

INTENTION TO OBTAIN SILVER DIAMINE FLUORIDE TREATMENT FOR DENTAL CARIES  
AMONG ELDERLY



A Thesis Submitted in Partial Fulfillment of the Requirements  
for the Degree of Master of Science in Geriatric Dentistry and Special Patients Care

FACULTY OF DENTISTRY

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ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

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By Miss Ratchawipa Nakphu  
Field of Study Geriatric Dentistry and Special Patients Care  
Thesis Advisor Associate Professor PAGAPORN PANTUWADEE  
PISARNTURAKIT, D.D.S., M.Sc., Dr.P.H

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Accepted by the FACULTY OF DENTISTRY, Chulalongkorn University in Partial  
Fulfillment of the Requirement for the Master of Science

----- Dean of the FACULTY OF  
DENTISTRY  
(Professor Pornchai Jansisyanont, D.D.S., M.S., Ph.D.)

THESIS COMMITTEE

----- Chairman  
(Associate Professor ORAPIN KOMIN, D.D.S., Ph.D.)

----- Thesis Advisor  
(Associate Professor PAGAPORN PANTUWADEE  
PISARNTURAKIT, D.D.S., M.Sc., Dr.P.H)

----- Examiner  
(NIPAPORN URWANNACHOTIMA, D.D.S., M.Ed., Ph.D.)

----- External Examiner  
(Assistant Professor Paranee Vatanasomboon, Ph.D.)

รัชวิภา นาคภู : เจตนาเชิงพฤติกรรมที่จะใช้ซิลเวอร์ไดอามีนฟลูออไรด์ในการรักษาฟันผุในผู้สูงอายุ. ( INTENTION TO OBTAIN SILVER DIAMINE FLUORIDE TREATMENTFOR DENTAL CARIES AMONG ELDERLY) อ.ที่ปรึกษาหลัก : รศ. ทพญ. ดร.ผกาภรณ์ พันธวุฒิ พิศาลธุรกิจ

#### Abstract

จุดมุ่งหมาย: เพื่อประเมินความตั้งใจของผู้สูงอายุในการใช้ซิลเวอร์ไดอามีนฟลูออไรด์ (SDF) รักษาโรคฟันผุ

วัสดุและวิธีการ: สุ่มกลุ่มตัวอย่างอายุระหว่าง 60-90 ปี ที่อ่านภาษาไทยได้และถามตอบเข้าใจ โดยใช้แบบสอบถาม หลังจากให้ความรู้เกี่ยวกับ SDF การสัมภาษณ์โดยใช้แบบสอบถามเป็นการใช้ Theory of Reason Action (TRA) ประกอบด้วยคำถาม 23 ข้อจาก 7 หัวข้อ ได้แก่ behavioral belief, evaluation of behavioral outcome, normative belief, motivation to comply, attitude towards behavior, subjective norm and intention.

ผลลัพธ์: กลุ่มตัวอย่างทั้งหมด 588 คน ซึ่งมีอายุเฉลี่ย 65.3 ปี (ส่วนเบี่ยงเบนมาตรฐาน=5.53), 52.7% เป็นผู้หญิง และ 58.1% วางงาน/เกษียณ ส่วนใหญ่ 80.8% อยู่กับครอบครัว 63.4% มีการศึกษาไม่ถึงชั้นประถมศึกษาปีที่ 6, 62.9% มีรายได้ครอบครัวต่อเดือนต่ำกว่า 10,000 บาทและ 63.6% มีโรคประจำตัว กลุ่มตัวอย่างจำนวน 82.5% ตั้งใจที่จะใช้ SDFในการรักษาฟันผุ โดยมีค่าเฉลี่ย (ส่วนเบี่ยงเบนมาตรฐาน)ของคะแนนความตั้งใจที่จะใช้ SDF เพื่อรักษาฟันผุ 2.14 (0.54) ปัจจัยที่มีผลต่อความตั้งใจอย่างมีนัยสำคัญทางสถิติ ได้แก่ อายุ ( $P=0.021$ ) รายได้ครอบครัว ( $P < 0.001$ ) มีโรคประจำตัว ( $P < 0.001$ ) ปัญหาเกี่ยวกับฟัน ( $P < 0.001$ ) และกลัวการไปพบการทันตแพทย์ ( $P < 0.001$ )

สรุป ผู้สูงอายุส่วนใหญ่ (ร้อยละ 82.5) ตั้งใจจะใช้ SDF เพื่อหยุดยั้งโรคฟันผุขึ้นกับคุณลักษณะที่แตกต่างกัน เช่น อายุ รายได้ของครอบครัว การมีโรคทางระบบ การมีปัญหาทันตสุขภาพ และ ความกลัวการพบทันตแพทย์ ( $P < 0.001$ )

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ปีการศึกษา	2565	ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

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KEYWORD: geriatric, sodium diamine fluoride, the theory of reasonable of action,  
behavioral, gerodontology

Ratchawipa Nakphu : INTENTION TO OBTAIN SILVER DIAMINE FLUORIDE TREATMENTFOR  
DENTAL CARIES AMONG ELDERLY. Advisor: Assoc. Prof. PAGAPORN PANTUWADEE  
PISARNTURAKIT, D.D.S., M.Sc., Dr.P.H

Aims: To evaluate the intention of the elders to use the Silver Diamine Fluoride (SDF)  
treatment for stopping dental caries progression after being informed

Materials and Methods: The elders aged 60-90 years old who are independent and  
can read Thai were recruited. A questionnaire-guided interview was performed to the elders after  
introduction of the SDF treatment. The questionnaire-guided interview was guided by the Theory  
of Reason Action (TRA) composed of 23 questions of 7 constructs including behavioral belief,  
evaluation of behavioral outcome, normative belief, motivation to comply, attitude towards  
behavior, subjective norm and intention. The intention to do the SDF treatment was use to  
indicate SDF acceptance or SDF unacceptance. Socio-demographic data and TRA variables were  
analyzed using descriptive statistics.

Results: A total of 588 participants with a mean (standard deviation) age of 65.3 (5.53)  
years were recruited. About 52.7% and 58.1% of the participant were females, and  
unemployed/retired, respectively. Most of the participants (80.8%) stayed with family. Most  
participants (63.4%, 62.9% and 63.6%) had less than a sixth-grade education, had a monthly  
family income of less than 10,000 Baht and had underlying diseases. 82.5% of the participant  
indicated the intention to do the SDF treatment. The average (standard deviation) of the  
intention score was 2.14 (0.54). The statistically significant factors associated with intention to do  
the SDF treatment are age ( $P=0.021$ ), family income ( $P < 0.001$ ), having underlying disease ( $P < 0.001$ ),  
dental problem ( $P < 0.001$ ) and afraid of going to see the dentist ( $P < 0.001$ ). Scores of  
the intention was resembled to the scores of others TRA variables except Motivation to comply  
Field of Study: Geriatric Dentistry and Special

Students' Signature .....

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Ratchawipa Nakphu



## TABLE OF CONTENTS

	Page
ABSTRACT (THAI) .....	iii
ABSTRACT (ENGLISH) .....	iv
ACKNOWLEDGEMENTS .....	v
TABLE OF CONTENTS .....	vi
LIST OF TABLES .....	ix
LIST OF FIGURES.....	x
CHAPTER I INTRODUCTION.....	1
1.1 Background and rationale .....	1
1.2 Research questions .....	2
1.3 Research objectives .....	2
1.4 Operational definitions .....	2
1.5 Benefit of the study.....	3
CHAPTER II LITERATURE REVIEW.....	3
2.1 Dental caries in elderly.....	4
2.2 Oral health services in Thailand.....	4
2.3 Silver diamine fluoride.....	5
2.4 The theoretical framework .....	9
2.5 Research conceptual framework.....	11
CHAPTER III RESEARCH METHODOLOGY.....	13
3.1 Research design .....	13
3.2 Population and sample .....	13

3.2.1 Inclusion criteria.....	13
3.2.2 Exclusion criteria.....	13
3.2.3 Sample size.....	13
3.3 Research instruments:.....	14
3.3.1 Information instrument: E-learning about SDF:.....	14
3.3.2 Data collection instrument:.....	14
3.4 Ethical consideration.....	15
3.5 Data collection.....	15
3.6 Data analysis.....	16
3.6.1 Variable coding and scoring.....	16
3.6.2 Statistical tests.....	17
CHAPTER IV RESULT.....	18
4.1 Description of the sample.....	18
4.2 Descriptive result of intention.....	20
4.3 TRA variables.....	20
4.4 Factors associated with the intention.....	25
CHAPTER V DISCUSSION.....	30
Limitation.....	32
CHAPTER VI CONCLUSION.....	33
REFERENCES.....	37
APPENDICES.....	1
APPENDIX I ETHICAL APPROVAL.....	2
APPENDIX II CONSENT FORM.....	3
APPENDIX III DIGITAL POSTER: E-LEARNING.....	5



APPENDIX IV QUESTIONNAIRE.....6

APENDIX V Development questionnaire.....16

VITA .....31



## LIST OF TABLES

	<b>Page</b>
Table 1. Demographic characteristics (N=588) .....	19
Table 2. Direct measurement of intention.....	21
Table 3. Indirect measurement of intention. ....	22
Table 4. Score of TRA variable according to difference intention to use SDF.....	25
Table 5. Comparison of intention level in different sociodemographic variables.....	27
Table 6. Reasons for not intend to use SDF.....	29



## LIST OF FIGURES

	<b>Page</b>
Figure 1. The Theory of Reasonable Action (TRA).....	10
Figure 2. Research conceptual framework.....	11
Figure 3. Frequency and percentage of participants with different intention to use SDF treatment.....	29



## CHAPTER I INTRODUCTION

### 1.1 Background and rationale

The older adults are growing and likely to be an increasingly large part of dental practice in the coming years. The typical aging patient's health status can become complicated due to comorbid conditions and physiological changes associated with aging. (1, 2) Dental conditions associated with aging include root and coronal caries. Root caries is a major cause of tooth loss in older adults, and tooth loss is the most significant negative impact on oral health-related quality of life for the elderly. The elderly people suffer from gingival recession and root exposure, which increase probability to get dental caries and erosion on the exposed root surface. (1-3)

The use of fluoride is a widely accepted method that can prevent tooth decay effectively. Various forms of fluoride application such as fluoride varnish or various form of sodium fluoride have topical effect on the tooth surface. Treatment options for caries include invasive and non-invasive treatments such as silver diamine fluoride (SDF), Atraumatic Restorative Treatment (ART), and fluoride varnish. (3) The main mechanism of fluoride to prevent tooth decay is promoting the remineralization and preventing demineralization of the tooth structure. (4, 5)

Silver diamine fluoride (SDF) is an alternative form of topical fluoride which can arrest the dental caries progression. SDF was proved effective for caries prevention and caries arresting among children and elderly. (6, 7) One disadvantage of the SDF treatment is the SDF treatment leaves the black staining on the decayed area. Many studies revealed the acceptance on the staining of SDF treatment in children. The primary and the posterior teeth were more accepted than the permanent and the anterior teeth. (8, 9) Unfortunately, there is very few studies about the opinion about SDF treatment among the elderly. As the black staining on the carious teeth is obvious, the elders might have different judgement on SDF treatment.

As behavioral intention is the most proximal cause of behavior, the study on intention would inform the likelihood of the suggested behavior will happen. Then,

the study among the elder about their intention to use the SDF treatment for arresting of dental caries would be benefit for further practice of the dental health profession.

## 1.2 Research questions

- 1.2.1 What is the intention level of SDF treatment among elders after being informed about such treatment via an e-learning survey?
- 1.2.2 What are the factors influence the decision of the elders whether to use SDF?

