in-demand and hard-to-fill occupations. Manila, Department of Labor and Employment; 2008

6. Dolea C, Stormont L, Braichet JM. Evaluated strategies to increase attraction and retention of health workers in remote and rural areas. Bull World Health Organ; 2010;88:379-385

7. Budhathoki SS, Zwanikken PAC, Pokharel PK, Scherpbier AJ. Factors influencing medical students' motivation to practise in rural areas in low-income and middle-income countries: a systematic review. BMJ Open 2017; 7:e013501

8. Leonardia JA, Prytherch H, Ronquillo K, Nodora RG, Ruppel A. Assessment of factors influencing retention in the Philippine National Rural Physician Deployment Program. BMC health services research. 2012; 12: 411

9. Verma P, Ford JA, Stuart A, Howe A, Everington S, Steel N. A systematic review of strategies to recruit and retain primary care doctors. BMC Health Serv Res. 2016;16(1):126

10. 20. Yong, J Scott A, Gravelle H, Sivey P, McGrail M. [Online] 2018 August 14 [cited 1 December 2018]. Do Rural Incentives Payments Affect Entries and Exits of General Practitioners? Social Science & Medicine. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0277953618304386

11. Department of Heath. Magna Carta of Public Health Workers. Manila. [Online] nd [cited 1 December 2018] Available from: https://pcw.gov.ph/law/republic-act-7305 1992.

12. Yong, J Scott A, Gravelle H, Sivey P, McGrail M. [Online] 2018 August 14 [cited 1 December 2018]. Do Rural Incentives Payments Affect Entries and Exits of General Practitioners? Social Science & Medicine. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0277953618304386

13. Department of Heath. Magna Carta of Public Health Workers. Manila. [Online] nd [cited 1 December 2018] Available from: https://pcw.gov.ph/law/republic-act-7305 1992.

14. World Health Organization. Primary Health Care (PHC). [Online] nd [cited 1 December 2018]. Available from: http://www.who.int/primary-health/en/

15. World Health Organization. A Universal Truth: No health without a workforce. [Online] nd [cited 1 December 2018]. Available from: http://www.who.int/workforcealliance/knowledge/resources/GHWA-a_universal_truth_report.pdf

16. World Health Organization. World Bank and WHO: Half the world lacks access to essential health services, 100 million still pushed into extreme poverty because of health expenses. [Online] nd [cited 1 December 2018]. Available from: http://www.who.int/news-room/detail/13-12-2017-world-bank-and-who-half-the-world-lacks-access-to-essential-health-services-100-million-still-pushed-into-extreme-poverty-because-of-health-expenses

17. Rosenblatt RA, Hart LG. Physicians and rural America. West J Med 2000; 173:348–51

18. Blumetithal, D. S. Geographic Imbalances of Physician Supply: An International Comparison. The Journal of Rural Health; 1994;10(2), 109–118

19. Hagopian A, Ofosu A, Fatusi A, Biritwum R, Essel A, Gary Hart L, et al. The flight of physicians from West Africa: views of African physicians and implications for policy. Soc Sci Med. 2005;61(8):1750–60

20. Hou J, Ke Y, Addressing the shortage of health professionals in rural China: issues and progress. 2015; 13(4): 327-328

21. World Health Organization. Increasing access to health workers in remote and rural areas through improved retention: Global policy recommendations. [Online] nd [cited 1 December 2018] https://www.who.int/hrh/retention/guidelines/en/

22. Salafsky B, Glasser M. Addressing issues of maldistribution of health care workers. Ann Acad Med Singapore. 2005 Sep; 34(8): 520-6

23. Rourke J, Strategies to increase the enrolment of students of rural origin in medical school: recommendations from the Society of Rural Physicians of Canada, Canadian Medical Association Journal, 2005; 172(1): 62-65

24. Vernon Curran & James Rourke (2004) The role of medical education in the recruitment and retention of rural physicians, Medical Teacher, 26:3, 265-272

