

Chapter 3

Preliminary Data Analysis

In this chapter we report result from preliminary data analysis based on the questionnaire responses obtained from the participants. These participants comprised 168 dental nurses in Pattani, Yala and Narathiwat provinces. First we show frequency distributions of the variables. Then we show the associations between outcomes and determinants.

3.1 Description of the variables

The role of the variables may be classified as either determinants or outcomes. These variables, their roles and data types are listed in Table 3.1.

Variables	Role	Type
Gender	determinant	binary
Age	determinant	continuous
Marital status	determinant	nominal (3)
Education background	determinant	ordinal (3)
Place of graduation	determinant	nominal (7)
Year of graduation	determinant	nominal
Malayu language	determinant	binary
Working experience	determinant	continuous
Work position	determinant	ordinal (3)
Work place	determinant	nominal (4)
Having dentist	determinant	binary
Number of dental nurse	determinant	continuous
Having dental assistant	determinant	binary
Variables	Role	Type
Curative activities	outcome	ordinal (5)
Preventive activities	outcome	ordinal (5)

Table 3.1: Variables and their role and data type

3.2 Characteristics of participants

The response rate was 83.3% (n= 140). Table 3.2 shows frequency distributions of the categorical determinants. Respondents comprised 89.3% of female. More than half (52.9%) were single and graduated for certificate level (54.3%). Most of them (66.4%) qualified as dental nurse degree from Sirindhorn College of Public Health (SCPH), Yala. There were 72.0% of participants qualified their degree before 2009. They can communicate in Malayu language, 67.1%. More than half (54.3%) were professional dental nurses. Most of them (53.6%) work in community hospitals while there were 31.4% of dental nurses working without a dentist, and there were only one dental nurse at workplace 58.6%, in addition 27.9% of them working without a dental assistant.

Variables	Frequency	Percentage
Gender		
Male	15	10.7
Female	125	89.3
Marital status		
Marriage	65	46.4
Single	74	52.9
Divorce	1	0.7
Education background		
Certificate level	76	54.3
Bachelor degree	61	43.6
Master degree	3	2.1
Place of graduate as dental nurse		
SCPH, Yala	93	66.4
SCPH, Ubonradchathanee	1	0.7
SCPH, Trang	7	5.0
SCPH, Konkaen	2	1.5
SCPH, Chonburi	36	25.7
SCPH, Supanburee	1	0.7
Year of Graduate		
Before 2009	101	72.1

Variables	Frequency	Percentage
2009 or later	39	27.9
Malayu language		
Yes	94	67.1
No	46	32.9
Work position		
Dental nurse practitioner	50	35.7
Dental nurse professional	76	54.3
Non government	14	10.0
Work place		
General hospital	16	11.4
Community hospital	75	53.6
Health center	36	25.7
Primary Care Unit (PCU)	5	3.6
Municipality health office	3	2.1
Provincial health office	5	3.6
Having dentist		
Yes	96	68.6
No	44	31.4
Number of dental nurses		
1 dental nurse	82	58.6
2 dental nurses	48	34.3
3 dental nurses	8	5.7
4 dental nurses	2	1.4
Having dental assistant		
Yes	101	72.1
No	39	27.9

Table 3.2: Distribution of categorical variables

Table 3.3 shows descriptive statistics of the continuous variables. The average age of the dental nurses was 30.9 years (SD= 8.2). The average year of working experience of the dental nurses was 9.2 years (SD= 7.7).

Variables	minimum	maximum	mean	Standard deviation
Age	20.3	55.0	30.9	8.2
Working experience	1.0	32.9	9.2	7.7

Table 3.3: Descriptive statistics of continuous variables

For further analysis some of the determinants were regrouped into binary variables because some variables had low frequency except workplace was regrouped into three categories. Age is regrouping by using generation concept, this concept categorize some aspect of each age group's behavior, needs and working styles (Radtanakun, 2009). Working experience is regrouping by career level of dental nurse, when they work for seven years they are more likely to get higher position. Work place is regrouping by role of dental nurse, first group is dental nurses who work in general and community hospital, second group is dental nurses who work in health center, primary care unit and municipality health office. The last group is dental nurses who work in municipality health office. These frequency categories are given in Table 3.4.