## 1.3 Research objectives

- 1.3.1 To evaluate the intention level of the elders to obtain of SDF treatment for preventing dental caries after being informed.
- 1.3.2 To indicate the influenced factors on decision making of the elders to use SDF.

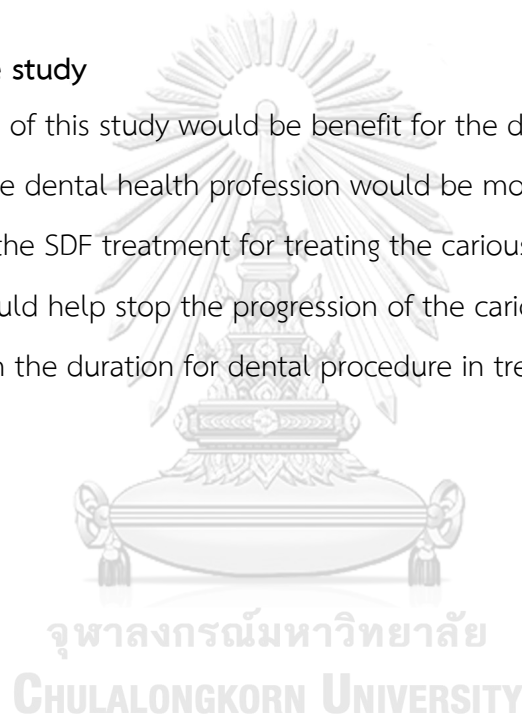
## 1.4 Operational definitions

- 1.4.1 **The elders** refer to the persons who are 60-year-old and over and independent.
- 1.4.2 **SDF treatment** refers to the using of silver diamine fluoride (SDF) for stopping the progression of dental caries.
- 1.4.3 **Dental caries** refers to enamel caries and dentinal caries which are not nearly exposed pulp.
- 1.4.4 **Intention level** refers to level of agreement of on statement about intention to do the SDF treatment.
- 1.4.5 **Intention to the SDF treatment** refers to an individual's readiness to the SDF treatment if they have dental caries.
- 1.4.6 **Attitude toward SDF treatment** refers to positive and negative feeling of an individual about obtaining the SDF treatment.
- 1.4.7 Behavioral belief refers to an individual's belief about the consequences of obtaining SDF treatment.
- 1.4.8 **Evaluation of behavioral outcome** refers to positive or negative judgements about the outcomes of obtaining the SDF treatment.

- 1.4.9 **Subjective norm** refers to an individual's belief about whether most people approve or disapprove of the SDF treatment.
- 1.4.10 **Normative belief** refers to an individual's belief about whether his/her peers approve or disapprove of the SDF treatment.
- 1.4.11 **Motivation to comply** refers to motivation to obtain the SDF treatment which their peers think he should use the SDF treatment.
- 1.4.12 **SDF (un)intention** refers to individual's (un)intention to use the SDF treatment.

### 1.5 Benefit of the study

The results of this study would be benefit for the dental health profession and the elders. The dental health profession would be more confident in suggesting the elders to use the SDF treatment for treating the carious lesion. The widely use of SDF treatment would help stop the progression of the carious lesion among the elders and shorten the duration for dental procedure in treating dental caries.



## CHAPTER II LITERATURE REVIEW

This chapter includes a review of related literature covering the following topics: 1) Dental caries in elderly; 2) Oral health services in Thailand; 3) Silver diamine fluoride; 4) The theoretical framework; and 5) Research conceptual framework.

## 2.1 Dental caries in elderly

The 8<sup>th</sup> National Oral Health Survey in 2017 indicated the average remaining teeth among elderly, 60-74 years old, was 18.6 teeth and average DMFT was 15.9 teeth. 56.1% of them had permanent teeth at least 20 teeth, and 40.2% of them had at least 4 pairs of posterior teeth. Among 39.4% of 60 – 74 year elders who had 20 permanent teeth with 4 pairs of posterior teeth, they are in rural areas (41.3%), urban areas (38.2%) and Bangkok (36.0 %). (10) Moreover, more than half of elderly in this age group had untreated dental caries (52.6%) and the highest proportion of untreated root caries (16.5%) among Thai population. (10)

Among the late elderly, 80-85 years old, the loss of permanent teeth increased with age. They had average 10 permanent teeth. Only 22.4% of them have at least 20 permanent teeth and 12.1% of them had 4 pairs of posterior teeth. Almost all population in this group had dental caries experience and 43.5% had at least one untreated dental caries. Thus, the situations of elders without enough functional permanent teeth and untreated dental decay indicated chewing difficulty among the elder. (10)

## 2.2 Oral health services in Thailand

In Thailand, only 31% of the elderly aged 60 years and over had received dental services in 2020. (11, 12) Most of the elders stayed at home and received care from their families, volunteers such as village health volunteers (VHVs) and / or health professionals from the lowest level of public health services called health promotion hospitals (HPHs) , (13, 14) If the complicated treatment is needed, they were referred to primary care or secondary care. The transportation of the elder, the cost of treatment, special caregiver need and physical health of the elder will become problems. (15, 16) There is still no specific facilities for the elders and others who need special care in general.

### 2.3 Silver diamine fluoride

Silver diamine fluoride (SDF) has been extensively researched and proven effective for caries prevention. SDF treatment arrests the coronal and root caries in children and older adult. (7) SDF is inexpensive, safe and easily accessible. SDF treatment requires less equipment and shorter period of time than other treatment procedures. Even SDF leaves an obvious black staining but SDF does not affect the bonding strength of composite resin to dentin. (17) SDF is compatible with glass-ionomer cement (GIC) and may increase the resistance of GIC and restoration of composites for cavities. (6, 18) SDF appears as a clear liquid which combines the antibacterial property of silver and remineralization activity of fluoride. (18)

SDF was first produced in 1970, Japan by Dr Nishino and Yamaga. (19) They combined action of fluoride and silver which can prevent and deter dental caries progression in children. In 2017, the American academy of pediatric dentistry published guideline for SDF application for dental caries management among children, adolescent and special needs patients. Many studies confirmed effectiveness of SDF in arresting dental caries in primary tooth compared with no treatment and several other treatments. (20) Nowadays, SDF 38% concentration is available in trade name Saforide® since 1970, which was imported by WeParden Co., Ltd. (5, 19)

SDF is a chemical formula ( $\text{Ag}(\text{NH}_3)_2\text{F}$ ) which reacts with hydroxyapatite ( $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$ ), the minerals of the teeth, Calcium Fluoride ( $\text{CaF}_2$ ) and Silver Phosphate ( $\text{Ag}_3\text{PO}_4$ ). The obtained end product can prevent the tooth decay and strengthen the decalcified tooth structure. The chemical reaction equations between Silver Diamine Fluoride ( $\text{Ag}(\text{NH}_3)_2\text{F}$ ) and Hydroxyapatite ( $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$ ) are as follows:



The calcium fluoride will be the reservoir of the fluoride and is a precursor in the reaction to change the hydroxyapatite into the fluoro-apatite which resist to acidic conditions. (7, 20) Silver phosphate cause mechanism of bacterial action. The reaction



above challenges the reaction with tooth decay in the tooth to form silver protein and settles in the tooth decay and break down for the silver ion which has the bacterial resistance ability. In the first process, silver ion binds to the disulfide groups of proteins in the bacterial membrane which cause bacteria to loss of duty in the exchange of substances. In which the deformed bacteria cells are unable to survive or grow. The second process, silver ion binds to the sulfides or thiol (-SH) groups of the cysteine amino acids, which is an important part of the enzyme activity. This reaction inhibits enzyme, leads to the interference of metabolism process, which causes bacteria to die. Lastly, silver ion can bind with guanine amino acids, which are the main components in DNA. Therefore, bacteria are unable to be genetically protected, and loss the ability to inhibit the activity of the matrix metalloproteinase (MMPs) and induce formation of the strong active dextran sugar causes tooth decay. (18, 21-23)

The amount of fluoride received from SDF application is less than that of other forms of fluoride supplement such as fluoride varnish. (4, 24) The use of SDF does not apply to all teeth in the mouth but to only some area of the teeth. The amount of fluoride received when applying fluoride varnish (Duraphat) is higher than the silver diamine fluoride (Saforide). It was found that fluoride varnish at a concentration of 22600 ppm 6.8-11.3 mg was used to apply at all teeth, while SDF at a concentration of 44800 ppm 1.4 mg was used to apply at all teeth. (7, 25) Studies indicated amount of fluoride in the application of SDF is considered as a safe level. (18, 21, 24)

Indication for SDF application includes patients with high caries risk who have active cavitated caries lesions presents with behavioral challenges or medical management and dental caries with multiple cavitated caries lesions that may not all be treated in one visit; no signs of pulp inflammation or spontaneous pain. SDF can be used prior to the restoration placement or as a part of caries control treatment. Informed consent in particular the emphasis on expected staining of treated lesions, potential staining on skin and clothing should be acquired prior to the SDF treatment. (7, 25)

It is unnecessary to remove debris or carious dentin from cavities prior to the clinical application of SDF. Isolation of the area to be treated with cotton rolls or other separation methods is recommended. Careful application with a micro brush is adequate for preventing intraoral and extraoral soft tissue exposure. Not more than one drop of SDF should be used for the entire appointment. Application time should be at least one minute if possible. The entire dentition may be treated after SDF treatment with 5% sodium fluoride varnish to help prevent caries on the teeth and sites not treated with SDF. (20, 26)

The effectiveness of SDF in arresting tooth decay is in the range from 60 to 80 percent by one use, (22, 27) depending on the size of the cavity and the location of the tooth. The anterior teeth have a higher rate of arrested tooth than the posterior teeth, 2-4 weeks follow-up are recommended for evaluating the arrest of caries after SDF treatment. (8, 9, 27)

The benefits of SDF are widely effective in helping to stop the development of the oral cavity, killing bacteria that damage the teeth. It is useful for children or adults who feel anxiety about dental treatment or unable to cooperate in dental procedures. SDF treatment requires minimum health care requirements and has shown the effectiveness in arresting dental caries. It is very helpful for people who do not have access to dental treatment from time and resource limitation or dental fear/anxiety as its procedure is short and easy, requires no special equipment, and generally only needs to be applied once a year. (19, 22)

SDF is widely used by dentists as it is safe even for young children (27) but SDF cannot be used in patients with allergic to silver, oral ulcers or advanced gum disease. Common side effect of SDF is black stain around the areas that use SDF. SDF can also stain the surfaces in contact such as clothes or nearby tissues in the mouth. Some studies suggested using potassium iodide with SDF to minimize stains. (27)

Studies reported about caregivers of children were satisfied with SDF treatment even it leaved the black stain. (26, 27) Their parents accepted the staining of SDF treatment in the primary and the posterior teeth more than the permanent and the anterior teeth as they were in less visible position. Moreover, it is very useful and feasible for crying, kicking or screaming, or uncooperative children. Many parents preferred the SDF treatment to alternative treatment under sedation or general anesthesia. The impact of location and treatment difficulty on SDF acceptance was varied by different socioeconomic and ethnic groups. (8, 9)

Examples of the use of SDF in different countries, Finland, the use of SDF is included in caries management guidelines, with its recommended use primarily focused on caries patients. Other Scandinavian countries, it is also used on elderly patients or early childhood caries lesions. Often included in the protection code applied to traditional fluoride varnish applications. There is currently no national/regional dental program. In Japan, dental hygienists can use it under the dentist's supervision. In 2019, the Japanese Society of Dental Medicine recommended that SDF be effective in inhibiting caries progression in patients with access or exposure difficulties for dental treatment. Kenya, there has been a provisional authorization for the use of SDF in Kenya by the Pharmacy and Poisons Board of Kenya allowing the importation of SDF products. There are no national guidelines for the use of SDF. In Austria, there are no uniform guidelines for the use of SDF in oral health plans. In Australia. Its use is included in the Clinical Services Guide for the Treatment of decidual and Permanent Teeth with caries. (28)



