

CHAPTER III

RESEARCH METHODOLOGY

3.1 RESEARCH QUESTIONS

Primary research question

What are the sources of stress for Chulalongkorn University dental students in the academics year 2003?

Secondary research questions

1. What are the sources of stress for Chulalongkorn University dental students in the academics year 2003 in each class year?
2. Are there any differences in the source of stress in Chulalongkorn University dental students in the academics year 2003 in each class year?

3.2 RESEARCH OBJECTIVES

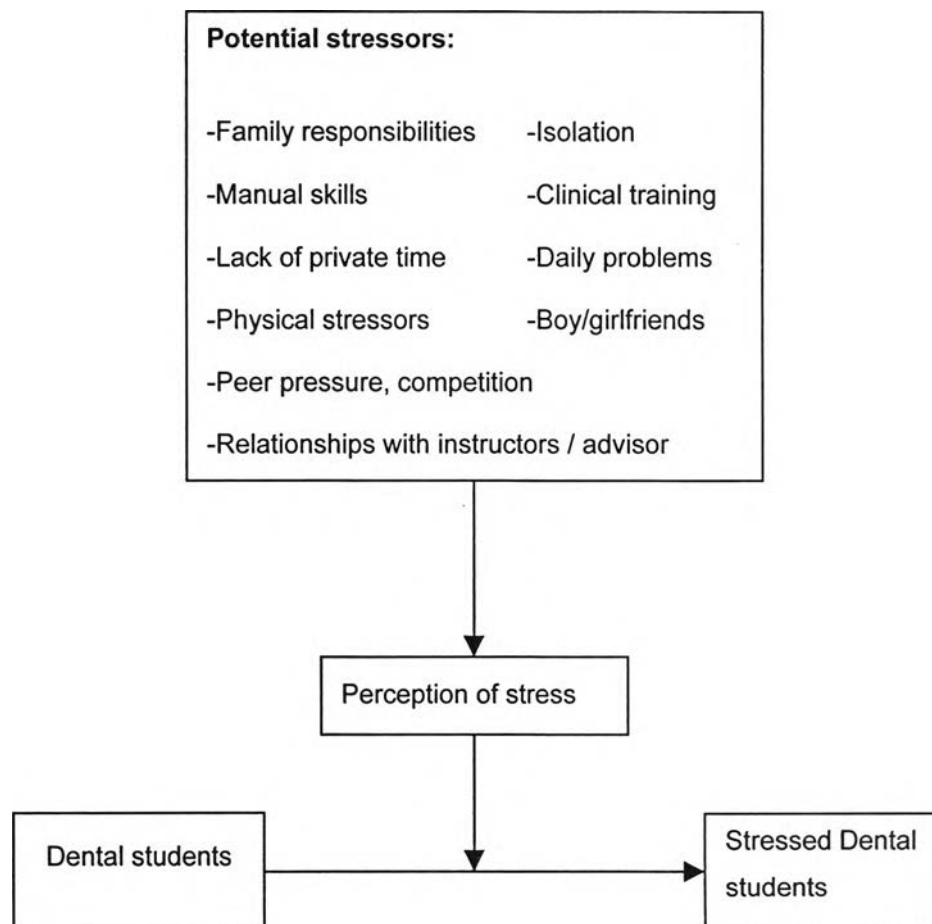
Primary research objective

To identify the sources of stress in 2003 academics year Chulalongkorn University dental students.

Secondary research objectives

1. To identify the sources of stress in each class year of Chulalongkorn University dental students in the academics year 2003.
2. To compare the sources of stress in each class year of Chulalongkorn University dental students in the academics year 2003.

3.3 CONCEPTUAL FRAMEWORK





3.4 OPERATIONAL DEFINITION

Dental students

The 1st to 6th year students who study in the Faculty of Dentistry, Chulalongkorn University in the 2003 academic year.

Stressors

Factors with the potential to cause stress.(24) The situations or objects produce threats in some demand that cause the structural constraint. The structural constraint is defined by locations of severe and non-self-limiting social disadvantage, by restriction of choices, by restriction in access to means, and by underreward in social exchange or the disjunction between goals and means. Additionally, it is not just unpleasant events, such as tests or job demands, that produce stress. Happy circumstances, such as getting prepared for a week's vacation or winning an election, can also produce stress.(25)

Stress

The perceived stress in the situation that was assumed to happen.