Variables	Frequency	Percentage
Age		
≤ 28 years	73	52.1
> 28 years	67	47.9
Marital status		
Marriage	65	46.4
Single	75	53.6
Education level		
Certificate	76	54.3
Bachelor or Master degree	64	45.7
Place of graduate		
SCPH, Yala	93	66.4
SCPH, in other provinces	47	33.6
Working experience		
≤ 7 years	77	55.0
> 7 years	63	45.0
Work place		
Public hospital	94	67.1
Health center	41	29.3
Health offices	5	3.6
Number of dental nurses		
1 dental nurse	82	58.6
> 1 dental nurses	58	41.4

Table 3.4: Frequency categories of the determinant variables

3.3 Frequency distributions of outcome variables

We now describe the distributions of the two outcome measurement concerned with working practice in curative activities and preventive activities. Each item had five response levels, coded as 4 (very frequently), 3 (frequently), 2 (occasionally), 1 (rarely), and 0 (never).

Figure 3.1 shows the frequency distributions of the twelve variables of working practice in curative activities. Percentages of frequency distribution are used on the horizontal axis, and the variables appear on the vertical axis. Dental nurses reported performing in a variety of curative activities, with oral examination (70.0 %), supra gingival scaling (65.0 %) and simple extraction (54.2 %) being the three most common activities. The least common were tooth drainage (77.8 %), suture (55.0 %) and taking radiographs (46.4%).

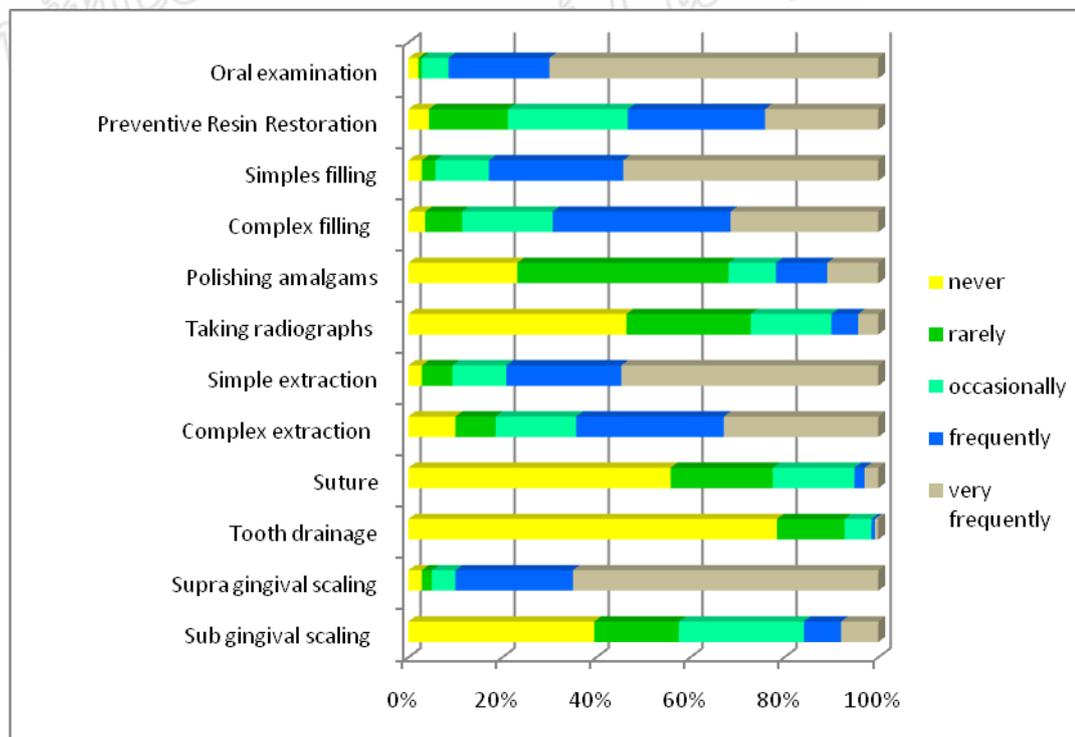


Figure 3.1: The frequency distribution of working practices in curative activities

Figure 3.2 shows the frequency distributions of the nine variables working practice in preventive activities. Dental nurses reported performing in a variety of preventive activities. The same levels were seen to be in the area of performing with oral health program for antenatal (60.7 %), fluoride application (58.6 %), oral healthcare in dental room (58.5 %), school dental service (55.7 %), pit and fissure sealant (55.7 %) and oral health care for preschool (54.3 %). While the three lowest activities were providing oral healthcare at home (18.5 %), conducting the oral health care plan based on the community's problem (8.5 %) and preparation dental work plan (6.4 %).