## 2.4 The theoretical framework

The Theory of Reason Action (TRA) aims to explain the relationship between attitudes and behaviors within human actions. It is mainly used to predict how an individual will behave, depending on the attitude and intention of the pre-existing behavior. The individual's decision to participate in a specific behavior depends on the expected results of the individual to be the result from the practice of behavior theory derived from previous research in social psychology. (29-31)

Behavior: a positive approach to behavior research. TRA seeks to predict and explain the intentions of certain behavioral practices. The theory needs clear behavior in terms of the following four concepts: action, goal, context, and time. Behavioral intentions are the main motivation of behavior, while the two main factors regarding behavioral intentions are attitudes and Norms of people. (29-31)

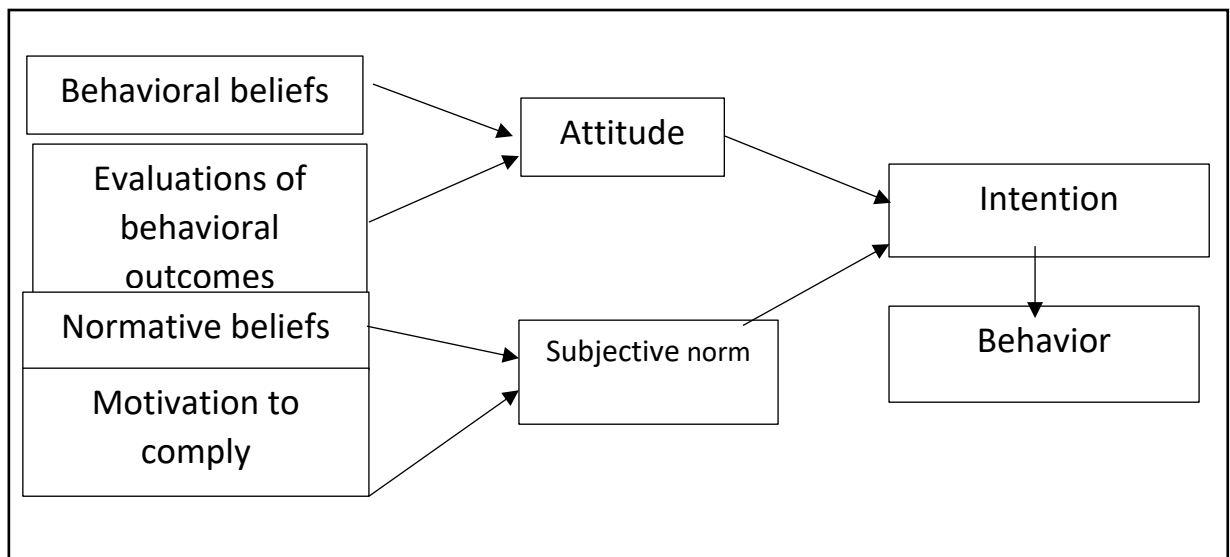
Behavioral intention: a function of both attitudes and subjective norms toward that behavior. Attitudes being how strongly one holds the attitude toward the act and subjective norms being the social norms associated with the act. The stronger the attitude, the more positive the subjective norm. However, the attitudes and subjective norms are unlikely to be weighted equally in predicting behavior. Depending on the individual and situation, these factors might have different impacts on behavioral intention, thus a weight is associated with each of these factors. (29-31)

Attitude: is one of the important factors of behavioral intent and reference to how people feel about certain behaviors. These attitudes are influenced by two factors; 1) Behavioral beliefs that relate to the outcomes of behaviors performed and 2) Evaluating possible outcomes. (29-31)

Subjective norms: One of the key factors of behavioral intentions and refers to the method of recognition of groups or individuals involved, such as family members,

friends, and people around them that may affect behavioral behavior. This norm is influenced by two factors; 1) Normative belief and 2) Motivation to comply. (29-31)

*Figure 1. The Theory of Reasonable Action (TRA)*



The FDI World Dental Federation says oral health is a fundamental component of health, physical and mental well-being. It is influenced by an individual's experience, perceptions, expectations, and adaptability. For this reason, oral disease prevention and oral health maintenance contribute to improving the health system and quality of life of the elderly. (32) In 2017, the Dental Association of Thailand released guidelines for the use of fluoride, including SDF, recommending the semi-annual use of SDF in caries lesions for patients with severe, behavioral ECC. not cooperating or unfavorable health conditions. In 2018, SDF was recommended as an alternative treatment for caries in primary teeth when access to dental care is restricted as is caries in permanent teeth.(28) the Ministry of Public Health Thailand has made dental services for the management of caries in primary teeth and root caries in permanent teeth. The SDF application is classified as a professional fluoride covered by free universal health coverage. (28)

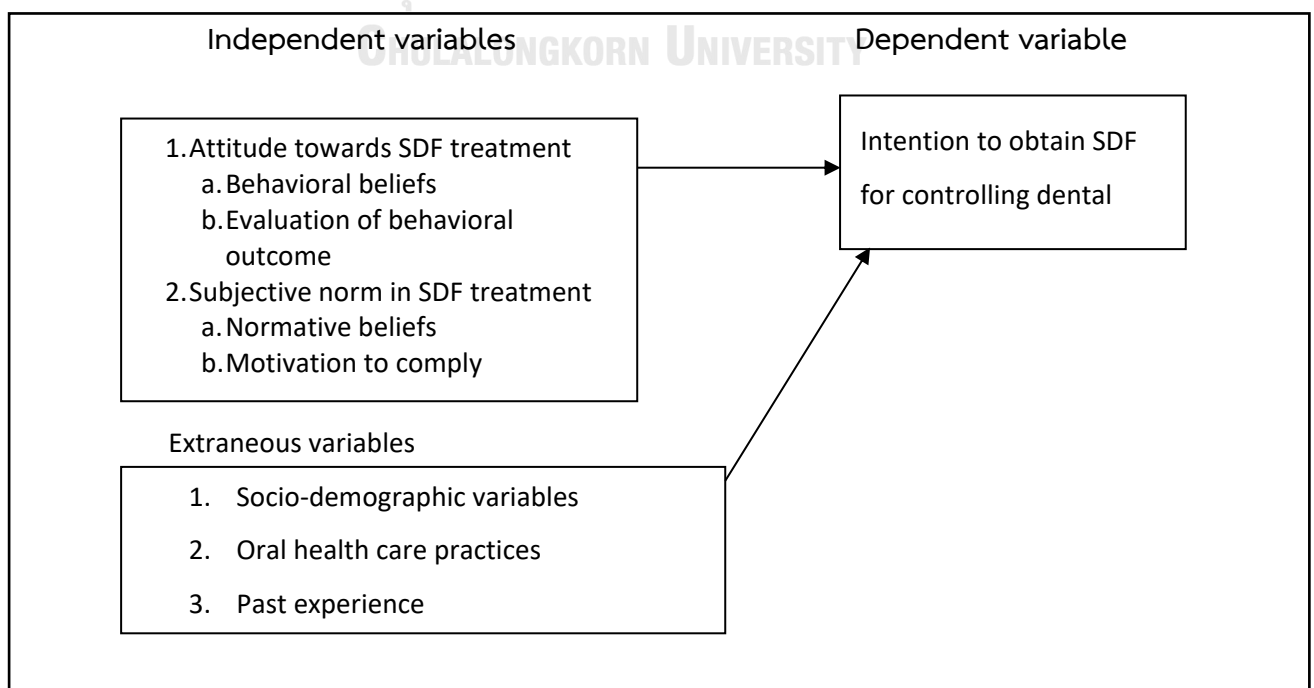
There were currently numerous studies on treatment satisfaction with SDF among children, which have examined perceptions and attitudes to the effects of staining. (8, 9) In Thailand, universal health coverage, which is one of the methods for treating tooth decay in the elderly.(28, 33) which was not widely used yet the researcher therefore sees the importance here. Also, TRA has not been used to assist in the study. It had led to this research work.

## 2.5 Research conceptual framework

The study intends to investigate factors association to SDF-using-intention which based on the Theory of reasoned action which concerning with the relations between, attitudes (behavioral beliefs and evaluation of behavioral outcomes), subjective norms (Normative beliefs and motivation to comply) and intentions.

A conceptual framework was developed for this study to guide the data analysis and to describe relationships among variables as presented in Figure 2.

Figure 2. Research conceptual framework





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## CHAPTER III RESEARCH METHODOLOGY

This chapter describes research design, population and sample selection, research instruments, ethical consideration, data collection and data analyses.

### 3.1 Research design

A survey research was employed to figure out the influence factors on decision making of the elder's intention to receive the SDF treatment. A newly developed self-administered questionnaire guided by the Theory of Reason Action (TRA) was used as an instrument for data collection.

### 3.2 Population and sample

The study population was Thai elders. Therefore, the sites of this study were hospitals and elderly homes that served the elder of Thailand. The non-probability sampling method, the purposive sampling, was chosen for this study. The elders in Hospital of Faculty of Dentistry, Chulalongkorn University and the elderly home care in Nakorn Pathom province who met the criterias was approached to enroll into the study.

#### 3.2.1 Inclusion criteria

Samples were recruited from the elders who attended the hospital or were in elderly home with the following criteria: 1) being the elders in hospital or in the elderly home who had age 60 years old and older who can take care of themselves and being independent; 2) being capable to read Thai.

#### 3.2.2 Exclusion criteria

Samples were excluded if they were unwilling to participate into the study

#### 3.2.3 Sample size

This study was a survey research measuring the intention to do the SDF treatment and its related factors. The minimum sample size was estimated mean by G Power Program (34) for estimating the minimum required sample for estimating



the intention level of participants who intend to use and not use SDF treatment in a single population.

Then, the test family was t tests for calculating Means: Difference from constant (one sample case). The type of power analysis was A priori: Compute required sample size-given  $\alpha$ , power, and effect size. Details as follows:  $\alpha = 0.05$ ; power = 0.90 and effect size = 0.15. The minimum sample size was 469. Compensating for estimated 20% incomplete information, the total number of subjects comprised of 562.8. Then, the minimum required sample size was 563 samples.

### 3.3 Research instruments:

Two types of instruments, information instrument and data collection instrument, were used in this study.

#### 3.3.1 Information instrument: E-learning about SDF:

An electronic poster about SDF was presented to the elders prior to the data collection. The elders were informed as follows: 1) What SDF is.; 2) Chemical reactions when catching tooth decay; 3) How the SDF treatment was done; 4) Price of SDF treatment; 5) Benefits and disadvantages of the SDF treatment. The elders could review this information by QR code scanning via smartphone. Details were in Appendix III

#### 3.3.2 Data collection instrument:

A newly developed self-administered questionnaire was a tool to collect information on variables related to SDF treatment intentions. The questions for evaluating variables guided by Theory of Reason Action (TRA) was a 4-point Likert scale, scores 1-4 as follows: 1 = Strongly Agree; 2 = Agree; 3 = Disagree; and 4 = Strongly disagree. Its validity and reliability determinations were described in Appendix V.

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

1. **Baseline variables** that possibly affect the outcomes were collected. These include sex, age, education, income, socio-economic status, relationship with patient, severity of disease and frailty.