3.5 RESEARCH DESIGN

The study was conducted in the academic year 2003. Since the study aims to investigate the sources of stress among dental students of Chulalongkorn University, the measurement will be performed in every class year. This means that the tests will be applied to every dental students in the academic year 2003. The sources of stress will then be identified. The design

of this study can be classified as an observational study with cross sectional method.

3.6 POPULATION AND SAMPLE

Population

The target population and the study population of this study are the dental students of Chulalongkorn University in the academic year 2003.

3.7 MEASUREMENT

3.7.1 OUTCOME MEASURES

3.7.1.1 BASELINE DATA

Personal background data of the subjects were obtained as follow;

-Demographic data:

Sex, year class, GPAX score and residence.

-Personal information:

Drinking habit, smoking habit, chronic diseases, exercise and consultation.

3.7.1.2 DEPENDENT VARIABLES

The outcomes of this study were the perception of stress of dental students categorized by level.

3.7.2 MEASURING TOOL

3.7.2.1 CONSTRUCTION OF THE QUESTIONNAIRE

The instrument used in this study is a newly constructed questionnaire for identifying the source of stress. The scale construction procedure followed Clifford R. Mynatt, Michael E. Dohertys and Christopher J. Pole, Richard Lampard's guidelines. According to their suggestions, these following steps was performed.(3, 26)

a. Deciding what is to be measured.

Since the goal of this study is to identify the potential stressors among dental students, the main construct was derived from the factors that relate to stress development,(3, 20) which are subjects about oneself, friends, family, study environment.

The instrument in this study is a self-administered questionnaire, which consists of 2 parts:

1. **Baseline variables** that possibly affect the outcome was collected. These include sex, class, GPAX score, chronic diseases (asthma, allergies, diabetes mellitus, arthritis, migraine, and peptic ulcer), and the presence of consultation, exercising habit, smoking habit, and drinking habit.

2. **Potential stressors:** The sources of stress in Chulalongkorn University dental students were measured by using a newly constructed questionnaire. Item pool for generating questionnaire cover the potential stressors which consist of 7 dimensions: Self efficacy beliefs, Faculty and

Administration, Workload, Peer pressure/ competition, Performance pressure, Manual skills and clinical training, Family pressure/expectation.

b. Developing a set of item or question.

A comprehensive list of statements concerning objectives of the study is generated usually based on the result of qualitative research. In this study, the qualitative study was performed in 5 third-year dental students and 5 fifth-year dental students. For example, one of the statements is the answer for the question "In your school life, what are your stressors?" Then, all the result was summarized and organized into a set of item.

c. Determining the questionnaire format.

For acquiring the exact result in identifying the source of stress, the 4-point scale will be more accurate than 2-point scale and 5-point scale. In case of being better than 2-point scale the possible answer is only "This item make me very stressful" and "This item has no effect to me at all". Some respondents' answer may be "This item make me moderately stressful", but there is not space for this answer. So they have to choose the deviated answer, which will not be the exact answer. And the 4-point scale is better than 5-point scale in this case, because most of the people will choose the middle answer. That will be the problem in the interpretation (that item is the potential stressors or not).

Likert-type format ranging from 0 (= not stressful) to 3 (= very stressful) was chosen. This format is easy to use and familiar to the respondents. Using the more precise scale seems to be inappropriate since this study just want to identify the source of stress. The scale is as followed:

Score	Definition
0	not stressful
1	slightly stressful
2	moderately stressful
3	very stressful

d. Having the initial pool review by the experts.

Three experts in the area of dental education were requested to evaluate the initial items. One of them is the Associated Dean of Academic affairs of the Faculty of Dentistry, Chulalongkorn University. The others are the Faculty staffs who are actively involved in the area of Dental education. The names of the three experts are listed in the Appendix B. An envelope was delivered by hand to each expert. Enclosed in the envelope were: 1) cover letter explaining the objectives of constructions and usage of questionnaire and the evaluation work requested, 2) the full research proposal and 3) the first draft questionnaire. The items were evaluated in terms of content validity, internal consistency, language, wording and lay out of the questionnaire. The experts were asked to rate a score for each item as will be explained in the statistical test topic (3.8.1) described below. After the test of content validity, the items were edited for clarity according to experts' suggestion.

e. Administering the items to a development sample.

