Factor associated with dental caries in alcohol dependences, Thailand

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ABSTRACT

Background: Alcohol dependences have higher risk to dental caries from having poor oral hygiene practice and exposure to acidic drink.

Objectives: To determine prevalence and associating factors associated to dental caries in alcohol dependences that are useful for designing targeted dental caries prevention and promotion program for this specific population.

Materials and methods: A cross-sectional survey was conducted involving 450 alcohol dependent patients admitted at male in-patient ward from November 2015 to September 2016 at Suanprung Psychiatric Hospital, Chiang Mai Province. Data in terms of number of decayed teeth, missing teeth due to decayed and filled teeth (DMFT), socio-demographic information and potential associating factors to dental caries experience were collected using structured interviews, questionnaires and oral examination. Descriptive statistics and multiple logistic regression were performed.

Results: Age of participants ranged from 18-69 years old. Mean DMFT was 7.86$\pm$6.37. Participants who were diagnosed as alcohol dependence and single had higher number of decayed teeth compared to others. Age, satisfaction to own oral health and self-perceived oral health were associating factors to DMFT.

Conclusion: Dental caries was a high prevalent problem among alcohol dependences. Dental caries prevention and promotion program targeting high prevalence sub-group of population with special focus on increasing self-satisfaction and self-perceived of own oral health should be considered.

Introduction

Thailand has the high alcohol consumption per capita in 15+ years old at 8.3 mL compared to 6.4 mL worldwide.[1] Among drinkers, the alcohol per capita consumption can be as high as 26.2 mL in males 15+ years old and 9.2 mL in females.

Alcohol is an addictive substance either stimulates or suppresses central nervous system which subsequently can induce mental illness. Over half (56%) of drinkers suffered from mental problem more than physical health problem.[2] The Thai National Mental Health Survey 2008 reported that mental health problem was self-reported by 11.7% of drinkers, 42.4% of binge drinkers and 58.8% of alcohol dependences.[2] Among alcohol dependences, 36.9% were diagnosed with anxiety, 27.9% depression and 1.9% bi-polar disorder. Schizophrenic was also found.[3]

Alcohol dependences are also in high risk of oral diseases. Alcohol is an acidic drink and can weaken enamel and increase caries susceptibility. Poor oral hygiene practice

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is commonly found amongst alcohol dependences.[4,5] A study by Hornecker *et al*. found that 52% of alcohol dependences did not brush their teeth.[6]

Suanprung Psychiatric Hospital is a large tertiary psychiatric hospital that provides holistic services for patients with mental health and psychiatric problems in the North of Thailand. It provided mental health services for 4,307 alcohol dependences in 2014. To integrate oral health into general health, it is necessary to understand factors affecting dental caries in this specific population to plan and design dental caries prevention and promotion programs. While there is an increase of evidence highlighting negative impact of alcohol on oral health, study on dental caries determinants in Thai alcohol dependences is scarce.

Factors associated to dental caries in alcohol dependences are useful for designing targeted dental caries prevention and promotion program for this specific population. Moreover, it will be helpful for the occupational therapist to design a suitable program and intervention to promote the patients' quality of life.

Therefore, the objective of this study was to identify associating factors to dental caries in alcohol dependences.

Materials and methods

A cross-sectional survey was conducted at male in-patient ward at Suanprung Psychiatric Hospital between November 2015 and September 2016 using convenient sampling. Ethics approval was granted by the Human Ethics Committee, Suanprung hospital (study ID 21/2015). Inclusion criteria were:

- Being diagnosed with alcohol dependence (ICD F10.20) or mental and behavioural disorders due to use of alcohol: psychotic disorder (ICD F10.50)
- No or mild alcohol withdrawal (≤7 scores of the Clinical Institute Withdrawal Assessment for Alcohol revised version or CIWA-Ar)[7]
- Good co-operative (<2 scores of 1, 2, 6 dimensions of the Health of the National Outcome Scales or HoNOS)[8]
- Can communicate in Thai
- Consent to participate to the study

Potential participants were excluded if platelet count was less than 100,000/cu.mm^3, diagnosed liver cirrhosis or hyperthyroidism or acute hepatitis; have heart disease that requires premedication before oral examination and procedure, and have immunocompromised condition that is in high risk of infection.

Questionnaire survey

A predefined survey consisted of questions related to participant's socio-demographic, alcohol consumption, dental service experience and oral hygiene practice was collected by a trained registered nurse. Face-to-face validation was conducted with the research team.

