

CHAPTER TWO

REVIEW OF LITERATURE

This chapter reviews and summarizes literature from seven main areas: (1) gingivitis (gum inflammation), (2) role of oral hygiene, (3) prevention of periodontal (gum) diseases, (4) stages of change model, (5) health belief model, (6) concepts of attitudes and related concepts, and (7) relevant research.

2.1 GINGIVITIS (GUM INFLAMMATION)

Gingivitis is a very common and mild form of gum (periodontal) disease that causes swelling (inflammation) of the gums. Because gingivitis can be so mild, people may not be aware that they have the condition. But, it is important to take gingivitis seriously and treat it promptly, because it can lead to much more serious gum diseases (Mayo Foundation for Medical Education and Research, 2009). Poor oral hygiene is a common contributor to the development of gingivitis. Bacterial plaque accumulates in the small gaps between the gums and teeth, including tartar, which forms on the teeth. The bacteria will produce toxins and cause inflammation to the gums around the teeth (<http://en.wikipedia.org/wiki/Gingivitis>). Periodontal diseases are classified according to the severity of the disease. The two major stages are gingivitis and periodontitis (American Dental Association, 2005). In gingivitis, the gums become red, swollen and can bleed easily. If untreated, gingivitis can develop further to periodontitis. Periodontitis involves a progressive loss of the alveolar bone around the teeth. It can lead to the loosening and subsequent loss of teeth (<http://en.wikipedia.org/wiki/Periodontitis>).

Other factors that lead to gingivitis include diabetes, smoking, aging, genetic predisposition, systematic diseases and conditions, stress, inadequate nutrition, puberty, hormonal fluctuations, pregnancy, substance abuse, HIV infection, and certain medication use (American Academy of Periodontal, 2008). Hence, ordinary people and people at risk should prevent gingivitis at an early stage by brushing and flossing every day. In addition, individuals should have an annual check-up to maintain teeth and gum health, and to prevent gingivitis from developing to periodontitis.

2.2 ROLE OF ORAL HYGIENE

Oral hygiene care is the integration and coordination of preventive, educational, and therapeutic services to improve the oral health of a patient through the use of assessment, diagnosis, planning, implementation, and evaluation (Alvarez, 1998). Crisp and Taylor (2005) stated that oral hygiene helps maintain the healthy state of the mouth, teeth, gums, and lips. Brushing cleans the teeth of food particles, plaque and bacteria, massages the gums, and relieves discomfort resulting from unpleasant odors and tastes. Flossing or using inter-dental brushes/sticks further helps remove plaque and tartar between the teeth, reducing gum inflammation and infection. The American Dental Association calls brushing and flossing the “dental care twins,” the activities crucial to a healthy mouth (Swain, n.d.). Hence, complete oral hygiene gives a sense of well-being, and thus can stimulate appetite (Crisp & Taylor, 2005).

According to Crisp and Taylor (2005), the most crucial roles of oral hygiene are maintenance and prevention. Dentists or nurses can help patients/clients maintain good oral health by teaching them correct techniques, or by actually performing hygiene for weakened or disabled patients/clients. Often times, the nurse must make referrals to a dentist or hygienist for problems requiring special care. Education about common gum and tooth disorders, and methods of prevention can motivate patients/clients to follow good oral hygiene practices.

2.3 PREVENTION OF PERIODONTAL (GUM) DISEASES

In order to reduce potential tooth loss from periodontal diseases, prevention must be pursued, as prevention is the only way to keep teeth, and eliminate suffering, pain, and loss of function (World Health Organization, 1978). There are three stages of periodontal diseases prevention (Dental Health Division, n.d) which are presented as follows:

1. Primary prevention. This stage is the most important, and can be practiced by oneself. This simple self-care stage involves properly brushing and using dental floss daily, and is the principle way to support teeth and gum health. Mason (2005) explained that primary prevention is the intervention of disease before it occurs.

2. Secondary prevention. This stage involves treatment of the early signs and symptoms of periodontium diseases in order to prevent disease progression. Therefore, screening by experts is an important part of the second stage, as experts are able to identify and treat the early signs of diseases. Additionally, it includes preventing the reoccurrence of diseases after treatment.