2. **TRA variables:** The Intention to do the SDF treatment and its related factors among the elderly were measured by using a newly developed questionnaire. Item pool for generating questionnaire contains these 7 dimensions: Behavioral belief, Evaluation of behavioral outcome, Attitude toward SDF treatment, Motivation to comply, Normative beliefs, Subjective norm and Intention to do the SDF treatment.

### 3.4 Ethical consideration

Prior to the study commencement, the Ethical approval from the ethic committee of the Faculty of Dentistry, Chulalongkorn University and The Research Ethics Review Committee for Research Involving Human Research Participants, Health Sciences Group, Chulalongkorn University was achieved: the ethical clearance No. HRE-DCU 2021-009. During the data collection the ethical consideration was also concerned, verbal persuasion to participate into the study voluntarily was explained along with the benefit in enrolling into the study. The informed consent was obtained from each participant.

### 3.5 Data collection จุฬาลงกรณ์มหาวิทยาลัย

A newly developed self-administered questionnaire about intention to do the SDF treatment was a tool for data collection including 1) Sociodemographic data and 2) TRA variables. Data were collected from January 2022 to June 2022 at Dental hospital of Faculty of Dentistry, Chulalongkorn University, and the elderly home care in Nakorn Pathom province. The elder who meet the criteria were approached for their willing to participate into this study. The electronic poster was presented to the elder who agree to participate. Then, the questionnaire was presented to the elder.

### 3.6 Data analysis

#### 3.6.1 Variable coding and scoring

**A. Sociodemographic variables** measured as categorical variables were coded as follows:

- a) Gender was coded as 1 for *male* and 2 for *female*.
- b) Place of residence was coded as 1 for *home with family*, 2 for *home alone*, and 3 for *home care*.
- c) Occupation was coded as 1 for *government employee*, 2 for *employee*, 3 for *business owner*, 4 for *unemployment/retirement*, 5 for *others*.
- a) Family income was coded as 1 for less than 10,000 baht per month, 2 for 10,001-30,000 baht per month, 3 for 30,001-50,000 baht per month and 4 for more than 50,000 baht per month
- b) Highest education level was coded as 1 for *Grade 6*, 2 for *Grade 9*, 3 for *Grade 12*, 4 for *bachelor's degree or higher*.
- c) Disease was coded as 1 for *no disease*, 2 for *hypertension*, 3 for *diabetes mellitus*, 4 for *hyperlipidemia*, 5 for *heart disease*, 6 for *renal failure* and 7 for *others*
- d) Daily activity was coded as 1 for *yes* and 2 for *no*.
- e) Pain experience was coded as 1 for *having pain experience* and 2 for *never having pain experience*.

**B. TRA variables** were coded and scored as follows.

- a) Intention to do the SDF treatment was one question with two responses: yes, and no. The “yes” answer was scored as 1; the “no” answer was scored as 0. Total score of intention to do the SDF treatment was range from 0 to 1.
- b) The TRA variables measured by four-point Likert rating scale were scored as 1 for strongly agree; 2 agree; 3 disagree and 4 for strongly disagree. Attitude was explored by three statements, behavioral belief was explored by six statements, evaluation of behavior outcome was explored by six statements, normative belief,

motivation to comply and subjective norm was explored by two, two and three statements, respectively. Possible scores range for attitude, behavioral belief, evaluation of behavior outcome, normative belief, motivation to comply and subjective norm were 3 to 12, 6 to 24, 6 to 24, 2 to 8, 2 to 8, 3 to 12, respectively.

### 3.6.2 Statistical tests

- a) Descriptive statistics was analyzed. Sample characteristics such as gender, occupation, highest education level, family income, disease, daily activity, and pain experience was analyzed in frequency and percentages. Attitude toward SDF treatment, behavioral belief, evaluation of behavioral outcome, normative belief, motivation to comply, subjective norm and intention to use SDF were analyzed using mean and standard deviation.
- b) Frequency and percentage of participants who indicated different intention to do the SDF treatment described the proportion of the elder who intend to do/not to do SDF treatment.
- c) The total scores of each TRA variables was summed and compared. The categorical variables (such as gender, occupation, highest education level, family income, disease, daily activity and pain experience) with each TRA variables with Chi square test, t-test, or ANOVA.

## CHAPTER IV RESULT

This chapter presents the evaluative results of the intention to do the SDF treatment and its related factors among the elder. Presentation of the result composed of four main parts: 1) Questionnaire development results; 2) Description of the sample; 3) TRA variables; and 4) Influence factors to the intention to do the SDF treatment. Details are as follows:

### 4.1 Description of the sample

The socio-demographic characteristics of participants are shown in Table 1. Most participants 86.1% were 60-70 years with a standard deviation of 5.53 years. Half the participants were female 52.7%, The majority were unemployed/retired 58.1%, most of the participants (80.3%) stay in house-with-family, half of the participants had a less than sixth-grade education and 14.1% had a bachelor's degree, or higher. 62.9% of participants had a monthly family income <10,000 Baht, 36.4% of participants had no underlying diseases and the highest proportion (44.7%) had had hypertension. Moreover, 80.6% of the participants have had dental problems.

**Table 1. Demographic characteristics (N=588)**

Sociodemographic characteristics		Number	Percentage
<b>Age</b> Mean (SD) = 65.3 (5.53) Minimum = 60, Maximum = 90			
60-70		506	86.1
71-80		67	11.4
81-90		15	0.1
<b>Gender</b>			
Male		278	47.3
Female		310	52.7
<b>Occupation</b>			
Government employee		11	1.9
Employee		86	14.7
Business owner		112	19.1
Unemployment/retirement		341	58.1
Others		38	6.5
<b>Residence</b>			
House-with-family		472	80.3
House alone		113	19.2
Nursing home		3	0.5
<b>Highest education</b>			
Lower than grade 6		373	63.4
Grade 6		88	15.0
High/vocational school		44	7.5
Bachelor's degree or higher		83	14.1
<b>Family income per month</b>			
Less than 10,000 Baht		370	62.9
10,000-30,000 Baht		187	31.8
30,001-50,000 Baht		12	2.0
More than 50,000 Baht		19	3.2
<b>Underlying disease</b>			
No		214	36.4

Sociodemographic characteristics	Number	Percentage
<b>Age</b> Mean (SD) = 65.3 (5.53) Minimum = 60, Maximum = 90		
Yes	374	63.6
Hypertension	263	44.7
Diabetes mellitus	113	19.2
Hyperlipidemia	10	1.7
Cardiovascular/Heart	54	9.2
Kidney	37	6.3
Others	13	2.2
<b>Have you ever had dental problems?</b>		
Yes	474	80.6
No	114	19.4

#### 4.2 Descriptive result of intention

35 and 450 elders indicated strongly agree and agree to “I intend to apply SDF when I have cavities”, respectively. 88 and 15 elders indicated disagree and strongly disagree to “I intend to apply SDF when I have cavities”, respectively. The mean (standard deviation) mode and median of the intention score were 2.14 (0.54), 2 and 2.0, respectively.

#### 4.3 TRA variables

The intention was direct and indirect measured by 22 statements.

Direct measurement of intention was measured by two variables including attitude and subjective norm. Table 2 showed statements of each variable and its corresponding frequency of each score or responses, mean, standard deviation, mode and median. Mean (SD) of Attitude and Subjective norm were 2.21(.550) and 2.33(.643), respectively. Modes and Medians of Attitude and Subjective norm were 2 and 2.0, respectively.

Table 2. Direct measurement of intention

	Score				Mean	SD	Mode	Median
	1	2	3	4				
Intention								
1. I intend to apply SDF when I have cavities	35	450	88	15	2.14	.540	2	2.00
attitude					2.21	.550		
1. It is acceptable to use SDF in my anterior teeth.	56	409	116	7	2.13	.570	2	2.00
2. It is acceptable to use SDF in my posterior teeth.	57	407	98	26	2.16	.645	2	2.00
3. I can accept the blackening from the use of tooth decay stoppers.	46	310	209	23	2.36	.682	2	2.00
Subjective norm					2.32	.642		
4. Someone important to me doesn't believe SDF can stop tooth decay.	31	382	136	39	2.31	.673	2	2.00
5. Someone important to me think fillings are better than SDF	32	386	135	35	2.29	.661	2	2.00
6. Someone important to me think that SDF is insecure.	26	371	131	60	2.38	.728	2	2.00



Indirect measurement of was measured four variables including behavioral belief, evaluation outcome, normative believed and motivation to comply. Table 3 showed statements of each variable and its corresponding frequency of each score or responses, mean, standard deviation, mode and median. Mean (SD) of behavioral belief, evaluation outcome, normative believed and motivation to comply were 2.04(.590), 2.10(.532), 2.30(.610) and 2.77(.635), respectively. Modes and Medians of behavioral belief, evaluation of behavioral outcome, normative believed and motivation to comply were 2 and 2.0, respectively.

*Table 3. Indirect measurement of intention.*



	score				Mean	SD	Mode	Median
	1	2	3	4				
Intention								
1. I intend to apply SDF when I have cavities	35	450	88	15	2.14	.540	2	2.00
Behavioral belief					2.04	.590		
1. Applying SDF can stop tooth decay	91	403	86	8	2.02	.596	2	2.00
2. Applying SDF avoids complicated dental procedures	97	396	70	25	2.04	.673	2	2.00
3. I think that using SDF saves on dental costs.	101	387	88	12	2.02	.673	2	2.00
4. Applying SDF saves time for dental time.	129	361	78	20	1.98	.699	2	2.00
5. Using SDF is safe.	90	391	80	27	2.07	.684	2	2.00
6. Applying SDF reduces the chances of toothache.	75	419	67	27	2.08	.648	2	2.00
Evaluation outcome					2.10	.532		
7. The advantage of applying SDF can help stop tooth decay	52	439	81	16	2.10	.570	2	2.00
8. The advantage of applying SDF is that it avoids complicated dental procedures.	52	445	79	12	2.09	.545	2	2.00
9. The advantage of applying SDF is that it saves dental costs.	70	423	72	23	2.08	.626	2	2.00
10. It is good to avoid difficult dental procedures by applying SDF	61	429	79	19	2.10	.599	2	2.00
11. The advantage of applying SDF is safe	69	427	70	24	2.09	.624	2	2.00
12. The use of SDF has a beneficial effect on stopping tooth decay.	42	449	75	22	2.13	.576	2	2.00

Normative belief					2.30	.610		
13. The important ones don't want to use SDF when I have cavities.	30	382	155	21	2.28	.614	2	2.00
14. The important ones don't use SDF because of the black color.	29	388	132	39	2.31	.667	2	2.00
Motivation to comply					2.77	.635		
15. I wouldn't use SDF when I have cavities if someone important to me doesn't want to use it.	69	309	204	6	2.25	.666	2	2.00
16. I wouldn't use SDF if someone important to me doesn't use SDF because of the black color.	84	305	194	5	2.20	.683	2	2.00



#### 4.4 Factors associated with the intention

Comparison of mean scores of each statement according to their intention, every statement of Behavioral belief, Evaluation of behavioral outcome, Normative beliefs, motivation to comply, attitude and subjective norm were statistically significant difference ( $p < 0.001$ ).