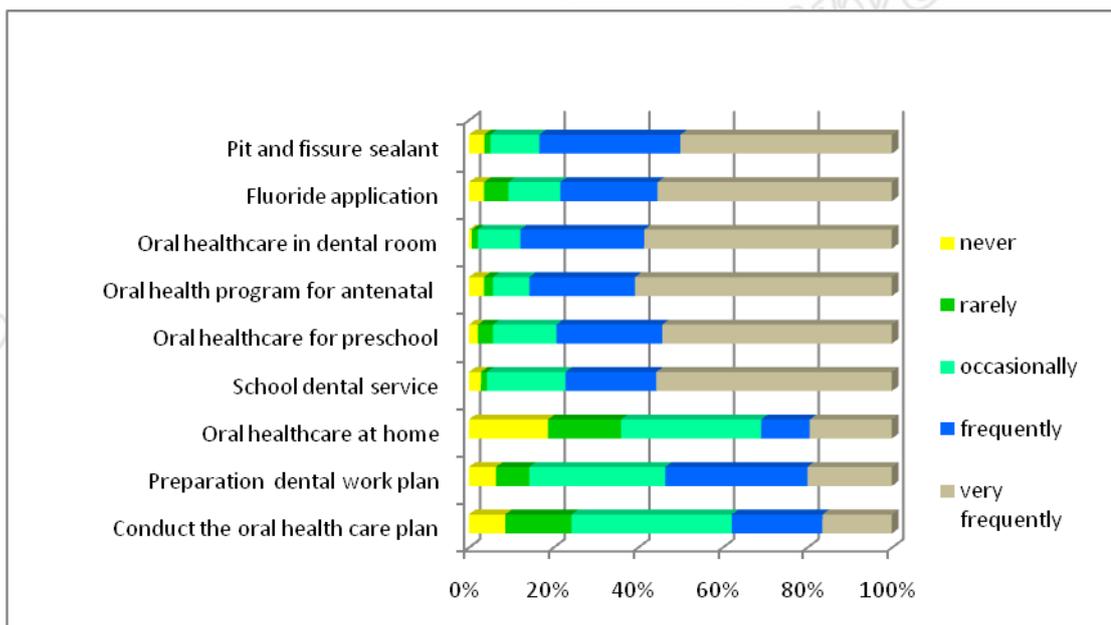


Figure 3.2: The frequency distribution of working practices in preventive activities

3.4 Correlations between outcomes

Table 3.5 shows results from using Pearson's correlation between each outcome item.

There are 47 pairs from 231 pairs (20.35 %) had a medium level of correlation

(correlation coefficient ranged from 0.30-0.50). We note that 15 pairs from 231 pairs

(6.49 %) of questionnaires had a high level correlation (correlation coefficient > 0.50).

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	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>	<i>Q5</i>	<i>Q6</i>	<i>Q7</i>	<i>Q8</i>	<i>Q9</i>	<i>Q10</i>	<i>Q11</i>	<i>Q12</i>	<i>Q13</i>	<i>Q14</i>	<i>Q15</i>	<i>Q16</i>	<i>Q17</i>	<i>Q18</i>	<i>Q19</i>	<i>Q20</i>	<i>Q21</i>	
<i>Q1</i>	1																					
<i>Q2</i>	0.32	1																				
<i>Q3</i>	0.60	0.46	1																			
<i>Q4</i>	0.47	0.38	0.61	1																		
<i>Q5</i>	0.09	0.39	0.23	0.11	1																	
<i>Q6</i>	0.10	0.32	0.12	0.21	0.25	1																
<i>Q7</i>	0.49	0.29	0.64	0.53	0.19	0.08	1															
<i>Q8</i>	0.34	0.32	0.41	0.62	0.11	0.08	0.41	1														
<i>Q9</i>	0.19	0.37	0.07	0.26	0.18	0.24	0.06	0.20	1													
<i>Q10</i>	0.08	0.08	-0.04	0.13	0.14	0.19	-0.03	0.14	0.52	1												
<i>Q11</i>	0.59	0.20	0.60	0.47	0.12	0.02	0.59	0.44	-0.05	0.01	1											
<i>Q12</i>	0.15	0.17	0.18	0.21	0.20	0.35	0.16	0.28	0.27	0.11	0.17	1										
<i>Q13</i>	0.47	0.51	0.57	0.46	0.22	0.05	0.40	0.29	0.33	0.10	0.33	0.12	1									
<i>Q14</i>	0.45	0.39	0.45	0.28	0.24	0.13	0.42	0.26	0.09	0	0.32	0.12	0.49	1								
<i>Q15</i>	0.49	0.26	0.40	0.28	0.24	0.13	0.37	0.11	0.20	0.14	0.27	-0.01	0.35	0.40	1							
<i>Q16</i>	0.30	0.19	0.33	0.24	0.22	0.18	0.28	0.21	0.20	0.12	0.18	0.13	0.27	0.31	0.54	1						
<i>Q17</i>	0.29	0.13	0.32	0.22	0.18	0.18	0.24	0.22	0.15	0.12	0.22	0.15	0.35	0.36	0.31	0.39	1					
<i>Q18</i>	0.39	0.26	0.34	0.25	0.22	0.18	0.31	0.24	0.13	0.12	0.02	0.27	0.42	0.50	0.43	0.37	0.75	1				
<i>Q19</i>	0.17	0.08	0.12	0.03	0.25	0.10	0.15	-0.07	0.05	0.01	0.09	0.02	0.22	0.21	0.36	0.17	0.32	0.43	1			
<i>Q20</i>	0.29	0.23	0.29	0.27	0.15	0.14	0.21	0.26	0.06	0.14	0.28	0.08	0.20	0.09	0.19	0.11	0.31	0.26	0.28	1		
<i>Q21</i>	0.15	0.17	0.20	0.24	0.19	0.14	0.11	0.27	0.08	0.12	0.21	0.02	0.16	0.04	0.18	0.15	0.38	0.24	0.36	0.77	1	