3. Tertiary prevention. This is the stage of organ loss prevention. Loosening teeth means the severity of periodontal disease has increased. In the past, dentists have preferred to remove loosening teeth. Nowadays, dentists select surgical intervention to remove pockets in order to control dental plaque, thus retaining the tooth. If the tooth needs to remove, this stage becomes focused on the remaining teeth. Mason (2005) explained that tertiary prevention limits the formation of a disability from a disease, or rehabilitation of an individual.

2.4 STAGES OF CHANGE MODEL

Kent and Croucher (1998) explained the two important aspects of behavior change. One aspect is that change can be difficult. A change in lifestyle may be required. The second aspect of behavior change is that the process is not simple. Prochaska and DiClemente (as cited in Kent & Croucher, 1998, p.58) described the process of change in five stages:

1. The pre-contemplation stage. A person does not consider changing the habit. In other words, he/she engages in certain behavior.
2. The contemplation stage. The person is thinking about making a change, perhaps weighing the pros and cons of a certain behavior.
3. The preparation stage. The person has decided to make a change, and is preparing him- or herself for the new behavior by making definite plans.
4. The action stage. After the person had prepared, the actual behavior change occurs.
5. The maintenance change. This important stage is aimed at maintaining a behavioral change. For example, people who quit smoking may begin to smoke again, even after the body has overcome the physiological addiction.

From the process above, Kent and Croucher (1998) explained that the change stages will be different among people, who have different needs. For example, an

individual may need practical help in changing his lifestyle. He might think about how to make a change and require practical assistance with how to achieve it. Also, he will ask for a demonstration on how to use dental floss (stage 2). Another person might be in the maintenance stage (stage 5). However, in health promotion, the aim is to encourage people to engage in healthy behaviors, and foster awareness of the importance of healthy habits, and to prepare the necessary groundwork for the particular ability and skills. While education may be necessary, it is not independently sufficient, because an individual may also need some motivation before engaging in the healthy behavior. Also, Green and Kreuter (2005) pointed out that the desired action will probably not occur unless a person receives a cue strong enough to trigger the motivation to act on the knowledge.

2.5 HEALTH BELIEF MODEL (HBM)

Health belief model (HBM) was a psychological model developed in the 1950's by Hockbaum, Rosenstock and Kegels, researchers at the U.S. Public Health Service. The model attempted to explain and predict a given health-related behavior. This model identified many perceptions: (1) perceived susceptibility, (2) perceived severity, (3) perceived benefits, (4) perceived barriers, and (5) cues to action. In the 1970s, Becker and colleagues elaborated the HBM to apply to people's responses to symptoms, and behavior responses to a diagnosed illness, particularly their compliance with medical regimen. In 1988, the concept of self-efficacy was added to the HBM by Rosenstock and colleagues to help the HBM address existing challenges related to changing habitual unhealthy behaviors (as cited in Jones & Barlette, n.d., pp.31-35).

Figure 2 presents and specifies the definitions related to the elements of HBM (Crisp, & Taylor, 2005; Baum, Newman, Weinman, West, & McManus, 1997). People will change their health behaviors depended on following factors:

1. Perceived susceptibility. A person believes that his or her health is in a negative state, and they are at risk to get a disease. In other words, experiencing a harmful condition is perceived as likely.

2. Perceived severity. The person perceives the potential seriousness of the condition in terms of pain or discomfort, time lost from work, economic difficulties, or other outcomes. Hence, the focus is on perceived threats of the condition.

3. Perceived benefits. The person believes that a course of action available to them would be beneficial in reducing either their susceptibility, or the severity of the condition. In other words, perceived benefits relates to the perceived effectiveness of a behavior in reducing a threat.