The questionnaires were sent to 6th year dental students of Chulalongkorn University in 2002 academic year because they are quite similar to the study population. The scale was enclosed by a cover letter explaining the objectives of the study and the requested work, and delivered by hand to each subject. The subjects were asked to complete the

questionnaire and to give suggestions to improve it. The data obtained from the development sample were analyzed.

f. Evaluating the items.

For reliability and validity estimation, responses from the pretest study were used.

THE VALIDITY OF THE INSTRUMENT

The validity concerns the extent to which an instrument measures and what is intended to measure. Validity places an emphasis on the objects of a test. Validation procedures are based on the types of evidences. These types of evidences are generally defined as three components of validity: content validity, criterion-related validity and construct validity.(27)

The content validity concerns the extent to which a set of items taps the content of some domain of interest by having the initial pool reviewed by the experts as explained before.

For this study we cannot do the criterion validity because there is no gold standard.

For the construct validity we can do the factor analysis in order to find out if they support the construct in some parts of the questionnaire.

THE REILABILITY OF THE INSTRUMENT

The reliability is defined as an estimated to which a test score is free from error, to what extent observed scores vary from true scores. As it is impossible to know the true score, the true reliability of a test can't be

calculated. First, the test-retest reliability shows that the test is stable over time, which can get from taking the test twice, in 2-4 weeks period. This study studies about stress that can change over time. Thus, the test was done in 7-10 days apart, in the first month of the 2003 academic year in 56 dental students (1st to 6th year). Then correlation was found among them. After that, internal consistency will be performed to show the correlation among items of the test and their consistency. Therefore, other parameters are used to define degree of test reliability.

g. Optimizing scale length.

The reliability and validity estimation can classify which item should be concerned or discarded. The data should be subjected to factor analysis for showing that the item in the same construct is a set of unidimensional.

3.8 STATISTICAL METHODS FOR SCALE DEVELOPMENT

Various statistical methods are employed to test the characteristics of the questionnaire.

3.8.1 ESTIMATION OF RELIABILITY

Reliability may be measured by administering the test repeatedly to the same sample within a short period (test-retest method). This will yield reliability measures in the form of correlation coefficients.(28) The test-retest reliability is a method to determine the stability of the measuring tool over time. Since the questionnaire was constructed in the Likert's scale, therefore the observed score was

constructed in the Likert's scale, therefore the observed score was treated as continuous data. The agreement between results of the two repeated measures was determined in term of intraclass correlation coefficient (ICC).

In this study, the test-retest reliability was performed in 56 dental students (the 1st to 6th year-dental students in the academic year 2003, 10 students in each year). The two tests were performed in 7-10 days apart. Because stress can change over time, 7-10 days is the appropriate time for the subjects, as they should not remember the questions, whereas the environment remains unchanged. The ICC was obtained by SPSS program version 11.0 in Two-way Mixed Effect Model (Absolute agreement Definition): People Effect Random and Measure Effect Fixed. Then, the Single Measure Intraclass Correlation of each dimension was evaluated. The more value of ICC shows that there is the more agreement between the two repeated measures. The ICC over 0.6 is acceptable. The details are shown in Table 3.1.

Table 3.1 Demonstrate the result of ICC

Dimension	Item	ICC
Self efficacy belief	1-5	0.8217
Family pressure	6-9	0.8503
Peer pressure	10-14	0.8263
Facilities	15-18	0.7403
Learning Environment	19-21	0.6922
Workload	22-29	0.7605
Clinical environment	30-34	0.8188

Internal consistency is another important kind of reliability testing in this study. The items, which are too difficult to understand, were either modified or eliminated after pilot testing. Then Cronbach's coefficient alpha is analyzed. The formula is:(29)

$$r_{\alpha} = \frac{k}{k-1} \left\{ 1 - \frac{\sum S_i^2}{S_x^2} \right\}$$

where r_{α} = Coefficient alpha

k = Total number of items

$\sum S_i^2$ = Summation of score variance from each item

S_x^2 = Variance of total score

The items, which have $r_{\alpha} < 0.7$ or > 0.9 , are either modified or discarded.