25. World Health Organization. How can medical schools contribute to the education, recruitment and retention of rural physicians in their region? [Online] nd [cited 1 December 2018]. Available from: http://www.who.int/bulletin/volumes/88/5/09-073072/en/

26. Rourke J. Increasing the number of rural physicians, Canadian Medical Association Journal, January 29, 2008 178 (3) 322-325

27. Debra L. Scammon, Scott D. Williams & Larry B. Li (1995) Understanding Physicians' Decisions to Practice in Rural Areas as a Basis for Developing Recruitment and Retention Strategies, Journal of Ambulatory Care Marketing, 5:2, 85-100

28. Verma P, Ford JA, Stuart A, Howe A, Everington S, Steel N. A systematic review of strategies to recruit and retain primary care doctors. BMC Health Serv Res. 2016;16(1):126

29. Han BH. Therapy of Social Medicine. English ed. Singapore: Springer; 2016.

30. Grant AM, Shin J. Work motivation: Directing, energizing, and maintaining effort (and research). Ryan RM, editor. Oxford handbook of motivation. England:Oxford University Press; 2011: 2

31. Leonardia JA, Prytherch H, Ronquillo K, Nodora RG, Ruppel A. Assessment of factors influencing retention in the Philippine National Rural Physician Deployment Program. BMC health services research. 2012; 12: 411

32. Purohit B, Bandyopadhyay T. Beyond job security and money: driving factors of motivation for government doctors in India. Human resources for health. 2014

33. Hancock C, Steinbach A, Nesbitt T Adler S, Auerswald C. Why doctors choose small towns: A developmental model of rural physician recruitment and retention. Social Science & Medicine . 2009; (69):1368-1376.

Interrater and intra-rater reliability of the Short-form Physiological Profile Assessment (S-PPA) for community-dwelling people with stroke

Authors:

Tai-Wa Liu,[1, 2] MSc; Shamay S.M. Ng,[1] PhD

[1]Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hung Hom, HKSAR

[2] School of Nursing & Health Studies, The Open University of Hong Kong, Ho Man Tin, HKSAR

Tai-Wa Liu email address: twliu@ouhk.edu.hk

Background: The short-form Physiological Profile Assessment (S-PPA) is a physiological-oriented clinical measure for assessing fall risks comprising 5 individual test items: (i) Melbourne Edge Test, (ii) quadriceps muscle strength, (iii) hand reaction time, (iv) proprioception and (v) postural sway, and a composite score can be computed to indicate falls risk. However, the S-PPA has not been tested among people with stroke. This study aimed to examine the interrater and intra-rater reliability of the S-PPA among community-dwelling people with stroke.

Methodology: Fifty-six community-dwelling seniors (n = 56) with a history of stroke at least one year were assessed, in which 28 of them were assessed for intra-rater reliability and the remaining 28 of them were assessed for inter-rater reliability.

Results: The intraclass correlation coefficient (ICCs) for interrater and intra-rater for the S-PPS composite score was 0.83 (95% CI: 0.67-0.92, p<0.000) and 0.74 (0.51-0.87, p<0.001), respectively. The ICCs for the interrater reliability (ICC (2, 1)) of the individual items ranged from 0.56 (95% CI: 0.25-0.77, p=0.001) to 0.87 (95% CI: 0.74-0.94, p<0.001). For the intra-rater reliability ICC (3, 1), the individual items ranged from 0.58 (95% CI: 0.28-0.78, p<0.001) to 0.94 (95% CI 0.87-0.97, p<0.001).

Conclusions: The S-PPA is reliable to use for assessing the fall risks of patients with chronic stroke.