**Table 4. Score of TRA variable according to difference intention to use SDF**

	Intend to use SDF		Not Intend to use SDF		P-value
	Mean	SD	Mean	SD	
<b>Behavioral belief</b>					
1. Applying SDF can stop tooth decay	1.83	.420	2.89	.522	<0.001
2. Applying SDF avoids complicated dental procedures	1.82	.431	3.08	.637	<0.001
3. I think that using SDF saves on dental costs.	1.82	.442	2.97	.532	<0.001
4. Applying SDF saves time for dental time.	1.75	.468	3.05	.616	<0.001
5. Using SDF is safe.	1.85	.439	3.16	.590	<0.001
6. Applying SDF reduces the chances of toothache.	1.86	.388	3.09	.673	<0.001
<b>Evaluation of behavioral outcome</b>					
7. The advantage of applying SDF can help stop tooth decay	1.92	.351	2.99	.569	<0.001
8. The advantage of applying SDF is that it avoids complicated dental procedures.	1.91	.334	2.92	.572	<0.001
9. The advantage of applying SDF is that it saves dental costs.	1.87	.384	3.06	.623	<0.001
10. It is good to avoid difficult dental procedures by applying SDF	1.89	.368	3.04	.576	<0.001

	Intend to use SDF		Not Intend to use SDF		P-value
	Mean	SD	Mean	SD	
11. The advantage of applying SDF is safe	1.88	.371	3.08	.621	<0.001
12. The use of SDF has a beneficial effect on stopping tooth decay.	1.92	.283	3.14	.543	<0.001
Normative beliefs					
13. The important ones for me	2.13	.512	3.01	.533	<0.001
14. Don't want to use SDF when I have cavities.	2.12	.515	3.17	.617	<0.001
Motivation to comply					
15. I wouldn't use SDF when I have cavities if someone important to me doesn't want to use it.	2.67	.663	3.12	.548	<0.001
16. I wouldn't use SDF if someone important to me doesn't use SDF because of the black color.	2.73	.699	3.09	.507	<0.001
Attitude					
17. It is acceptable to use SDF in my anterior teeth.	1.95	.426	2.94	.439	<0.001
18. It is acceptable to use SDF in my posterior teeth.	1.96	.451	3.07	.646	<0.001
19. I can accept the blackening from the use of tooth decay stoppers.	2.21	.612	3.03	.585	<0.001
Subjective norm					
20. Someone important to me doesn't believe SDF can stop tooth decay.	2.15	.571	3.07	.598	<0.001
21. Someone important to me think fillings are better than SDF	2.14	.566	3.04	.559	<0.001

	Intend to use SDF		Not Intend to use SDF		P-value
	Mean	SD	Mean	SD	
22. Someone important to me think that SDF is insecure.	2.23	.671	3.10	.533	<0.001

\*t-test,  $\alpha=0.05$

A total of 588 participants were aged 60-90 years with a mean (standard deviation) age of 65.3 (5.53) years. About 52.7% and 58.1% of the participant were females, and unemployed or retired, respectively. Most of the participants (80.8%) stayed with family. Most participants (63.4%) had less than a sixth-grade education. Most participants (62.9%) had a monthly family income of less than 10,000 Baht. Most participants (63.6%) had underlying diseases such as hypertension (44.7%), diabetes mellitus (19.2%), hyperlipidemia (1.7%), and cardiovascular disease (9.2%). Most participants (80.6% and 79.9%) indicated they have ever had dental problems and participants went to the dentist, respectively. The general characteristics of the study participants are presented in Table 5.

**Table 5. Comparison of intention level in different sociodemographic variables**

	total		Intention		no-intention		P-value*
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
Age (years)							0.021 (a)
min, max	60, 90		486	82.7	102	17.4	
mean, S.D.	65.3, 5.53						
60-70	506	86.1	413	85.0	93	91.0	
71-80	67	11.4	63	13.0	4	4.0	
81-90	15	2.6	10	2.0	5	5.0	
Gender							0.194
male	278	47.3	223	45.9	55	53.9	

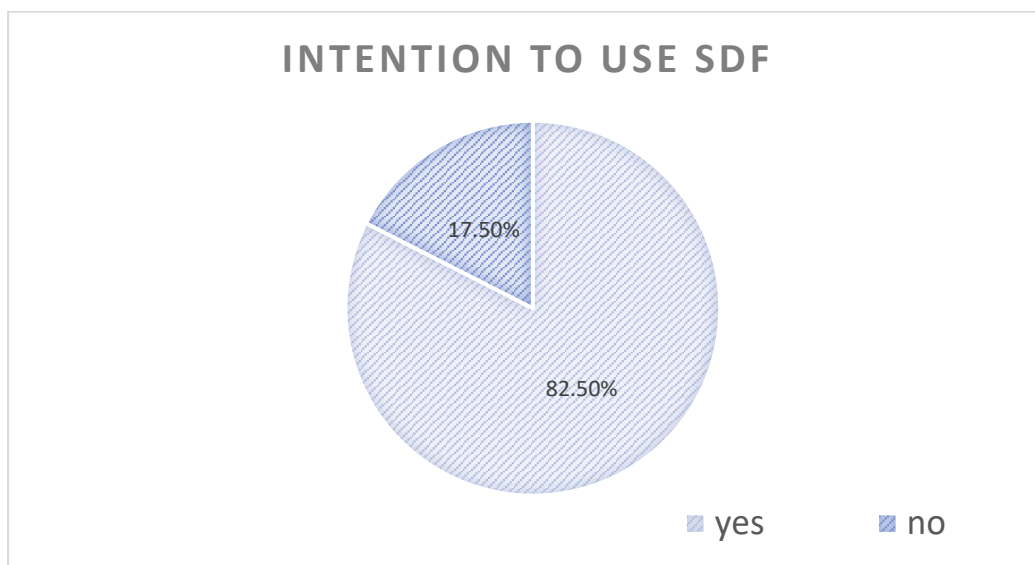
female	310	52.7	263	54.1	47	46.1	
Occupation							0.157
Government officer	11	1.9	11	2.3	0.0	0.0	
Employee	86	14.7	73	15.0	13	12.7	
Business owner	112	19.1	89	18.3	23	22.5	
Unemployed/Retired	341	58.1	276	56.8	65	63.7	
Others	38	6.5	37	7.6	1	1.1	
Residence							0.119
House-with-family	475	80.8	394	81.0	81	13.9	
House alone	113	19.2	92	19.0	21	3.6	
highest education							0.058
Lower than Grade 6	373	63.4	318	65.4	55	53.9	
Upper than Grade 6	215	36.5	168	34.6	47	46.1	
Family income per month							<0.001
Less than 10,000 Baht	370	62.9	328	67.5	42	41.2	
More than 10,000	218	37	158	32.5	60	58.2	
underlying disease							<0.001
No underlying disease	214	36.4	203	41.8	11	10.8	
Having underlying disease	588	63.6	283	58.2	91	89.2	
Have you ever had dental problems?							<0.001
yes	474	80.6	378	77.8	96	94.1	
no	114	19.4	108	22.2	6	5.9	
Fear of going to the dentist							<0.001
yes	470	79.9	372	76.6	98	96.1	
no	118	20.0	114	23.4	4	3.9	

The factors associated with intention to use SDF were Age ( $P=0.021$ ), family income ( $P < .001$ ), underlying disease ( $P < .001$ ), dental problem ( $P < .001$ ) and fear dentist ( $P < .001$ ) were significant.

*Most of the elder who indicated no intention to do the SDF treatment were 60-70 years old (91.0%), had family income per month more than 10,000 Baht (58.2%),*

having underlying disease (89.2%), having ever had dental problem (94.1%), and fear of going to dentist (96.1%).

**Figure 3. Frequency and percentage of participants with different intention to use SDF treatment**



As a result, 102 elderly respondents did not intend to use SDF. There are many reasons, which can be classified as follows 16.7% SDF don't beautiful, 37.3% Don't know SDF, 16.7% of SDF doesn't safe, 53.9% think SDF do not stop decay and 19.6% others.) in table 6.

**Table 6. Reasons for not intend to use SDF.**

Reasons (N =103)	Frequency	Percentage
SDF doesn't beautiful	17	16.7
Don't know SDF	38	37.3
SDF doesn't safe	40	39.2
SDF doesn't stop decay	55	53.9
other	20	19.6



## CHAPTER V DISCUSSION

This study describes the development of questionnaires on the intention of SDF use among older adults which is believed to be the result of theoretical beliefs. The Theory of Reasoned Action (TRA) is a theory devised by Fishbein and Ajzen (1975) which describes the general behavior of humans as “every human action arises from the use of Reasons and information for decision-making whether to act or not to do something. Therefore, predicting human behavior must consider factors related to or affecting human decision-making which affects by Attitude and the Subjective Norm. TRA theory is considered appropriate (29-31). The tools be used in oral health research must be reliable. Therefore, this study aims to had assessed the reliability and validity of the questionnaire. The exploratory factory analysis were employed for construct validity. The results indicated the statements were well constructed according to TRA variables. In the present study, the internal consistency expresses as Cronbach's alpha coefficient was 0.878-.952, considering appropriated, whereas Cronbach's alpha coefficient is  $< 0.7$  is considered reliable (35).

This was a cross-sectional study conducted only at the time to validate the qualification of the research tool, suggesting future studies to test the reliability and validity of similarly populated questionnaires. Experimental research and long-term studies will be needed to assess and due to the epidemic situation of COVID-19, it was quite difficult to collect information. Many elderly people do not came to the hospital for treatment due to the fear of the disease, not being vaccinated and their family did not allow them to leave the house.

This study focuses on the intention level of the use of SDF in older adults. The level of intention varies with the behavior of the elderly involved in various factors. The results revealed most the elder (6% and 76.5%, ) strongly agree and agree to the statement “I intend to apply SDF when I have cavities”, respectively, with mean 2.14. This indicated positive feedback to the SDF treatment for stopping dental caries progression even though it leaves black staining on the affected tooth

surfaces. This indicated the potential to introduce this SDF treatment as a routine treatment for arresting dental caries as this treatment is a very efficiently. Moreover, the SDF treatment cost has been in the list of payment for Thai people who are under the universal coverage recently. Then, the SDF treatment will be cost- and time-saver for treating dental caries among the elder. The 8th National Oral Health Survey in 2017 found the average DMFT among the elderly, 60-74 years old, was 18.6 teeth per person, which was seen as a large number. Using SDF would be benefit in helping to easily stop tooth decay. Furthermore, there are several problems regarding to dental health services budget and distribution of dentists. (10) The number of patients who intend to do the SDF treatment was 82%, which was a big number for this paper. The results of the 6 factors including behavioral belief group, Evaluation of behavioral outcome group, Motivation to comply group, Normative beliefs group, Attitude group, and Subjective norm were in the same way that SDF staining in teeth was recognize. The variables that influenced this decision were age, family income, underlying disease, dental problems, and fear of dentists. Most patients were financially poor or have had unfavorable dental experience causing them to avoid complicated dental work. The elderly patients also had self-help and this might be difficult for them to receive dental treatment at the faculty. (26, 27, 35) This study was found to be consistent with other studies on the use of SDF in patients, but other researches were mostly on children and parents. (26, 35) . SDF was not widely used in Thailand; therefore, it was likely to be unknown by the patients. These also caused patients not believe that it can treat tooth decay. In Thailand, dental patients are more familiar with filling and extracting teeth. If patients have more information about SDF, there may be a higher percentage of participants who indicate intention to use SDF treatment.

Thailand's universal health insurance covers treatment with this SDF which can support this method of treatment if there are materials and in each area there may be intention different levels.

### Limitation

This study is only focus on the intention to receive SDF treatment. Although, this might not reveal the actual rate of SDF treatment, the result can help the dental profession to estimate the response of the elders in the future treatment for patients with dental caries.

The random sampling would like to have more variety in random sampling. But there are restrictions on COVID-19, making it impossible to find many patients. Because patients come to the hospital relatively few and when leaving the house, there is a risk of contracting the disease because vaccination was not widespread at that time. Then, the further study focusing on satisfaction of SDF treatment, both short-term and long-term, would be benefit for the dental health professional and the elder to make it widely use in routine practice.