In this study, the internal consistency was performed in 56 dental students (the 1st to 6th year-dental students in the 2003 academic year, 10 students in each year). Responses were then analyzed for the internal consistency using SPSS program version 11.0. The Cronbach's coefficient of each dimension value between 0.7-0.9 is acceptable. The details of the Cronbach's coefficient alpha are demonstrated in table 3.2 and table 3.3

Table 3.2 Demonstrate the result of Cronbach's coefficient alpha

Dimension	Item	Cronbach's coefficient alpha
Self efficacy belief	1-5	0.8379
Family pressure	6-9	0.9063
Peer pressure	10-14	0.8190
Facilities	15-18	0.7915
Learning Environment	19-21	0.8609
Workload	22-29	0.8991
Clinical environment	30-34	0.9109

Table 3.3 Demonstrate the item-total statistics

Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Alpha if item deleted
1. I feel that nobody likes me.	3.63	6.02	0.67	0.810
2. I feel that my friends are not interested in me.	3.89	6.90	0.72	0.782
3. I feel that my instructors are not interested in me.	4.30	8.07	0.68	0.805
4. I cannot consult instructor when I have problems in my practice.	4.04	7.66	0.62	0.810
5. I cannot consult instructor when I have problems in my study.	4.00	7.82	0.60	0.817
6. I have conflicts with my family member.	2.11	5.33	0.83	0.870
7. My family expected me to get high score.	2.41	6.28	0.82	0.870
8. My family does not understand when I got low score.	2.50	7.05	0.76	0.896
9. There are conflicts among my family members	2.14	5.58	0.80	0.877
10. When I have troubles, I cannot consult my friends.	3.23	6.36	0.68	0.763
11. I can't get along with my classmates.	3.07	5.89	0.73	0.748
12. My classmates are cheating in their work and get higher score than me.	3.61	7.95	0.57	0.897
13. My classmates are cheating in their examination and gets higher score than I am.	3.64	7.51	0.6242	0.780
14. I'm afraid that my friends will get higher score than me.	3.80	8.82	0.52	0.813
15. The computer's efficiency is poor.	3.02	5.29	0.40	0.829
16. The computer room opens in an inappropriate time.	2.88	3.93	0.74	0.668
17. There are not enough seats in the library.	2.71	4.14	0.65	0.714
18. There are not enough books in the library.	2.80	4.27	0.63	0.723
19. Instructor teaches too fast.	2.63	2.93	0.72	0.821
20. The lecture is boring.	2.52	2.36	0.77	0.780
21. The media is not appropriate to the lesson.	2.72	2.79	0.73	0.809
22. There are too frequent examinations.	10.05	24.85	0.68	0.887
23. Assignments are too difficult.	10.14	25.29	0.75	0.880
24. There are too many assignments.	9.98	25.51	0.64	0.890
25. My work is not counted in the requirement.	10.25	25.39	0.70	0.885
26. I cannot make my work as well as I expect.	10.05	25.14	0.73	0.882
27. I cannot finish my work in time.	10.07	25.16	0.75	0.880
28. I cannot do well in the examination.	10.11	26.17	0.66	0.888
29. My grade is lower than my expectation.	10.46	27.82	0.55	0.897
30. Unit is out of order.	6.10	9.33	0.72	0.904
31. Wasting time in queuing.	6.27	8.88	0.78	0.892
32. Inappropriate instruments.	6.23	9.46	0.81	0.884
33. My patient comes late.	5.90	9.93	0.80	0.888
34. Instructor comes to clinic late.	6.00	9.40	0.79	0.887

