HOUSEHOLD HAZARDOUS WASTE MANAGEMENT BEHAVIOR OF PEOPLE IN BANGKOK

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HOUSEHOLD HAZARDOUS WASTE MANAGEMENT BEHAVIOR OF PEOPLE IN BANGKOK

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ABSTRACT

The objectives of this research were to study the levels of behavior and other factors in household hazardous waste management behavior of people in Bangkok. This study also explored the problems and obstacles in household hazardous waste disposal and made recommendations for household hazardous waste management. The data were collected by questionnaires. The study population was 400 households. The Statistical Package for Social Sciences was used for data analysis.

The results of this study showed that the household hazardous waste management behavior of people in Bangkok was at a high level. Factors affecting behavior of household hazardous waste management are: knowledge on hazardous waste management and health value both of which made a significant difference in household hazardous waste management behavior. (at $p<0.001$) Age and residential area also made a significant difference in household hazardous waste management behavior. (at $p<0.01$) Likewise, educational level made a significant difference in household hazardous waste management behavior. (at $p<0.05$) Gender, occupation, number of family members, monthly income and access to hazardous waste management information made no significant difference in household hazardous waste management behavior.

The problems and obstacles in proper household hazardous waste management behavior were that most people lacked knowledge about hazardous waste management and had inconvenience in hazardous waste separation from community waste. The study also found that local authorities generally lacked an efficient household hazardous waste management program and the facilities for hazardous waste collection were inadequate.

The result of this study recommended that the local authorities involved should provide more hazardous waste containers to improve efficiency of hazardous waste management system by a more effective collection method also, improvement in manpower, equipment and vehicles were recommended. Moreover, a central authority should be assigned to the task of providing both information and the provisions necessary for the safe disposal of household hazardous waste.

KEY WORDS : HOUSEHOLD HAZARDOUS WASTE / MANAGEMENT / BEHAVIOR / BANGKOK

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พฤติกรรมการจัดการมูลฝอยอันตรายในครัวเรือนของประชาชนในเขตกรุงเทพมหานคร
(HOUSEHOLD HAZARDOUS WASTE MANAGEMENT BEHAVIOR OF PEOPLE IN BANGKOK)

ทิพย์จุฑา อมรอัครวัจน์ 4436886 SHEV/M

สค.ม. (สิ่งแวดล้อม)

คณะกรรมการควบคุมวิทยานิพนธ์ : จิราพร จักรไพวงศ์, สค.ม.(สิ่งแวดล้อม) , ชุติมา แสงเงิน, ศษ.ด.(สิ่งแวดล้อมศึกษา), พรรณิภา บูรพาชีพ, น.ม.

บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อศึกษาระดับพฤติกรรมและปัจจัยที่มีผลต่อพฤติกรรมการจัดการมูลฝอยอันตรายในครัวเรือนของประชาชนในเขตกรุงเทพมหานคร รวมทั้งศึกษาปัญหา อุปสรรคและข้อเสนอแนะในการจัดการมูลฝอยอันตรายในครัวเรือน เก็บรวบรวมข้อมูลจากประชาชนในเขตกรุงเทพมหานคร จำนวน 400 ราย โดยใช้แบบสอบถาม ข้อมูลที่ได้นำมาวิเคราะห์โดยใช้โปรแกรมสำหรับการวิจัยทางสังคมศาสตร์

ผลการศึกษา พบว่า กลุ่มตัวอย่างมีพฤติกรรมการจัดการมูลฝอยอันตรายในครัวเรือนในระดับสูงและปัจจัยที่มีผลต่อพฤติกรรมการจัดการมูลฝอยอันตรายในครัวเรือน ได้แก่ ความรู้เกี่ยวกับการจัดการมูลฝอยอันตราย การให้คุณค่าต่อสุขภาพอนามัย มีผลต่อพฤติกรรมของประชาชนในการจัดการมูลฝอยอันตรายในครัวเรือนอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.001 อายุและเขตที่อยู่อาศัยมีผลต่อพฤติกรรมของประชาชนในการจัดการมูลฝอยอันตรายในครัวเรือนอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.01 และระดับการศึกษามีผลต่อพฤติกรรมของประชาชนในการจัดการมูลฝอยอันตรายในครัวเรือนอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05 ส่วนเพศ อาชีพ จำนวนสมาชิกในครัวเรือน รายได้ต่อเดือนของครัวเรือนและการรับรู้ข่าวสารเกี่ยวกับการจัดการมูลฝอยอันตรายในครัวเรือน ไม่มีผลต่อพฤติกรรมการจัดการมูลฝอยอันตรายในครัวเรือน

ปัญหาอุปสรรคในการจัดการมูลฝอยอันตรายในครัวเรือน พบว่า ประชาชนส่วนมากมีปัญหาการขาดความรู้เกี่ยวกับการจัดการมูลฝอยอันตรายที่ถูกต้อง ความยุ่งยากในการคัดแยกมูลฝอยอันตรายออกจากมูลฝอยทั่วไป การขาดประสิทธิภาพในการจัดการมูลฝอยอันตรายในครัวเรือนของกรุงเทพมหานคร การขาดถังรองรับมูลฝอยอันตรายและปัญหาการค้นหาของเก่าขายและสุนัขคุ้ยเขี่ย

ข้อเสนอแนะ คือ หน่วยงานที่เกี่ยวข้องควรจัดวางถังรองรับมูลฝอยอันตรายให้เพียงพอ ควรเพิ่มประสิทธิภาพของระบบการจัดการมูลฝอยอันตราย ทั้งทางด้านระบบการจัดเก็บ บุคลากร วัสดุอุปกรณ์และยานพาหนะ มีการจัดตั้งหน่วยงานที่เป็นศูนย์กลางทำหน้าที่ดูแลรับผิดชอบเกี่ยวกับการจัดการมูลฝอยอันตรายอย่างเป็นระบบ มีการเผยแพร่ประชาสัมพันธ์ให้ทราบถึงปัญหาที่เกิดจากมูลฝอยอันตราย การจัดการมูลฝอยอันตรายในครัวเรือนที่ถูกต้องและผลกระทบที่เกิดขึ้นต่อสุขภาพอนามัยและสิ่งแวดล้อม

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CONTENTS

CONTENTS (Cont.)

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

1.1 Background and statement of problem

Human have many activities causing a residue and leftover. This is “garbage” or “waste” generated from household consumption, especially now, Thai society has developed to a better living and has a tendency to higher consumption. The high production generated a large proportion of the waste from production and consumption process. Furthermore, the population growth, tight and dense dwelling result in a large quantity of the waste and insufficient waste dumping area.

A garbage problem is the major problem in the large capital particularly Bangkok. The information of The Pollution Control Department (B.E.2546 :3) was reported that in 2001 Bangkok produced approximately 9,320 tons of waste daily, while waste was produced by the whole country approximately 38,600 tons. It indicates that Bangkok produced 30 percents of the municipal solid waste in the country. With the current in population and consumption growth rate, 18,750 tons of waste daily in Bangkok will be needed to be disposed in 2015, on average 8% of increasing waste annually or up to 1.7 kg/person/day. This is a dramatic increase. (Department of Public Cleansing, B.E.2544: 1)

In addition to the community solid waste, a household hazardous waste problem is an environmental problem and tends to be a severe problem. During the past decade, the national activities generated increasingly hazardous waste every year. Hazardous waste increased from 1 million tons in 1990 to 1.6 million tons in 2000. 25% of hazardous waste was produced by community activities. Household is the main source of that waste and most are collected and disposed with municipal waste. (Nisanart Sathirakul, B.E.2545:4)

Household hazardous waste generated from utilization and consumption which consists of chemical and metal is a tendency to be high. According to an estimate of the hazardous waste generated from household in Bangkok in 2002-2017,

(Pollution Control Department, B.E.2541:3-46) It found that in 2002 was 7,054,327 kg., in 2007 would be 7,759,760 kg., in 2015 would be 8,380,541 kg. and in 2017 would be 9,050,984 kg. In 2000, only 191 kg./day were collected from household in Bangkok. The remainder of the waste is mostly disposed with municipal waste or released to the environment. When disposal is proceeded improperly, hazardous waste can be a potential health risk to people and can cause severe burns, illness, blindness or even death. (Department of Public Cleansing, B.E.2544: 1) Impacts on economic and society, the injury were disabled and unemployed. The government needs to support them; otherwise, it will become the national problem.

Impacts on the environment, toxin poses a threat to environment. Contamination and consolidation in environment such as toxin, metal, pesticide and other substances generated from household hazardous waste can backward impact on human by food chain. These wastes can leach into surface water and ground water—the sources for our drinking water. (Thippawan Paewsakul, B.E.2541: 89) A potential risk of hazardous waste could perceive hardly, complicated, difficult verified and unlimited damage in deep and wide range. (Apinya Tanthaweewong, B.E.2544: 187)

Given the foregoing problem, The Ninth National Economic and Social Development Plan (2002-2006) of Thailand emphasize solutions on this problem. The purposes are to enhance the capacity to collect, dispose of, and reduce hazardous waste from manufacturing production and communities, should be increased to no less than 50% of all hazardous waste generated. No less than 50% of the provinces nationwide should adopt an appropriate, safe and complete solid waste disposal process, and no less than 30% of solid waste produced should be recycled. Encouraging the reduction and recycling of wastes through economic incentives and polluter-pay principles, a system to collect hazardous waste residues, packaging, and other residuals should be developed and implemented. (National Economic and Social Development Board, 2002: 61)

Bangkok Metropolitan Administration as the responsible agency determined hazardous waste management plan in The Fifth Bangkok Metropolitan Development Plan (1997-2001) to minimize waste by separation of hazardous waste before disposal and reduction of poisonous substance in order to enhance proper collecting and disposal of hazardous waste from community with hygienic condition. There is a policy to improve hazardous waste management practices and efficiency in collecting,

separation and day by day disposal. (Department of Policy and Planning, Bangkok Metropolitan Administration, B.E.2540: 73-77) These solutions were continually practiced to The Sixth Bangkok Metropolitan Development Plan (2002-2006) defined to upgrade the hazardous waste management more efficient and encourage people to dispose of hazardous waste from community at least 20% of hazardous waste within The Sixth Bangkok Metropolitan Development Plan (Department of Policy and Planning, Bangkok Metropolitan Administration, B.E.2545: 158-167)

In the fifth and the sixth plan, Bangkok Metropolitan Administration handles for hazardous waste rising. Household hazardous waste quantity generally mounts related to the population growth and increasing of hazardous waste from community involved to economics growth. It was indicated that community hazardous waste relied on standard of living and technology development. On the contrary, hazardous waste minimization results from the encouragement of the least waste reduction by promotion to training and education from state. (Pollution Control Department, B.E. 2541: 28) The efficient hazardous waste management should start from purchasing the less hazardous product and reducing hazardous product consumption. In case of occurrence of hazardous waste, hazardous waste must be separated before disposal. Separation hazardous waste before disposal need public participation in order to separate efficiently due to waste segregation before disposal is a key process to concretely minimize waste. Hazardous waste separation, particularly, emphasizes to manage and specifies what household hazardous waste to separate from community waste and special control. (Autsanee Auyasatian, B.E.2541:28) In order to protect health and environment, people should know how to properly minimize, separate, store, collect and dispose of hazardous waste. Proper hazardous waste management is in charge of all people to do it.

Household hazardous waste management needs participation from all family members. To raise consciousness and awareness of danger of household hazardous waste being the hidden peril in safe environment of their living place as long as there are still chemicals and hazardous product used on a daily basis, also to encourage people to aware of harmfulness of hazardous waste that can be dangerous to human health, animal and environment, the researcher was concerned with the study of household hazardous waste management of people in Bangkok in order to manage household hazardous waste seriously. It will save the quality of life and public health including natural resources and environment.

1.2 Objectives

1. To study the level of household hazardous waste management behavior of people in Bangkok.
2. To study the factors that affected the household hazardous waste management behavior of people in Bangkok.
3. To study the problems, obstacles and recommendations for the household hazardous waste management of people in Bangkok.

1.3 Scope of the study

This research is to study the household hazardous waste management behavior of people in Bangkok by studying from the people who lived in Bangkok or the household representatives with more than 18 years of ages, living at least one year in Bangkok.

1.4 Definition of terms

Behavior refers to the actions or practices of people with knowledge and understanding, whether the practices can be observed by the other people or not.

Household hazardous waste refers to waste composed or contaminated any hazardous chemicals which are harmful to public health and the environment and generated from household.

Household hazardous waste management refers to the actions and activities comprising of hazardous waste minimization, hazardous waste separation, hazardous waste storage and hazardous waste discarding.

Household hazardous waste management behavior refers to the actions or practices of people to their household hazardous waste management comprising of hazardous waste minimization, hazardous waste separation, hazardous waste storage and hazardous waste discarding.

Hazardous waste minimization refers to the decrease of hazardous waste by reducing hazardous substance consumption and the least purchase of the hazardous products.

Hazardous waste separation refers to the hazardous waste segregation from community solid waste and separate by categories for safe and convenience in storage and collection.

Hazardous waste storage refers to the hazardous waste storage in suitable container and placing hazardous waste in front of house or at collecting point.

Hazardous waste discarding refers to bringing hazardous waste into the sealed container or separated container in order to wait for collecting to disposal.

People refer to the person who lives in Bangkok or the household representative with more than 18 years of ages and living at least one year in Bangkok.

Residential area refers to living area of people in Bangkok which Bangkok Metropolitan Administration divided 50 districts into 6 areas as follows:

1. Rattanakosin area includes 9 districts: Phra Nakorn, Pom Prap Sattru Phai, Sampanthawong, Dusit, Bang Rak, Pathumwan, Bang Sue, Ratchathewi, Phaya Thai.

2. Burapa area includes 9 districts: Don Mueang, Bueng Kum, Lat Phrao, Lak Si, Bang Kapi, Sai Mai, Chatuchak, Wang Thonglang and Bang Khen

3. Srinakarin area includes 8 districts: Prawet, Suan Luang, Kanna Yao, Min Buri, Nong Chok, Lat Krabung, Khlong SamWa and Saphan Sung

4. Chao Phraya area includes 9 districts: Vadhana, Bang Kho Laem, Bang Na, Khlong Toei, Yan Nawa, Sathon, Phra Khanong, Din Daeng and Huai Khwang

5. North Khung Thon area includes 7 districts: Bangkok Yai, Bangkok Noi, Bang Phlat, Phasi Charoen, Taling Chan, ThawiWatthana and Nong Khaem

6. South Khung Thon area includes 8 districts: Thon Buri, Khlong San, Rat Burana, Thung Khru, Bang Khae, Chom Thong, Bang Khun Thian and Bang Bon

Monthly income refer to the average earning from working of all the family members per month before deduct any expenses.

Types of household hazardous wastes refer to the household hazardous waste can be categorized into 6 types as follows:

1. **Light bulb**: Fluorescent light bulb, light bulb and other electric lights.
2. **Dry cell**: Dry cell for flashlight and any size of dry cell.
3. **Spray**: Spray paint and other aerosol cans
4. **Contaminated container**: Hazardous substance contaminated container like toilet bowl cleaner, chlorine bleach, expired cosmetic, outdated medicines, pesticides, ant-roach killers, motor oil, brake and transmission fluid, furniture polish, wood varnish, sliver polish, paints, adhesive, thinners, lacquer, herbicides, chemical fertilizers, photographic chemicals and other contaminated containers.
5. **Battery**: Automobile batteries, any phone batteries, emergency batteries and power supply batteries.
6. **Others**: The hazardous wastes apart from five groups above such as printer ink cartridge, aluminum foil, mosquito repelling mat, electronic wastes, etc.

Access to hazardous waste management information refers to frequency in all information perception of people about hazardous waste management by seeing, listening, talking and reading through accessible media.

Knowledge about hazardous waste management refer to data and fact concerning hazardous waste and hazardous waste management in characteristic, category, proper management, impact of hazardous waste to health and environment, including relevant law and regulation.

Health value refers to the practices of people in health promotion by having a good mind, good exercises, good eating, good workings and good rests.