Key words:

Stroke, fall, fall risks

Oral Health behaviours in Portuguese School Young people: Effect of Health Education

Filipa Alexandra da Silva Fraga[1] & Amâncio António de Sousa Carvalho[2]

[1]Registered Nurse, Northeast Hospital Centre, Hospital Unit of Mirandela, Master in Community Health Nursing, Mirandela, Portugal, filipafraga_2@msn.com

[2]Adjunct Professor, Health School, University of Trás-os-Montes and Alto Douro (UTAD), Doctor in Child Studies, CIEC - Research Centre on Child Studies, Vila Real, Portugal, amancioc@utad.pt

Abstract

One of the main health problems of the juvenile population is the oral diseases due to their prevalence. These entail high economic costs and relevant health losses and should therefore be adequately prevented and treated early. The adoption of appropriate behaviours of oral hygiene and eating are some of the fundamental methods for the prevention of diseases of the oral cavity. This study intends to evaluate the effect of health education on the oral health behaviours in a sample of school children. A quasi-experimental study of a single group, longitudinal and quantitative approach, whose sample consisted in 76 students from a basic school in the Northeast of Portugal. In the data collection, a questionnaire was used, which was applied in the classroom. For the data treatment we used SPSS software as well as descriptive and inferential statistics. The majority of the sample (n = 76) were male (53.9%), belonged to the age group of 12-13 years old (61.8%) and attended the 7th year of schooling (46.1%). Most of them used to brush teeth two or more times a day (87.8%), did not use dental floss (80.3%), consulted the dentist twice in the last year (34.0%) and consumed candies sometimes (54%). The score of adequacy of oral health behaviours differs significantly (Student's t: $p < 0.000$) between pre and post-intervention, in the context of Health Education (HE), with the highest mean in the second moment (14.408 versus 13.066). The oral hygiene behaviours, oral health surveillance in the medical consultation and eating behaviours were very similar to those of other studies carried out in Portugal. HE sessions had a beneficial effect on the adequacy of the oral health behaviours in this sample of students, which highlights the need in continuing these interventions.

Keywords: Adolescents; Oral health; Health Education; Oral health behaviours; Oral hygiene; Public health.

1. Introduction

Oral health contributes to the overall health of children and young people. It can be said that there is no health in general, if there is no oral health, being an essential feature, allowing the human being to have the ability to speak, smile, sigh, kiss and taste. It is, therefore, indispensable for the quality of life and well-being. Oral health is much more than a healthy mouth, it is when the individual is free of chronic orofacial pain and head and neck neoplasm, without soft tissue lesions and lesions of other pathologies affecting the oral cavity, teeth and craniofacial tissues (Vilela, 2014).

According to the International Dental Federation (IDF), quoted by the Order of Dentists Doctors (ODD) (2018) oral health: "It is multifaceted and includes, but not limited to, the ability to speak, smile, smell, taste, touch, chewing, swallowing and transmitting countless emotions through facial expressions with confidence and without pain or discomfort as well as without craniofacial complex diseases".

Adolescence covers the period between 10 and 19 years old in which young people have the last opportunity to emphasize behaviours, habits and attitudes in order to prevent health problems in the adult life. At this stage, in a physical level there are changes in the size and shape of the body, accentuating the differences between male and female sexes. It is a time when adolescents should calculate their limits in a healthy and non-destructive way, as it is a phase of great creativity, energy and new experiences (UNICEF, 2011).

In oral health, this phase is characterized by the transition from mixed to definitive dentition, in which the facial and skull bones grow, modifying the facial physiognomy, affecting several functions such as swallow, speech, aesthetics, body image and affective relationships (Antunez, 2005).

It should be noted that in adolescence, permanent teeth become definitive, so oral hygiene should be daily and constant, as the dentition is more propitious to increase the incidence of dental caries. At this stage adolescents tend to increase the consumption of sugars, decreasing the number of teeth brushings which can cause erosions, bruxism, increased incidence of dental caries and a series of other problems that interfere with their self-image (Martinez, Zulueta, Ramirez & Gonsalves, 2013).

In response to all these shortcomings and actions was created in Portugal the National Program for the Promotion of Oral Health (NPPOH), whose intervention strategy is the promotion of health, prevention and treatment of oral diseases, developing throughout the life cycle and environments where children and young people live and study. This intervention, that begins in pregnancy and develops during childhood, is consolidated in kindergarten and school, through School Health. The NPPOH aims to "reduce the incidence and prevalence of oral diseases in children and young people, improve oral health knowledge and behaviours, and promote equity in oral health care for children and young people with special health -needs" (DGS, 2005).