3.8.2 ESTIMATION OF VALIDITY

Validity concerns the extent to the measure instruments and purposes of the measurement. Content validity refers to the universal of the content. To verify the content validity, copies of Thai version of the questionnaire was sent to three dental education experts to evaluate the initial items. One of the experts is the Associated Dean of Academic affairs of the Faculty of Dentistry, Chulalongkorn University, the others are the Faculty staffs who are actively involved in dental education. Name of these experts was listed in the Appendix B. The items, which were delivered by hand to each expert, compose of 1) cover letter explaining the objectives of constructions and the evaluation questionnaire, 2) the full research proposal and 3) the first draft of the questionnaire. The experts evaluated the relevance of the questionnaire to students' stressor. The items were evaluated in terms of content validity, internal consistency, languages, and the scoring system is as followed:

score	definition
1	Relatively valid item
0	Not sure
-1	Relatively irrelevant item

The obtained scores from each item will be calculated to demonstrate the validity of each item by using the following formula:

$$IC = \frac{\sum R}{N}$$

where IC = Item correlation

ΣR = Total scores of that item

N = Number of expert

The items that obtain $IC < 0.5$ will be either modified or discarded. The result of this content validity testing are shown in table

3.4

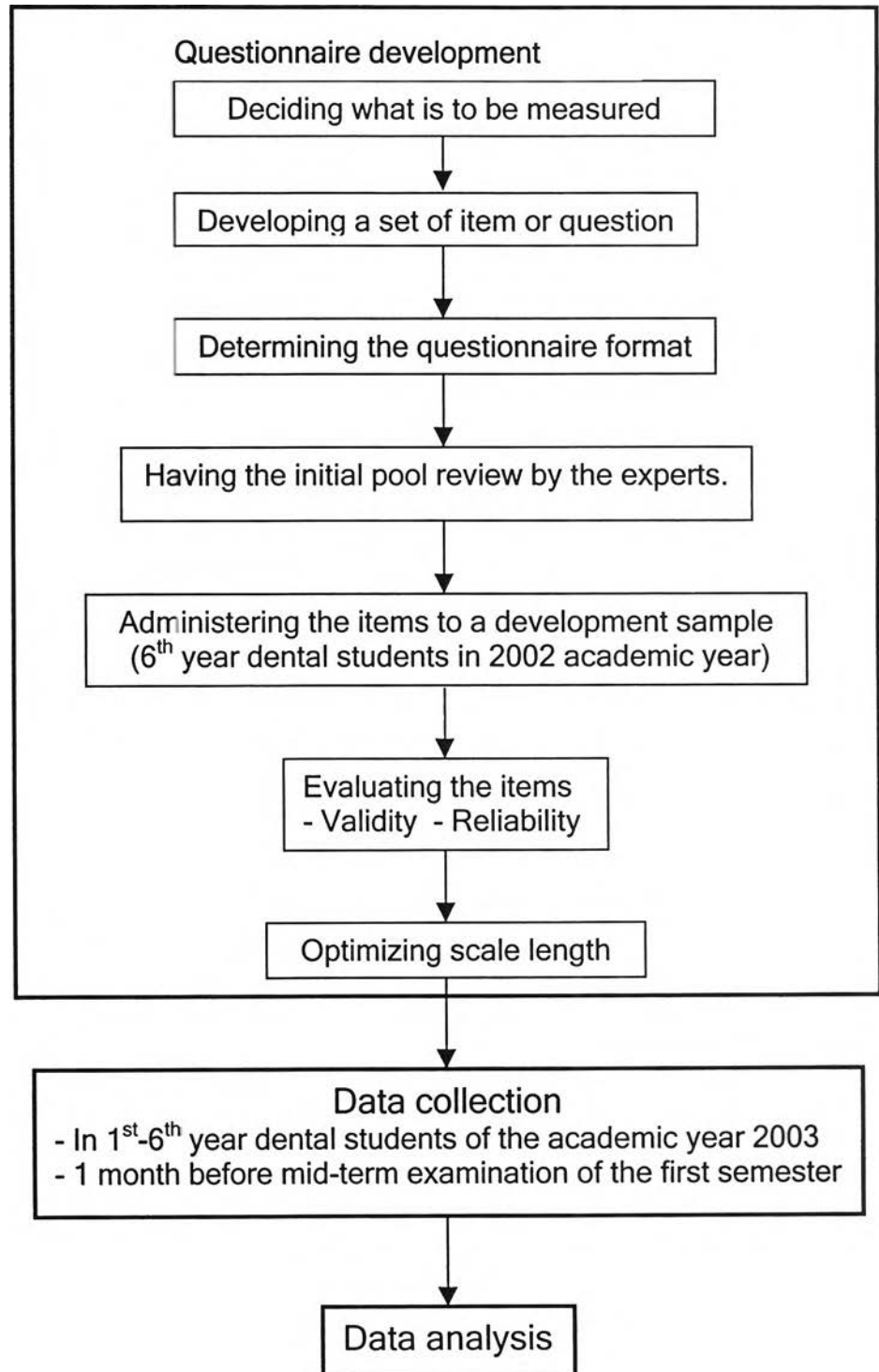
Table 3.4 Demonstrate the result of content validity testing