1.5 Variables of the study

1. Independent Variables

- Personal factors include gender, age, residential area, educational level, occupation, monthly income, number of family members
- Motive factors include types of household hazardous wastes, access to hazardous waste management information, knowledge about hazardous waste management, health value

2. Dependent Variable is household hazardous waste management behavior of people in Bangkok

1.6 Variables and level of measurement

Independent Variables

Personal factors

- Gender	Nominal
- Age	Interval
- Residential area	Nominal
- Educational level	Nominal
- Occupation	Nominal
- Monthly income	Interval
- Number of family members	Interval

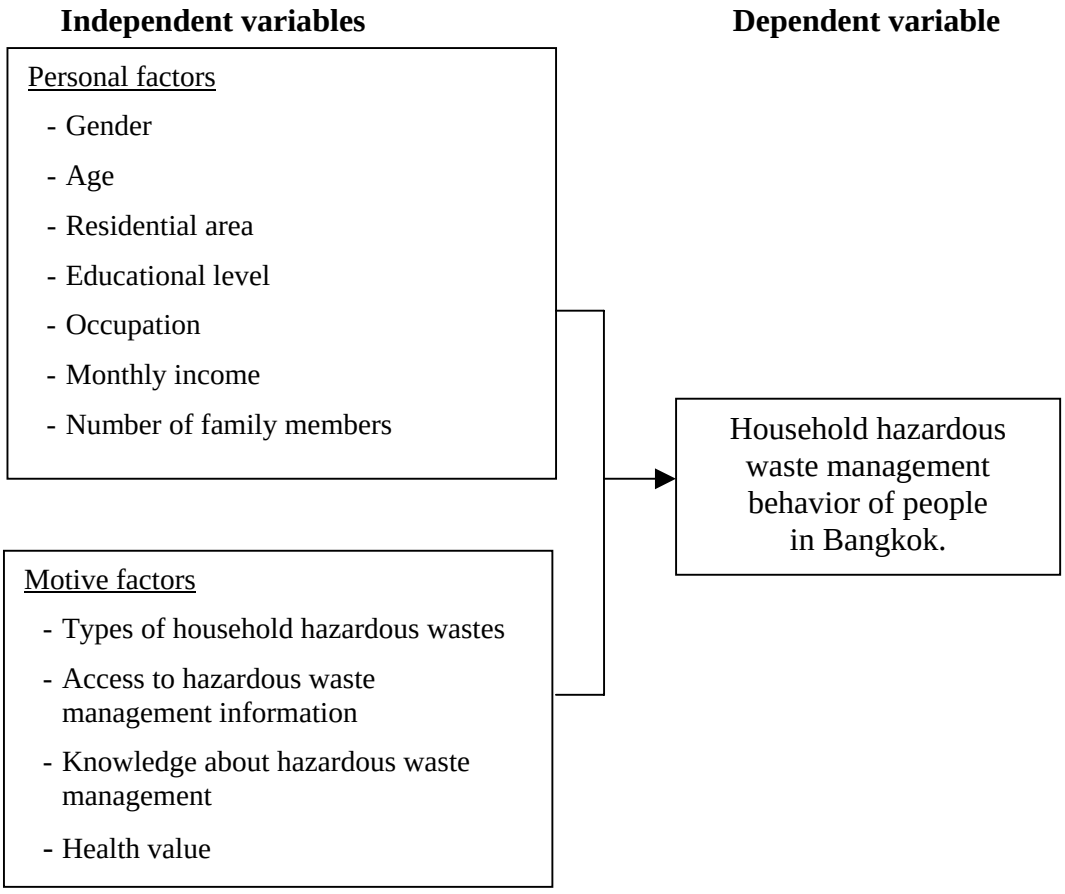
Motive factors

- Types of household hazardous wastes	Nominal
- Access to hazardous waste management information	Interval
- Knowledge about hazardous waste management	Interval
- Health value	Interval

Dependent variable

Household hazardous waste management behavior of people in Bangkok	Interval

1.7 Conceptual framework



1.8 Hypothesis of the study

The hypotheses of this study are as follows:

1. The household hazardous waste management behavior of people in Bangkok is at a moderate level.

2. Personal factors consisted of gender, age, residential area, educational level, occupation, monthly income, number of family members make a difference in the household hazardous waste management behavior of people in Bangkok.

3. Motive factors comprised of types of household hazardous wastes, access to hazardous waste management information, knowledge about hazardous waste management and health value make a difference in the household hazardous waste management behavior of people in Bangkok.

1.9 Benefits of the study

1. To realized the level of the household hazardous waste management behavior of people in Bangkok. The study results can be used as a guideline to manage household hazardous waste generated from the people efficiently.

2. To realized the factors of the household hazardous waste management behavior of people in Bangkok. The study results can be basic information to raise and lead to changing of hazardous waste management behavior of people continue to accurate and appropriate management process.

3. To realized the problem, obstacles and recommendation for household hazardous waste management behavior of people in Bangkok. The associated authority can take advantages from the study results to be the key information in public relation plan and action plan for raise the public participation in hazardous waste management solving and household hazardous waste management would be practiced seriously for many advantages effect on quality of life and public health including natural resources and environment.

CHAPTER 2
LITERATURE REVIEW

Conducting study, the researcher reviewed and compiled data from relevant academic documents and concerning researches for research basis as follows:

2.1 Concepts of the behavior

2.2 Concepts of hazardous waste

2.3 Household hazardous waste management

2.4 Concepts of the knowledge

2.5 Concepts of the health value

2.6 Relevant researches

2.7 Variables related to this study

2.1Concepts of the behavior

2.1.1 Definition of the behavior

Many researchers have defined the meaning of behavior, for example:

Norman L. Munn (1962:5) explains that behavior refers to action or activities of human irrespectively of intention. Behavior includes action that other people might see or might not see it such as walking, speaking, listening, understanding, thinking, to be angry, heart beat, muscle working.

Chuda Jitpitak (B.E.2525: 2) stated that a person's behavior is not only shown through the physical actions but it also includes the internal feelings or emotions that the person may have, which cannot be observed by other people such as value, attitude, opinion, belief, taste and psychological status, those are personal characters whose affect the behavior.

Prapapen Suwan (B.E.2526: 15) gave a meaning of behavior as every action that an individual may perform, whether an action can be noticed by other people or not. This includes walking, speaking, thinking, feeling, and interests, etc.

Wimonsit Harayanggul (B.E.2535: 35) remarked human behavior that psychological or internal behavior control external behavior, human has the feeling when touching, receiving, learning, remembering, thinking, decision making and moods influenced by external things in routine life. These psychological behaviors have the relationship with environmental behavior (external behavior). Human psychological behavior may relate directly with human, too. The human socials occur in physical environment, so psychological behavior more or less has the relationship with physical environment. No matter what human do, they should receive information, changing environment, try to interpret the meaning, learning process and accumulate those experiences in mind which will be useful for development process in the future.

Pricha Wihokto (B.E.2543:5) defined the meaning of behavior as every action that an individual may perform, does not matter how an action can be noticed by other people, activities upon discretion or unconsciousness.

Preeyaporn Wong-anutroj (B.E.2534:14-15) described that behavior is human actions or responses that may be subconscious or conscious to response from stimulant. No matter that people around can observe those actions more or less, but those can be tested by instruments. It were classified behavior into 2 groups, those are:

1. Overt Behavior is behavior that can be observed, e.g.; speaking, smiling.

2. Covert Behavior is behavior that cannot be observed, e.g.: thinking, remembering, etc.

From the definitions mentioned above, the researcher has concluded that behavior refers to the actions or practices of people with knowledge and under standing, whether the practices can be observed by the other people or not.

2.1.2 Components of behavior

Psychologists believed that behavior is a product from action of human, organisms, or the environment. According to Bloom's theory (Bloom: 1975 quoted in Prapapen Suwan, B.E.2526:15-17), behavior has 3 components, as follows;

1. Cognitive domain relates to perceiving, sensing, remembering facts, as well as development of intellectual capabilities or concept and principles or rules and

problem solving. These behaviors comprise of knowledge, comprehensive, application, analysis, synthesis, and evaluation.

2. Affective domain means interest, view, feel, action, like, dislike, value, perception, acceptance, adjustment of and chance in the existing value. Those behaviors take place in the mind of a person, thus difficult to define. These behaviors consist of 5 steps, namely; receiving or attending, responding, valuing, organizing and characterization by a value.

3. Psychomotor domain is behavior that requires expression ability of the body. It includes behavior that expressed or noticeable in a certain situation, and a reluctant behavior, i.e. a person does not react promptly. Psychomotor domain is the final behavior on which this research focuses. It comprises of the two domains discussed earlier (cognitive and affective domains). These behaviors when expressed can be assessed easily, though the processes of these behaviors take time and various steps for decision making.

Conbach (1972:14) determined 7 components of human's behavior, namely;

1. Goal is a need to create activities in response to an arising need. Needs can be fulfilled immediately, but some may take time.

2. Readiness is maturity or capability necessary for conducting the activities in response to the need.

3. Situation is an event with prevailing opportunity to select activities that meet the need.

4. Interpretation: Prior conducting any activity, human beings should consider a situation, and then select the method that enhances the utmost satisfaction.

5. Response is to conduct activities in response to the needs, by using the method selected from the interpretation stage.

6. Consequence is the result of the activities conducted, which may or may not turn out as expected.

7. Reaction to thwarting: If human beings cannot fulfill the needs, they may return to interpret the situation and select a new method.

2.1.3 Determinants of human behaviors

Chuda Jitpituk (B.E.2535: 59-72), there are many factors effect on human behavior that can be classified into 2 types:

1. Personal habit:

1.1 Belief means the way people think of anything in the aspect of fact, whether true or not, belief may originate from seeing, telling, reading and self-thinking.

1.2 Value means things people hold on in mind which can help them in selection.

1.3 Attitude relates to people behavior; it is a trend or prepared stage for behavior. Attitude is a major factor affecting social behavior.

1.4 Personality is a factor effect on what person will do if he is in any situation.

2. Other social processes, those are:

2.1 Stimulus object and the concentration of stimulus for behavior, personal habit, e.g.; belief, value, attitude and personality, influence behavior. But behavior cannot be developed if there is no stimulus object which is internal factor, that are; accumulated knowledge, experiences from the past events or received from externa1 source, e.g.: information, other person, etc.

2.2 Situation means environment either person or non-person that is in personal status and going to have behavior.

Pat Sujumnong (B.E.2522:80-82) explains components that influence human behavior as follows:

1. Social group such as neighbor group, school mate group, institute mate group.

2. Identification figure such as father and mother, sister, teacher, famous people in social.

3. Status may be a status that social determine such as gender, age, religion or status that person achieves by himself such as rank, position, etc. When people have different status, their behavior also will be different.

4. Development of technology: nowadays people like to use all labor saving devices that make peoples behavior change.

5. Laws: some behavior of human is control by laws such as to smoke a cigarette on a public transportation in Bangkok is illegal. So the behavior is decreased by laws.

6. Religion: Each religion has different taboo. So in the same situation, people who have different religion might behave differently.

7. All tradition, culture and beliefs influence human behavior.

8. Environment: People who live in different environment have different behavior such as people who live in town and people who live in rural.

9. Attitude influence human behavior such as student who has bad attitude toward teacher might behave strangely by not pay attention in class, always absent from school without reason.

10. Learning: psychologist believes that most of human's behaviors are from learning. It is a continuous procedure from kids to adults such as kid imitates adult.

2.1.4 Behavioral measurement

Personal behavior both internal and external can be studied by many methods. Internal behavior cannot be observed, the way to measure is indirect method, by interview, questionnaire, laboratory investigation and by communication. Thus the instrument used for measuring behavior may be constructed questionnaire or other instruments, e.g., sphygmomanometer, stethoscope, etc.

Somjit Supannathat (B.E.2526: 131-136) described two methods of studying behavior by:

1. Direct study

1.1 Direct observation, for example, a teacher observes student behaviors in the classroom by telling the students that the teacher will observe what the students do in the classroom. This type of observation, some students will not behave their real behaviors.

1.2 Naturalistic observation, the observer will not disturb the observed person behavior and observed person will not know that he is observed. This type of observation will access real behavior and the result can explain the nearby behavior,

too. The limitation of Naturalistic Observation is much time used to access the effected behavior and the observation has to do many times in a period of time. Some behaviors may be observed up to 50 years.

In conclusion, both Direct and Naturalistic Observation, the observer must be careful, systematized and record the observed behavior. Furthermore, the observer must have no bias to observed person that cause the study more valid and reliable.

2. Indirect study - there are many methods to study, those are:

2.1 Interview - the researcher needs to interrogate with the interviewee or group of interviewees by direct interrogation or through middleman, e.g., by an interpreter through interviewee who speaks another language. There are two types of interview: direct interview; the interviewer will ask the interviewee on the purposed subject, indirect or informal interview; the interviewee will not know what the interviewer needs, the interviewer will go on talking and insinuate the purposed subject when having the chance, the interviewee will not know what the interviewer specifically interrogate is to study his behavior. The interview can access many data but the limitation is some hidden story that the interviewee does not want to disclose.

2.2 Using of questionnaire - it is appropriate for the study on behavior in a large number of literate people or in a group of people who are living far away and scattering. Moreover the questionnaire can be used to ask the past behavior or trend of future behavior. Another advantage is the studied person can give his behavior data or other behavior that he does not want to show to other people with other methods of the study. The studied people are sure that the study would be confidential and questionnaire can be used any times.

2.3 Experiment - the studied people will be controlled under the conditions the researcher needs. Control can actually be used only in laboratory, but in community the study has to control any other variables which are very difficult. Laboratory experiment can access limited data. Sometimes the researcher may a little bit use of them and sometimes cannot be used in the actual situation. But the experiment is very useful in studying human behavior in the field of medicine.

2.4 Record - this method the researcher can access personal behavior data by self-recorded behavior that may be daily record or some types of behavior such as: eating, working, health, environment behavior, etc.

2.2 Concepts of hazardous waste

2.2.1 The definition of household hazardous waste

"Hazardous waste management handbook" of The Technical and Project Division, Department of Public Cleansing (B.E.2544: 2) defined that "household hazardous waste" refer to "waste which is composed or contaminated hazardous substance such as ignitability, reactivity, toxicity, corrosives or any hazardous substances that causes the problem to health and environment."

Household hazardous waste (Thippawan Paewsakul, B.E.2541:4) refers to the waste from industrial products that people use daily. When these products are expired or no longer in use, the leftover products or the used containers become household hazardous waste.

Thai Institute of Public Health Research (Thippawan Paewsakul, B.E.2541:4) has gathered some information on household hazardous waste and found that there are at least 15 kinds of household hazardous waste as follows: light bulbs, fluorescent lights, dry cell, aerosols, paint sprays, expired cosmetic, toilet bowl cleaners, batteries, engine oil, break fuel, wood varnish, leather polish, metal polish, paints, thinner, lacquer, adhesive, insecticide or pesticide, chemical fertilizer containers, expired medicines

From the definitions mentioned above, the researcher has concluded that household hazardous waste refers to waste composed or contaminated any hazardous chemicals which are harmful to public health and the environment and generated from household.

2.2.2 Hazardous waste categories

Garbage problem was the major problem of the large capital particularly Bangkok that produced 9,000 tons daily. Household hazardous waste is generated from utilization and consumption consisting of chemicals and metal that tends to be high. (Department of Public Cleansing, B.E.2544: 1)

When disposal is proceeded improperly, hazardous waste pose a threat to people and can cause severe burns, illness, blindness or even death. Impacts on

economic and society, the injury were disabled and unemployed. The government needs to support them; otherwise, it will become the national problem. According to The Hazardous Substances Act 1992 section 4 determined the definition of “hazardous waste” refers to the material as follows: (Department of Public Cleansing, B.E.2544:2)

1. Explosive
2. Ignitability
3. Oxidizing agent and peroxide
4. Toxicity
5. Infectivity
6. Radioactivity
7. Genetic reactivity
8. Corrosives
9. Irritability
10. Other materials like chemicals and everything can be harm to human, animals, plants and environment.

2.2.3 The sources of hazardous waste

The major sources of hazardous waste that have impact on human health and environment (Suthila Tunlayasatian, Kosol Wongsawan and Sathit Wongsawan, B.E.2544:184-185) as follows:

1. Industrial factory Industrial factory is the major hazardous waste sources of this country. In all production process can cause the waste, since the material providing step, production step and after using the industrial product and provided that in the production process using chemicals, metals, oil and synthetic substances. The opportunity of throwing away the hazardous waste from production process to environment is increase.

Industrial waste was the hazardous waste source that generated 73% of nationwide hazardous waste. Most still were stored in many places and sometimes there are throw it away in a public place because the treatment facilities are inadequate for all hazardous waste.

2. Household Now the population growth and the new technology in life cause many kind of hazardous waste increasing. For instant, fluorescent light, battery,

dry cell, herbicide container, and motor waste oil. These wastes are frequently leaved with the community wastes. It is difficult in separation and disposal. Hazardous waste from household is comprised of the hazardous material when it was useless.

3. Hazardous waste from agriculture for example, chemicals container, herbicide container and insecticide. They were leaved to environment with improper disposal.

4. Hazardous waste from hospital for instant, infectious waste, tissues, organ from patient and medical treatment including the radioactive waste, body fluids and contaminated waste from patient such as roll gauze, bandage, cotton balls. These wastes were leaved to environment to mix up with the community waste by improper disposal. Since the most hospitals still do not have the incinerator for infectious waste. In Bangkok and vicinity since 1992, there have been the infectious waste separation in hospital and incinerated at the wastes disposal facilities; otherwise, it could cause hepatitis and typhoid fever.