Clinical examination

A dentist examined dental caries status on a dental chair and recorded number of decayed (D), missing due to decay (M) and filled due to decayed teeth (F) which made up to missing teeth due to decayed and filled teeth (DMFT) index. The oral examination adopted the WHO Oral Health Survey Basic Methods 5th Edition.[9] Intra-rater reliability was 0.88.

Data analysis

STATA version 14.0 was used to manage and analyse data. Descriptive statistics of data collected by questionnaires and oral examination was performed to generate frequencies, percentages, means and standard deviations of variables. Spearman rank, Wilcoxon Rank Sum test and Kruskal Wallis test were conducted to assess categorical data comparison. Multiple logistic regression with significant level of 0.05 were examined.

Results

Average age was 41.8±9.26 years old (ranged between 18-69 years). Average number of teeth in a mouth of participants was 28.12±3.73. Average DMFT was 7.86±6.37. Of these 84% did not received treatment for decayed teeth and 67% lost their teeth due to caries. Table 1 shows caries experience in specific age groups and characteristics of participants. Significant associating factors (*p*<0.05) to the DMFT were age, diagnostic group, occupation, had dental treatment in the past, having chewing problem, self-perceived oral health status, satisfaction of own oral health, and time of the last clean and scale.

Table 1. Study variables description by caries experience and index.

Variables	Mean (SD)			
	DMFT	**DT**	**MT**	**FT**
Age (years)				
≤30	5.57 (4.11)	4.24 (3.49)	0.67 (1.42)	0.65 (1.66)
31-40	7.56 (5.91)	4.88 (4.31)	2.16 (2.98)	0.53 (1.64)
41-50	7.88 (6.75)	3.97 (3.98)	3.66 (4.25)	0.25 (0.85)
>50	9.80 (7.11)	4.53 (4.49)	4.79 (4.86)	0.48 (1.72)
p value[a]	<0.001	0.203	<0.001	0.033
ICD				
F10.20 alcohol dependence	8.28 (6.47)	4.74 (4.30)	3.04 (3.86)	0.50 (1.51)
F10.50 mental and behavioural disorders due to use of alcohol: psychotic disorder	7.11 (6.14)	3.86 (3.82)	2.93 (4.08)	0.31 (1.29)
p value[b]	0.034	0.025	0.354	0.12
Hospital admission				
1-5	7.62 (6.24)	4.40 (4.10)	2.83 (3.78)	0.39 (1.34)
>5	9.67 (7.08)	4.62 (4.59)	4.31 (4.86)	0.75 (2.01)
p value[a]	0.069	0.504	0.077	0.330
Body mass index (BMI)				
<18.5	7.57 (5.52)	3.82 (3.33)	3.04 (3.98)	0.30 (1.07)
18.5-22.9	8.02 (6.58)	4.68 (4.33)	3.62 (4.45)	0.11 (0.53)
23.0-24.9	7.19 (5.70)	3.95 (3.68)	2.58 (3.71)	0.66 (1.74)
25.0-29.9	8.28 (6.72)	4.57 (4.05)	2.67 (3.57)	1.04 (2.40)
≥30	8.62 (8.94)	4.92 (6.93)	3.00 (3.19)	0.69 (2.21)
p value[c]	0.947	0.940	0.229	<0.001
Highest education				
≤Year 9th	7.45 (5.94)	4.29 (3.93)	2.90 (3.89)	0.25 (1.05)
High school, certificate, diploma	9.28 (7.68)	5.17 (5.12)	3.62 (4.39)	0.49 (1.04)
Bachelor and postgraduate	8.26 (6.46)	3.80 (3.36)	2.37 (3.05)	2.09 (3.28)
p value[c]	0.209	0.579	0.159	<0.001
Occupation				
Unemployed, labour, farmer, others	7.80 (6.34)	4.48 (4.07)	2.99 (4.02)	0.32 (1.27)
Public servant	6.63 (6.16)	2.83 (3.26)	2.47 (3.07)	1.33 (2.29)
Business owner/merchant	10.30 (7.13)	5.43 (5.83)	3.83 (3.60)	1.04 (1.97)
p value[c]	0.047	0.042	0.365	<0.001
Marital status				
Single	8.14 (6.20)	5.08 (4.32)	2.45 (3.58)	0.62 (1.82)
Married	7.86 (6.82)	4.17 (4.11)	3.34 (4.22)	0.36 (1.24)
Widow/divorce/separate	7.32 (5.77)	3.72 (3.76)	3.35 (3.92)	0.25 (0.82)
p value[c]	0.533	0.014	0.052	0.164
Number of family member				
1-2	8.01 (6.32)	4.33 (4.08)	3.19 (3.95)	0.49 (1.67)
3-4	7.87 (6.22)	4.42 (3.98)	3.01 (4.09)	0.44 (1.31)
5-6	7.78 (6.96)	5.02 (4.90)	2.48 (3.24)	0.27 (1.11)
≥7	7.00 (6.30)	2.58 (2.29)	3.68 (4.83)	0.74 (2.10)
p value[a]	0.640	0.830	0.295	0.915