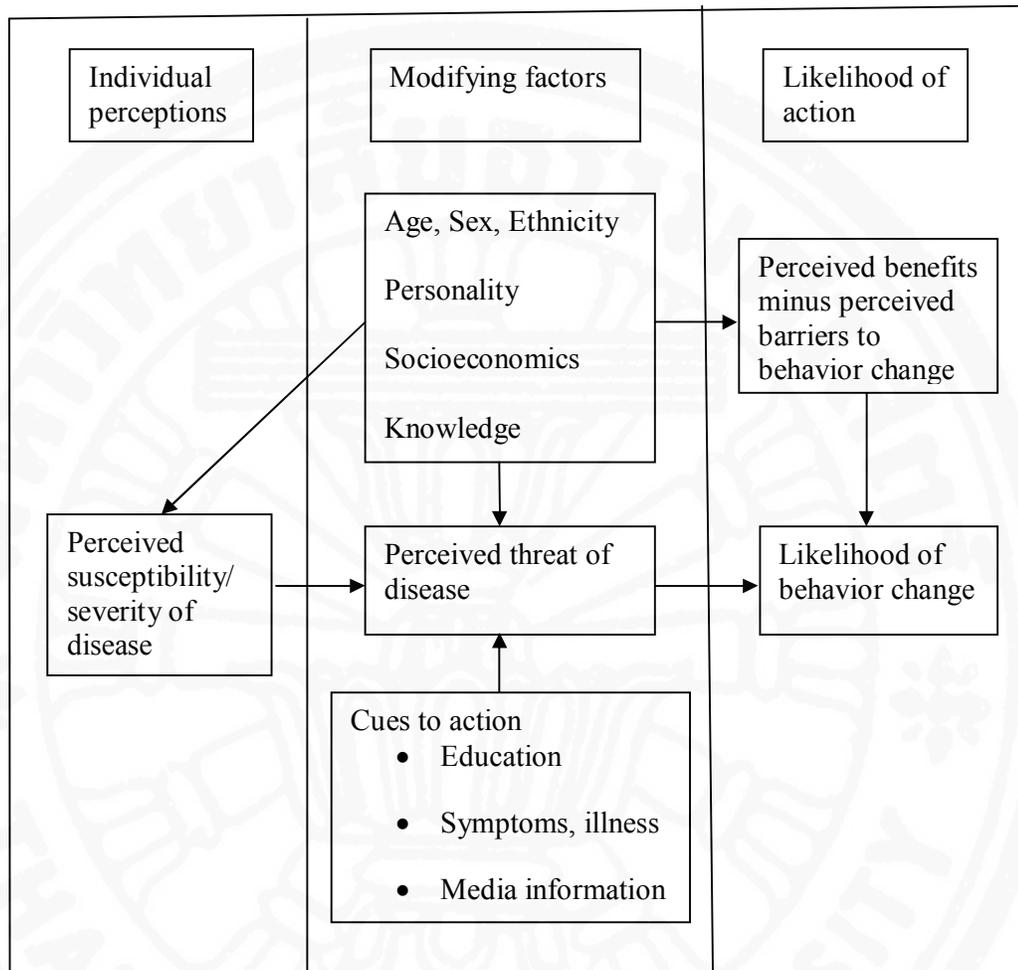
4. Perceived barriers. The person perceives the challenges surrounding treatment, such as the expense, or the consequences after action. This relates to the negative aspects of behavior. Perceived barriers are factors that may serve to predict the undertaking of a positive behavior in the form of treatment.

5. Cues to action. The person perceives a cue to action, or a precipitating force that makes the person feel the need to take action. This is something that motivates a person's behavior. There are two aspects of motivation towards behavior, internal cues, such as perceiving symptoms or illness, and external cues, such as receiving media information or reminders from other people such as fathers, mothers, husbands, and wives.

6. Self-efficacy. This concept was originally developed in 1977 by Albert Bandura in social cognitive theory (social learning theory). This theory pointed out that people learn from one another by observing, imitating and modeling. When it is applied to the HBM, it appears as a person's confidence in her/his ability to successfully perform an action.

Modifying factors are not, however, direct factors relating to health behavior, rather they are factors related to perceiving and practicing healthy behavior. There are three parts; (1) population factors such as age, gender, education level, (2) socioeconomic factors such as personality, social status, and the culture of people towards disease prevention, and (3) basic structure factors such as knowledge and experience in disease.

Figure 2. Health belief model.



From Cambridge Handbook of Psychology, Health and Medicine, (p.115), by A. Baum, S. Newman, J. Weinman, R. West, and C. McManus, 2007, Cambridge: Cambridge University Press.