Table 3.5: Correlation between responses between Q1-Q21

After we investigated the correlation between each outcome, we found that they have relationship with each others. Then we used factor analysis to group the determinants which has large correlation with each other and small correlation with determinants in other groups.

3.5 Factor analysis

The factor loadings for each questionnaire item after using promax rotation of the factors are shown in Table 3.6. There are five items that were omitted because of their high uniqueness (uniqueness score > 0.80).

Questionnaire item	Factor 1	Factor 2	Factor 3	uniqueness
Simple filling (Q3)	0.87			0.28
Simple extraction (Q7)	0.85	0.15		0.45
Complex filling (Q4)	0.80	-0.19		0.44
Supra gingival scaling (Q11)	0.79	-0.15		0.51
Oral examination (Q1)	0.69	0.10		0.47
Pit and fissure sealant (Q13)	0.72	0.18		0.55
Complex extraction (Q8)	0.60	-0.14	0.15	0.64
Preventive Resin Restoration (Q2)	0.54	0.17		0.72
Fluoride application (Q14)	0.52	0.40	-0.24	0.56
School dental service (Q18)		0.95		0.16
Oral healthcare for preschool (Q17)	-0.13	0.84	0.10	0.34
Oral healthcare at home (Q19)	-0.21	0.55	0.26	0.70
Oral health program for antenatal (Q16)	0.15	0.41		0.75
Oral healthcare in dental room (Q15)	0.27	0.37		0.66
Conduct the oral health care plan (Q21)	-0.10		1.04	0.01
Preparation dental work plan (Q20)			0.77	0.36
Polishing amalgams (Q5)	0.27	0.15	0.12	0.88
Taking radiographs (Q6)		0.17		0.93
Suture (Q9)	0.25	0.15		0.94
Tooth drainage (Q10)	0.10	0.21		0.97
Sub gingival scaling (Q12)	0.25			0.93

Table 3.6: The results from factor analysis

The questionnaire items are thus grouped into three factors as follows:

Factor 1 is the activities that dental nurses have done in a dental room in their work place. We named this “*clinical activities*”, comprising simple filling, simple extraction, supra gingival scaling, oral examination, pit and fissure sealant, complex extraction, preventive resin restoration and fluoride application.

Factor 2 is all activities which relate to oral diseases prevention. We called this “*preventive activities*”, comprising school dental service, oral healthcare for preschool, oral healthcare at home and oral health program for antenatal.

Factor 3 is activities which relate to doing or preparing a dental work plan in order to improve oral health situation. We called this “*project activities*”, comprising, preparation dental work plan and conduct of the oral health care plan.

The outcomes are constructing by averaging item scores in their groups as follows,

$$\text{Clinical activities} = (Q3+ Q7+Q4+Q11+Q1+Q13+Q8+Q2+Q14)/ 9$$

$$\text{Preventive activities} = (Q18+Q17+Q19+Q16+Q15)/ 5$$

$$\text{Project activities} = (Q21+Q20)/ 2$$

Thus, the outcome values are range from 0-4.