Table 1. Study variables description by caries experience and index (continued).

Variables	Mean (SD)			
	DMFT	**DT**	**MT**	**FT**
Average monthly household income (Baht)				
≤3,000	8.39 (6.00)	4.16 (3.66)	3.76 (4.03)	0.46 (1.69)
3,000-25,000	7.98 (6.54)	4.70 (4.31)	2.98 (4.09)	0.30 (1.09)
>25,000	6.70 (5.83)	3.30 (3.66)	2.28 (2.80)	1.11 (2.28)
p value[a]	0.202	0.714	0.007	<0.001
Having medical condition				
No	7.50 (6.03)	4.27 (3.99)	2.80 (3.54)	0.43 (1.53)
Yes	8.22 (6.69)	4.58 (4.31)	3.20 (4.29)	0.44 (1.33)
p value[b]	0.312	0.526	0.659	0.426
Smoking history				
Never smoke	7.55 (6.70)	4.56 (4.31)	2.30 (3.73)	0.68 (1.88)
Smoked	7.99 (6.24)	4.37 (4.09)	3.28 (4.00)	0.34 (1.19)
p value[b]	0.236	0.705	<0.001	0.016
Quit smoking (years)				
≤5	6.06 (4.81)	3.17 (3.74)	2.06 (1.98)	0.83 (2.15)
>5	7.00 (5.70)	2.14 (2.77)	4.14 (4.15)	0.71 (2.13)
p value[a]	0.606	0.289	0.585	0.299
Cigarette consumption/day				
≤10	8.30 (6.42)	4.55 (4.15)	3.48 (4.19)	0.26 (0.96)
>10	7.47 (5.93)	4.53 (4.06)	2.55 (3.34)	0.39 (1.37)
p value[a]	0.638	0.545	0.111	0.181
Age started smoking (years)				
≤20	7.89 (6.00)	4.36 (4.09)	3.20 (3.88)	0.32 (1.17)
>20	8.62 (7.68)	4.40 (4.12)	3.81 (4.68)	0.40 (1.33)
p value[a]	0.184	0.212	0.819	0.108
Age started drinking (years)				
≤20	7.94 (6.42)	4.52 (4.25)	2.97 (3.95)	0.45 (1.46)
>20	7.47 (6.13)	3.95 (3.62)	3.16 (3.88)	0.36 (1.29)
p value[a]	0.600	0.094	0.447	0.372
Alcohol dependence (years)				
≤10	7.65 (6.41)	4.43 (4.09)	2.75 (3.79)	0.46 (1.52)
11-20	8.59 (6.47)	4.73 (4.24)	3.37 (4.22)	0.49 (1.42)
>20	7.36 (5.79)	3.50 (4.36)	3.83 (4.14)	0.03 (0.17)
p value[a]	0.095	0.594	<0.001	0.858
Average daily standard drink				
≤20	8.39 (6.56)	4.32 (3.77)	3.40 (4.44)	0.66 (1.98)
21-40	7.78 (6.36)	4.65 (4.42)	2.78 (3.51)	0.34 (1.13)
>41	7.07 (6.01)	3.82 (3.86)	2.96 (4.29)	0.29 (0.95)
p value[a]	0.355	0.715	0.171	0.047
Highest CIWA scores				
1-7 (less severe)	7.63 (6.48)	4.19 (4.52)	3.11 (3.48)	0.33 (0.97)
8-14 (moderate)	7.95 (6.44)	4.34 (3.90)	3.10 (4.47)	0.51 (1.79)
15-19 (severe)	9.46 (7.41)	5.05 (4.43)	4.05 (5.29)	0.35 (1.37)
≥20 (very severe)	7.76 (5.89)	4.91 (4.16)	2.65 (3.26)	0.20 (0.63)
p value[a]	0.313	0.047	0.439	0.599

Table 1. Study variables description by caries experience and index (continued).