Table 2.1 Source and samples of hazardous wastes

Source of hazardous waste	Hazardous waste samples
1. Household	Dry cell, fluorescent light bulb, battery, toilet bowl cleaner, medicine, expired cosmetic, paint, insecticide
2. Commercial and service - Photo lab - Laundry - Printing house	Battery, fluorescent light bulb, ink cartridge and solvents, silver contaminated sludge ink, photographic processing chemicals
3. Transportation activities - Gas station - Garage	Battery, motor oil, auto lubricant waste, hydraulic oil, oil filter, paint, paint stains, solvent, thinner, cleaner
4. Agriculture	Pesticide (herbicide, insecticide, fungicide), pesticide contaminated container, battery, dry cell, fluorescent light bulb
5. Hospital, Clinic and laboratory /observe room	Infectious wastes, chemicals from chemical treatment process, infectious wastes residue from incinerator, analytical chemicals, chemical contaminated specimen

Source: Department of Public Cleansing, Bangkok Metropolitan Administration, B.E.2544

2.2.4 The effect on health and environment

At the present, human health is being jeopardized by toxic substances from the environment due to the accumulation of non-dissolvable toxic substances or substances with natural long-life spans. These substances or substances with natural long-life spans, these substances can cause contamination in food and water. Other substances that contaminate the environment include heavy metal toxic, chemical used in insecticide, radioactive and various microorganism or microbes.

Heavy metal substances widely used in industrial productions which are harmful to our heath and causing a lot of problems these days are mercury, lead, DDT, manganese, cadmium, chromium and radioactive. (Department of Public Cleansing, B.E.2544:21)

Mercury is a heavy metal used in industrial factories that produce vinyl chloride for CVP plastic, sodium hydroxide, paints or fungicide and insecticide manufacturers. Some of these factories do not have effective heavy sludge or waste water expulsion systems or they do but do not use them due to high cost. So they dispose these toxic wastes into the rivers, canals or public places illegally. If disposed in water, mercury mixed with solid waste or waste water will be transformed to methyl mercury by a kind of microbes in the water. Methyl mercury is highly toxicant and harmful to fish and other water inhabitants. Fish, for example, can accumulate very large amount of methyl mercury. When we eat fish we absorb methyl mercury. So, when we eat fish we absorb methyl mercury through our digestive system and it will be accumulated in our red corpuscle, brain and kidney after that the methyl mercury will combine with sulfur which can be found in many types of enzyme. This reaction can reduce enzyme’s efficiency according to the amount of mercury our body received. Accumulation of methyl mercury can cause several symptoms such as tightness in the digestive system and intestines that can cause stomachache, vomiting muscle ache or neuron system and it can be fatal. One example is many fishermen in a village at the Gulf of Mina Mata in Japan died after eating fish and shell fish with high level of methyl mercury. In 1950, the World Health Organization limited the amount of mercury in canned fish and other seafood ate not exceeding 0.5 milligrams per kilogram and other kinds of food not exceeding 0.05 milligrams per kilogram. Mercury is a natural substance and can not be eradicated. From the seafood checking

in Thailand many years ago, they were mercury levels of 0.004-0.237 milligrams per kilogram which was considered harmless. But it is likely that mercury level will get higher because of more waste released from industrial factories or communities to rivers and canals these days. If we do not look into this problem seriously, our health can be jeopardized by this substance.

Lead is another heavy metal that can contaminate food and water that we consume on the air that we breathe in through dust. Battery factories, foundries or paints and pesticide factories also are the causes of lead pollution. Lead poisoning usually occurs after this substance has accumulated in the body. It decreases the amount of red corpuscle which is the cause of anemia even though the body consumes sufficient amount of iron. Lead terminates the enzyme working system that is related to red corpuscle building. Chronicle lead poisoning symptoms include pale skin, weight lost, abnormality in respiratory system and kidney excretory system. Generally, there is less than 1 milligram per kilogram of lead in food. Seafood usually contains higher lead than other kinds of food. We normally consume an average of 0.2-0.4 milligrams of lead a day. But those who live in the highly polluted areas or consume excessive amount of food with lead are likely to receive more lead and it can be accumulated and toxicant.

DDT or chlorinated hydrocarbon insecticide is the substance used to kill carrier insects such as mosquitoes and cockroaches. But some manufacturers use it for agricultural purposes to kill insects in weeds, vegetables, fruits and other foods. For whatever reason it is, whether it’s from the unawareness or selfishness, DDT can toxicant consumers and others severely. DDT is hard to dissolve, unfortunately the toxic left over remain in vegetables, fruits and food. DDT can be mobilized from fat deposits, when we consume this toxic substance, it will be accumulated in fat and liver and can cause chronicle neuron problems and fatigue.

Radioactivity Radioactive fallout is another health hazardous substance which is spreading widely these days. Radioactive fallout contaminated in food, water and the air we breathe in come from various causes. For examples, radioactivity leak from the fallout’s left in water sources or buried in the ground, nuclear plants explosion and the using of gamma rays to kill microbe for reducing decomposition and pro1onging food preservation are the causes of radioactivity contamination. Radioactivity can cause cancer and genetic effect.

2.2.5 Related laws

There are 3 laws abiding hazardous waste management which are the Factory Acts 1992, the Hazardous Substance Act 1992 and the Enhancement and Conservation of National Environmental Quality Act 1992. (Department of Public Cleansing, B.E.2544:20)

1. The Factory Acts 1992 and the Notification of Ministry of Industry: Ref (2/2512) is to separate the toxic or ignitable materials from wastes and store in proper and tightly sealed containers there also must be a specific method of disposing of the waste safely and does not cause any annoyance.

2. The Hazardous Substances Act 1992 In the Hazardous Substances Act of Legislation, Section 4, defines Hazardous Material as explosive, ignitability oxidize, peroxide, toxicity, pathogenicity, radioactivity, corrosive, any materials that cause genetic changes or irritable and other materials or chemical products that may be harmful to any individual, animal, plants, properties or the environment.

The disposal of hazardous waste, according to the Hazardous Substances Act 1992 of Legislation, must comply with the Ministry of Industry's notification, section 20. There is no new notification, therefore it is abided to the old or previous ones that is the notification of the Ministry of Agriculture and Cooperatives, the Ministry of Public Health and the Ministry of Industry concerning transportation, storage, toxic materials demolishing or handling of toxic materials containers (the 1st issue), 1982 dated July 21,1982. The disposal methods are as follows:

2.1 Do not dispose any toxic materials around the areas where here are animal farms, communities, public water sources or the areas nearby the above mentioned places which may be harmful to any individual animals, plants or other properties or the public's health.

2.2 Disposal of toxic materials must comply with rules and regulations, procedures or conditions academically set.

2.3 It is prohibited to reuse toxic materials containers for any other purposes.

2.4 Any used to materials containers must be disposed of properly.

2.5 Any contaminated waste or leftover materials must be separated in specified containers.

2.6 Do not dispose toxic waste with other community wastes. There must be a specific method of disposing toxic waste for the safety of the public.

2.7 There must be a disposal system for toxic material in waste water at the production sites to prevent any danger or annoyance to the individuals, animals, plants or properties nearby.

3. The Enhancement and Conservation of National Environmental Quality Act 1992 is for control of hazardous waste. This Act authorizes the Minister of Science, Technology and Environment, under the suggestion of Pollution Control Committee, in issuing the Ministry's rules set for types and categories of hazardous waste. The wastes from production processes, use of any chemical substances or hazardous materials in industrial agricultural production processes as well as any matters concerning the public health or in other businesses to be under controlled by determining criteria, rules and regulation and methods to control the collection processes, transportation, importing or exporting, security, treatment and disposing processes. It also states that usage or disposal of any hazardous substances to the environment must not exceed the environmental standard. Other than that large industrial business causing pollution from the use of chemical substances or hazardous materials in the production processes must submit reports on the environmental effect analysis and proposals on protection and modification of the problem.

2.3 Household hazardous waste management

Hazardous waste management refers to any activity concerned with the hazardous waste management consisting of the waste minimization, separation, storage, collection, putting the waste in appropriate container for transportation including treatment and disposal. There are various methods of hazardous waste management according to each type of the waste. (Department of Public Cleansing, B.E.2544:9)

1. Minimization

The proper management is the least waste generation which it is better than disposal. (Wittaya Yusook, B.E.2545:253) The important principle in minimizing the amount of hazardous waste is to dispose the least amount of hazardous waste to the

environment and to be worthwhile using the hazardous product as possible. (Suree Boonyanupong, B.E.2542:25) The reduction of excessive consuming or unnecessary packaging is the extreme waste minimization. (Somnuk Chatchawal B.E.2543: 23) by

- Look for safer alternatives to hazardous products.
- Try to purchase the environmentally friendly products.
- Buy only as much of a hazardous product as you need to do the job at hand.
- Buy the least hazardous product. Let the signal words serve as a guide.
- Buy and use the product made with more natural or herbal ingredients, decomposable material instance of synthesize material such as lemongrass mosquito repellent, micro-bacteria cleaner.
- Buy a reusable or refillable product such as a rechargeable battery, refilled cleaner.
- Read labels carefully before buying the product. Avoid buying the products with labels containing the words: caustic, corrosive, danger, explosive, flammable, poison, toxic, volatile or warning.
- Follow label directions on how to use a product, and use the recommended amounts. More is not necessarily better, and may be hazardous to your health.

The most important aspect of household hazardous waste management is source control. The objectives of source control are to reduce the amount of household hazardous waste generated and to prevent improper disposal of those wastes that are generated. Source control is thus aimed at preventing problems before they happen. Two key elements of source control are public education and prohibited waste control programs at waste management facilities. (John C.Glaud, 1993:21-8)

2. Separation

Hazardous waste separation can be done at the origin of the waste or at the transfer station, recycle plant or disposal site. Sorting out at the origin must be done by the residents or the people who work at each business area. This can be done by separating hazardous waste from community solid waste. Hazardous waste can be categorized into:

1) Recycled hazardous waste
2) Non-recycled hazardous waste
    - To be treated / primary treatment

- To be burnt in
- To be buried in secured landfill

3. Storage

Hazardous waste storage has many methods depend on sources of hazardous waste as follows:

3.1 Household – separate hazardous waste from original household garbage by placing hazardous waste in front of house in order to wait for collection to dispose according to the appointed time or bring hazardous waste to Drop-off Station that set up by the district office.

3.2 Commerce/service such as gas station, automobile repair shop had better place hazardous waste container in their working area for temporary storage and wait for the worker to collecting.

3.3 Hospital, clinic and laboratory room that are the sources of infectious waste, poisonous chemicals and radioactive waste must have container and specific storage room waiting for special collection. They have consider is container or storage container must have size and pattern fixed to characteristic of waste and have amount of container sufficient to waste quantities generated for protecting the contamination to environment while wait for collecting.

Hazardous waste storage principle (Pollution Control Department, B.E.2541 :10-58) was determined for convenient collecting operation and protection the occurring danger to human health and environment. A small amount of liquid hazardous waste should be kept in original containers when possible or equivalent container should be punctured to prevent leak. Then place the entire container in a plastic bucket or preventing leak tray. Large amount of waste should be kept in a bucket or tank (depend on quantity and sources). For solid waste will store in rigid, puncture-resistant leak-proof container like ink cartridge be still kept in the original package until return it to the manufacturer.

4. Discarding

According to the policy of the governor of The Bangkok Metropolitan Administration (BMA) in the part involved to waste collecting of BMA, there is a policy to determine the waste discarding method of people or “waste discarding

revolution" for people properly discards waste (separated waste into bag and tightly fasten it), discard in appointed time and discard in the BMA designated area. For development of efficient waste collection of BMA, public participation and sense of responsibility should be fostered. (Public Cleansing Department, BMA, B.E.2544)

In accordance with the regulation of BMA in concerning principle of waste and nightsoil management in building, place and health care service 2002 (BMA, 2003) that determined to hazardous waste management according to principle and method, the same as the original waste. Therefore the hazardous waste discarding, people have to put hazardous waste into sealed container or separated by categories container in order to wait for collection.

5. Collection has many methods as follows:

5.1 On-side Pick-up - There is 2 methods as follows:

- Curbside Collection is hazardous waste collection from the container that placed in front of house or business area. Collecting worker will pour the waste from that container into collecting truck.

- Special Collection is collection of poisonous hazardous waste. Expert collecting workers with skillful and special training are needed for infectious waste and radioactivity collection. In business area, collecting worker will enter to separate and tightly contain waste and then bring that container to collecting truck.

5.2 Collect at designated Drop-off Station have many methods as follows:

- Permanent Hazardous Waste Facilities - It might have a single facility or more serving the community.

- Portable Hazardous Waste Storage Facilities such as Mobile Collection Facilities.

- One-Day Collection Program – might held in shopping mall, government office building in special occasion or special day. Hazardous waste is brought to a specified site or a specified day. The wastes are then taken from the public. In the same community, one-day collection programs have evolved into periodic collection programs, in which the producers described above are repeated on a regular basis one or more times per year such as 2 or 3 times a year. Public relation would be available to the public for preparing the hazardous waste to discard. For these collection days be successful, adequate promotion and educated are critical.

Transfer Station for Hazardous waste is temporary station for sorting out the hazardous waste. Certain types of waste are collected and packaged into sealed containers for safety while transporting to the deposing site. Some types of waste such as infectious waste or radioactive waste will be transferred directly from the place of the origins to the disposing center without passing through the transfer stations.

Now Bangkok Metropolitan Administration services collection for sending waste to General Environment Conservation Public Company Limited or GENCO to properly dispose of waste. (Department of Public Cleansing, B.E.2544:18)

6. Packaging

Certain types of waste must be seal packed before transferring to disposing center. Regulations for the packaging depend on the qualities and condition of the waste. There are strict rules for infectious waste and radioactive waste to prevent it which can spreading to the environment and have a direct effect on people. Other waste such as sludge must be packed in a tightly covered container at the place of the origin or at the Transfer Station before transporting to the disposing site.

7. Hazardous Waste Transportation

Hazardous waste from Transfer Station will be transported to the disposing center. This will be done in vehicles with labels showing what kind of waste they are transporting so that things can be dealt with rapidly and correctly in case of an accident.

8. Treatment and Disposal There are 4 methods as follows:

8.1 Chemical/Physical

8.2 Thermal Destruction

8.3 Secure Landfill

8.4 Biological Treatment

From the concept above, researcher studied on the household hazardous waste management of people specifically in as following parts:

Hazardous waste minimization refers to the decrease of hazardous waste by reducing hazardous substance consumption and the least purchase of the hazardous products.

Hazardous waste separation refers to the hazardous waste segregation from community solid waste and separate by categories for safe and convenience in storage and collection.

Hazardous waste storage refers to the hazardous waste storage in suitable container and placing hazardous waste in front of house or at collecting point.

Hazardous waste discarding refers to bringing hazardous waste into the sealed container or separated container in order to wait for collecting to disposal.

2.3.1 The action plan for hazardous waste management

For the action plan for hazardous waste management should be procedure as follows: (Department of Public Cleansing, B.E.2544:14)

1. Define the relevant person or agency for taking responsible for hazardous waste management obviously and conveniently for that organization. For example in national level: Ministry of Industry, in local level is duty of Bangkok Metropolitan Administration, The province industrial office, in entrepreneur unit is duty of the place and maintenance division.

2. Study on environmental law and relevant for using as a framework of hazardous waste management in the part of responsibility consisting of regulations, standard and state notification that enforced to factory and community such as The Enhancement and Conservation of National Environmental Quality Act 1992, The Hazardous Substances Act 1992, The Public Health Act 1992 and all pollution standards.

3. Determine procedures related to the law and regulation. These are duty of national and local authorities that announce to people constantly and use enforcement measure and legal punishment.

4. Survey the information about hazardous waste in organizations such as database comprising of hazardous waste location, hazardous waste types, hazardous waste quantities estimation, danger from hazardous waste and local service for hazardous waste management.

5. Monitoring and control for preventing for danger level of hazardous waste generation. Local must monitor and control such as controlling the improper disposal of hazardous waste into the community waste, enforce hospital to set up the standard infectious waste incinerator by forming the investigation committee.

6. Prepare the efficient hazardous waste management system. This is the local duty to build up understanding of people and public corporation in regulation and agreement for comfortable and safety.

7. Public relation for encouraging public participation for people and hazardous waste producer. Public relation is a strategy to raise consciousness and awareness of people in danger from hazardous waste and hazardous waste management. In addition, public relation is a channel to let the people know how the local authorities handle with hazardous waste.

2.3.2 Participation in solving hazardous waste problems

(Thailand Environmental Law Foundation, B.E.2542:32)

1. We must help to build up understanding and provide knowledge to the public about what hazardous waste is. For examples, what can be categorized as hazardous waste, how we should handle it initially, how to store it safely and how we can manage people to sort out hazardous waste from ordinary waste. In addition, any communication or media used concerning hazardous waste should be done in the same manners, for instant using the same signs or symbols that everyone can understand.

2. Provide appropriate and adequate control system and hazardous waste management system and separate them from community solid waste management system.

3. Systematically collect hazardous waste data for examples what is the amount of the wastes, where do they come from, where are they stored, how do we manage these wastes initially. So we can see to the condition of the problems and able to control, follow up and investigate more correctly and methodically.