According to the stages of change model by Prochaska and DiClemente (1992), when people are contemplating the pros rather than the cons, and when perceived benefits are greater than the perceived barriers in the HBM (1997), there is an increased likelihood of behavior change. Champion (1984) explained that patients' health beliefs predict the likelihood of assuming health promoting behavior. According to Zifferblat's study (as cited in Kent & Coucher, 1998, p.64), if a patient can feel or observe the time to take medication, or the time to brush and floss my teeth easily and unambiguously, compliance would tend to be high. In addition, people's behavior depends on the way in which they observe the consequences of others'

behavior. Modeling can prompt a positive change in behavior. For example, a child may improve his oral hygiene if he sees other members of the family take care of their teeth and gums (Kent & Coucher, 1998, p.71).

2.6 CONCEPTS OF ATTITUDES AND RELATED CONCEPTS

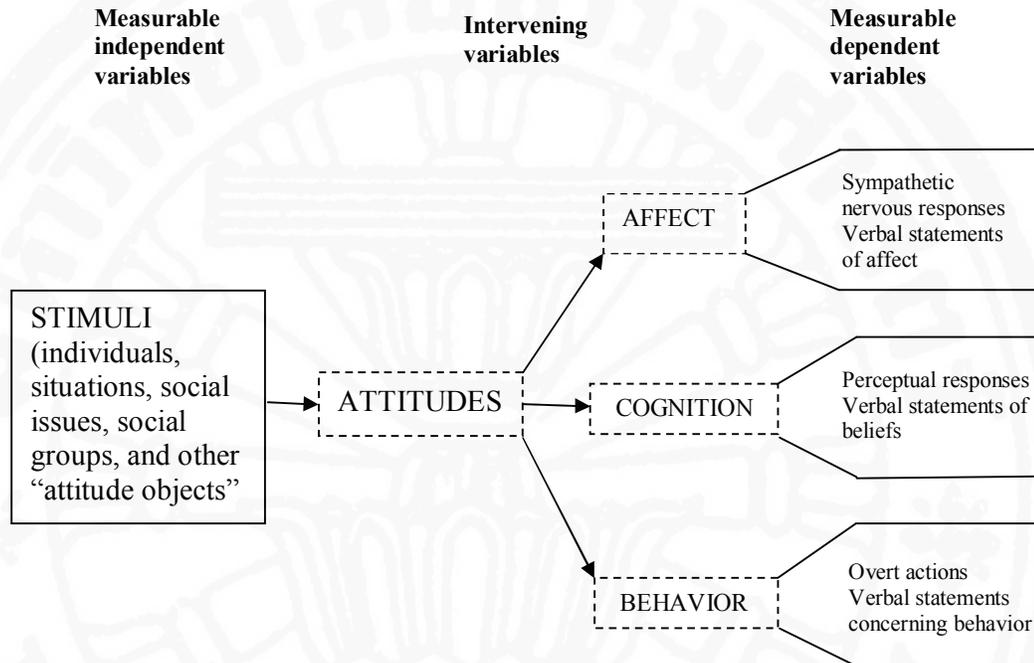
An attitude is a factor which facilitates behavior. Allport (as cited in Triandis, 1971) stated that an attitude is a mental or neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related. Eagly and Chaiken (1993) indicated that attitude is a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor. And, Triandis (1971) defined the term attitude as an idea charged with emotion which predisposes a class of actions to a particular class of social situations. According to these definitions (see Figure 3), there are tri-componential viewpoints of attitudes presented by Rosenberg and Hovland (1960) as follows:

1. A cognitive component refers to the ideas and beliefs which the attitude-holder has about the attitude object.
2. An affective (emotional) component refers to the feeling and emotions one has towards the object. In other words, a person "feels good" or "feels bad" towards the object.
3. A behavior component refers to one's action tendencies towards the object. It is the behavioral intention of the person towards the object.

These three different components of "attitudes" interact with each other and tend to become consistent, when one changes, it will tend to change the other two. Attitudes help people to adjust, to defend their egos, to express their values, and to understand the world around them (Triandis, 1971). Also, attitude is the consequence of past and present experiences to determine the person's responses (Oskamp, 1991; Triandis, 1971). On the other hand, Fishbein and Ajzen (as cited in Oskamp, 1991, p.10) expressed a different view in that it is not necessary that all aspects of the attitudes associate in the same way. In other words, there is no necessary consequence among beliefs, attitudes, and behavioral intentions. This is because a person usually has various beliefs about the same object, and that these beliefs are not necessarily

related. For example, “I intend to read this book” does not imply “I am going to buy this book”.