In this sense, education about oral hygiene procedures is fundamental, since behaviours such as brushing and the use of dental floss are crucial for effective oral hygiene (Albuquerque, 2013).

The adoption of appropriate behaviours of oral hygiene and feeding are some of the fundamental methods for the prevention of diseases of the oral cavity. Thus, all schools should privilege and organize health education actions. In this sequence, the National School Health Program (NSHP) was created, in which some of the objectives are to promote and protect health and prevent disease in the educational community. The school being a safe and healthy space, facilitates the adoption of healthy behaviours, promoting the health of the educational community. The NSHP is the technical-normative reference of the health system for the school health area, based on the national priorities and the most prevalent health problems in the children and youth population (DGS, 2015).

The decreasing in dental caries risk is directly related to factors of behavioral nature, such as regular brushing, the use of dental floss, a balanced diet and consultation at the dentist. These are the main oral health behaviours considered in the present study. Tooth brushing should be

performed at least twice a day after meals and should include, in addition to the teeth, washing of gums and tongue, using toothpaste, with a fluoride concentration age-appropriate. The use of dental floss should complete oral hygiene, as it allows the removal of food residue and bacterial plaque on interdental surfaces, where the brush does not reach or it is not effective (Pereira, Veiga, Amaral & Pereira, 2013). Oral hygiene is essential for the prevention of dental caries and gum diseases (DGS, 2005). Inadequate eating habits in adolescence may be risk factors for future chronic diseases in adulthood, among them dental caries (Dominici, 2013).

The World Health Organization (WHO) foresees a reinforcement of actions of health promotion and prevention of oral diseases, involving more actively education and health professionals by 2020 (DGS, 2015).

In this line of thought it had been created in 2005 in Portugal the NPPOH in order to promote oral health, prevent and treat oral diseases among younger people (DGS, 2005). One of the components and objectives of NPPOH is to evaluate and reduce the incidence and prevalence of oral diseases, hence dental checks had been created. This is a document that provides the user access to preventive and curative treatments provided free by professionals in particular stomatologists and dentists in their private offices. The choice is free and assured to the user through a list of adhering doctors, available at Health Centers or through the oral health microsite. Beneficiaries are pregnant followed by the National Health Service, users of the National Health Service benefiting from the Solidarity Supplement for the elderly, children and young people from 3 to 15 years old and patients with HIV/AIDS. From the point of view of public health, the consultation with the dentist is a determinant of great importance in order to evaluate the Oral Health state (NHS, 2017).

Tooth caries is a common denominator in all the existing populations in the world and is the responsible factor for pain and early loss of teeth. It is one of the most prevalent diseases in pre-school and school age and has a great impact on the individual and social well-being of children and adolescents (Petersen, 2003).

According to Patel (2012), oral diseases continue, however, because of their high prevalence, to be one of the main health problems of the world population, including children and young people, without these improvements having been, however, evenly distributed. There are also strong socio-economic asymmetries that reflect disparities and economic development between regions and countries. Approximately 60-90% of school children and approximately 100% of adults have caries, which could be overcome if fluoride levels were maintained at a reduced basal level in the oral cavity (Sousa, 2016).

Although in the last National Study of Prevalence of Oral Diseases in Portugal, there is a decrease in decayed teeth at 6 and 12 years of age, it is important to understand the knowledge and behaviors adopted by children (OMD, 2013).

It is within the scope of this problematic that our study emerges, whose objective is: to evaluate the effect of Health Education (HE), in the Oral Health behaviours, in a sample of schooled young people.

There are some oral health studies at a national level but scarce at a regional and local levels, which are cross-sectional but which do not assess the effect of interventions.