4. Launch a campaign for everyone to reduce using products that cause hazardous waste which will reduce the production of those products, encourage everyone to choose the environmentally friendly products such as dissolvable plastic

bags, rechargeable batteries, insecticide made from plants or herbs and recycled materials.

5. Establish an emergency center to give out knowledge in case of any emergency or answer any questions about hazardous waste at all time or in the case of any illegal incident that needs immediate attention

6. Contact state agency or private sector that operates in hazardous waste management that they could properly dispose of hazardous waste and give you advice in household hazardous waste management as follows:

1) Office of Environmental Technology, Department of Industrial Works, Ministry of Industry

2) Maptaput Industrial Waste Disposing Center, The Industrial Estate Authority in Maptaput

3) Samae Dam Industrial Waste Disposing Center

4) Division of hazardous Substances, Pollution Control Department, Ministry of Natural Resources and Environment

7. Provide public relation to raise consciousness and awareness of people therefore, both state agencies and private sectors can help to control and manage hazardous waste properly and disseminate information widely.

2.4 Concepts of the knowledge

2.4.1 Definitions of the knowledge

Benjamin S. Bloom, et al. (1971:271) stated that knowledge is associated with the remembering of some specific or general things. It also includes the way in which certain processes, methods or solutions can be recalled by using the memory.

Carter V. Good (1973:325) mentioned that knowledge refers to the way in which an individual can analyze certain experiences that has been obtained based on the truth or facts as the actual details of the situation. The analyzed information is then stored and collected to be used for other useful purposes in the future.

Prapapen Suwan (B.E.2520:16) defined that knowledge is an initial behavior that learner memorizes, either through practicing, seeing, hearing, or memorizing.

Knowledge in this respect covers knowledge on definitions, meanings, facts, theories, rules, structures, and solutions to problem, for example.

Jittra Vasuvanich (B.E.2528:6) was defined knowledge as memory, remembering the truth, story, detail in textbook or thing that was told.

The Lexicon Webster Dictionary Encyclopedia Edition by Smith (1997:531), definition of knowledge can be summarized as things related with facts, truth, rules and structure, resulted from study or research. Knowledge of places, things or person can be attributable to observations, experiences, reports, or other information that human acquires or compiles from experiences.

Benjamin S. Bloom,et al. (1971:271-273) sort out the behavior in knowledge or cognitive domain to 6 level as follow;

1. Knowledge is learning that specifies to memory and reminded to thinking, maternal and phenomenon. It begins from basic and individual through complication and relation

2. Comprehension is the efficiency of intellect about communication by interpretation, translation and summary for prediction

3. Application is the efficiency of using by apply the contents for new or real situation

4. Analysis is the efficiency of considering and spreading maternal or content to detail part but have related to each other and finding the relation of every parts that how can component

5. Synthesis is the efficiency of combining detail part into the whole for finding the solution of problem.

6. Evaluation is the efficiency of decision about thinking, result, answering and content for some objectives by criterion for step assessment, development. It is the efficiency that uses knowledge, understanding, employment, analysis and synthesis for considering, may concern with emotion and vision.

From those meanings, knowledge is defined as the data or facts that could remember remind understand and collected from direct and indirect studying.

2.4.2 Knowledge measuring tools

Measurement of knowledge (Paisarn Hwangpanich,B.E.2526:35-36) is made by test or examination because they motivate the person who is tested or examined to response with some behavior such as speaking, writing, looking, etc. and could be seen or counted, sorted out the level or quality of that person. There are 3 kinds of measurement as follows;

1. Oral test is testing by straight dialogue to tester, sometimes it is called interview.

2. Written test is testing by writing. There are 2 kinds of this, as follows;

2.1 Composition is a kind of test which needs an answerer to explain, describe or comment about that subject.

2.2 Limited answer is a kind of test which needs an answerer to consider, compare or decide. There are 4 types such as true or false, fill in the blank, pair off and choose the correct answer.

3. Practice testing is a kind of testing which need the tester to show their behavior by doing.

The kind of written test, limited answer by choosing the true or false answer was performed to collect data in this research from questionnaires.

2.5 Concepts of the health value

Value has the importance to human behavior. There is determination to the significance of value as follows: (The National Culture Commission B.E.2525:35-36)

1. Value acts as a rule or a standard of all human behavior. Value is a determinant of behavior that whether should we do, what should we do, what will be more appropriate than.

2. Value is a tradition for decision and solution the problem in case of the person facing the conflict such as to obey the order, select own freedom or helps the legislator.

3. Value is a motivation or pressure of person such as the high materialistic value causes the perseverance and persistence for the pursuit of the defined objectives.

Dewey explained the importance of value that it involves the human activities in all pattern. Concept of Dewey theory (Dewey, 1909 cited by Werkmeister, W.H. 1970-1973:40-61) may conclude as main point as follows:

1. Value arises from the desire of person to adjust him for the necessaries and needs in life. When the person face the obstacles such as lack or conflict between him and environment. The value can response needs with beneficial for his status.

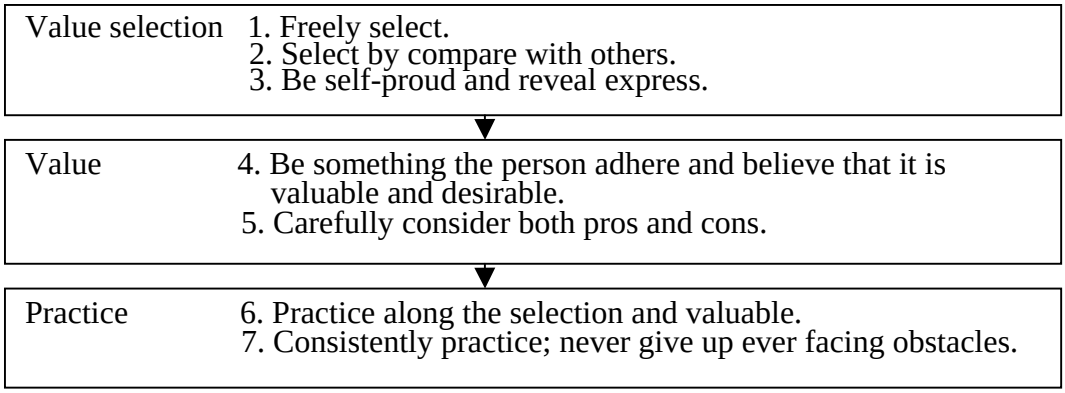
2. Value can cause vital impulse and set up the willing goal to ends-in view. Person have requirement and interested in finding the approach to reach a valuable.

3. Value is the behavior that can study by the scientific study in observation, analysis, examination and verification.

4. Actually comprehend in value depends on analytic capacity in currently needs of person and predication that what situation person were satisfied and with what process. There are also analysis and reappraisal.

Health value is the key factor in healthy behavior of human and is acknowledgement in behavioral science and nursing science scholar that value is judgment, determinant, leader or pressure on behavior to have inclination. Value is the hidden power within most behavior of human. Influence of value has accept in principle and was cited by the field of social sciences and behavioral science. (Maslow 1959, McClelland 1958 and Rokeach 1973 quoted in Somjit Supannathat, B.E.2529:2) Healthy behavior, likewise other behavior, has the result from person placing value to "health". If person place a high value to "health", it will be directive of person having the correct healthy behavior. Raths, Harmin and Simon concluded the step of health value in Figure 2.1. Health value is the factor that affected to household hazardous waste management behavior of people.

Figure 2.1 Steps of health value



Source: Raths, Harmin and Simon, 1966.

The crucial role of health value having two respects is to be the standard of person to practice and stimulate public to practice in health promotion, then change to rather permanent healthy behavior. This can lead public to have healthiness. (Somjit Supannathat B.E.2529:4)

Manoon Wongnaree (B.E.2539:44) said that “Five Good” would make you healthy and long lived as follows:

1. Good mind - Mind is the main subject, do not forget “mind is master, body is slave”. Mind should be developed before body.

1.1 Positive thinking and always humor.

1.2 When you face obstacles and sufferings, you should accept it and seek for the solutions with conscience and peacefully.

1.3 When you are happy, living with being conscious and without fed, prudent in happiness and satisfaction.

2. Good exercise

2.1 Keep exercise everyday.

2.2 Continually exercise at least each an hour.

2.3 Exercise with the appropriate style.

3. Good eating

3.1 Eat the nutrient food in each meal.

3.2 In daily meal, eat a wet dish and a dry dish. It is sufficient.

3.3 Eat 3 meals a day, in dinner should eat more vegetables and fruits.

4. Good working

4.1 Do honest and moralistic work.

4.2 Work perseveringly, creatively and devote yourself to organization.

4.3 Believe in endurance, tolerance and adhere to the principles of virtue.

5. Good rest

5.1 Manage your daily time by divided time into 8+8+8 hours.

5.2 Arrange time for yourself, for family, for office and for social and the nation.

5.3 Sleep at least 6 hours a day.

Kasam Tantipharachiwa and Kulya Tantipharachiwa (B.E.2528:22-23) said the four main principles for health promotion of all people as follows:

1. Suitable eating refers to eating meet the heightened nutritional needs of body. Do not eat more or less than needs. Avoid eating fat and oil. Give up drinking tea, coffee and liquor. Eating status evaluation is the evaluation of eating equilibrium and standard weight according to age and height.

2. Suitable sleeping refer to an adequate sleeping by the hour of sleeping depend on the sufficient of each body. There are not defined standard.

3. Suitable living refers to maintaining the good hygiene. Keep exercise and being a good shape. Avoid having the disease. Release mental stresses. Be a good temper and have relaxation.

4. Suitable society refers to self-adjustment with the society. The first time of adjustment may be on a sufferance, but reasonability, understanding and acceptance make better adjustment than and live in the society with happiness.

From the mentioned above, health value refers to the practices of people in health promotion by having a good mind, good exercises, good eating, good workings and good rests.

2.6 Relevant researches

2.6.1 Hazardous waste relevant researches

Pramuan Poonsang (B.E.2536: 98) studied Knowledge attitude and practice on household hazardous waste management in urban and rural areas: Sukhothai province. It found that the practice of people on household hazardous waste management was significant differences between urban and rural area because custom, lifestyle and any environment of two areas had differences. The practice on household hazardous waste management that is an activity in daily life also was difference.

Duangkamol Talayasut (B.E.2540: Abstract) studied the alternative form of organization for the management of community hazardous wastes in Bangkok Metropolitan Administration. It was found that there was not yet an appropriate scientific method for hazardous waste disposal, since there was no separation of

hazardous waste form general garbage hazardous. The method of general garbage disposal was still applied to hazardous health. The amount of hazardous waste was increasing every day. The first appropriate and possible organizational structure was to assign Bangkok Metropolitan Administration, especially the cleansing unit, which oversaw the garbage disposal at present, to be responsible for the disposal of hazardous waste in Bangkok. The second alternative was to set up a sub-committee as a coordinator for hazardous waste disposal, while the implementation unit should be under the line organization in various ministries. Also, the third alternative was to set up a new organization in the form of state enterprise to solve the hazardous wastes problems separately.

Tippawan Paewsakul(B.E.2541: 70) studied community household hazardous waste management in Bangkok. Bangkok Metropolitan Administration realize harm of hazardous waste contamination that effects to public health and environment and determined community household hazardous waste management in Bangkok as follows:

1. To launch the campaign to persuade the residents participation in disposal hazardous waste from household by publicize in all media such as brochures, posters, television spots, radio spots, exhibitions and handbooks to enhance environmental knowledge.

2. Hazardous waste separation from community system

2.1 Target group – the hazardous waste separation from community system divided the target group into 2 groups as follows:

1) First group – the residents in special zone target area of 9 demonstrated districts, namely; Khlong Toei, Suan Luang, Bang Kapi, Lat Phrao, Bueng Kum, Huai Khwang, Ratchathewi, Sathon and Thonburi to separate hazardous waste and put it into plastic bags of Bangkok Metropolitan Administration by specific hazardous waste types beside the bags for people to separate properly.

2) Second group – the residents throughout Bangkok bring hazardous waste from household to throw away in the hazardous waste bin at gas station, department store and official place.

2.2 Provide hazardous waste bags for the residents in special zone target area of 9 demonstrated districts and large hazardous waste bags for hazardous

waste receiving in hazardous waste bins in the unit of capacity equivalent to 240 liters and use the collecting truck in twice times a week.

2.3 Provide hazardous waste containers is the waste bins in the unit of capacity equivalent to 240 liters for receiving hazardous waste from household in type of dry cell, battery, spray can, outdated medicine, fluorescent light bulb and all light bulb.

2.4 Fix the standing point of hazardous waste bins at gas station, official place, department store and district office throughout Bangkok by using the collecting truck at a time a week.

3. Hazardous waste collection – hazardous waste collection use hazardous waste collecting truck. In preliminary, there are use the recycle truck to collect the hazardous waste from the hazardous waste bins at gas station, department store and district office throughout Bangkok and service for residents in special zone target area.

4. Hazardous waste storage – before hazardous waste were collected and disposed at the disposal center of Ministry of Industry, they were stored at storage station in the area of the garbage disposal facilities of Bangkok Metropolitan Administration and coordinate with Department of Industrial Works to assign the specialist of GENCO for suggestion in area preparation and storage system before transferring the waste to the disposal center. Moreover, Bangkok Metropolitan Administration arranges the project of storage preparation and disposal system of hazardous waste from community in Bangkok for the obvious hazardous waste management plan and prevents the adverse impact on environment.

5. Hazardous waste disposal – Bangkok Metropolitan Administration made the memorandum with Ministry of Industry in January 22, 1997. In the part of hazardous waste from community in Bangkok, Bangkok Metropolitan Administration would take responsible for collecting the hazardous waste from community and General Environment Conservation Public Company Limited or GENCO would bring hazardous waste to treat and dispose of it.

Pollution Control Department employed the GAI Consultants Incorporate Group (GAI), Team Consulting Engineer Co., Ltd. (TEAM) and TIS Consultants Co., Ltd. (TIS) to study “The project of study, survey, analyze and settle the administrative model and disposal management for hazardous waste from community”. (Pollution

Control Department, B.E.2541: 4-29) Thanks to pollution problem of hazardous waste from community had become to critical problem of Thailand, this problem need to be manage and control properly before becoming the intense problem beyond cure. From the study result, the estimates of community hazardous waste quantities in 1996, Thailand had hazardous waste from community more than 280 million kilograms. In this amount found that almost 50% were directly disposed into environment by open dumping or disposed without control, burning, disposed into surface water, disposed down the drain and disposed with community solid waste in waste disposal facilities undesignated for hazardous waste. In the next 20 years, hazardous waste would increase from the current level of 60%. There is a tendency to be harm to human and environment. For example, surface water was contaminated motor waste oil from improper disposal. This can solve by reduction or elimination of hazardous waste by proper management. Hazardous waste from community is become to the major problem to environment and public health because there have been lack of proper management measure and hazardous waste growth. Therefore, there must determine the protection and solution of this problem.

Suree Boonyanupong (B.E.2542: 5-1 to 5-2) studied the household waste management in Chiang Mai by survey the hazardous waste management of population group in community and hazardous waste management attitude of population group for finding the appropriate model of hazardous waste management. It found that only 28% of population samples correctly understood about hazardous waste, but most of the population pleased to participate in hazardous waste separation. Due to activities generated a large amount of hazardous waste, this waste was generated from household besides industrial factory. Hazardous waste disposal of most samples using municipal service were throwing away in the bin especially, solid hazardous waste. Hazardous waste management attitude, population sample thought that the safe method to protecting public health and environment from hazardous waste was hazardous waste separation by provided specified area for disposal. Thus, people must have participation in hazardous waste separation and reduction of hazardous product consumption. If there is launching of the campaign in hazardous waste management, samples thought that the first target group being educated the correct knowledge were public and students.

Suwimon Thongpradit (B.E.2542: 81) studied Knowledge and attitude of Mathayomsuksa 3 students in Ratchaburi province toward pollution of solid waste and hazardous waste. Analysis of data showed that the students had a moderate level of knowledge toward pollution of solid waste and hazardous waste and a positive attitude toward pollution of solid waste and hazardous waste. The knowledge was unsatisfied, so students should be educated about the correct knowledge toward pollution of solid waste and hazardous waste.

Chutpon Potisuwan (B.E.2543: Abstract) studied Influential factors affecting the management behaviors on hazardous waste from households: a case study in tambon Suthep, amphoe Muang, changwat Chiang Mai. The results of the research were as follows: 1) Most of the samples had good experiences and knowledge hazardous waste management. Their behaviors on managing the household hazardous waste were found at a moderate level, as well as the behaviors to separate and discard the household hazardous waste. 2) Personal data consisting of family status, education, economics and social factors were found as affecting the management behaviors of the samples on household hazardous waste, at a statistically significance level of 95% 3) The samples addressed a number of problems and obstacles on how to manage hazardous waste. Those were concerned with the right way to and all agencies to gain knowledge for improving their behaviors on how to separate the waste with more convenience and facilities to keep out the waste form areas with the right containers.