## CHAPTER VI CONCLUSION

This study had shown that the average intention level (mean (sd)) of Thai elderly is 2.14 (0.54). After being informed via an e-learning, 82.5% of the Thai elderly indicated they intend to use SDF treatment. The influencing factors of different intention were age, family income, having underlying disease, having dental problems, and afraid of going to see the dentist ( $P < 0.001$ ). Almost all TRA constructs indicated the same direction.

The behavioral belief, evaluation of behavioral outcome, normative belief, motivation to comply, attitude and subjective norm ( $P < 0.001$ ) were the influencing factors on decision making of the elders to use SDF. Both direct and indirect measurement of intention according to the TRA indicated similar results. The elders indicated their judgements little depended on their family or people around them.

The results of this study indicated positive feedback to the SDF treatment among elders. The dental health profession would be more confident in suggesting the elders to use the SDF treatment for treating the carious lesion. The widely use of SDF treatment would help stop the progression of the carious lesion among the elders and shorten the duration for dental procedure in treating dental caries. The use of SDF treatment for dental caries treatment among the elderly might become routine treatment.

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APPENDICES



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## APPENDIX I ETHICAL APPROVAL



No. 040/2021

### Study Protocol and Consent Form Approval

The Human Research Ethics Committee of the Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand has approved the following study to be carried out according to the protocol and patient/participant information sheet dated and/or amended as follows in compliance with the **ICH/GCP**

**Study Title** : Intention to obtain Silver Diamine Fluoride treatment for dental caries among elderly

**Study Code** : HREC-DCU 2021-009

**Study Center** : Chulalongkorn University

**Principle Investigator** : Ms. Ratchawipa Nakphu

**Protocol Date** : February 5, 2021

**Date of Approval** : July 9, 2021

**Date of Expiration** : July 8, 2023

(Assistant Professor Dr. Kanokporn Bhalang)  
**Chairman of Ethics Committee**

(Professor Dr. Thanaphum Osathanon)  
**Associate Dean for Research**

\*A list of the Ethics Committee members (names and positions) present at the Ethics Committee meeting on the date of approval of this study has been attached (upon requested). This Study Protocol Approval Form will be forwarded to the Principal Investigator.

Approval is granted subject to the following conditions: (see back of the approval)

## APPENDIX II CONSENT FORM

หนังสือแสดงเจตนายินยอม

วันที่..... เดือน.....

พ.ศ.....

ข้าพเจ้า .....อายุ .....ปี อาศัยอยู่

บ้านเลขที่.....

ถนน.....ตำบล.....

อำเภอ.....

จังหวัด.....โทรศัพท์.....

โทรสาร..... ขอแสดงเจตนายินยอมเข้าร่วมโครงการวิจัยเรื่อง “การยอมรับได้ในการใช้ซิลเวอร์ไดเอมีนฟลูออไรด์เพื่อยับยั้งฟันผุในผู้สูงอายุหรือผู้ป่วยพิเศษ คณะทันตแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย” โดยข้าพเจ้าได้รับทราบเกี่ยวกับรายละเอียดของโครงการ ดังต่อไปนี้

วัตถุประสงค์ของการทำวิจัย เพื่อศึกษาถึงอัตราการยอมรับได้ที่จะใช้ซิลเวอร์ไดเอมีนฟลูออไรด์เพื่อยับยั้งฟันผุในผู้สูงอายุหรือผู้ป่วยพิเศษ ประโยชน์ที่จะได้รับจากการวิจัยเพื่อที่จะทราบว่าผู้ป่วยและผู้ดูแลสามารถยอมรับได้ไหมที่จะใช้สารขนาดนี้ และอะไรเป็นปัจจัยในการตัดสินใจ

ข้อมูลในแบบสอบถามของท่านจะถูกเก็บไว้เป็นความลับ และใช้ในการวิจัยนี้เท่านั้น จะไม่มีการนำข้อมูลเฉพาะบุคคลออกเผยแพร่ต่อสาธารณะ ผู้วิจัยขอความร่วมมือในการตอบแบบสอบถามตามความเป็นจริง และกรุณาตอบคำถามทุกข้อ

ข้าพเจ้าได้รับทราบรายละเอียดของการวิจัยนี้ และเข้าใจจุดประสงค์โดยละเอียดแล้ว ยินดีให้ข้อมูลเพื่อนำไปใช้ในงานวิจัยได้

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ลงชื่อ.....(ผู้ให้

ความยินยอม)

(.....)

วันที่.....เดือน.....พ.ศ.....

ลงชื่อ.....(พยาน)

(.....)

ลงชื่อ.....(พยาน)

(.....)

ผู้วิจัยขอขอบคุณในความร่วมมือตอบแบบสอบถามนี้

รัชวิภา นาคภู (ผู้วิจัย)

ภาควิชาทันตกรรมสูงอายุและผู้ป่วยพิเศษ คณะทันตแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย โทร.0-887682739



## ซิลเวอร์ไดอะไมนฟลูออไรด์ (SDF)

- ถูกใช้ในทางทันตกรรมเพื่อยับยั้งฟันผุ ป้องกันการเกิดฟันผุซ้ำในเด็ก และใช้ป้องกันการเสียวฟัน และฟันผุในผู้ใหญ่
- ซิลเวอร์ไดอะไมนฟลูออไรด์ถูกใช้ในกรณีการผ่าแบริดที่เสีย

### ขั้นตอนการทำ

- ทำความสะอาดฟัน เป่าให้แห้ง ไม่จำเป็นต้องเอาฟันผุออก
- ทาวาสลินที่เหงือก ริมฝีปากรอบๆ กันน้ำลายด้วยสำลีหรือผ้าก๊อซ
- ใช้แปรงขนาดเล็กแตะหยดซิลเวอร์ไดอะไมนฟลูออไรด์ทาเฉพาะรอยผุ แล้วอบเบาๆ อย่างน้อย 1 นาที
- กำจัดซิลเวอร์ไดอะไมนส่วนเกินออกด้วยสำลีก้อนเล็กๆ เป่าเบาๆ ให้แห้งประมาณ 3 นาที



### ข้อบ่งใช้

- ผู้ป่วยที่มีความเสี่ยงต่อการเกิดฟันผุสูง
- ผู้ป่วยที่ผุหลายตำแหน่งไม่สามารถมารักษาได้อย่างต่อเนื่อง หรือไม่ให้ความร่วมมือ หรือต้องรักษาภายใต้การดมยาสลบ
- ผู้ที่ไม่สามารถเข้าถึงบริการทางทันตกรรม
- ผู้ที่มีฟันผุบริเวณที่รักษาได้ยาก
- ผู้ป่วยที่มีปัญหาสุขภาพกายหรือสุขภาพจิต อื่น ๆ

### ข้อดี

การใช้ซิลเวอร์ไดอะไมนฟลูออไรด์ทำให้รอยผุเปลี่ยนเป็นสีดำ หรือติดสีดำ ได้ถ้าสัมผัสเลือดน้ำหรือผิวหนัง

### ข้อดี

ใช้ง่าย มีความปลอดภัย ใช้เวลานานไม่นาน ไม่เจ็บปวด ราคาไม่แพง



120 บาท/ครั้ง



หลังทาทันที

หลังทาท 1 ปี

หลังทาท 2 ปี



## APPENDIX IV QUESTIONNAIRE

Questionnaire ID.....

แบบสอบถามการยอมรับได้ในการใช้ซิลเวอร์ไดออกไซด์ฟลูออไรด์ในการรักษาโรคฟันผุในผู้สูงอายุ

อายุ.....

เพศ

- ชาย
- หญิง

อาชีพ

- พ่อบ้าน/แม่บ้าน
- ข้าราชการ
- พนักงานเอกชน
- ค้าขาย/ขายตรง
- เจ้าของกิจการ
- รับจ้างทั่วไป
- ว่างาน/เกษียณอายุ
- อื่น.....



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สถานที่อาศัย

- บ้านตัวเองอยู่กับลูกหลาน
- บ้านตัวเองอาศัยอยู่คนเดียว
- บ้านพักคนชรา

รายได้เฉลี่ยของครอบครัวต่อเดือน

- น้อยกว่า 10,000 บาท
- 10,001 – 30,000 บาท
- 30,001 – 50,000 บาท
- มากกว่า 50,000 บาท ขึ้นไป

#### ระดับการศึกษาสูงสุด

- ประถมศึกษา
- มัธยมศึกษาตอนต้น
- มัธยมศึกษาตอนปลาย
- ปวส.หรือเทียบเท่า
- ปริญญาตรี
- ปริญญาโท
- ปริญญาเอก

#### โรคประจำตัว

- ไม่มีโรคประจำตัว
- ความดันสูง
- เบาหวาน
- ไขมันในเลือดสูง
- หัวใจ
- ไต
- อื่น ๆ.....

ท่านสามารถช่วยเหลือตัวเองในการทำกิจกรรมประจำวันได้หรือไม่

- ได้



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- ไม่ได้

ท่านเคยได้รับความเจ็บปวดในการทำฟันมาก่อนหรือไม่

- ใช่
- ไม่ใช่

กรุณาเลือกคำตอบที่ตรงกับความเห็นของท่านต่อข้อความเหล่านี้

#### Attitude

ฉันรู้สึกว่ายอมรับได้ถ้าเกิดสีดำจากการใช้สารหยุดยั้งฟันผุในฟันหน้า

- ยอมรับได้
- ยอมรับได้บ้าง
- ยอมรับไม่ได้เล็กน้อย
- ยอมรับไม่ได้เลย

ฉันรู้สึกว่ายอมรับได้ถ้าเกิดสีดำจากการใช้สารหยุดยั้งฟันผุในฟันหลัง

- ยอมรับได้
- ยอมรับได้บ้าง
- ยอมรับไม่ได้เล็กน้อย
- ยอมรับไม่ได้เลย



ราชภัฏสกลนครมหาวิทยาลัย  
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ถ้าท่านไม่สามารถยอมรับได้จากการเกิดสีดำจากการใช้สารหยุดยั้งฟันผุ เนื่องจากสาเหตุใดโปรดระบุ

- ไม่สวย
- เป็นสารที่ไม่รู้จัก
- อื่น ๆ.....