Table 3.7 gives numerical summaries of the three factors outcome. We see that the project activity has a lower mean than other factors.

Variable	Size	Mean	Median	StDev
Clinical activities	140	3.11	3.25	0.79
Preventive activities	140	3.08	3.16	0.76
Project activities	140	2.37	2.50	1.06

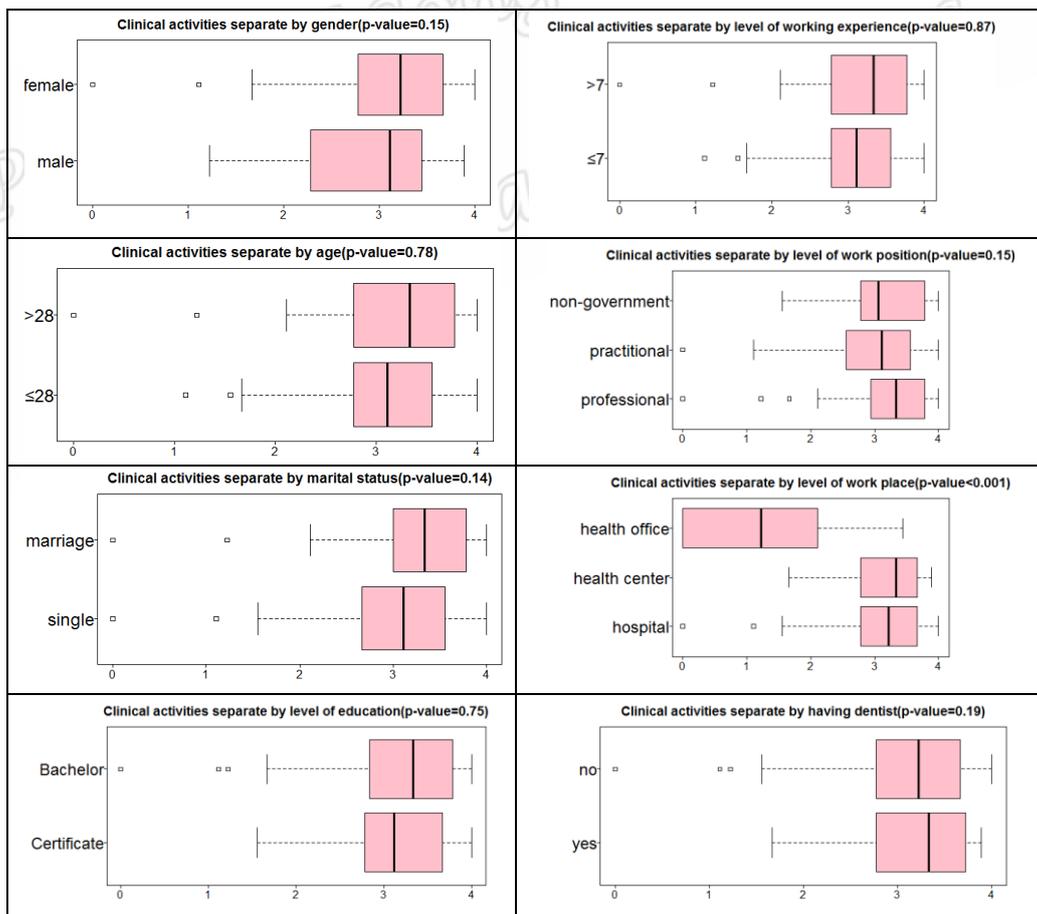
Table 3.7: Descriptive statistic of three factors

Factor scores for *clinical activities* and *preventive activities* are transforming using square root of four minus factor score due to normality assumptions.

3.6 Association between outcomes and each determinant

We now investigate the association between each factor and each determinant two sample *t*- test and ANOVA and display the results using box plot.

Figure 3.3 shows comparison of *clinical activities* with all determinants. The dental nurses who graduated before year 2009 were doing more practice in clinical activities than dental nurses who graduated in year 2009 or later (p-value= 0.04). Dental nurses who work in provincial health office doing less practice in *clinical activities* than dental nurses who work in health center and hospital (p-value <0.001).