Somnuk Chatchawal(B.E.2543:105,122-125) studied Waste from household: practice and management-solution concept by studying hazardous waste behavioral pattern, attitude and community and household hazardous waste management concept. It found that most household given the similar definition of hazardous waste was chemicals waste or used chemicals containing cans such as spray cans, paint cans, insecticide containers, toilet cleaner including dry cell, dead battery, light bulb, old neon bulb, form and medicine bottle. Some household identified that this means to the accumulated or having fungi waste, the sharpen metal like iron scraps and nails. In the part of hazardous waste disposal behavior, it found that 1) *Car-motorcycle battery* There are the battery bark buying shop, 50.49% of household samples kept it for selling, 25.49% kept it to repair or dispose in the other place further house like around

the market and 15.69% were disposed to the municipal or sanitation district bin. 2) *Dry cell* Due to its small size and unwanted of waste buyer, dry cell was disposed in many pattern. 27.67% were disposed of it with general waste in the municipal or sanitation district bin, 27.67% kept it in the plastic bag and disposed of it in many places like in the bin around the market or working area, 24.11% buried it. 3) *Neon bulb* Most 31.58% threw the useless neon bulb away to the municipal or sanitation district bin, 30.26% buried it. 4) *Insecticide cans* It found that most 37.05% disposed of it with general waste in the municipal or sanitation district bin, 29.86% buried it and disposed of it in many places like in the bin around the market or working area. 5) *Chemicals containers (hair spray, paint spray)* most 37.05% dispose with general waste in the municipal or sanitation district bin, 29.08% buried it and disposed in many places. In addition, disposal of the waste along the house, burning and throw it away in the house area was these hazardous waste disposal.

Yuphin Raphiphan (B.E.2544: 67) studied Knowledge, attitude and management that effect the community committee's participation in classification of garbage used daily before throwing in Panusnikom municipality, Panusnikom district, Chonburi province. From the hazardous waste categories study, researcher studied the four categories of these wastes: neon light bulb, dry cell, battery, insecticide cans. The result found that hazardous waste management method of most population has a tendency to incorrect method. For example, disposal of these wastes in dry garbage container or disposed of it in municipal waste container without warping or separate waste into plastic bag. Also it found that colors of waste container in community were not being the same standard.

Promsiri, S. (2002: Abstract) studied Management on hazardous waste of motorcycle repairing entrepreneurs in Chiang Mai municipality Chiang Mai province. It found that most motorcycle repairing entrepreneurs practiced hazardous wastes management at a medium level. Analysis by correlation found that: level of education, knowledge and awareness of hazardous wastes management were significant at the 0.05, 0.01 and 0.01 level, respectively.

2.7 Variables related to this study

Gender

Pissadarn Saenchat (B.E.2541: 103) studied Factors affecting the environmental sanitation behavior of rural people in Changwat Ubon Ratchathani. It found that gender had relationship with the environmental sanitation behavior of rural people. Female had positive relationship with behavior and had more accurate environmental sanitation behavior than male.

Weerasoonthon, S. (2000: 71) studied Waste reduction behavior of residents in townhouse villages in Chatuchak district, Bangkok Metropolis. It found that female practiced waste reduction more than male did. Based on statistical test, there was a significant difference between genders with waste reduction behavior. (at $p<0.01$)

Therefore, the researcher hypothesizes that the different genders make a difference in the household hazardous waste management behavior of people in Bangkok.

Age

Soontaree Pannoy (B.E. 2543:109) studied the study to knowledge and practices of medical personnel regarding the management of infectious waste: a case study of Somdejrphrapinklao Hospital. Practices in management regarding infectious waste were statistically influenced at the 0.01 level by age.

Kaewsawang, S. (2002: 107) studied An evaluation of knowledge attitude and behavior of household and commercial sectors to solid waste selection in Salaya municipality, Nakhornpathom province. The result obtained reveal the people, which have different age also behave and act differently towards the separation of solid wastes at a statistical significant level of 0.05.

Therefore, the researcher hypothesizes that the different ages make a difference in the household hazardous waste management behavior of people in Bangkok.

Residential area

Ubolrat Roongruangsilp (B.E.2540: 154) studied Health promoting behaviors among vocational college students in Prachuabkhirikhan province. It found that place of living was significant related to health promoting behaviors. The students who live in municipality had health promoting behaviors at a high level (21.2%) and students who live out of municipality had health promoting behaviors at a low level (2.5%).

Suwimon Thongpradit (B.E.2542: 82-84) studied Knowledge and attitude of mathayomsuksa 3 students in Ratchaburi province toward pollution of solid waste and hazardous waste. It found that the students where schools had different location area had significant different knowledge and attitude toward pollution of solid waste and hazardous waste at statistical level of 0.05. The students who studied in school in municipality had higher average scores than students who studied in schools where are out of municipality, it probably due to, in municipality area, they can perceive all information from many media better than the out of municipality area that caused from technology and media provide to perception of all information from many media.

Therefore, the researcher hypothesizes that the different residential areas make a difference in the household hazardous waste management behavior of people in Bangkok.

Educational level

Chutpon Potisuwan (B.E.2543: 63) studied Influential factors affecting the management behaviors on hazardous waste from households: a case study in tambon Suthep, amphoe Muang, changwat Chiang Mai. In analysis of variance of behaviors on hazardous waste scores as classified by education found that there had statistically significant at the level of 0.041, showed that the samples who had different education had statistically significant different behaviors on hazardous waste from households.

Promsiri, S. (2002: 74) studied Management on hazardous waste of motor cycle repairing entrepreneurs in Chiang Mai municipality Chiang Mai province. It found that level of education related to the management of hazardous wastes from motorcycle repairing entrepreneurs and significant at the 0.05 level.

Therefore, the researcher hypothesizes that the different educational levels make a difference in the household hazardous waste management behavior of people in Bangkok.

Occupation

Chutpon Potisuwan (B.E.2543: 68) studied Influential factors affecting the management behaviors on hazardous waste from households: a case study in tambon Suthep, amphoe Muang, changwat Chiang Mai. It found that In analysis of variance of behaviors on hazardous waste scores as classified by occupation found that there had statistically significant at 0.000 level showed that the samples who had different occupation had statistically significant different behaviors on hazardous waste from households. The samples who were employee had behaviors on hazardous waste from households better than another groups.

Weerasoonthon, S. (2000: 71) studied Waste reduction behavior of residents in townhouse villages in Chatuchak district, Bangkok. It found that the residents who were self-employed practiced waste reduction more than students, state/state enterprise officers, employed, housewives and unemployed did respectively. Based on statistical test, occupation made a significant difference to waste reduction behavior. (at $p<0.01$)

Therefore, the researcher hypothesizes that the different occupations make a difference in the household hazardous waste management behavior of people in Bangkok.

Monthly income

Saksri Kaewiam (B.E.2543:87) studied Knowledge and practice of entrepreneurs regarding garbage disposal at Damnoen Saduak floating market, Ratchaburi province. It found that the population who earned 4,000-8,000 baht per month had practice regarding garbage disposal more than the other group: 8,001-12,000 baht and 12,001 baht and higher, respectively. So, the population who had different average income had statistically significant different practice regarding garbage disposal at 0.05 levels.

Weerasoonthon, S. (2000: 72) studied Waste reduction behavior of residents in townhouse villages in Chatuchak district, Bangkok Metropolis. It found that the residents earning 5,000-12,000 Baht practiced waste reduction more than those who earned 19,001-50,000 Baht and 12,001-19,000 Baht did respectively. Based on statistical test, monthly income exerted a significant difference to waste reduction behavior. (at $p<0.01$)

Therefore, the researcher hypothesizes that the different monthly incomes make a difference in the household hazardous waste management behavior of people in Bangkok.

Number of family members

Prawit Choosri (B.E.2542: 76) studied Knowledge and opinions of entrepreneurs regarding garbage disposal along Cha-Am Beach, Phetchaburi province. It found that the studied population who had 2-4 members in firm had opinions regarding garbage disposal more than the others group: 5 members and more and 1 member, respectively. Based on statistical test, it found that the entrepreneurs who had different number of members in business had significant different opinions regarding garbage disposal along Cha-Am Beach at statistical level of 0.001.

Kaewjumnong, C. (2002: 46) studied The behavior of sub-district health officers concerning infectious waste management in the health center Nakhon srithammarat province. It found that the residents with sub-district health officers from 3 persons and less practiced infectious waste management more than those who sub-district health officers from 4 persons and more did respectively. Based on statistical test, number of sub-district health officers made a significant different to infectious waste management behavior. (at $p<0.01$)

Therefore, the researcher hypothesizes that the different numbers of family members make a difference in the household hazardous waste management behavior of people in Bangkok.

Types of household hazardous wastes

Types of household hazardous wastes is the factor probably have an influence in a difference in household hazardous waste management behavior of people due to people in each households have different types of hazardous waste and also have different household hazardous waste management behavior.

Therefore, the researcher hypothesizes that the different types of household hazardous wastes make a difference in the household hazardous waste management behavior of people in Bangkok.

Access to hazardous waste management information

Ampawa, P. (2001: 66) studied Energy saving behavior of bachelor degree students. It was discovered that the acceptance of information on the issue of the sample group was significantly related to their energy saving behavior at the level of 0.01, making their behavior different. The higher degree of energy saving behavior was in line with the amount of information perceived.

Kaewjumnong, C. (2002: 45) studied The behavior of sub-district health officers concerning infectious waste management in the health center Nakhon srithammarat province. It found that the residents with ever practiced infectious waste management more than those who never did respectively. Based on statistical test, acceptance of information on infectious waste management made a significant different to infectious waste management behavior. (at $p<0.01$)

Therefore, the researcher hypothesizes that the different accesses to hazardous waste management information make a difference in the household hazardous waste management behavior of people in Bangkok.

Knowledge about hazardous waste management

Pasrin Phannan (B.E.2543: 96) studied Knowledge, awareness and protecting behavior on hazards caused by performance of waste collecting workers of Bangkok Metropolitan Administration. It found that the level of knowledge statistically significant related to protecting behavior on hazards caused by performance of waste

collecting workers at level of 0.05, in the other hand, waste collecting workers of Bangkok Metropolitan Administration who had different knowledge also had different protecting behavior.

Promsiri, S. (2002: 74) studied Management on hazardous waste of motorcycle repairing entrepreneurs in Chiang Mai municipality Chiang Mai province. It found that the knowledge in air pollution protection of production line worker related to behavior in air pollution protection in positive relation and significant at the 0.05 level.

Therefore, the researcher hypothesizes that the different knowledge about hazardous waste management makes a difference in the household hazardous waste management behavior of people in Bangkok.

Health value

Amornrattana Praditsarn (B.E.2535: 66) studied Health value and self-care practice in school age children. Results of the study indicated that health value was positively significant correlated with self-care practice. Children who have a high level of health value reported higher level of self-care practice than children who have a low level of health value.

Parinda Chirakulpatana (B.E.2536: 66) studied Health value, health locus of control and health risk behavior in adolescence. It found that the sampling group had health value at a high level and had internal self-locus equal to external locus and higher than fortune locus. They had health risk behavior at a low level.

Therefore, the researcher hypothesizes that the different health values make a difference in the household hazardous waste management behavior of people in Bangkok.

CHAPTER 3
MATERIAL AND METHOD

This study was a survey research. The objective was to study on the household hazardous waste management behavior of people in Bangkok. Using the questionnaires was the data collecting instrument and the researcher had determined the research method as follows:

3.1 Target population

The populations of this research were the people in Bangkok who were the parents of Mathayomsuksa 1 students (The 1st year of secondary school) in schools under the jurisdiction of The Secondary Education Division, The Department of General Education, Ministry of Education in the academic year 2003. The total were 42,239 persons from 116 schools (Plan Division, The Department of General Education, 2003) and schools under the jurisdiction of The Office of the Private Education Commission in general education section in the academic year 2002. The totals were 13,418 persons from 136 schools. (The Office of the Private Education Commission, 2003) The total populations of Mathayomsuksa 1 students were 55,657 persons. The students of the two jurisdictions were most Mathayomsuksa 1 students in Bangkok.

3.2 Sample size and sampling method

3.2.1 Sample size

Taro Yamane's formula (Suchart Prasith-rathsint, B.E.2544: 127) was applied to determine a sample size of the population as follows :

$$n = \frac{N}{1+Ne^2}$$

When n = Sample group.
N = Population.
e^2 = The sampling error rate not over 5 percents.

$$n = \frac{55,657}{1+55,657\ (0.05)^2}$$

$$= 399.99\ (400)$$

From the above formula, the result of sampling size is total 400 persons.

3.2.2 Sampling method

In this study, researcher used Multi-Stage Sampling as the following steps:

Step 1 Researcher used a random sampling to the 50 districts of Bangkok from 6 areas of Bangkok districts as follows:

1. **Rattanakosin area** includes 9 districts: Phra Nakorn, Pom Prap SattruPhai, Sampanthawong, Dusit, Bang Rak, Pathumwan, Bang Sue, Ratchathewi and Phaya Thai
2. **Burapa area** includes 9 districts: Don Muang, Bueng Kum, Lat Phrao, Sai Mai, Bang Kapi, Chatuchak, Wang Thonglang, Lak Si and Bang Khen
3. **Srinakarin area** includes 8 districts: Prawet, Suan Luang, Kanna Yao, Nong Chok, Min Buri, Lat Krabung, Khlong SamWa and Saphan Sung
4. **Chao Phraya area** includes 9 districts: Vadtana, Bang Kho Laem, Khlong Toei, Bang Na, Yan Nawa, Sathon, Phra Khanong, Din Daeng and Huai Khwang
5. **North Khung Thon area** includes 7 districts: Bangkok Yai, Bangkok Noi, Bang Phlad, Phasi Charoen, Taling Chan, ThawiWatthana and Nong Khaem
6. **South Khung Thon area** includes 8 districts: Thon Buri, Khlong San, Rat Burana, Thung Khru, Bang Khae, Chom Thong, Bang Khun Thian and Bang Bon

In each area, researcher used simple random sampling to find 2 representative districts and the total representative districts were 12 districts as follows:

Rattanakosin area - Phra Nakorn, Dusit
Burapa area - Bang Kapi, Chatuchak
Srinakarin area - Lat Krabung, Min Buri
Chao Phraya area - Khlong Toei, Sathon

North Khung Thon area - Bangkok Noi, ThawiWatthana
South Khung Thon area - Thon Buri, Bang Khun Thian

Step 2 In this study, researcher collected data via students by sending the questionnaires to students and then they sent it to their parents who were people in Bangkok. For collecting data from any level of population samples in Bangkok, Researcher used purposive sampling to choose schools both under the jurisdiction of The Department of General Education and under the jurisdiction of The Office of the Private Education Commission in Bangkok. In each 12 representative districts, researcher selected 2 schools in a district. The sample schools were total 24 schools. (Table 3.1)

Table 3.1 The sample schools list as classified by area and district

Area	District	School	Jurisdiction*
Rattanakosin	Phra Nakorn	1. Suankularb Wittayalai School	General
		2. Benjamarachalai School	General
	Dusit	3. St. Francis Xavier Convent School	Private
		4. YotinBurana School	General
Burapa	Bang Kapi	5. Tepleela School	General
		6. Bangkapi School	General
	Chatuchak	7. St.John School	Private
		8. Sarawittaya School	General
Srinakarin	Lat Krabung	9. Protprittaya Payat School	General
		10. Saint Mary School	Private
	Min Buri	11. Setthabutbumpen School	General
		12. Meanprasatwittaya School	Private
Chao Phraya	Khlong Toei	13. Sacred Heart Convent School	Private
		14. Mattayom Watthatthong School	General
	Sathon	15. Bangkok Christian College	Private
		16. Wat Suthiwararam School	General
North Khung Thon	Bangkok Noi	17. Wat Dusitaram Secondary School	General
		18. Satriwatrakhang School	General
	ThawiWatthana	19. Taweewattana School	General
		20. Nawamintrachinutit Satriwitthaya Putthamonthon School	General
South Khung Thon	Thon Buri	21. Santa Cruz Convent School	Private
		22. Suksanari School	General
	Bang Khun Thian	23. Rattanakhosinsomphod Bangkhunthian School	General
		24. Thawithapisek 2 School	General

Note: * General - the jurisdiction of The Department of General Education
Private - the jurisdiction of The Office of the Private Education Commission

Step 3 After selecting the representative school, the researcher collected data from 24 schools with each 25 questionnaires by the class instructor considering in questionnaires distribution for student brought to their parents for filling in the questionnaires and return the completed questionnaires to their class instructor.

3.3 Instrument

The instruments used in this study were questionnaires which were constructed based on related literature review. Questionnaire items covered all the objective of the study. There were both closed-ended and open-ended items. The questionnaires consisted of the following parts:

Part 1: Personal factors including gender, age, residential area, educational level, occupation, monthly income and number of family members. There were both closed-ended and open-ended items.

Part 2: Types of household hazardous wastes consisted of open-ended questions.

Part 3: Access to hazardous waste management information consisted of open-ended and closed-ended questions.

Part 4: Knowledge about hazardous waste management consisted of closed-ended questions.