2. Methodology

This is an observational, quasi-experimental, longitudinal and of quantitative approach (Fortin, Côté & Filion, 2009).

2.1. Participants

The target population of this study was composed of 135 students from the 3rd cycle of a Basic School 2,3 of the Northeast of Portugal, with 56 students attending 7th grade, 44 students 8th grade and 35 students 9th grade of level education. As inclusion criteria we defined: i) 3rd cycle students who attended the context school of this study; ii) To be between 12 and 17 years of age. We establish as exclusion criteria: i) Students with special educational needs; ii) students who did not

respond to at least 80% of the questionnaire. After applying these criteria, the convenience sample consisted of 76 students, about 56.3% of the population.
Of the total sample (n = 76), the majority were male (53.9%), belonged to the age group of 12-13 years old (61.8%) and attended 7th grade of schooling (46.1%) (**Table 1**). The mean age was 13.09 ± 1.061 years, the minimum being 12 years old and the maximum being 16 years of age and the mode was 12 years old.

Table 1
Characterization of the sample (n = 76)

Variables		**Af**	**Rf (%)**
Gender	Female	35	46.1
	Male	41	**53.9**
Age group	12-13 years	47	**61.8**
	≥ 14 years	29	38.2
Level of Education	7th Grade	35	**46.1**
	8th Grade	15	19.7
	9th Grade	25	32.9
Total		76	**100**

Legend: Af – Absolute frequency; Rf – Relative frequency.

2.2. Material

In data collection we used a self-filling questionnaire, built for this purpose. It was validated through a pre-test, and the questionnaire was previously applied to a group of 15 students from a school in the region, with very similar characteristics to our target population. The questionnaire was organized in two parts: in the first one we intended to characterize the sample in sociodemographic terms; in the second one we included a set of questions about the Oral Health (OH) behaviours (Oral Hygiene, eating, vigilance in consultation with the dentist).

We construct the variable "Adequacy of OH behaviours", from the sum of the scores of the original variables: Do you brush your teeth? How many times a day? How long does it take to brush your teeth? How do you perform hygiene? When you brush your teeth? How do you perform oral hygiene? Do you use any other product in your oral hygiene? Do you use dental floss? Have you ever been consulted by a dentist? In the last 12 months have you been consulted by a dentist? Do you know what the dentist's check is? Have you ever used the dentist's check? Do you eat candies? When do you eat candies? How often do you eat candies? Do you drink soft drinks? Do you eat fruits? Do you usually eat vegetables? When proper behavior was not performed, we assigned the score zero and when it was performed, we assigned one point. Then we added the obtained score in all these variables, which allowed us to evaluate the set of these behaviours, comparing the results obtained in the first moment of evaluation with those of the second moment of evaluation. The minimum score was zero and the maximum was 18 points, from zero to nine points, we considered that the student had inadequate oral health behaviors, and from 9.1 to 18 points, the behaviours were considered adequate.

2.3. Procedures

In order to collect data, a request for authorization was made to carry out the study to the General Directorate for Education (Portugal), which gave a favorable opinion (No. 0612700001 of 2017 November 03) and to the Director of School, who also authorized. Then, the coordinator of the HE Project of the school was contacted, who was ready to streamline the process and articulate with the teachers of each one of the students classes, participating in the study. The coordinator distributed the questionnaires to the class teachers who were informed about the study objectives and the data collection procedure. Each of these teachers applied and collected the questionnaires in

their classes. The period of data collection took place from 6 to 15 December 2017. Ethical principles were respected in accordance with the Helsinki Convention.

The data processing was made by SPSS Software (24.0). We used descriptive statistics, with absolute and relative frequency and mode calculations for all variables and the mean and standard deviation for the variables of measurement level ratio. We also used inferential statistics, using "t" test to compare the mean score of adequacy of OH Behaviours, before the interventions of HE and after intervention. We considered the 5% as a level of significance (Marôco, 2014).

3. Presentation and discussion of results

OH behaviours involve Oral Hygiene behaviours, OH monitoring, and OH-related eating behaviours.