Variables	Mean (SD)			
	DMFT	**DT**	**MT**	**FT**
Number of drinkers in family				
none	7.86 (6.80)	3.93 (3.88)	3.31 (4.61)	0.62 (1.72)
drinker	6.86 (4.39)	3.68 (2.71)	2.27 (2.76)	0.91 (2.00)
Alcohol dependence	7.94 (6.25)	4.79 (4.38)	2.87 (3.55)	0.28 (1.14)
p value[c]	0.842	0.230	0.342	0.679
Received dental services				
No	7.29 (6.50)	4.54 (4.29)	2.75 (4.15)	0
Yes	8.26 (6.26)	4.34 (4.06)	3.17 (3.78)	0.74 (1.81)
p value[b]	0.034	0.833	0.008	NA
Received oral hygiene instruction				
No	7.50 (6.26)	4.43 (4.17)	2.83 (4.06)	0.24 (1.01)
Yes	8.64 (6.56)	4.41 (4.13)	3.37 (3.65)	0.86 (2.02)
p value[b]	0.056	0.830	0.029	<0.001
Number of tooth brushing per day				
1	8.38 (6.36)	4.93 (4.14)	2.71 (3.82)	0.44 (1.55)
2	5.44 (4.75)	4.30 (4.17)	2.97 (3.80)	0.45 (1.47)
≥3	4.33 (4.04)	5.20 (4.09)	3.05 (4.08)	0.36 (1.07)
Irregular	5.33 (2.51)	3.20 (3.42)	7.00 (9.87)	0
p value[c]	0.639	0.254	0.656	0.788
Brush teeth after getting up				
Never	9.50 (10.61)	6.50 (6.36)	2.00 (2.83)	1.00 (1.41)
Sometimes	13.00 (9.97)	5.00 (3.67)	7.80 (9.63)	0.20 (0.45)
Always	7.79 (6.31)	4.41 (4.16)	2.95 (3.82)	0.44 (1.44)
p value[c]	0.210	0.406	0.343	0.389
Brush teeth after having lunch				
Never	7.70 (6.31)	4.42 (4.23)	2.91 (3.78)	0.37 (1.28)
Sometimes	9.25 (6.86)	4.67 (3.83)	3.65 (4.75)	0.94 (2.31)
Always	7.21 (6.00)	3.79 (3.50)	3.10 (4.63)	0.32 (0.94)
p value[c]	0.236	0.624	0.763	0.089
Tooth brushing before bed				
Never	9.24 (6.96)	5.00 (4.59)	3.56 (4.57)	0.68 (1.95)
Sometimes	8.03 (6.13)	4.56 (3.32)	2.64 (4.18)	0.83 (2.34)
Always	7.76 (6.36)	4.38 (4.20)	3.00 (3.88)	0.38 (1.28)
p value[c]	0.446	0.551	0.843	0.614
Types of toothbrush brittle				
Extra soft	10.0 (10.34)	6.71 (8.16)	3.00 (2.94)	0.28 (0.76)
Soft	8.44 (6.74)	4.85 (4.25)	3.06 (4.14)	0.52 (1.43)
Medium	7.24 (6.01)	4.00 (4.00)	2.76 (3.49)	0.48 (1.60)
Hard	8.08 (6.28)	4.39 (3.89)	3.49 (4.70)	0.20 (1.08)
Not sure/do not know	7.62 (4.03)	4.88 (3.31)	2.62 (2.26)	0.12 (0.35)
p value[c]	0.550	0.191	0.967	0.172

Table 1. Study variables description by caries experience and index (continued).