Right answer	=	1	score
Wrong answer	=	0	score

Evaluation was performed by using criteria of Ministry of Education (B.E. 2535:24)

70 % and higher	=	Knowledge at a high level
60 – 69 %	=	Knowledge at a moderate level
59 % and lower	=	Knowledge at a low level

Part 5: Health value consisted of closed-ended questions.

	Positive	Negative
"Yes"	1	0
"No"	0	1

Evaluation was performed by using criteria of Ministry of Education (B.E. 2535:24)

70 % and higher	=	Health value at a high level
60 – 69 %	=	Health value at a moderate level
59 % and lower	=	Health value at a low level

Part 6: The household hazardous waste management behavior consisted of closed-ended questions.

	Positive	Negative
"Regularly"	2	0
"Sometimes"	1	1
"Never"	0	2

Evaluation was performed by using criteria of Ministry of Education (B.E. 2535:24)

70 % and higher = The hazardous waste management behavior at a high level
60 – 69 % = The hazardous waste management behavior at a moderate level
59 % and lower = The hazardous waste management behavior at a low level

Part 7: Problems, obstacles and recommendations for the household hazardous waste management. There were open-ended questions.

3.4Quality of the questionnaire

The researcher constructed a questionnaire based on documentary studies and related literature reviews. Then the questionnaire was tried out with Wat Phra Sri Mahathat Secondary Demonstration School, Rajabhat Institute Phra Nakorn in September 2003 and analyzes reliability of questionnaire.

3.4.1 Reliability test for the part of knowledge about hazardous waste management and health value were evaluated by Split Half Method of Spearman Brown's Correction (Suchart Prasith-rathsint, B.E. 2544 : 251-253)

$$r'_{xx'} = \frac{2r_{xx'}}{1+r_{xx'}}$$

When $r'_{xx'}$ = Reliability of the whole questionnaire

$r_{xx'}$ = Reliability of half of questionnaire

The question to measure the knowledge about hazardous waste management have reliability equal 0.8425.

The question to measure health value have reliability equal 0.8025.

3.4.2 Reliability test for the part of household hazardous waste management behavior was evaluated by using alpha coefficient with the following equation: (Suchart Prasith-rathsint, B.E. 2544 : 253-254)

$$\alpha = N / (N-1) [1-\sum\sigma^2 (Yi) / \sigma^2 X]$$

N = Number of questions in the questionnaire

$\sigma^2 x$ = Summation of the variance of each question

$\sum\sigma^2(yi)$ = Total variance of all questions

The question to measure the household hazardous waste management behavior have reliability equal 0.8834.

3.5 Data collection

The researcher used field survey to collect data during September 2, 2003-November 11, 2003. The procedure for data collection was operated as follows:

1. The researcher requested the official documentation from the faculty of Social Sciences and Humanities, Mahidol University in order to ask for permission from the schools under the jurisdiction of The Department of General Education and the schools under the jurisdiction of The Office of the Private Education Commission.

2. The researcher sent the official documentation to the directors of 24 sample schools for permission and data collection.

3. The researcher distributed the questionnaires to 24 sample schools and asking for permission to the class instructor of Mathayomsuksa 1 to distribute the questionnaires to their students. Then the students brought the questionnaires to their parents or the household representative for filling in the questionnaires and return it to their class instructor.

4. To pick up the completed questionnaires for analyze data.

3.6 Data analysis

After the questionnaires were collected, the completed ones were used in data coding according instruction. The data were transferred to the personal computer and further statistical method was done. The statistical analysis was used in the program of statistical package for social sciences for windows.

3.7 Statistics used

Statistical methodology for description and data analysis as follows:

1. Analyze the data characteristic of personal factors and motive factors used descriptive statistical such as percentage, mean and standard deviation.

2. Testing correlation between independent variables and dependent variable used One Way Analysis of Variance by Break-Down Dependent Variable.

CHAPTER 4
RESULTS

The study of the household hazardous waste management behavior of people in Bangkok, the questionnaires filled in by 400 persons. The presentation sequences of the findings are as follows:

Part I: Personal factors and motive factors of samples found by using percentage, mean and standard deviation.

Part II: The analysis of correlation of the independent variables and dependent variable. One Way Analysis of Variance was used.

Part III: Problems, obstacles and recommendations of samples.

Part I: Personal factors and motive factors of samples

4.1 Personal factors

Personal factors were provided in Table 4.1, the results are:

Gender: Most samples 69.3 % were female and 30.7 % were male.

Age: Most samples 47.8% were 35-45 years. 32.5% was 46 years and more and 19.7% were 34 years and less. The average age was 41 years. The maximum age was 65 years and the minimum age was 18 years.

Residential area: Most samples 21.0% lived in Srinakarin area, 20.0% in North Khung Thon area, 19.3% in South Khung Thon area, 15.0% in Burapa area, 14.3% in Chao Phraya area and 10.4% in Rattanakosin area respectively.

Educational level: Most samples 50.0% were educated in bachelor degree and higher. 22.0% were educated in primary school, 17.5% were high school and equivalent and 10.5% were secondary school respectively.

Occupation: Most samples 33.3% were commerce/self-employee,28.8% were employee/private company officer, 16.8% were government officer/state enterprise officer, 15.5% were housewife and 5.6% unemployed respectively.

Monthly income: Most samples 41.3% had monthly income between 15,001-50,000 baht. 41.0% had monthly income 15,000 baht and less and 17.7% had monthly income 50,001 baht and more respectively. The average monthly income was

37,687.50 baht. The maximum monthly income was 1,000,000 baht and the minimum monthly income was 1,000 baht.

Number of family members: Most samples 67.0% had 4-6 persons. 22.8% had 3 persons and less and 10.2% had 7 persons and more respectively. The average number of family members was 4 persons. The maximum numbers of family members was 9 persons and the minimum numbers of family members was 2 persons.

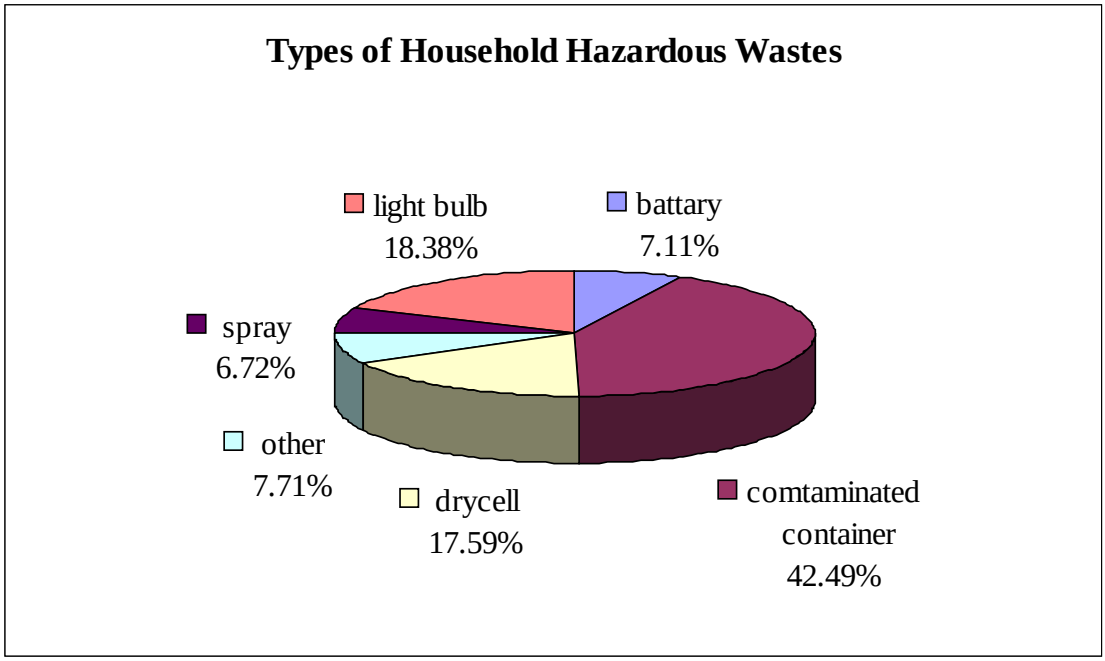
Table 4.1 Number and percentage of personal factors of samples

Personal factors	Percentage	Number
Total	100.0	400
Gender		
Male	30.7	123
Female	69.3	277
Age		
34 years and less	19.7	79
35-45 years	47.8	191
46 years and more	32.5	130
$\bar{X}$ = 41.53 S.D = 8.00 Max = 65 Min = 18		
Residential area		
Rattanakosin	10.4	42
Burapa	15.0	60
Srinakarin	21.0	84
Chao Phraya	14.3	57
North Khung Thon	20.0	80
South Khung Thon	19.3	77
Educational level		
Primary school	22.0	88
Secondary school	10.5	42
High school and equivalent	17.5	70
Bachelor degree and higher	50.0	200
Occupation		
Commerce/Self-employee	33.3	133
Government officer/State enterprise officer	16.8	67
Employee/Private company officer	28.8	115
Housewife	15.5	62
Unemployed	5.6	23
Monthly income		
15,000 baht and less	41.0	164
15,001-50,000 baht	41.3	165
50,001 baht and more	17.7	71
$\bar{X}$ = 37,687.50 S.D = 66,192.74 Max = 1,000,000 Min = 1,000		
Numbers of family member		
3 persons and less	22.8	91
4-6 persons	67.0	268
7 persons and more	10.2	41
$\bar{X}$ = 4.51 S.D = 1.56 Max = 9 Min = 2		

4.2 Types of household hazardous wastes

From the study of household hazardous waste types of the samples, it was found that (Figure 4.1) the most samples 42.49% had contaminated containers like toilet bowl cleaner, chlorine bleach, expired cosmetic, outdated medicines, pesticides, ant-roach killers, motor oil, brake and transmission fluid, furniture polish, wood varnish, sliver polish, paints, adhesive, thinners, lacquer, herbicides, chemical fertilizers, photographic chemicals and other contaminated containers. 18.38% had light bulb: fluorescent light, light bulb and other electric lights, 17.59% had dry cell: dry cell for flashlight and any size of dry cell, 7.71% had others: printer inks cartridge, aluminum foil, mosquito repelling mats, electronic wastes and others, 7.11% had battery: automobile batteries, all phone batteries, emergency batteries and power supply batteries, including 6.72% had sprays: spray paint and other aerosol cans.

Figure 4.1 Percentages of types of household hazardous wastes



4.3 Access to hazardous waste management information

In table 4.2 shows the media through which the samples got hazardous waste management information including frequency.

Through newspapers: 28.8% got information everyday, 19.5% got information once-twice times a week, 18.0% got information once-twice times a month, 17.0% got information 3-4 times a week and 16.7% never got information respectively.

Watching television: 45.3% got information everyday, 18.8% got information once-twice times a month, 16.8% got information 3-4 times a week, 11.3% got information once-twice times a week, , and 7.8% never got information respectively.

Listening radio: 25.5% never got information, 20.8% got information once-twice times a month, 19.5% got information once-twice times a week, 17.3% got information everyday and 16.9% got information 3-4 times a week respectively.

Through billboard: 26.5% got information once-twice times a month, 24.3% never got information, 21.0% got information once-twice times a week, 14.3% got information everyday and 13.9% got information 3-4 times a week respectively.

Through pamphlets/brochures: 47.0% never got information, 32.8% got information once-twice times a month, 11.3% got information once-twice times a week, 8.5% got information 3-4 times a week and 0.4% got information everyday.

Reading magazines/journals: 37.5% never got information, 29.0% got information once-twice times a month, 19.5% got information once-twice times a week, 9.8% got information 3-4 times a week and 4.2% got information everyday respectively.

With verbal communication: 30.0% never got information, 24.5% got information once-twice times a month, 20.8% got information everyday, 15.0% got information once-twice times a week and 9.7% got information 3-4 times a week respectively.

Through formal publication: 45.8% never got information, 31.0% got information once-twice times a month, 13.0% got information once-twice times a week, 5.5% got information 3-4 times a week and 4.7% got information everyday respectively.

From academic institution/library: 58.3% never got information, 22.0% got information once-twice times a month, 11.3% got information once-twice times a week, 5.7% got information 3-4 times a week and 2.7% got information everyday respectively.

From internet: 69.8% never got information, 13.0% got information once-twice times a month, 9.0% got information once-twice times a week, 4.8% got information 3-4 times a week and 3.4% got information everyday respectively.

The researcher considered the frequencies of the access to hazardous waste management information found that the most frequency of media of samples was television 45.3%, newspapers 28.8%, verbal communication 20.8%, radio 17.3%, billboard 14.3%, formal publication 4.7%, magazines/journals 4.2%, internet 3.4%, academic institution/library 2.7% and pamphlets/brochures 0.4%respectively.

The least frequency of media of samples was internet 69.8%, academic institution/library 58.3%, pamphlets/brochures 47.0%, formal publication 45.8%, magazines/journals 37.5, verbal communication 30.0%, radio 25.5%, billboard 24.3%, newspapers 16.7% and television 7.8% respectively.

Table 4.2 Number and percentage of access to hazardous waste management information **N = 400**

Media	Frequency				
	Everyday (%)	**3-4 times a week (%)**	**1-2 times a week (%)**	**1-2 times a month (%)**	**Never (%)**
Newspapers	115 (28.8)	68 (17.0)	78 (19.5)	72 (18.0)	67 (16.7)
Television	181 (45.3)	67 (16.8)	45 (11.3)	75 (18.8)	32 (7.8)
Radio	69 (17.3)	68 (16.9)	78 (19.5)	83 (20.8)	102 (25.5)
Billboard	57 (14.3)	56 (13.9)	84 (21.0)	106 (26.5)	97 (24.3)
Pamphlets/Brochures	2 (0.4)	34 (8.5)	45 (11.3)	131 (32.8)	188 (47.0)
Magazines/Journals	17 (4.2)	39 (9.8)	78 (19.5)	116 (29.0)	150 (37.5)
Verbal communication	83 (20.8)	39 (9.7)	60 (15.0)	98 (24.5)	120 (30.0)
Formal publication	19 (4.7)	22 (5.5)	52 (13.0)	124 (31.0)	183 (45.8)
Academic institution/ Library	15 (2.7)	27 (5.7)	45 (11.3)	88 (22.0)	225 (58.3)
Internet	14 (3.4)	19 (4.8)	36 (9.0)	52 (13.0)	279 (69.8)

4.4 Levels of access to hazardous waste management information

According to measurement criteria of Ministry of Education (B.E. 2535:24) as follows: low level (59 % and lower), moderate level (60 – 69 %) and high level (70 % and higher). By categorizing the levels of access to hazardous waste management information, table 4.3 reports that 83.0% of samples had the access to information at a low level, 12.0% had the access to information at a moderate level and 5.0% had the access to information at a high level. The average score of access to information was 14.38. The maximum score was 38 and the minimum was 0.

Table 4.3 Number and percentage of samples as classified by the levels of access to hazardous waste management information

Levels of access to information	Percentage	Number
Total	100.0	400
Low level (23scores and lower)	83.0	332
Moderate level (24-28 scores)	12.0	48
High level (29 scores and higher)	5.0	20
$\bar{X}$ = 14.38 S.D = 8.6221 Max = 38 Min = 0		

However, the study result indicated the most samples 83.0%had the access to hazardous waste management information at a low level. It might be that the samples never access to hazardous waste management information through media like internet 69.8%, academic institution/library 58.3%, pamphlets/brochures 47.0%, formal publication 45.8%, magazines/journals 37.5, verbal communication 30.0%, radio 25.5%, billboard 24.3%, newspapers 16.7% and television 7.8% respectively.

The finding (Table 4.4) found that most samples 99.0% required the additional hazardous waste management information and 1.0% did not required because they had sufficient information, properly practiced and did not have hazardous waste in their house. The samples required additional information in topics of the proper hazardous waste discarding 22.5%, household hazardous waste minimization 21.0%, household hazardous waste separation 17.7%, hazardous waste treatment of disposal center 14.1%, the law related to hazardous waste 12.9% and household hazardous waste storage 11.8%. The samples required additional information in media of television 25.6%, newspapers 16.7%, magazines/journals 16.4%, radio 8.8%, billboard 8.1%, pamphlets/brochures 8.1%, formal publication 4.8%, training/meeting /seminar 4.0%, academic institution/library 4.0% and internet 3.5%.

Table 4.4 Number and percentage of requirement of additional hazardous waste management information

Requirement of additional information	Percentage	Number
Total	100.0	400
Accept	99.0	396
Refuse	1.0	4
Topics		
Household hazardous waste minimization	21.0	83
Household hazardous waste separation	17.7	70
Household hazardous waste storage	11.8	47
The proper hazardous waste discarding	22.5	89
Hazardous waste treatment	14.1	56
The law related to hazardous waste	12.9	51
Media		
Newspapers	16.7	66
Magazines/Journals	16.4	65
Television	25.6	101
Training/Meeting/Seminar	4.0	16
Radio	8.8	35
Formal publication	4.8	19
Billboard	8.1	32
Academic institution/Library	4.0	16
Pamphlets/Brochures	8.1	32
Internet	3.5	14

4.5 Knowledge about hazardous waste management

The study of knowledge about hazardous waste management, the knowledge measurement used the closed-ended question that has two choices of answer: yes-no for total eighteen items showed at Table 4.5

Item 1 Hazardous waste refer to waste that is composed or contaminated hazardous substances such as ignitability, reactivity, corrosive, toxicity or any hazardous substance that can be harm to public health and environment. Most samples 98.8% were right and 1.2% was wrong.