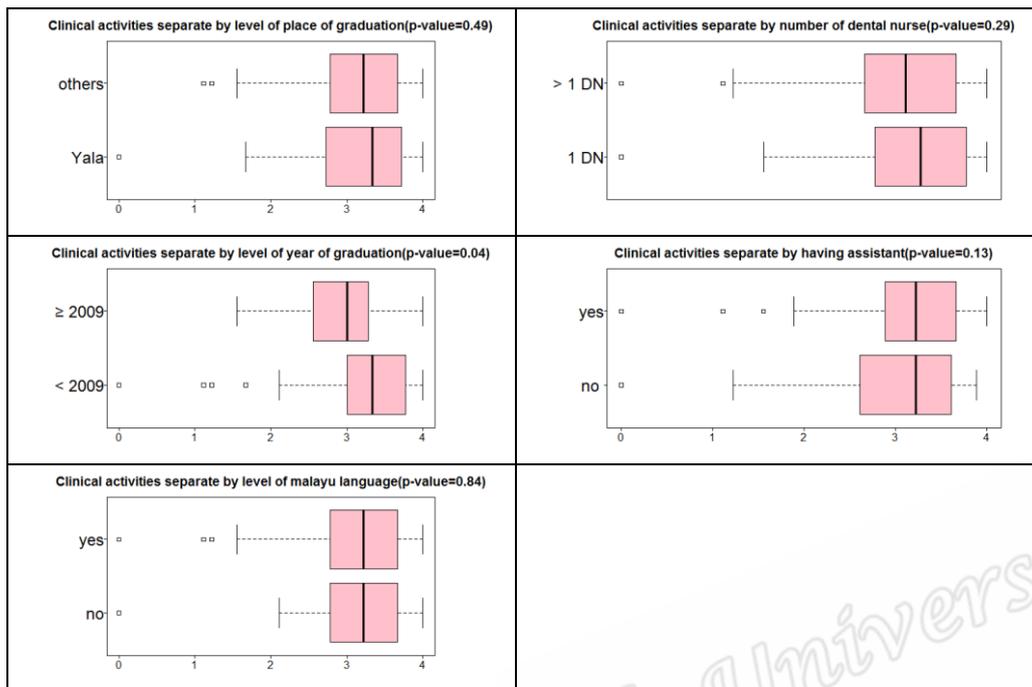
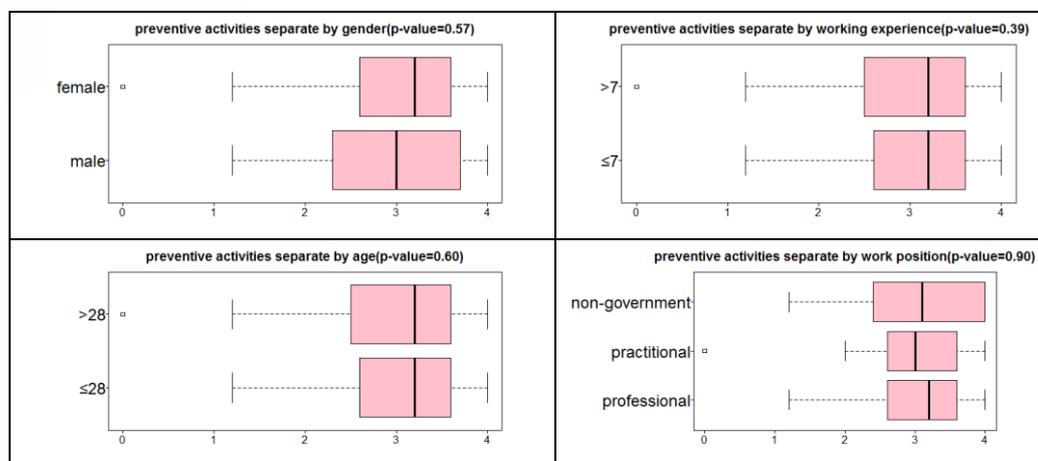


Figure 3.3: Box plot of clinical activities with all determinants

Figure 3.4 shows comparison of *preventive activities* with all determinants. Dental nurses who work in provincial health office doing less practice in *preventive activities* than dental nurses who work in health center and hospital (p-value <0.001). Dental nurses who work with dentists were doing more practice in *preventive activities* than dental nurses who worked without dentists (p-value= 0.02).