3.1. Characterization of Oral Hygiene behaviours

Of the total sample (n = 76), most students brushed their teeth twice a day (68.9%), most of them for two or more minutes a day (92.1%) during the morning (90.8%), properly brushed gums, teeth and tongue (52.6%), in addition to toothpaste used disinfectant liquid for mouthwash (55.3%) and did not use dental floss (80.3%) (**Table 2**).

Table 2
Characterization of Oral Hygiene behaviour

Variables	Af	Rf (%)
Frequency of tooth brushing per day		
1 time	9	12.2
2 times	51	**68.9**
3 times	13	17.6
4 times	1	1.3
Toothbrushing time		
< 2 minutes	6	7.9
2 minutes or more	70	**92.1**
Period of the day that made the brushing of the teeth		
Morning	69	**90.8**
After lunch	8	10.5
After dinner	28	36.8
Before sleeping	54	71.1
Form of Oral Hygiene		
Brush the gums, teeth and tongue	40	**52.6**
Brush the teeth and tongue	14	18.4
Brush the teeth and gums	10	13.2
Brush only the teeth	12	15.8
Use of a product in addition to toothpaste and the brush		
Fluoride tablets	5	6.6
Liquor for rinsing	42	**55.3**
Dental thread	5	6.6
Not	24	31.6
Use of dental floss	61	**80.3**
Not	10	13.2
Yes, sometimes	5	6.6
Yes, daily		

.

In the study of Barata, Veiga, Mendes, Araújo, Ribeiro and Coelho (2013), with a sample of 156 students, from the 7th and 10th grades, who wanted to analyze the oral health behaviours of the Mangualde adolescents, the results are in agreement with ours, because most of the students (74.4%) had their teeth brushed two or more times a day.

In the study carried out in Portugal by Pereira et al. (2013), who investigated OH behaviours in a sample of Portuguese adolescents composed by 7563 students, 7-12th grade of level education, 42.8% of the respondents brushed their teeth, gums and tongue and 16.8% only brushed their teeth, very similar to the percentage obtained in our study.

In this same study, the percentage of dental floss was different, in which 37.1% of the respondents in the study stated that they used it, much higher than the present study, which was only 16.7%, which can be explained by the fact that it involved older students.

3.2. Characterization of Oral Health Surveillance Behaviours

Most of the students in the sample had consulted the dentist during their lifetime (98.7%), with 59.2% having had this behaviour in the last 12 months, the largest group twice a year (34%), most of them already knew which was the dentist's check (97.4%) and had already used it (84.0%) (**Table 3**).

Table 3

Characterization of behaviour of Oral Health surveillance

Variables	Af	Rf (%)
Have you ever been consulted by a dentist		
Not	1	1.3
Yes	75	**98.7**
Consultation with a dentist in the last year		
Not	7	9.2
I do not know/do not remember	24	31.6
Yes	45	**59.2**
Periodicity of consultation with the dentist		
1time	9	18.0
2 times	17	**34.0**
3 times	13	26.0
≥ 4 times	11	22.0
Do you know what "check-dentist"?		
Not	2	2.6
Yes	74	**97.4**
Use of "check-dentist"		
Not	12	16.0
Yes	63	**84.0**

In the study by Pereira et al. (2013), the majority of the sample (86.7%) had consulted the dentist, 55% of whom did that in the last 12 months. In a study carried out in Portugal by Teixeira (2012), a sample of 273 adolescents, aged between 8 and 17 years old, who lived in rural and urban areas and attended schools in the district of Viseu and Guarda, whose objective was to characterize the behaviours of oral health, the majority of the sample (95.1%) had already consulted the dentist, 67.3% in the last 12 months. Regarding to the use of dentist checks and comparing with our study, 45.6% of the sample used the check-dentist, and 27.4% did not know of its existence, a percentage much lower than our study. This difference could be due to the fact that this program in 2018 is already much better known by the community than in 2013.