Item 2 Hazardous waste storage with community waste is properly taken. Most samples 76.3% were right and 23.7% were wrong.

Item 3 Any kinds of household hazardous waste have the same disposal process. Most samples 80.8% were right and 19.2% were wrong.

Item 4 Hazardous substance in hazardous waste can widespread and stay around the environment but no harm to human. Most samples 87.0% were right and 13.0% were wrong.

Item 5 Mix up with community waste is the best method to manage hazardous waste like useless spray can and insecticide can. Most samples 92.5% were right and 7.5% were wrong.

Item 6 Paint, aluminum foil, automobile battery, ink cartridge, herbicide can make fetus disabled (Teratogenic). Most samples 84.3% were right and 15.7% were wrong.

Item 7 The flammable products like benzene, kerosene and gasoline should be stored in a cool area. Most samples 63.0% were right and 37.0% were wrong.

Item 8 Grey bin with red lid keep for hazardous waste disposal only. Most samples 80.8% were right and 19.2% were wrong.

Item 9 Separate hazardous waste from community waste like batteries is convenient to collect and safe for worker. Most samples 87.3% were right and 12.7% were wrong.

Item 10 Nail polish, hair spray and hair color are safe for public health and environment. Most samples 80.0% were right and 20.0% were wrong.

Item 11 The best solution of hazardous waste pollution problem is household hazardous product minimization. Most samples 84.0% were right and 16.0% were wrong.

Item 12 BMA's regulation defines to put all kind of waste into plastic bag or specified bag and firmly tie before bringing the bag to BMA's bin. Most samples 82.5% were wrong and 17.5% were right.

Item 13 A chemical consisting of hazardous waste cannot be widespread in the air. Most samples 87.8% were right and 12.2% were wrong.

Item 14 Lead, tungsten and manganese are the active chemicals of dry cell battery. Most samples 89.8% were right and 10.2% were wrong.

Item 15 Aerosol cans, spray cans and insecticide sprays can be exploded in fire. Most samples 89.5% were right and 10.5% were wrong.

Item 16 Bleach and stain removers can pour down to the backyard swamp and safety for environment. Most samples 80.0% were right and 20.0% were wrong.

Item 17 Automobile waste oil can pour down in the drain. Most samples 91.5% were right and 8.5% were wrong.

Item 18  is the sign of dangerous product that can explode. Most samples 77.5% were wrong and 22.5% were right.

Table 4.5 Number and percentage of samples as classified by knowledge about hazardous waste management

Questions	Right	Wrong
1. Hazardous waste refer to waste that is composed or contaminated hazardous substances such as ignitability, reactivity, corrosive, toxicity or any hazardous substance that can be harm to public health and environment.	98.8% (395)	1.2% (5)
2. Hazardous waste storage with community waste is properly taken.	76.3% (305)	23.7% (95)
3. *Any kinds of household hazardous waste have the same disposal process.	80.8% (323)	19.2% (77)
4. * Hazardous substance in hazardous waste can widespread and stay around the environment but no harm to human.	87.0% (348)	13.0% (52)
5. *Mix up with community waste is the best method to manage hazardous waste like useless spray can and insecticide can.	92.5% (370)	7.5% (30)
6. *Paint, aluminum foil, automobile battery, ink cartridge, herbicide can make fetus disabled. (Teratogenic)	84.3% (337)	15.7% (63)
7. The flammable products like benzene, kerosene and gasoline should be stored in a cool area.	63.0% (252)	37.0% (148)
8. Grey bin with red lid keep for hazardous waste disposal only.	80.8% (323)	19.2% (77)
9. Separate hazardous waste from community waste like batteries is convenient to collect and safe for worker.	87.3% (349)	12.7% (51)
10. *Nail polish, hair spray and hair color are safe for public health and environment.	80.0% (320)	20.0% (80)
11. The best solution of hazardous waste pollution problem is household hazardous product minimization.	84.0% (336)	16.0% (64)
12. *BMA's regulation defines to put all kind of waste into plastic bag or specified bag and firmly tie before bringing the bag to BMA's bin.	17.5% (70)	82.5% (330)
13. *A chemical which is consisting of hazardous waste cannot be widespread in the air.	87.8% (351)	12.2% (49)
14. Lead, tungsten and manganese are the active chemicals of dry cell battery.	89.8% (359)	10.2% (41)
15. Aerosol cans, spray cans and insecticide sprays can be exploded in fire.	89.5% (358)	10.5% (42)
16. *Bleach and stain removers can pour down to the backyard swamp and safety for environment.	80.0% (320)	20.0% (80)
17. *Automobile waste oil can pour down in the drain.	91.5% (366)	8.5% (34)
18. *  is the sign of dangerous product that can explode.	22.5% (90)	77.5% (310)

Note: * Negative items

It was noticed that item 12 about the regulation of Bangkok Metropolitan Administration and item 18 about danger sign in container label that were negative items. Most of the samples were wrong. In item 2 hazardous waste storage with community waste, 23.7% of samples were wrong. Item 7 the flammable products storage, 37.0% of samples were wrong. Item 16 bleach and stain removers can pour down to the backyard swamp and safety for environment, 20.0% of samples were wrong. Incorrect knowledge about hazardous waste management of samples has adverse impact on household hazardous waste management behavior.

4.6 Levels of knowledge about hazardous waste management

According to measurement criteria of Ministry of Education (B.E. 2535:24) as follows: low level (59 % and lower), moderate level (60 – 69 %) and high level (70 % and higher). By categorizing the levels of knowledge about hazardous waste management, table 4.6 reports that 65.8% of samples had the knowledge about hazardous waste management at a high level, 24.8% had the knowledge about hazardous waste management at a moderate level and 9.4% had the knowledge about hazardous waste management at a low level respectively. The average score of knowledge about hazardous waste management was 13.93. The maximum score was 18 and the minimum was 7. (Table 4.6)

Table 4.6 Number and percentage of samples as classified by the levels of knowledge about hazardous waste management

Levels of knowledge	Percentage	Number
Total	100.0	400
Low level (10 scores and lower)	9.4	38
Moderate level (11-13 scores)	24.8	99
High level (14 scores and higher)	65.8	263
$\bar{X}$ = 13.93 S.D = 2.21 Max = 18 Min = 7		

4.7 Health value

The study of health value, the health value measurement used the closed-ended question that has two choices of answer: yes-no for total eighteen items showed at Table 4.7

Item 1 in topic of eating food fully 5 nutrients daily groups found that most samples 75.3% practiced regularly and 24.7% practiced irregularly.

Item 2 in topic of exercise minimum 3 times a week and each 20-30 minutes found that most samples 51.0% practiced regularly and 49.0% practiced irregularly.

Item 3 in topic of drinking fresh water at least 8 glasses a day found that most samples 72.5% practiced regularly and 27.5% practiced irregularly.

Item 4 in topic of smoking cigarette found that most samples 92.5% practiced irregularly and 7.5% practiced regularly.

Item 5 in topic of drinking liquor more than 3 glasses a week found that most samples 89.0% practiced irregularly and 11.0% practiced regularly.

Item 6 in topic of having an annual check-up found that most samples 58.3% practiced regularly and 41.7% practiced irregularly.

Item 7 in topic of having health insurance at least 1 issue found that most samples 64.5% practiced regularly and 35.5% practiced irregularly.

Item 8 in topic of washing hands before and after eating and after going restroom found that most samples 89.8% practiced regularly and 10.2% practiced irregularly.

Item 9 in topic of wearing gloves every time when you touch the dirty or hazardous substances found that most samples 67.0% practiced regularly and 33.0% practiced irregularly.

Item 10 in topic of wearing shoes when you get out of home found that most samples 93.0% practiced regularly, 7.0% practiced irregularly.

Item 11 in topic of avoidance of being in pollution area like traffic congestion area found that most samples 83.8% practiced regularly, 16.2% practiced irregularly.

Item 12 in topic of disposal of all waste in the same bin found that most samples 50.5% practiced regularly and 49.5% practiced irregularly.

Item 13 in topic of reading detail in food packaging label every time before purchasing found that most samples 88.5% practiced regularly, 11.5% practiced irregularly.

Item 14 in topic of buying uncovered food that sold on the footpath found that most samples 77.5% practiced irregularly and 22.5% practiced regularly.

Item 15 in topic of avoidance of purchase instant food, convenient food or dining out found that most samples 56.5% practiced regularly, 43.5% practiced irregularly.

Item 16 in topic of nourishing with dietary supplement products that you believe it will benefit you found that most samples 62.5% practiced irregularly and 37.5% practiced regularly.

Item 17 in topic of avoidance of eating high fat food, high sweeten or salted food found that most samples 78.3% practiced regularly, 21.7% practiced irregularly.

Item 18 in topic of eating high fiber food like vegetables, fresh fruits found that most samples 90.3% practiced regularly and 9.7% practiced irregularly.

Table 4.7 Number and percentage of samples as classified by health value

N=400

Questions	Yes	No
1. You always eat food fully 5 nutrients daily groups.	75.3% (301)	24.7% (99)
2. You exercise minimum 3 times a week and each 20-30 minutes.	51.0% (204)	49.0% (196)
3. You usually drink fresh water at least 8 glasses a day.	72.5% (290)	27.5% (110)
4. *You always smoke cigarette.	7.5% (30)	92.5% (370)
5. *You drink liquor more than 3 glasses a week.	11.0% (44)	89.0% (356)
6. You usually have an annual check-up.	58.3% (233)	41.7% (167)
7. You have health insurance at least 1 issue.	64.5% (258)	35.5% (142)
8. You always wash your hands before and after eating and after going restroom.	89.8% (359)	10.2% (41)
9. You wear gloves every time when you touch the dirty or hazardous substances.	67.0% (268)	33.0% (132)
10. You regularly wear shoes when you get out of home.	93.0% (372)	7.0% (28)
11. You avoid being in pollution area like traffic congestion area.	83.8% (335)	16.2% (65)
12. *You often dispose of all waste in the same bin.	50.5% (202)	49.5% (198)
13. You read detail in food packaging label every time before purchase.	88.5% (354)	11.5% (46)
14. *You buy uncovered food that sold on the footpath.	22.5% (90)	77.5% (310)
15. You avoid purchase instant food, convenient food or dining out.	56.5% (226)	43.5% (174)
16. *You usually nourish with dietary supplement products that you believe it will benefit you.	37.5% (150)	62.5% (250)
17. You avoid eating high fat food, high sweeten or salted food.	78.3% (313)	21.7% (87)
18. You normally eat high fiber food like vegetables, fresh fruits.	90.3% (361)	9.7% (39)

Note: * Negative items

It was noticing that item 12 disposal of all waste in the same bin which was negative item, most samples 50.5% practices regularly. Practice like this have a negative effect on household hazardous waste management behavior

Additionally it found that item 2 about exercise, 49.0% of samples practiced irregularly. Item 6 about an annual check-up, 41.7% of samples practiced irregularly Item 15 about avoidance to purchase instant food, convenient food or dining out, 43.5% of samples practiced irregularly. Either practiced regularly or practiced irregularly of samples were resemble. Practice of samples like this did not promote the health value and it might be deteriorated public health and sanitation.

4.8 Levels of health value

According to measurement criteria of Ministry of Education (B.E. 2535:24) as follows: low level (59 % and lower), moderate level (60 – 69 %) and high level (70 % and higher). By categorizing the levels of health value, table 4.8 reports that 52.8% of samples had the health value at a high level, 31.0% had the health value at a moderate level and 16.2% had the health value at a low level respectively. The average score of health value was 13.14. The maximum score was 18 and the minimum was 5.

Table 4.8 Number and percentage of samples as classified by the levels of health value

Levels of Health Value	Percentage	Number
Total	100.0	400
Low level (10 scores and lower)	16.2	65
Moderate level (11-13 scores)	31.0	124
High level (14 scores and higher)	52.8	211
$\bar{X}$ = 13.14 S.D = 2.79 Max = 18 Min = 5		

4.9 Household hazardous waste management behavior

The household hazardous waste management behavior of people were explored by the close-ended questions for total thirty-two items, which each item had three choices of answer of regularly, sometimes and never. There were divided into four aspects: hazardous waste minimization, hazardous waste separation, hazardous waste storage and hazardous waste discarding. The result of the study found that: (Table 4.9)

Hazardous waste minimization

Item 1 You discard all kind of waste in house bin. Most samples 64.8% practiced regularly, 30.5% practiced sometimes and 4.7% never practiced.

Item 2 You read packaging label, warning and instruction when you buy hazardous products such as dry cell, battery, ant killer and toilet bowl cleaner. Most samples 64.8% practiced regularly, 33.3% practiced sometimes and 1.9% never practiced.

Item 3 You buy the natural product or herbal materials like micro-bacteria fertilizer, lemongrass mosquito repellant. Most samples 60.5% practiced sometimes, 27.0% practiced regularly and 12.5% never practiced.

Item 4 You buy refillable product for package reduction. Most samples 63.3% practiced regularly, 31.0% practiced sometimes and 5.7% never practiced.

Item 5 You purchase slim type fluorescent for long-life working. Most samples 72.5% practiced regularly, 21.8% practiced sometimes and 5.7% never practiced.

Item 6 You buy reusable product like rechargeable battery. Most samples 42.3% practiced sometimes, 40.5% practiced regularly and 17.2% never practiced.

Item 7 You use insecticide chemicals, toilet bowl cleaner and bleach liquid only what you need to do the job, using only necessary. Most samples 69.3% practiced regularly, 27.7% practiced sometimes and 3.0% never practiced.

Item 8 You buy the product assured standardization by Thai Industrial Standards Institute, The Food and Drug Administration. Most samples 83.0% practiced regularly, 16.5% practiced sometimes and 0.5% never practiced.

Hazardous waste separation

Item 1 You separate hazardous waste from the other waste. Most samples 56.5% practiced sometimes, 37.0% practiced regularly and 6.5% never practiced.

Item 2 You put hazardous waste into tied bag or sealed container. Most samples 50.0% practiced regularly, 44.0% practiced sometimes and 6.0% never practiced.

Item 3 You store all kind of waste without separation for disposal in community bin. Most samples 57.0% practiced sometimes, 22.3% practiced regularly and 20.7% never practiced.

Item 4 You wash your hands after touching dirty or hazardous waste. Most samples 91.3% practiced regularly, 7.0% practiced sometimes and 1.7% never practiced.

Item 5 You separate dead mobile battery and put it in sealed bag. Most samples 41.5% practiced regularly, 41.3% practiced sometimes and 17.2% never practiced.

Item 6 You separate spray can, insecticide spray, toilet bowl cleaner bottle from community waste and put them to sealed bag. Most samples 51.5% practiced sometimes, 41.0% practiced regularly and 7.5% never practiced.

Item 7 You separate waste that can be harm like ink cartridge by putting it to sealed bag for separating it from community waste. Most samples 48.5% practiced sometimes, 38.0% practiced regularly and 13.5% never practiced.

Item 8 You go along with your community in hazardous waste separation. Most samples 47.5% practiced sometimes, 45.3% practiced regularly and 7.2% never practiced.

Hazardous waste storage

Item 1 You practice follow label instructions or directions on insecticide packaging either how to use or dispose of the product after use. Most samples 65.5% practiced regularly, 34.0% practiced sometimes and 0.5% never practiced.

Item 2 You pay more attention to store hazardous waste in house. Most samples 66.5% practiced regularly, 32.3% practiced sometimes and 1.2% never practiced.

Item 3 You store all household hazardous products in the locked cabinets and keep it out of reach of children and pets. Most samples 85.3% practiced regularly, 13.0% practiced sometimes and 1.7% never practiced.

Item 4 You tell your family members to be aware of touching and using hazardous substances in daily life. Most samples 73.3% practiced regularly, 24.7% practiced sometimes and 2.0% never practiced.

Item 5 When you change a new light, you put the old one into the new box before disposal of it for light broken protecting. Most samples 78.5% practiced regularly, 20.8% practiced sometimes and 0.7% never practiced.

Item 6 You store insecticide, windshield cleaner and cleaner liquid in the same area for safety and convenient using. Most samples 55.0% practiced regularly, 28.8% practiced sometimes and 16.2% never practiced.

Item 7 You store motor oil, kerosene, oil paint to separate them from daily used stuff. Most samples 78.5% practiced regularly, 17.3% practiced sometimes and 4.2% never practiced.

Item 8 You check the expiration date of daily cosmetic and medicines. Most samples 77.5% practiced regularly, 21.0% practiced sometimes and 1.5% never practiced.