Variables	Mean (SD)			
	DMFT	DT	MT	FT
Types of dentifrice				
Normal	8.05 (7.80)	3.95 (5.49)	3.05 (2.60)	1.05 (2.60)
Fluoride	7.68 (6.33)	4.42 (4.10)	2.92 (3.95)	0.34 (1.19)
Sensitive/gum care	8.14 (4.95)	3.57 (2.88)	2.86 (2.85)	1.71 (3.68)
Herbal	9.36 (6.74)	5.02 (4.10)	4.02 (4.88)	0.31 (0.89)
Do not use dentifrice	7.88 (5.22)	4.00 (4.33)	2.35 (2.76)	1.53 (2.79)
p value[c]	0.530	0.603	0.355	0.016
Have chewing problem				
No	6.54 (5.95)	3.98 (4.18)	2.08 (3.01)	0.47 (1.66)
A bit	8.76 (6.51)	4.72 (4.11)	3.63 (4.38)	0.41 (1.26)
A lot	9.67 (7.50)	5.67 (4.73)	3.33 (3.06)	0.67 (1.15)
p value[c]	<0.001	0.049	<0.001	0.476
Self-perceived oral health				
Very poor	13.78 (8.45)	6.50 (6.70)	6.28 (5.18)	1.00 (1.81)
Poor	10.07 (7.10)	5.98 (4.62)	3.85 (4.58)	0.24 (0.98)
Fair	6.88 (5.50)	3.77 (3.50)	2.64 (3.57)	0.46 (1.44)
Good/very good	5.74 (5.25)	3.36 (3.60)	1.83 (2.68)	0.54 (1.91)
p value[c]	<0.001	<0.001	<0.001	0.080
Satisfaction of own oral health				
Little	10.33 (7.44)	5.92 (5.00)	3.95 (4.61)	0.46 (1.38)
Moderate	6.91 (5.52)	3.80 (3.55)	2.70 (3.61)	0.40 (1.34)
A lot	5.29 (6.15)	3.65 (3.92)	0.82 (1.24)	0.82 (2.90)
p value[c]	<0.001	<0.001	<0.001	0.820
Frequency of having dental visit				
Only when having symptom	8.38 (6.36)	4.37 (4.09)	3.33 (3.90)	0.68 (1.80)
<once a year	5.44 (4.75)	3.56 (3.61)	1.11 (1.45)	0.78 (1.20)
>once a year	4.83 (3.06)	1.83 (1.47)	1.67 (1.86)	1.33 (1.21)
p value[c]	0.126	0.248	0.101	0.045
Did you have dental appointment last year?				
No	7.82 (6.05)	4.21 (3.89)	3.15 (3.96)	0.46 (1.41)
Cannot remember	10.25 (6.02)	3.00 (2.16)	6.75 (5.56)	0.50 (0.58)
Yes	8.76 (6.70)	4.45 (4.39)	3.16 (3.47)	1.14 (2.23)
p value[c]	0.436	0.923	0.160	0.003
Number of dental appointments				
1	7.98 (6.26)	4.46 (4.48)	2.77 (3.25)	0.75 (1.62)
2	11.08 (7.56)	4.62 (4.11)	4.46 (3.91)	2.00 (3.06)
≥3	11.33 (8.03)	4.11 (4.51)	4.33 (4.18)	2.89 (3.69)
p value[c]	0.218	0.893	0.136	0.003
When was the last scale and clean?				
< 6 months	6.93 (5.25)	2.86 (3.30)	2.93 (3.54)	1.14 (1.96)
6-12 months	9.36 (7.24)	4.54 (4.15)	3.41 (4.32)	1.41 (2.63)
Never	9.41 (5.91)	4.88 (4.06)	3.98 (4.02)	0.55 (1.53)
>12 months/cannot remember	4.92 (5.52)	3.06 (3.84)	1.39 (2.24)	0.46 (1.37)
p value[c]	<0.001	0.003	<0.001	0.012

Note: [a]*Spearman Rank,* [b]*Wilcoxon Rank Sum Test,* [c]*Kruskal Wallis Test, NA: not available.*

Multiple logistic regression analysis found that age, diagnostic group, self-perceived oral health, satisfaction of own oral health are significant predicting factors of DMFT. While predicting factors of DT were diagnostic group, marital status, self-perceive oral health and satisfaction of own oral health. Predicting factors of MT were age, smoking, had dental treatment in the past and self-perceived oral health whereas those received oral health education and educational level, and BMI were significant factors of FT (Table 2).

Table 2. Multiple logistic regression analysis results with selected variables.

Dependent variable	Associating factors	Adjusted β (95%CI)	*p* value
DMFT	Age (years)	0.10 (0.04, 0.16)	0.001
(R^2 12.2)	Diagnosed with ICD F10.20	1.17 (0.01, 2.33)	0.049
	Self-perceived oral health	-1.66 (-2.56, -0.75)	<0.001
	Satisfaction of own oral health	-1.64 (-2.97, -0.31)	0.031
DT	Diagnosed with ICD F10.20	1.01 (0.22,1.79)	0.012
(R^2 9.3)	Marital status		
	- Single	1.00	
	- Married	-1.03 (-1.87, -0.19)	0.016
	- Widow/divorce/separate	-1.34 (-2.35, -0.34)	0.009
	Self-perceived oral health	-0.91 (-1.50, -0.31)	0.003
	Satisfaction of own oral health	-0.94 (-1.82, -0.06)	0.036
MT	Age (years)	0.14 (0.11, 0.18)	<0.001
(R^2 18.1)	Smoking	0.94 (0.20, 1.68)	0.013
	Received dental services	0.72 (0.04, 1.40)	0.036
	Self-perceived oral health	-0.97 (-1.41, -0.53)	<0.001
FT	Received oral hygiene instruction	0.39 (0.10, 0.67)	0.007
(R^2 18.1)	Highest education	0.56 (0.34, 0.77)	<0.001
	Body Mass Index	0.05 (0.01, 0.08)	0.013