3.3. Eating behaviours related to Oral Health

Most of the students in the sample consumed candies (54.0%), after meals (57.7%), "few times" per day (55.3%), consumed soft drinks (88.2%), consumed fruit (98.7%) and vegetables 89.9%) (**Table 4**).

Table 4
Food consumption relative to Oral Health

Variables	Af	Rf (%)
Candies consumption		
Not	1	1.3
Yes	34	44.7
Sometimes	41	**54.0**
When do You eat candies?		
After meals	41	**57.7**
Between meals	26	36.6
Before sleeping	4	5.6
Frequency of candy consumption		
Rarely	6	7.9
Few times	42	**55.3**
Once a day	14	18.4
Twice a day	5	6.6
More than twice a day	9	11.8
Soft drinks consumption		
Not	9	11.8
Yes	67	**88.2**
Fruit consumption		
Not	1	1.3
Yes	75	**98.7**
Vegetables consumption		
Not	8	10.7
Yes	67	**89.9**

Matos, Simões, Camacho and Reis (2014), in their study entitled Health Behavior in School-aged Children (HBSC), in collaboration with the World Health Organization (WHO), which aimed to study adolescent's lifestyles and their behaviour, in several schools of mainland Portugal, with a sample of 6026 adolescents, aged between 11 and 15 years old, most adolescents reported that they consumed candies at least once a week (65.1%), also consumed soft drinks less than once a week (50.7%), consumed fruit (50.5%) and vegetables (57.8%) at least once a week. While candies consumption was lower, in the case of soft drinks was much higher in this study. However, the consumption of healthy foods (fruit and vegetables) was also much higher in our study.

The mean score of the variable Adequacy of OH behaviours differs significantly between the moments before and after the HE interventions (Student t: $p < 0.000$), being higher in the second moment (14.408> 13.066).

4. Conclusion

The sociodemographic pattern of the sample of the participating students in the study is characterized by being a male student, aged between 12-13 years old and attending the 7th grade of schooling.

In terms of OH, the major problems of the students in the sample lie in the non-use of dental floss, do not rely on dental doctor's OH checkup and do not do it routinely, the high consumption of candies and soft drinks.

The interventions performed in the HE field had a positive effect on the adequacy of the OH behaviours, which improved from the pre-intervention moment to the post-intervention moment. It is therefore important to continue these interventions for the prevention of oral diseases in this community of students.

The main limitation of this study lies in the fact that it is an accidental sample, which may have implications for the representativeness and inference of the sample for the population.

The study may contribute to raise the awareness of the School Health team in this geographical area, to the importance of this type of interventions and the prevention of oral diseases in order to give it continuity, thus providing an incentive to obtain more health gains.

5. References

Albuquerque, T.M.B.R.E.G.S. (2013). Atitudes, comportamentos e condições de saúde oral de estudantes universitários ao longo da sua vivência académica. Tese de Doutoramento não publicada. Universidade de Lisboa, Lisboa, Portugal.

Anon (2014). Programa Nacional de Promoção da Saúde oral (PNPSO). Acedido em: https://www.saudeoral.min-saude.pt.

Antunez, M. (2005). Principais problemas odontológicos dos adolescentes. Adolescência e Saúde. 2 (4), 6-12. Recuperado de https://www.google.pt/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwj6-sDwo5LbAhUD2ywKHUFUCMYQFggnMAA&url=http%3A%2F%2Fwww.adolescenciaesaude.com%2Faudiencia_pdf.asp%3Faid2%3D154%26nomeArquivo%3Dv2n4a03.pdf&usg=AOvVaw0xlTjKmsUex3_lFhlZ6a-S

Barata, C., Veiga, N., Mendes, C., Araújo, F., Ribeiro, O., & Coelho, I. (2013). Determinação do CPOD e comportamentos de saúde oral numa amostra de adolescentes do concelho de Mangualde. Revista Portuguesa de Estomatologia, Medicina Dentaria e Cirurgia Maxilofaxcial, 54 (1), 27-32.