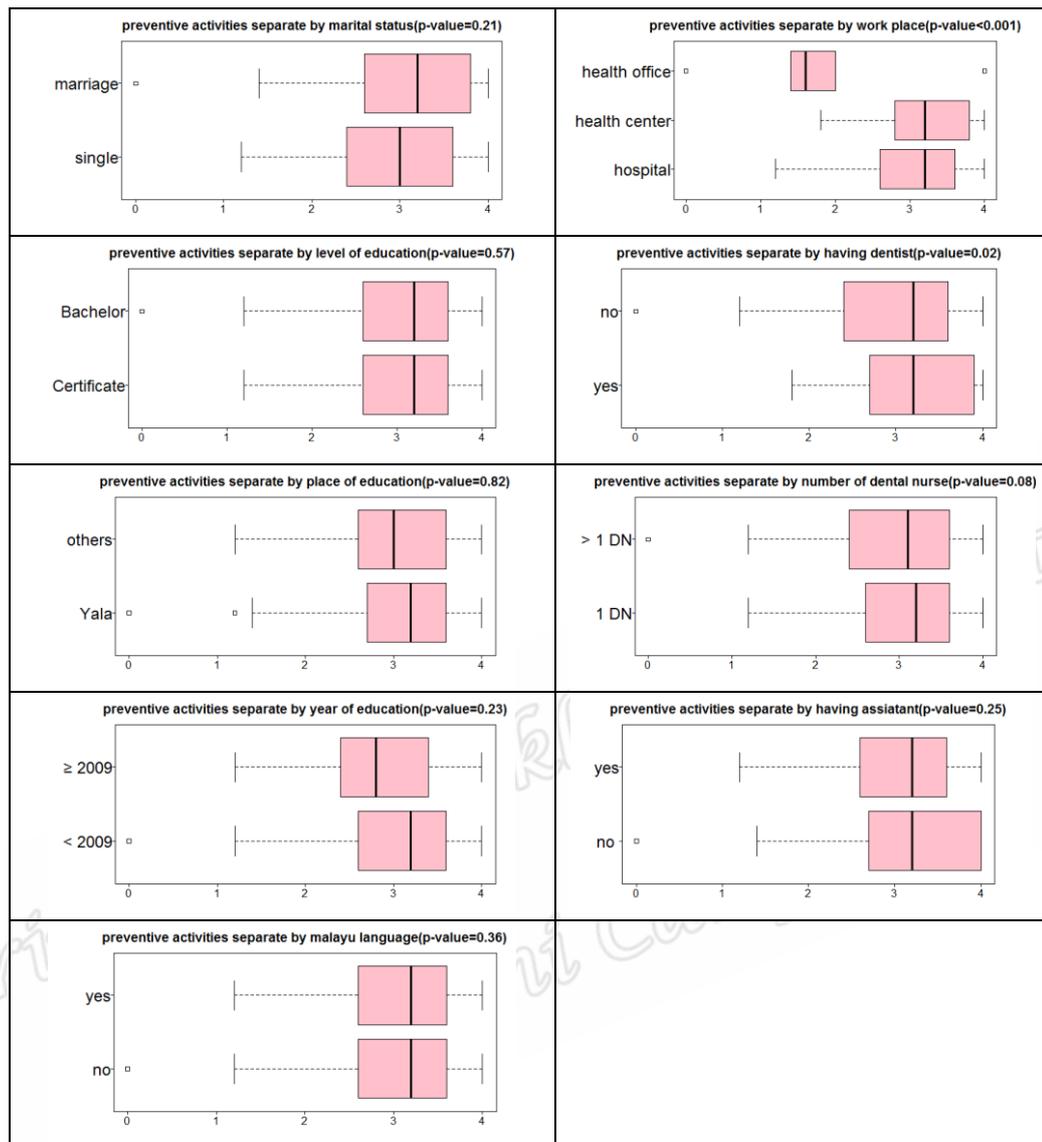


Figure 3.4: Box plot of preventive activities with all determinants

Figure 3.5 shows comparison of *project activities* with all determinants. The marriage dental nurses were doing more practice in *project activities* than single dental nurses (p-value< 0.001). Dental nurses who graduate before year 2009 were doing more practice in *project activities* than dental nurses who graduate in year 2009 or later (p-value= 0.007).