Figure 3. Three-component view of attitudes.



From Social Psychology: Attitude, Cognition, and Social Behavior, (p.54), by R. Eiser, 1986, Cambridge: Cambridge University Press.

2.6.1 Related Concepts

2.6.1.1 Beliefs

Beliefs are extremely important in attitude theory (Eagly & Chaiken, 1993). Lopper (2006) stated that a belief is a thought we hold and deeply trust about something. Beliefs tend to be buried deep within the subconscious, which trigger automatic reactions and behaviors. We seldom question beliefs; we hold them to be truths. Fishbein and Ajzen (1975) defined beliefs as statements indicating a person's subjective probability that an object has a particular characteristic. The truth or falsity of proposition about the object is asserted. This denotes a relationship between the object and some characteristic. From Oskamp's point of view (1991), there is a clear distinction between beliefs and attitudes, in that beliefs are thoughts and ideas while

attitudes are feelings and emotions. In addition, a person who has positive feelings about an outcome will hold a favorable attitude to perform the behavior while an unfavorable attitude will lead to mostly negative outcomes (Ajzen & Fishbein, 1980). Regarding oral health, people with stable and favorable beliefs will have a lower prevalence of poor self-rated oral health, as well as fewer sites with bleeding on probing, fewer teeth extracted due to caries, and lower plaque. Hence, their strong beliefs related to oral health associates with keeping the teeth and gums very clean (Broadbent, Thomson, & Poulton, 2006).

2.6.1.2 Values

In terms of values, Madison (2003) explained that a value is a concept concerned with the worth of people or things. Worth may be considered in terms of usefulness or economic value. Value theory can also involve legal, moral, aesthetic, or quantitative values. It can involve just one type of value, or a combination of different types. According to Perry's view (1954), value is "any object of any interest" as an instance of the position that value is the referent of a semantical predicate (Ogden, 2000). In addition, Rokeach (1968) identified value as an important life-goal or societal condition desired by a person. Since values are person's goals or standards in life, it is clear that individuals will have strong positive attitudes towards the values they hold. Moreover, values are central in a person's whole system of attitudes and beliefs, that is they are resistant to change, and they influence many other beliefs and attitudes (Rokeach; Kahle; Tetlock, as cited in Oskamp & Schultz, 2005, pp.14-15). For example, using dental floss on a regular basis has not only aesthetic value, but hygienic value in reducing the incidence of the oral problems (Mcneill, 1975).

2.6.1.3 Habits

Habits are frequently-related patterns of behavior, whereas attitudes are not behavior. Habits are usually quite automatic and standardized in their manner of performance, but they require the presence of an appropriate stimulus object in order to occur (Allport, 1935). Adam (2009) stated that when people routinely perform the same actions, the brain learns this pattern of behavior and sets up a pathway. According to Steven Covey, a habit is the intersection of knowledge, skill and desire (Richardson, 2005).

In health behavior, Ronis et al (as cited in Gochman, 1997, p.303) noted that it is difficult to create a habit, especially individuals acting on their own. People will never think about the need to perform such behavior, or may even be against the action because it is difficult to do or unpleasant. Some people may forget in the process of trying to change their behavior. Also, they may become frustrated with trying to create a habit and abandon the attempt. For example, the use of dental floss to prevent gum disease is illustrated, and although the advertising has been presented to people, many individuals still do not know about its benefit. O'Neill et al (1987) cited that people who want to begin a flossing regimen, report many difficulties. Flossing is not easy to perform correctly and it is hard to remember to floss. Ultimately, most people abandon flossing (Ronis et al, 1989).

2.7 RELEVANT RESEARCH

This section presents some interesting research related to dental floss, and general issues related to oral health.

Terezhalmay, Bartizek, and Biesbrock (2008) studied the plaque-removal efficacy of four types of dental floss. This study was designed by comparing brushing alone, and brushing combined with four floss products: three traditional (unwaxed, woven, and shred-resistant) and one powered flosser. The plaque in the mouth was recorded before and after brushing. The report showed that brushing together with flossing of any type of floss products led to greater plaque removal than brushing alone. However, among the four floss types, powered flosser was the greatest to remove plaque, while there were no differences between the other three traditional floss products.