Direção-Geral da Saúde. (2005). Programa Nacional de Promoção de Saúde Oral. Lisboa: autor. Recuperado de http://www.dgs.pt/pns-e-programas/programas-de-saude/saude-oral.aspx

Direção-Geral da Saúde. (2015). *Saúde escolar «Áreas de intervenção» Saúde oral*. Lisboa: autor. Recuperado de https://www.dgs.pt/promocao-da-saude/saude-escolar/areas-de-intervencao/saude-oral.aspx

Dominici, F. F. (2013). *Saúde do adolescente: questões da prática assistencial para dentistas*. Universidade Federal do Maranhão – UNA-SUS/UFMA. Brasil

Fortin, M. F., Côté, J. & Filion, F. (2009). *Fundamento e etapas do processo de investigação*. Loures: Lusodidacta.

Marôco J. (2014). Análise estatística com o SPSS Statistics. Pêro Pinheiro: Report Number.

Martinez, B. O., Zulueta, S. V., Ramírez, M. C., & Gonsalves, C. C. (2013*). Salud bucal en la adolescência*. MEDISAN. Recuperado de http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1029-30192013000100015

Matos, M.G., Simões, C., Camacho, I., Reis, M., & Equipa do Aventura Social. (2014). *Aventura Social e Saúde: A saúde dos adolescentes portugueses em tempos de recessão*: Relatório do Estudo HBSC 2014. Lisboa. Recuperado de http://aventurasocial.com/publicacoes.php

Ordem dos Médicos Dentistas. (2013). *Mais crianças com seis e 12 anos livres de cáries*. Recuperado de *https://www.omd.pt/noticias/2013/03/caries-criancas-estudo*

Ordem dos Médicos Dentistas. (2018). Prevenção e Higiene Oral. Recuperado de https://www.omd.pt/publico/prevencao-higiene-oral/

Patel, R., & Advisor, D. (2012). Better Oral Health European Platform, 2012. *The State of Oral Health in Europe*. Recuperado de http://www.oralhealthplatform.eu/state-oral-health-europe.

Pereira, C., Veiga, N., Amaral, O., & Pereira, J. (2013). *Comportamentos de saúde oral em adolescentes portugueses*. Revista Portuguesa de Saúde Pública, 31 (2), 145-152.

Petersen P.E. (2003). The World Oral Health Report 2003: continuous improvement of oral

health in the 21st century--the approach of the WHO Global Oral Health Programme. *Community dentistry and oral epidemiology*, 31 Suppl, 1:3-23.
Serviço Nacional de Saúde. (2017). Saúde oral. Lisboa: autor. Recuperado de https://www.sns.gov.pt/sns-saude-mais/saude-oral/
Sousa, S.I.M.D. (2016). Qualidade de vida relacionada com a Saúde Oral. Dissertação de Mestrado em Gestão e Economia da Saúde. Faculdade de Economia da Universidade de Coimbra, Universidade de Coimbra, Coimbra, Portugal. Recuperado de https://eg.uc.pt/bitstream/10316/35201/1/Tese%20Susana%20Sousa%20Set2016.pdf
Teixeira, P.D.F. (2012). *Comportamentos de saúde oral numa amostra de adolescentes de áreas rurais e urbanas*. Dissertação de Mestrado, Universidade Católica Portuguesa, Viseu.
United Nations Children`s Fund. (UNICEF). (2011). *Situação mundial da infância. Adolescência, uma fase de oportunidades*. Recuperado de. https://www.unicef.org/brazil/pt/br_sowcr11web.pdf
Vilela, J. P. (2014). *Comparação de Comportamentos de Saúde Oral em Crianças*. Tese de Doutoramento não publicada. Universidade Fernando Pessoa, Faculdade Ciências da Saúde, Porto, Portugal.

PUBLIC HEALTH CONFERENCE 2019
11-13 JULY 2019
BANGKOK, THAILAND
CONFERENCE PROCEEDINGS

ISBN 978-86-87043-67-1