Note: *DMFT: decayed/missing/filled teeth, DT: decayed teeth, MT: missing teeth, FT: filled teeth.*

Discussion

Thailand had a high alcohol consumption per capita and was at the 3rd rank in Asia followed South Korea and Japan. Alcohol consumption per capita in South Korea, Japan and Thailand were 12.3 mL, 7.2 mL and 7.1 mL, respectively.[10] Based on the Thai national survey of drinking behaviour and psychiatric disorders in 2008, 5.3 million individuals (10.9%) had excess alcohol consumption with the highest rate in the North as 13.3%.[11] This statistic was consistent with the 2017 reports by the Center of Alcohol Studies and found that the proportion of current drinkers was highest in the North at 35.4% compared to the national average at 28.6%.[12,13]

This cross-sectional study is the first survey examining dental caries status of alcohol dependences with and without mental and behavioural disorders at a large psychiatric hospital in the North of Thailand. Study participants were recruited from male in-patient ward because over 90% of alcohol dependence patients at the study site were male. The large proportion of male was also reported in other Thai and international studies.[14-19] Our findings confirmed previous evidence that alcohol dependence related to socioeconomic disadvantages e.g. highest education was primary school, income was 5,000-30,000 Baht and labour.[10,19,20]

Most of participants (70.9%) were ex-smokers, 63.8% were current smokers. It is common that alcohol drinkers were also smokers.[21] Participants of our study started drinking at 17.93 years old and smoking at 17.06 year old, which confirmed the previous findings that found significant relationship between drinking and smoking behaviour.[22] The Thai National Mental Health Survey 2013 found that the younger an individual start drinking, the higher risk of bad alcohol consumption behaviour. Having family member(s) who was(were) drinker can increase the risk of having bad alcohol consumption behaviour up to 4.1 times.[23]

Study participants had significantly poorer dental caries status. Participants aged 35-44 years having decay tooth/teeth was DMFT 7.31±5.96 among participants compared to DMFT 6.0±5.14 national average and DMFT 5.8±4.85 regional average. The percentage of individual having decay tooth/teeth in participants was 2.4 times higher than the national average (84.7% vs 35.2%).

While the poor oral health was a prominent problem in this population, dental service utilisation was low as 41.3% never get dental services and 68.7% never received oral hygiene instruction. Untreated dental caries was found in 84.2% total decayed teeth. Previous study found that alcohol dependence had poor hygiene practice.[6] However, 80.7% participants in our study brushed their teeth twice a day.

Participants who were diagnosed as alcohol dependence and single had a greater number of decayed teeth compared

to others. Evidence showed that alcohol and medication for alcohol dependence can cause dry mouth and reduce salivary flow which increased risk of dental caries development and progress.[24] Our result found that DMFT significantly related to age, satisfaction to own oral health and self-perceived oral health.

Conclusion

The findings suggested that dental caries prevention program should focus on alcohol dependences who are single given their highest dental caries prevalence. Dental caries prevention and promotion program and oral hygiene instruction should be implemented as soon as a person being diagnosed as alcohol dependence with an emphasis on improving self-perception and satisfaction of own oral health.

Although the participants can represent Thai alcohol dependence population, the current study design allowed us to only explore association of dental caries and its determinants using collected data at a certain time. Longitudinal studies are required if researchers wish to learn more about causal mechanism and observe the pattern of changes.

Ethical approval

Ethics approval was granted by the Human Ethics Committee, Suanprung hospital (study ID 21/2015).

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Conflict of interest

Authors declared no conflict of interest to declare.

CRedit authorship contribution statement

Namsukh Kongkalai: proposal developing, funding application, research conduct, data analysis, manuscript preparing and approve; **Prapornpan Utamachote**: research performing under supervision; **Supatra Sang-in**: data analysis and approve.

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