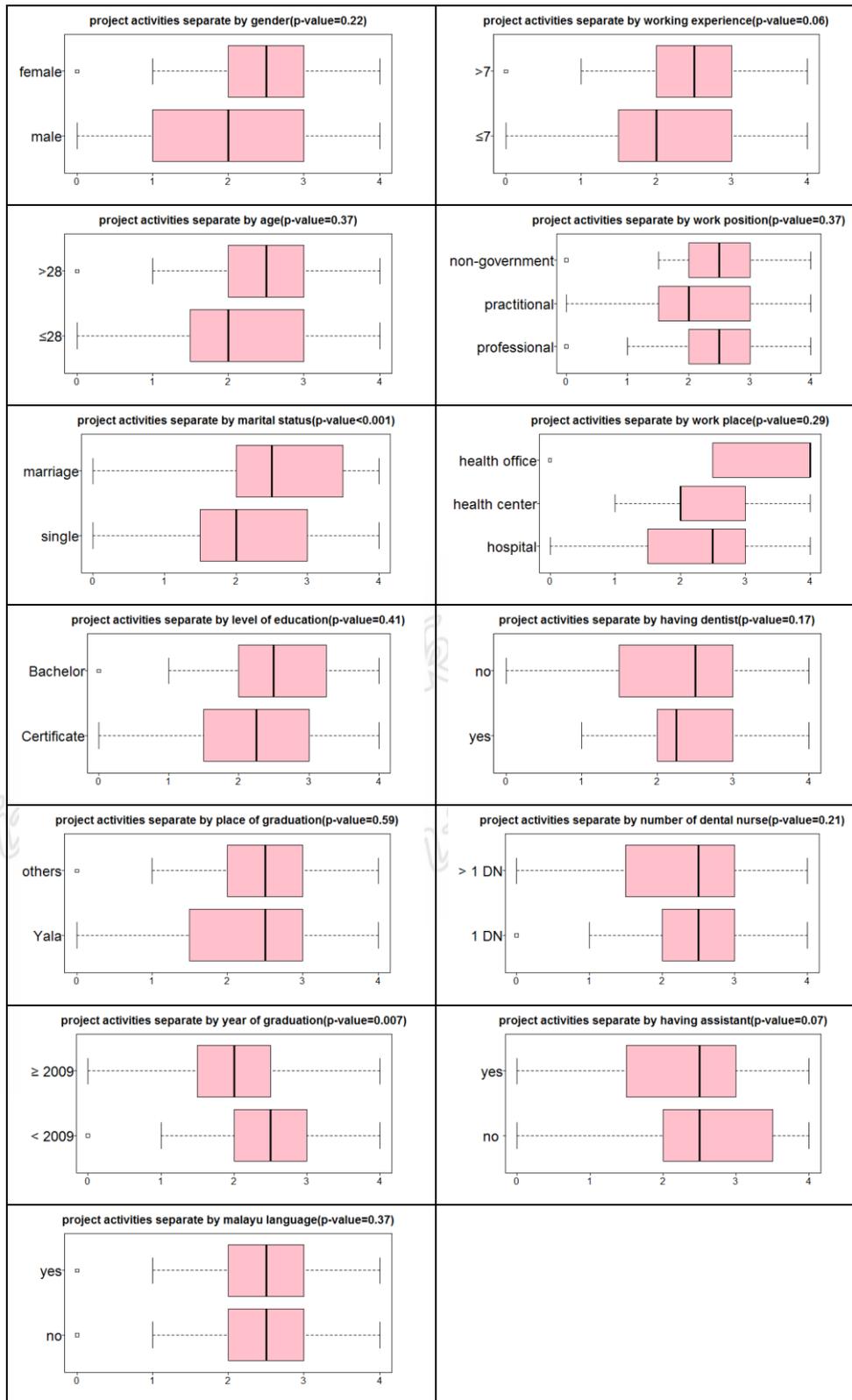


Figure 3.5: Box plot of project activities with all determinants

3.7 The result from open-ended question

Table 3.8 shows results from open-ended question. The dental nurses reported their working problems including “their work beyond their role whereas the roles of dental nurses are not clear (34.3%)”, “their position cannot be promoted by further study (25.0%)” and “insufficient materials and instruments, lack of dental unit and lack of professional support (17.14%)” being the three most common problems.

The working problem of dental nurses	Frequency	Percentage
1. They working beyond their scope whereas the roles of dental nurses are not clear	48	34.3
2. Their position cannot be promoted by further study	35	25.0
3. Insufficient materials and instrument, lack of dental unit and lack of professional support	24	17.1
4. The safety and the unrest situation in their areas	18	12.9
5. Dental nurses works on treatment field work more than preventive field work	12	8.6
6. Lack of encouragement and welfare	9	6.4

Table 3.8: The result from open-ended question

From the preliminary results we can group 21 items into 3 factors. *They are clinical activities, preventive activities and project activities.*

Year of graduation of dental nurse is associated with both *clinical activities* and *project activities*. Work place is associated with both *clinical activities* and *preventive activities*. Dentist is associated with *preventive activities*. Marital status is associated with *project activities*.

In the next chapter these determinants are considered jointly in a multiple linear regression model.