การทา SDF มีประโยชน์ต่อผู้ป่วยที่มีฟันผุ

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย



- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

ฉันประสบปัญหาในการทำฟัน เช่น ต้องมีคนช่วยจับ

- ใช่
- ไม่ใช่

ฉันกลัวการทำฟัน

- ใช่
- ไม่ใช่

**Behavioral belief**

การทำSDFช่วยหยุดยั้งโรคฟันผุได้

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

การทำSDFช่วยลดความเสี่ยงการทำฟันที่ยุ่งยากได้

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

ฉันคิดว่าการใช้สารนี้ช่วยให้ประหยัดค่าใช้จ่ายในการทำฟัน

- ใช่
- ไม่ใช่



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การทาสDFช่วยประหยัดเวลาทำฟันได้

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

การใช้SDFมีความปลอดภัย

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

การทาสDFช่วยลดโอกาสเกิดการปวดฟันจากฟันผุได้

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

การทาสDFช่วยประหยัดค่าใช้จ่ายที่เกิดจากการเดินทางมาทำฟันหลายครั้งได้

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

Evaluation of behavior outcome

การทาสDFช่วยหยุดยั้งโรคฟันผุได้เป็นสิ่งที่ดี

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

การทำSDFช่วยหลีกเลี่ยงการทำพื้นที่ยุ่งยากทำให้มีผลดี

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

การทำSDFช่วยประหยัดค่าใช้จ่ายในการทำพื้นที่

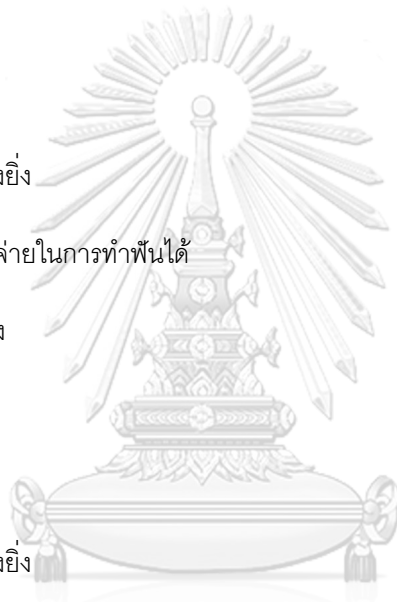
- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

การทำSDFมีประโยชน์ในการช่วยลดเวลาในการทำพื้นที่

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

การใช้SDFมีความปลอดภัยเป็นผลดีในการรักษาพันธุ์

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย



- ไม่เห็นด้วยอย่างยิ่ง

การทาสDFมีประโยชน์ช่วยลดโอกาสเกิดการปวดฟันจากฟันผุได้

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

การทาสDFช่วยประหยัดค่าใช้จ่ายที่เกิดจากการเดินทางมาทำฟันเป็นสิ่งที่ดี

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง



**Normative belief**

ฉันเชื่อว่าครอบครัวของฉันอาจไม่ชอบสีดำที่เกิดจากการทาสDF

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

ฉันเชื่อว่าครอบครัวของฉันชอบผลการทาสDFที่ช่วยหยุดยั้งฟันผุได้

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย

- ไม่เห็นด้วยอย่างยิ่ง

ฉันเชื่อว่าครอบครัวของฉันชอบผลการทาของSDFที่ช่วยประหยัดค่าใช้จ่ายในการทำฟันได้

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

ฉันเชื่อว่าครอบครัวของฉันชอบผลการทาของSDFแล้วช่วยให้ไม่ต้องไปหาหมอฟันบ่อย ๆ

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

ฉันเชื่อว่าครอบครัวของฉันต้องการให้ฉันใช้SDF เมื่อฉันมีฟันผุ

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

จุฬาลงกรณ์มหาวิทยาลัย  
CHULALONGKORN UNIVERSITY

### Motivation to comply

ถ้าครอบครัวของฉันเห็นควรให้ทำSDFฉันจะทำเมื่อฉันมีฟันผุ

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย

- ไม่เห็นด้วยอย่างยิ่ง

ฉันต้องปรึกษาครอบครัวก่อนที่จะทา SDF

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

ครอบครัวของฉันมีอิทธิพลต่อฉันในการตัดสินใจทา SDF

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

Subjective norm

คนที่มีความสำคัญต่อฉันคิดว่าฉันควรทา SDF ถ้าฉันมีฟันผุ

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย
- ไม่เห็นด้วยอย่างยิ่ง

intention to use

ถ้าฉันมีฟันผุฉันจะทา SDF

- เห็นด้วยอย่างยิ่ง
- เห็นด้วย
- ไม่เห็นด้วย



□ ไม่เห็นด้วยอย่างยิ่ง

อาสาสมัครได้รับทราบถึง ขั้นตอนการทำวิจัยนี้แล้ว และยินยอมที่จะร่วมการวิจัยโดยการตอบแบบสอบถามนี้



## APENDIX V Development questionnaire

For determining the influencing factors on decision making of the elder to do the SDF treatment, a newly developed self-administered questionnaire was employed. Details were as follows:

The scale construction process followed Clifford R. Mynatt, Michael E. Dohertys and Christopher J. Pole, Richard Lampard's guidelines. According to their instructions, these steps were carried out. (35, 36)

### 1) Study and review theories and concepts.

Studying and reviewing the theories and concepts related to the tool construction variables. In order to be consistent with the research question of this study, the intention to use the SDF treatment for dental caries among elderly was explored and guided by the Theory of Reason action. (37)

### 2) Ask related person

Asking relevant people to clarify what to measure and gave new ideas or use of more understandable language in the questionnaire. Those involved should be close to the population to be studied. (37)

### 3) Question construction

3.1) **Determining the questionnaire format.** Likert-type format was rated with 4-pointed Likert scale, score 1-4 as follows: 1=strongly agree, 2=agree, 3=not agree, 4=strongly disagree. This format is easy to use and familiar to respondents.

3.2) **Testing with experts.** The expertise in that field read and completed questionnaires. Experts gave the recommendation for adjustment to make sure that the questions were not ambiguous and understandable.

3.3) **Test questions with the target audience.** The scale was administered to an initial (pretest) sample of about 60 participants. In this study, patients of undergrad clinic at Faculty of Dentistry Chulalongkorn university were chosen to do the pilot testing.

3.4) **Evaluating the items.** The answers from pretest study were used for reliability assessments. First, the internal consistency was performed to show a



list of tests that related to one another and items that measure the same thing. And the content validity was carried out to ensure that the test measures what was intended to be measured. These psychometric assessments are necessary to ensure that the data of the lists and scales are technically accurate.

3.5) **Optimizing scale length.** Data was subjected to factor analysis. Factor analysis can show that the items in the same structure are a set of unidimensional data and can specify items that are not suitable for any summary variable which should be discarded.

#### 4) Statistical methods for questionnaire development

Using various statistical methods to test the characteristics of the newly developed questionnaire.

##### 4.1) Estimation of validity

4.1.1) **Content validity:** Accuracy involves the extent to which the instrument measures what it intends to measure. Content validation refers to the adequacy of the universe's sample tests. In examining the accuracy of the content of the proposed measuring tools, a copy of the newly developed Thai version of the questionnaire was sent to four experts in the related field (health behavior theory, SDF user and geriatric dentistry). All experts were asked to assess the relevance and adequacy of this questionnaire. The grading system is as follows.

1	for relatively valid item
0	for not sure
-1	for relatively irrelevant item

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

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

where IC = Item correlation

$\sum R$  = Total scores of that item

N = Number of experts

The items that obtain  $IC < 0.5$  were modified or discarded.

#### 4.1.2) Construct validity

The factor analysis was employed to ensure the construct validity of the newly developed questionnaire. The result obtained from pretest population was used to calculate the correlation among items. Following data cleaning and checking, missing values were excluded pair wise. Factorability of the questionnaire was investigated by item-total correlations, Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO), Bartlett's test of sphericity, and measures of sampling adequacy (MSAs). The optimal number of factors was determined sequentially using latent root criteria (eigenvalues  $> 1.0$ ) and scree plot. Item loadings should exceed 0.40. A principal axis factoring analysis (PAF) with promax rotation was performed to assess the construct validity. Exploratory factor analysis (EFA) was conducted to assess the construct validity of the scale.

#### 4.2 Estimation of reliability

The tool's reliability testing was performed for the consistency of questionnaires. The important reliability test in this study is the internal consistency test. After the pilot test, difficult-to-understand items were corrected or eliminated. Then analyze the results with the Cronbach's alpha coefficient. The formula is:

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

where  $r_{\alpha}$  = 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 item that has  $r_{\alpha} < 0.7$  or  $> 0.9$  is modified or discarded. (38)

Internal consistency of the questionnaire was assessed by three conditions: 1) Cronbach's coefficient alpha larger than 0.70; 2) Inter-item correlation larger than 0.30; and 3) Item-to-total correlation larger than 0.50. Items were deleted to achieve those conditions.

3. **Baseline variables** that possibly affect the outcomes were collected. These include sex, age, education, income, socio-economic status, relationship with patient, severity of disease and frailty.

4. **TRA variables:** The Intention to do the SDF treatment and its related factors among the elderly were measured by using a newly developed questionnaire. Item pool for generating questionnaire contains these 7 dimensions: Behavioral belief, Evaluation of behavioral outcome, Attitude toward SDF treatment, Motivation to comply, Normative beliefs, Subjective norm and Intention to do the SDF treatment.

## results

To refine and validate the characteristics of a newly developed questionnaire, various statistics were employed for validity and reliability. The questionnaire draft has been tested in a development sample to bring in the validity and reliability of the questionnaire.

### 1 Characteristic of the questionnaire development sample

Samples are 171 elders who attend the dental appointment at the dental hospital of Faculty of Dentistry, Chulalongkorn University during January 2022 to February 2022. Age range from 51 to 60, mean age is 57.89 years with standard deviation 2.74. Most elder are male (62%), Details was shown in Table 1.

**Table 1. Sociodemographic characteristics of the questionnaire development sample**

Sociodemographic characteristics	Number	Percentage
<b>Age</b> Mean (SD) = 57.89 (2.74)		
Minimum = 51, Maximum = 60		
51	5	2.9
52	11	6.4
53	4	2.3
54	3	1.8
55	10	5.8
56	10	5.8
57	14	8.2
58	20	11.7
59	9	5.3
60	85	49.7
<b>Gender</b>		
Male	106	62.0
Female	65	38.0
<b>Occupation</b>		
Government employee	44	25.7
Employee	31	18.2
Business owner	39	22.8
Unemployment/retirement	55	32.1
Others	2	1.2
<b>Residence</b>		
House-with-family	85	49.7
House alone	86	50.3
<b>Participant/Caregiver's highest education</b>		
Lower than grade	53	31.1
Grade 6	11	6.4
High/vocational school	46	26.9
Bachelor's degree or higher	61	35.7
<b>The family income per month</b>		
Less than 10,000 Baht	54	31.6
10,000-30,000 Baht	43	25.1
30,001-50,000 Baht	19	11.1
More than 50,000 Baht	55	32.2
<b>Underlying disease</b>		
No underlying disease	96	56.1
Hypertension	47	27.5
Diabetes mellitus	13	7.6
Hyperlipidemia	30	17.5
Cardiovascular/Heart	5	2.9
Kidney	3	1.8
Others	11	6.4

Sociodemographic characteristics	Number	Percentage
<b>Have you ever had dental problems?</b>		
Yes	102	59.6
No	69	40.4

## 2 Validity determination

a) **Content validity** concerns the extent to which the instrument measures what it intends to measure. The results from all experts assessing the relevance and adequacy of this questionnaire indicated acceptability of the questionnaire. No item was indicated as irrelevant. Therefore, all items were included in the questionnaire after minimal modification in wording as suggested by the expert.

### b) Construct validity

The 22 statements were used to assess the construct validity of the questionnaire. They were split into 2 groups for direct measurement of the intention (6 statements) and indirect measurement of the intention (16 statements).

#### Indirect measurement of the intention:

The correlation matrix indicated a simple correlation among the 22 statements whose values exceeded 0.5. The correlation matrix, Kaiser-Meyer-Olkin measure for sampling adequacy (KMO) (0.953), Bartlett's test of sphericity (Chi-Square = 9599.642,  $df = 120$  and  $p\text{-value} < 0.001$ )

The results revealed communality values, the amount of variance in the variable shared with all other variables. The optimal number of factors suggested by the scree test was a four-factor model as it showed a noticeable difference in slope after the first four components. Principal axis factoring (PAF) with rotation was carried out. The final factors explained 77.82% of the variance. The factor-loading tables were compared after rotation. A principal axis factoring (PAF) with Promax rotation gave the best fit model. The pattern matrix was examined for factor loadings (Costello and Osborne,

2005). Within each factor, every statement had positive factor loadings; they ranged from 0.571 to 1.131 (Table 2).