Finkelstein and Grossman (1979) studied the effectiveness of dental floss in reducing gingival inflammation. In their study, the subjects were not regular users of floss. They used waxed or unwaxed floss randomly. Also, they were controlled to floss on only one side of the mouth (upper and lower arches). The subjects would practice their normal oral hygiene. They were not permitted to use mouth rinses, and were flossed by a dental hygienist for 14 consecutive days. The result showed a significantly greater bleeding reduction in the flossed sides. The median value of bleeding sites showed a reduction ranging from two to zero for the flossed sides, and

from two to one for the unflossed sides. Also, the study found no significant difference between waxed and unwaxed floss as both types of floss showed improvement in bleeding reduction, which related to a decrease in gum inflammation on the flossed side for each subject.

Concerning oral hygiene and periodontal disease, Greene (1963) summarized two studies from Ecuador (1959) and Montana (1961). Although the subjects in these two studies were different in cultural background, a strong relationship was found between oral hygiene and periodontal disease in both groups. Although the scores of tartar were shown to increase with age, there were some different points related to age. The study found high scores of debris at the youngest age group (5-9 years old, and 10-14 years old), ages 15-19, however, displayed a lower debris score. It was assumed that people in the latter age group were interested in personal well-being or concerned about their appearance. The study also showed that the improvement of oral cleanliness was statistically significant.

Tanner, Kent, Dyke, Sonis, and Murray (2005) studied the clinical and other risk indicators for early periodontitis in adults aged 20 to 40. The results showed that early periodontitis was associated with gingival inflammation, age, and cigarette smoking. In terms of gingival inflammation, lower molar inter-proximal sites frequently resulted in inter-proximal attachment loss, whereas lower bicuspid teeth were at risk for gingival recession on buccal surfaces. Age correlated with increased periodontal loss. There was an association between gingival inflammation and development, and progression of early-onset periodontitis. This suggested that early periodontitis may extend to young adults. Those with a smoking history, former and current smokers, had a slightly higher proportion in the early periodontitis categories. The indicator for future periodontal attachment loss in adult periodontitis was an existing attachment loss, while the gingivitis in early-onset periodontitis was strongly associated with future periodontal attachment loss.

Borrell, Beck, and Heiss (2006) studied the relationship between socioeconomic disadvantage and periodontal disease: the dental atherosclerosis risk amongst communities studies. This study examined individuals and neighborhood-level socioeconomic characteristics were associated with periodontal disease. The results showed associations between individual socioeconomic indicators in terms of

income, education level, and residence of neighborhood, or neighborhood circumstances and the prevalence of severe periodontitis. In terms of income level, low income in white communities was associated with severe periodontitis, whereas low education and income levels were factors among African Americans. Moreover, low-income whites residing in disadvantaged neighborhoods had more severe periodontitis than high-income whites living in privileged socioeconomic neighborhoods. This study investigated neighborhood circumstances and postulated that the area of residence influences an individual's health behaviors and health-related norms. Neighborhood circumstances or social contexts could promote or prevent behaviors, such as oral health habits and cigarette smoking, which affected periodontal health. However, the recommendations declared that further studies needed to investigate the specific processes through which neighborhood characteristics interacted with individual-level socioeconomic indicators, and identify behaviors that affect periodontal disease.

Pakarat Nitisiri (ศการัตน์ นิตสิริ, 2539) studied attitudes related to the use of dental floss among schoolchildren aged 12-14. 185 students were given dental floss to use in their homes. The evaluation was assessed using interviews following a two month period. Pakarat found that some students used the floss at least once a day, some used it when they had food particles, some used it more than once a day, and some only flossed on some days. The majority of students were satisfied with the use of dental floss, and wanted to continue using it. Also, the students could use dental floss correctly if they were taught. The study showed that flossing should be performed at a specific age. Most respondents responded that flossing should begin at twelve years old, while a few respondents felt that flossing should begin before age twelve. This study suggested that flossing should accompany brushing. The study suggested that students who could not afford dental floss due to the economic status of their families should learn the benefits of dental floss use, so that floss is a priority when their situation changes.