Item	Expert 1	Expert 2	Expert 3	IC
1. I feel that nobody likes me.	1	1	1	1
2. I feel that my friends are not interested in me.	1	1	1	1
3. I feel that my instructors are not interested in me.	1	1	1	1
4. I cannot consult instructor when I have problems in my practice.	1	1	1	1
5. I cannot consult instructor when I have problems in my study.	1	1	1	1
6. I have conflicts with my family member.	1	1	1	1
7. My family expected me to get high score.	1	1	1	1
8. My family does not understand when I got low score.	1	1	1	1
9. There are conflicts among my family members	1	1	1	1
10. When I have troubles, I cannot consult my friends.	1	1	0	0.67
11. I can't get along with my classmates.	1	1	1	1
12. My classmates are cheating in their work and get higher score than me.	1	1	1	1
13. My classmates are cheating in their examination and gets higher score than I am.	1	1	1	1
14. I'm afraid that my friends will get higher score than me.	1	1	1	1
15. The computer's efficiency is poor.	1	1	1	1
16. The computer room opens in an inappropriate time.	1	1	1	1
17. There are not enough seats in the library.	1	1	1	1
18. There are not enough books in the library.	1	1	1	1
19. Instructor teaches too fast.	0	1	1	0.67
20. The lecture is boring.	1	1	1	1
21. The media is not appropriate to the lesson.	1	1	1	1
22. There are too frequent examinations.	1	1	1	1
23. Assignments are too difficult.	1	0	1	0.67
24. There are too many assignments.	1	1	1	1
25. My work is not counted in the requirement.	1	0	1	0.67
26. I cannot make my work as well as I expect.	1	1	1	1
27. I cannot finish my work in time.	1	1	1	1
28. I cannot do well in the examination.	1	1	1	1
29. My grade is lower than my expectation.	1	1	1	1
30. Unit is out of order.	1	0	1	0.67
31. Wasting time in queuing.	0	1	1	0.67
32. Inappropriate instruments.	0	1	1	1
33. My patient comes late.	1	0	1	0.67
34. Instructor comes to clinic late.	1	0	1	0.67

From the above, no item was scored less than 0.5. That means all of them are valid. Thus, they are all included in the questionnaire with some modification according to the expert's suggestion.

The results obtained from the population will be used for calculating the correlation among items. Factor analysis will be used for explaining the relationship among several correlated variables in term of a few conceptual meaningful relatively independent factors. The method generally proceeds in 4 steps, which are 1) preparation of the correlation matrix, 2) determination of initial factors by principle-components analysis, 3) rotation of initial factor (varimax rotation was used in this study), and 4) determination of the component scores. If it shows details of each dimension similar to the pretest, the analysis will be going on. If it shows details of each dimension different from the pretest, the details of each dimension will be rearranged. The internal consistency of the questionnaire will be performed, then the data will be analyzed follow the grouping as the suggestion from factor analysis.

Summary of the research administration



3.9 DATA COLLECTION

The measurement was performed in one month before mid-term examination of the first semester of the academic year 2003. The questionnaire was presented to the respondents by the researcher. The purpose of the inquiry is explained first.

To maximize the numbers of response, the researcher distributed the questionnaire and explained the benefit of the study to respondents by herself. The respondents must be assured not only that participation is valued and those answers are neither correct nor incorrect, but also that the participation is strictly protected in terms of confidentiality, and thus, causes no risk. In addition, the research can be benefited to the respondents as it showed contributes to the adjustment of the course for stress reduction. Then, the respondents are left to complete the questionnaire (about 10 minutes).