**Table 2. Factor loadings and communalities of exploratory factor analysis of the ECCPS (indirect)**

Statements	Factor			
	1	2	3	4
1. Applying SDF can stop tooth decay	.940			
2. Applying SDF avoids complicated dental procedures	1.043			
3. I think that using SDF saves on dental costs.	.964			
4. Applying SDF saves time for dental time.	1.104			
5. Using SDF is safe.	.909			
6. Applying SDF reduces the chances of toothache.	.807			
7. The advantage of applying SDF can help stop tooth decay		.574		
8. The advantage of applying SDF is that it avoids complicated dental procedures.		.571		
9. The advantage of applying SDF is that it saves dental costs.		.879		
10. It is good to avoid difficult dental procedures by applying SDF		.663		
11. The advantage of applying SDF is safe		.685		
12. The use of SDF has a beneficial effect on stopping tooth decay.		.678		
13. The important ones don't want to use SDF when I have cavities.			1.118	
14. The important ones don't use SDF because of the black color.			1.131	
15. I wouldn't use SDF when I have cavities if someone important to me doesn't want to use it.				.888
16. I wouldn't use SDF if someone important to me doesn't use SDF because of the black color.				.853

#### Direct measurement of the intention:

The correlation matrix indicated a simple correlation among the 6 statements whose values exceeded 0.5. The correlation matrix, Kaiser-Meyer-Olkin measure for sampling adequacy (KMO) (.864), Bartlett's test of sphericity (Chi-Square = 2647.161, df = 15 and p-value <0.001)

The results revealed communality values, the amount of variance in the variable shared with all other variables. The optimal number of factors suggested by the scree test was a two-factor model as it showed a noticeable difference in slope after the first

two components. Principal axis factoring (PAF) with rotation was carried out. The final factors explained 77.82% of the variance. The factor-loading tables were compared after rotation. A principal axis factoring (PAF) with Promax rotation gave the best fit model. The pattern matrix was examined for factor loadings (Costello and Osborne, 2005). Within each factor, every statement had positive factor loadings; they ranged from .512 to .890 (Table 3).

**Table 3. Factor loadings and communalities of exploratory factor analysis of the ECCPS (direct)**

Statements	Factor	
	1	2
17. It is acceptable to use SDF in my anterior teeth.	.860	
18. It is acceptable to use SDF in my posterior teeth.	.760	
19. I can accept the blackening from the use of tooth decay stoppers.	.512	
20. Someone important to me doesn't believe SDF can stop tooth decay.		.818
21. Someone important to me think fillings are better than SDF		.810
22. Someone important to me think that SDF is insecure.		.890

### 3 Reliability determination

The Cronbach's coefficient alpha was used to determine the internal consistency of each construct. Value of Cronbach's coefficient alpha between 0.70-0.90 is acceptable. The details of the Cronbach's coefficient alpha and other statistics are showed in Table 3.

The calculation revealed the internal consistency, indicated by Cronbach's coefficient for each factor, ranged between 0.87 and 0.95, which is acceptable. The Cronbach's coefficient alpha results for Factors 1, 2, 3, 4, 5 and 6 were 0.951, 0.952, 0.883, 0.870, 0.878 and 0.917, respectively. The corrected item-total correlations ranged from 0.527 to 0.865 (Table 3). Since Cronbach's alpha coefficient for each construct was > 0.80 the results indicate strong correlations with this questionnaire (Hair et al, 2006)

indicating the questionnaire is a reliable instrument for assessing the intention to use SDF treatment and related factors.

The final instrument had 6 factors: Factor 1 Behavioral belief with 6 statements. Factor 2 Evaluation of behavioral outcome with 6 statements, Factor 3 Normative belief with 2 statements. Factor 4 Motivation to comply with 2 statements. Factor 5 Attitude with 3 statements, and factor 6 Subjective norm with 3 statements.





Table 3. Cronbach's coefficient alpha and other statistics

Statements	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Alpha if item deleted
<b>Behavioral belief</b>		<b>Cronbach's Alpha = .951</b>		
1. Applying SDF can stop tooth decay	10.18	7.998	.837	.943
2. Applying SDF avoids complicated dental procedures	10.16	7.589	.856	.941
3. I think that using SDF saves on dental costs.	10.18	7.792	.849	.942
4. Applying SDF saves time for dental time.	10.21	7.7512	.843	.943
5. Using SDF is safe.	10.31	7.527	.859	.941
6. Applying SDF reduces the chances of toothache.	10.12	7.706	.854	.941
<b>Evaluation of behavioral outcome</b>		<b>Cronbach's Alpha = .952</b>		
7. The advantage of applying SDF can help stop tooth decay	10.43	6.365	.847	.944
8. The advantage of applying SDF is that it avoids complicated dental procedures.	10.45	6.471	.847	.944
9. The advantage of applying SDF is that it saves dental costs.	10.45	6.111	.854	.943
10. It is good to avoid difficult dental procedures by applying SDF	10.44	6.323	.852	.943
11. The advantage of applying SDF is safe	10.45	6.123	.850	.943
12. The use of SDF has a beneficial effect on stopping tooth decay.	10.41	6.289	.865	.942
<b>Normative belief</b>		<b>Cronbach's Alpha = .883</b>		
13. The important ones don't want to use SDF when I have cavities.	2.35	.44.8	.793	-
14. The important ones don't use SDF because of the black color.	2.34	.390	.793	-

Statements	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Alpha if item deleted
<b>Motivation to comply</b>		<b>Cronbach's Alpha = .870</b>		
15. I wouldn't use SDF when I have cavities if someone important to me doesn't want to use it.	2.78	.450	.770	-
16. I wouldn't use SDF if someone important to me doesn't use SDF because of the black color.	2.74	.437	.770	-
<b>Attitude</b>		<b>Cronbach's Alpha = .813</b>		
17. It is acceptable to use SDF in my anterior teeth.	4.52	1.248	.732	.688
18. It is acceptable to use SDF in my posterior teeth.	4.50	1.148	.711	.694
19. I can accept the blackening from the use of tooth decay stoppers.	4.27	1.165	.572	.852
<b>Subjective norm</b>		<b>Cronbach's Alpha = .917</b>		
20. Someone important to me doesn't believe SDF can stop tooth decay.	4.75	1.682	.829	.882
21. Someone important to me think fillings are better than SDF	4.76	1.707	.827	.885
22. Someone important to me think that SDF is insecure.	4.66	1.541	.843	.873

Inter-item correlation between statements in each construct demonstrated value higher than 0.3 as shown in Table 4. Through Table 9.

**Table 4. Correlation matrix of behavioral belief**

Behavioral belief	1	2	3	4	5	6
1. Applying SDF can stop tooth decay	1.000	.785	.781	.711	.754	.755

2. Applying SDF avoids complicated dental procedures	.785	1.000	.771	.757	.764	.778
3. I think that using SDF saves on dental costs.	.781	.771	1.000	.769	.764	.744
4. Applying SDF saves time for dental time.	.711	.757	.769	1.000	.788	.775
5. Using SDF is safe.	.754	.764	.764	.788	1.000	.790
6. Applying SDF reduces the chances of toothache.	.755	.778	.744	.775	.790	1.000

**Table 5. Correlation matrix of evaluation of behavioral outcome**

Evaluation of behavioral outcome	7	8	9	10	11	12
7. The advantage of applying SDF can help stop tooth decay	1.000	.795	.764	.746	.758	.773
8. The advantage of applying SDF is that it avoids complicated dental procedures.	.795	1.000	.767	.769	.737	.766
9. The advantage of applying SDF is that it saves dental costs.	.764	.767	1.000	.769	.780	.775
10. It is good to avoid difficult dental procedures by applying SDF	.746	.769	.769	1.000	.773	.792
11. The advantage of applying SDF is safe	.758	.737	.780	.773	1.000	.793
12. The use of SDF has a beneficial effect on stopping tooth decay.	.773	.766	.775	.792	.793	1.000

**Table 6. Correlation matrix of normative belief**

Normative belief	13	14
13. The important ones don't want to use SDF when I have cavities.	1.000	.793
14. The important ones don't use SDF because of the black color.	.793	1.000

Table 7. Correlation matrix of motivation to comply

Motivation to comply	15	16
15. I wouldn't use SDF when I have cavities if someone important to me doesn't want to use it.	1.000	.770
16. I wouldn't use SDF if someone important to me doesn't use SDF because of the black color.	.770	1.000

Table 8. Correlation matrix of attitude toward SDF treatment

Attitude	17	18	19
17. It is acceptable to use SDF in my anterior teeth.	1.000	.747	.543
18. It is acceptable to use SDF in my posterior teeth.	.747	1.000	.527
19. I can accept the blackening from the use of tooth decay stoppers.	.543	.527	1.000

Table 9. Correlation matrix of subjective norm

subjective norm	20	21	22
20. Someone important to me doesn't believe SDF can stop tooth decay.	1.000	.774	.795
21. Someone important to me think fillings are better than SDF	.774	1.000	.792
22. Someone important to me think that SDF is insecure.	.795	.792	1.000

### 3) TRA variables

The means and standard deviations for each statement and each construct are listed in Table 11. The statements were grouped according to their related constructs. Higher mean scores indicated greater disagreement with the statement and higher standard deviations indicated more variability in the responses. Statements in the motivation to comply construct generally had higher mean scores with more variability than other constructs. Statements in the behavioral belief construct had generally lower mean scores with the lowest variability. (Table 11.).

**Table 11. Means, standard deviations and Cronbach's coefficient alpha and other statistics.**

Statements	Mean	Standard deviation	Corrected item-total correlation
<b>Behavioral belief Cronbach's Alpha = .951</b>			
1. Applying SDF can stop tooth decay	2.02	.560	.837
2. Applying SDF avoids complicated dental procedures	2.04	.631	.856
3. I think that using SDF saves on dental costs.	2.02	.594	.849
4. Applying SDF saves time for dental time.	1.99	.654	.843
5. Using SDF is safe.	2.07	.642	.859
6. Applying SDF reduces the chances of toothache.	2.07	.609	.854
<b>Evaluation of behavioral outcome Cronbach's Alpha = .952</b>			
7. The advantage of applying SDF can help stop tooth decay	2.09	.535	.847
8. The advantage of applying SDF is that it avoids complicated dental procedures.	2.08	.511	.847
9. The advantage of applying SDF is that it saves dental costs.	2.07	.588	.854
10. It is good to avoid difficult dental procedures by applying SDF	2.08	.561	.852
11. The advantage of applying SDF is safe	2.08	.587	.850
12. The use of SDF has a beneficial effect on stopping tooth decay.	2.12	.542	.865
<b>Normative belief Cronbach's Alpha = .883</b>			
13. The important ones for me don't want to use SDF when I have cavities.	2.34	.624	.793
14. The important ones for me don't use SDF because of the black color.	2.35	.669	.793
<b>Motivation to comply Cronbach's Alpha = .870</b>			
15. I wouldn't use SDF when I have cavities if someone important to me doesn't want to use it.	2.74	.661	.770
16. I wouldn't use SDF if someone important to me doesn't use SDF because of the black color.	2.78	.671	.770
<b>Attitude Cronbach's Alpha = .878</b>			
17. It is acceptable to use SDF in my anterior teeth.	2.12	.547	.757

18. It is acceptable to use SDF in my posterior teeth.	2.14	.607	.808
19. I can accept the blackening from the use of tooth decay stoppers.	2.12	.521	.737
<b>Subjective norm Cronbach's Alpha = .917</b>			
20. Someone important to me doesn't believe SDF can stop tooth decay.	2.07	.589	.829
21. Someone important to me think fillings are better than SDF	2.34	.663	.827
22. Someone important to me think that SDF is insecure.	2.33	.654	.843



## VITA

NAME ratchawpa nakphu  
DATE OF BIRTH 4 October 1990  
HOME ADDRESS 781/33 regenthome81 bangkok



จุฬาลงกรณ์มหาวิทยาลัย  
CHULALONGKORN UNIVERSITY