Hazardous waste discarding

Item 1 You read and follow the instruction, suggestion, usage and product disposal direction. Most samples 62.3% practiced regularly, 35.7% practiced sometimes and 2.0% never practiced.

Item 2 You lay down the packed dead fluorescent in front of house for clearly see and convenient collecting of worker. Most samples 71.5% practiced regularly, 23.0% practiced sometimes and 5.5% never practiced.

Item 3 You pour the rest of bleach liquid, bathroom cleaner down the drain because it may help you clean up your drain. Most samples 39.5% never practiced, 35.5% practiced sometimes and 25.0% practiced regularly.

Item 4 You often pour the waste chemicals down the drain because it is the most safety hazardous waste management for you. Most samples 52.0% never practiced, 35.3% practiced sometimes and 12.7% practiced regularly.

Item 5 When you change car, motorcycle and any engines oil, you leave the waste oil at the transmission shop. Most samples 52.8% practiced regularly, 31.8% practiced sometimes and 15.4% never practiced.

Item 6 You dispose of dry cell or dead battery by separating them in the sealed bag or locked container. Most samples 47.5% practiced sometimes, 42.0% practiced regularly and 10.5% never practiced.

Item 7 You manage the unused mobile battery by placing it down the mobile battery receiving box for return it to the manufacturers. Most samples 53.3% never practiced 27.3% practiced sometimes and 19.4% practiced regularly.

Item 8 You bring the entire storage hazardous waste in the sealed bag and place it in front of house or remarked point for waiting BMA collecting. Most samples 58.8% practiced regularly, 33.0% practiced sometimes and 8.2% never practiced.

Table 4.9 Number and percentage of samples as classified by household hazardous waste management behavior

Content	Regularly	Sometimes	Never
Hazardous waste minimization			
1. You discard all kind of waste in house bin.	64.8% (259)	30.5% (122)	4.7% (19)
2. You read packaging label, warning and instruction when you buy hazardous products such as dry cell, battery, ant killer and toilet bowl cleaner.	64.8% (259)	33.3% (133)	1.9% (8)
3. You buy the natural products or herbal materials like micro-bacteria fertilizer, lemongrass mosquito repellant.	27.0% (108)	60.5% (242)	12.5% (50)
4. You buy refillable product for package reduction.	63.3% (253)	31.0% (124)	5.7% (23)
5. You purchase slim type fluorescent for long life working.	72.5% (290)	21.8% (87)	5.7% (23)
6. You buy reusable product like rechargeable battery.	40.5% (162)	42.3% (169)	17.2% (69)
7. You use insecticide chemicals, toilet bowl cleaner and bleach liquid only what you need to do the job, using only necessary.	69.3% (277)	27.7% (111)	3.0% (12)
8. You buy the product assured standardization by Thai Industrial Standards Institute, The Food and Drug Administration.	83.0% (332)	16.5% (66)	0.5% (2)
Hazardous waste separation			
1. You separate hazardous waste from the other waste.	37.0% (148)	56.5% (226)	6.5% (26)
2. You put hazardous waste into tied bag or sealed container.	50.0% (200)	44.0% (176)	6.0% (24)
3. *You store all kind of waste without separation for disposal in community bin.	22.3% (89)	57.0% (228)	20.7% (83)
4. You wash your hands after touching dirty or hazardous waste.	91.3% (365)	7.0% (28)	1.7% (7)
5. You separate dead mobile battery and put it in sealed bag.	41.5% (166)	41.3% (165)	17.2% (69)
6. You separate spray can, insecticide spray, toilet bowl cleaner bottle from community waste and put them to sealed bag.	41.0% (164)	51.5% (206)	7.5% (30)
7. You separate waste that can be harm like ink cartridge by putting it to sealed bag for separating it from community waste.	38.0% (152)	48.5% (194)	13.5% (54)
8. You go along with your community in hazardous waste separation.	45.3% (181)	47.5% (190)	7.2% (29)

Table 4.9 Number and percentage of samples as classified by household hazardous waste management behavior (Continue)

Content	Regularly	Sometimes	Never
Hazardous waste storage			
1. You practice follow label instructions or directions on insecticide packaging either how to use or dispose of the product after use.	65.5% (262)	34.0% (136)	0.5% (2)
2. You pay more attention to store hazardous waste in house.	66.5% (266)	32.3% (129)	1.2% (5)
3. You store all household hazardous products in the locked cabinets and keep it out of reach of children and pets.	85.3% (341)	13.0% (52)	1.7% (7)
4. You tell your family members to be aware of touching and using hazardous substances in daily life.	73.3% (293)	24.7% (99)	2.0% (8)
5. When you change a new light, you put the old one into the new box before disposal of it for light broken protecting.	78.5% (314)	20.8% (83)	0.7% (3)
6. You store insecticide, windshield cleaner and cleaner liquid in the same place for safety and convenient using.	55.0% (220)	28.8% (115)	16.2% (65)
7. You store motor oil, kerosene, oil paint to separate them from daily used stuff.	78.5% (314)	17.3% (69)	4.2% (17)
8. You check the expiration date of daily cosmetic and medicines.	77.5% (310)	21.0% (84)	1.5% (6)
Hazardous waste discarding			
1. You read and follow the instruction, suggestion, usage and product disposal direction.	62.3% (249)	35.7% (143)	2.0% (8)
2. You lay down the packed dead fluorescent in front of house for clearly see and convenient collecting of worker.	71.5% (286)	23.0% (92)	5.5% (22)
3. You pour the rest of bleach liquid, bathroom cleaner down the drain because it may help you clean up your drain.	25.0% (100)	35.5% (142)	39.5% (158)
4. *You often pour the waste chemicals down the drain because it is the most safety hazardous waste management for you.	12.7% (51)	35.3% (141)	52.0% (208)
5. * When you change car, motorcycle and any engines oil, you leave the waste oil at the transmission shop.	52.8% (211)	31.8% (127)	15.4% (62)
6. You dispose of dry cell or dead battery by separating them in the sealed bag or locked container.	42.0% (168)	47.5% (190)	10.5% (42)
7. You manage the unused mobile battery by placing it down the mobile battery receiving box for return it to the manufacturers.	19.4% (78)	27.3% (109)	53.3% (213)
8. You bring the entire storage hazardous waste in the sealed bag and place it in front of house or remarked point for waiting BMA collecting.	58.8% (235)	33.0% (132)	8.2% (33)

Note: * Negative items

4.10 Levels of household hazardous waste management behavior

According to measurement criteria of Ministry of Education (B.E. 2535:24) as follows: low level (59 % and lower), moderate level (60 – 69 %) and high level (70% and higher). By categorizing the levels of hazardous waste management behavior, table 4.10 reports that 59.3% of samples had the hazardous waste management behavior at a high level, 30.0% had the hazardous waste management behavior at a moderate level and 10.7% had the hazardous waste management behavior at a low level. The average score of hazardous waste management behavior was 47.33. The maximum score was 62 and the minimum was 21.

Table 4.10 Number and percentage of samples as classified by the levels of household hazardous waste management behavior

Levels of behavior	Percentage	Number
Total	100.0	400
Low level (37 scores and lower)	10.7	43
Moderate level (38-45 scores)	30.0	120
High level (46 scores and higher)	59.3	237
$\bar{X}$ = 47.33 S.D = 7.45 Max = 62 Min = 21		

According to household hazardous waste management behavior by aspects (Table 4.11) reports:

Hazardous waste minimization: Most samples 50.5% had hazardous waste minimization behavior at a high level, 37.5% had behavior at a moderate level and 12.0% had behavior at a low level. The average score was 12.34. The maximum score was 16 and the minimum was 6.

Hazardous waste separation: Most samples 37.5% had hazardous waste separation behavior at a low level, 32.3% had behavior at a high level and 30.2% had behavior at a moderate level. The average score was 10.83. The maximum score was 16 and the minimum was 2.

Hazardous waste storage: Most samples 73.0% had hazardous waste storage behavior at a high level, 21.3% had behavior at a moderate level and 5.7% had

behavior at a low level. The average score was 13.52. The maximum score was 16 and the minimum was 6.

Hazardous waste discarding: Most samples 50.0% had hazardous waste discarding behavior at a moderate level, 28.5% had behavior at a low level and 21.5% had behavior at a high level. The average score was 10.66. The maximum score was 16 and the minimum was 2.

Table 4.11 Number and percentage of samples as classified by the levels of household hazardous waste management behavior by aspects

N=400

Levels of behavior	Percentage	Number
1. Hazardous waste minimization		
Low level (10 scores and lower)	12.0	48
Moderate level (11-13 scores)	37.5	150
High level (14 scores and higher)	50.5	202
$\bar{X}$ = 12.34 S.D = 2.22 Max = 16 Min = 6		
2. Hazardous waste separation		
Low level (10 scores and lower)	37.5	150
Moderate level (11-13 scores)	30.2	121
High level (14 scores and higher)	32.3	129
$\bar{X}$ = 10.83 S.D = 3.22 Max = 16 Min = 2		
3. Hazardous waste storage		
Low level (10 scores and lower)	5.7	23
Moderate level (11-13 scores)	21.3	85
High level (14 scores and higher)	73.0	292
$\bar{X}$ = 13.52 S.D = 2.13 Max = 16 Min = 6		
4. Hazardous waste discarding		
Low level (10 scores and lower)	28.5	114
Moderate level (11-13 scores)	50.0	200
High level (14 scores and higher)	21.5	86
$\bar{X}$ = 10.66 S.D = 2.39 Max = 16 Min = 2		

4.11 Regular hazardous waste management of samples

The study of regular hazardous waste management of samples (Table 4.12) found that

Light bulb: Most samples 33.5% separated in plastic bag and discarded in specify bin, 31.5% separated in plastic bag and discarded in general bin, 18.8% discarded in grey bin with red lid of Bangkok Metropolitan Administration, 11.0% discarded in general bin with unwrapping, 2.8% had other hazardous waste management such as putting the old light bulb in the new package and 2.4% discarded in nearby vacant place.

Dry cell: Most samples 37.1% separated in plastic bag and discarded in general bin, 26.5% separated in plastic bag and discarded in specify bin, 20.0% discarded in general bin with unwrapping, 15.0% discarded in grey bin with red lid of Bangkok Metropolitan Administration and 1.4% discarded in nearby vacant place.

Spray: Most samples 32.0% separated in plastic bag and discarded in general bin, 30.8% separated in plastic bag and discarded in specify bin, 20.3% discarded in grey bin with red lid of Bangkok Metropolitan Administration, 16.3% discarded in general bin with unwrapping and 0.6% discarded in nearby vacant place.

Contaminated container: Most samples 37.5% separated in plastic bag and discarded in general bin, 31.8% separated in plastic bag and discarded in specify bin, 17.8% discarded in general bin with unwrapping, 12.5% discarded in grey bin with red lid of Bangkok Metropolitan Administration and 0.4% discarded in nearby vacant place.

Battery: Most samples 31.8% separated in plastic bag and discarded in specify bin, 30.3% separated in plastic bag and discarded in general bin, 19.5% discarded in grey bin with red lid of Bangkok Metropolitan Administration, 13.8% discarded in general bin with unwrapping, 3.3% had other hazardous waste

management such as leaving the old battery at the battery shop and 1.3% discarded in nearby vacant place.

Others like ink: Most samples 35.0% separated in plastic bag and discarded in general bin, 29.3% separated in plastic bag and discarded in specify bin, 15.3% discarded in grey bin with red lid of Bangkok Metropolitan Administration, 15.3% discarded in general bin with unwrapping, 3.5% had other hazardous waste management such as selling to the ink shop and to be a discount on the next purchase and 1.6% discarded in nearby vacant place.

It was noticed that hazardous waste management of most samples were separated in plastic bag and discarded in bin either general bin or specify bin in light bulb 33.5%, dry cell 37.1%, spray can 32.0%, contaminated containers 37.5%, battery 31.8% and other household hazardous waste like ink 35.0%. It might indicated household hazardous waste management behavior of samples that they separated hazardous waste from general solid wastes.

Table 4.12 Number and percentage of samples in regular hazardous waste management

N = 400

Waste Types	Household hazardous waste management					
	Discarded in general bin with unwrapping	**Separated in plastic bag and discarded in general bin**	**Separated in plastic bag and discarded in specify bin**	**Discarded in grey bin with red lid of BMA's**	**Discarded in nearby vacant place**	**Others**
Light bulb	44 (11.0)	126 (31.5)	134 (33.5)	75 (18.8)	10 (2.4)	11 (2.8)
Dry cell	80 (20.0)	148 (37.1)	106 (26.5)	60 (15.0)	6 (1.4)	0 (0)
Spray	65 (16.3)	128 (32.0)	123 (30.8)	81 (20.3)	3 (0.6)	0 (0)
Contaminated container	71 (17.8)	150 (37.5)	127 (31.8)	50 (12.5)	2 (0.4)	0 (0)
Battery	55 (13.8)	121 (30.3)	127 (31.8)	78 (19.5)	6 (1.3)	13 (3.3)
Others like ink	61 (15.3)	140 (35.0)	117 (29.3)	61 (15.3)	7 (1.6)	14 (3.5)

Part II: The analysis of the correlation of personal factors and motive factors with the household hazardous waste management behavior. (One Way Analysis of Variance)

The analyses the correlation of personal factors and motive factors with the household hazardous waste management behavior as follows: (Table 4.13)

Gender: Female had more household hazardous waste management than male. Based on statistical test, gender made no significant difference in household hazardous waste management behavior.

Age: The samples with ages 46 years and more had more household hazardous waste management than those who were 35-46 years and 34 years and more did respectively. Based on statistical test, age made a significant difference in household hazardous waste management behavior. (at $p<0.01$)

Residential area: The samples living in North Krung Thon area had more household hazardous waste management behavior than those living in Burapa area, Chao Phraya area, Rattanakosin area, Srinakarin area and South Khung Thon area did respectively. Based on statistical test, residential area made a significant difference in household hazardous waste management behavior. (at $p<0.01$)

Educational level: The samples held high school and equivalent had more household hazardous waste management behavior than those who held bachelor degree and higher, secondary school and primary school did respectively. Based on statistical test, educational level made a significant difference in household hazardous waste management behavior. (at $p<0.05$)

Occupation: The samples who were employee/private company officer had more household hazardous waste management behavior than those who were housewife, commerce/self-employee, government officer/state enterprise officer and unemployed did respectively. Based on statistical test, occupation made no significant difference in household hazardous waste management behavior.

Monthly income: The samples earning 50,001 baht and more had more household hazardous waste management behavior than those who earned 15,001-50,000 baht and 15,000 baht and less did respectively. Based on statistical test, monthly income made no significant difference in household hazardous waste management behavior.

Number of family members: The samples having 7 persons and more had more household hazardous waste management behavior than those who having 4-6 persons and 3 persons and less did respectively. Based on statistical test, number of family members made no significant difference in household hazardous waste management behavior.

Access to hazardous waste management information: The samples with a moderate level of information access had more household hazardous waste management behavior than those who access at a high level and a low level did respectively. Based on statistical test, access to hazardous waste management information made no significant difference in household hazardous waste management behavior.

Knowledge about hazardous waste management: The samples with a high level of knowledge had more household hazardous waste management behavior than those who having a moderate level and a low level did respectively. Based on statistical test, knowledge about hazardous waste management made a significant difference in household hazardous waste management behavior. (at $p<0.001$)

Health value: The samples with a high level of health value had more household hazardous waste management behavior than those who having a moderate level and a low level did respectively. Based on statistical test, health value made a significant difference in household hazardous waste management behavior. (at $p<0.001$)

Table 4.13 The correlation analysis of personal factors, motive factors with the household hazardous waste management behavior. (One Way Analysis of Variance) N=400

Factors	N	$\bar{X}$	S.D	Sig. of F
Gender				0.674
Male	123	2.46	0.69	
Female	277	2.49	0.68	
Age				0.003**
34 years and less	79	2.25	0.74	
35-45 years	191	2.52	0.69	
46 years and more	130	2.57	0.60	
Residential area				0.002**
Rattanakosin	42	2.40	0.77	
Burapa	60	2.62	0.58	
Srinakarin	84	2.37	0.71	
Chao Phraya	57	2.60	0.62	
North Khung Thon	80	2.66	0.57	
South Khung Thon	77	2.29	0.76	
Educational level				0.046*
Primary school	88	2.32	0.67	
Secondary school	42	2.43	0.70	
High school and equivalent	70	2.57	0.60	
Bachelor degree and higher	200	2.54	0.70	
Occupation				0.226
Commerce/Self-employee	133	2.44	0.69	
Government officer/State enterprise officer	67	2.40	0.80	
Employee/Private company officer	115	2.59	0.60	
Housewife	62	2.53	0.65	
Unemployed	23	2.35	0.78	
Monthly income				0.051
15,000 baht and less	164	2.43	0.66	
15,001-50,000 baht	165	2.46	0.73	
50,001 baht and more	71	2.66	0.61	
The numbers of family member				0.412
3 persons and less	91	2.44	0.72	
4-6 persons	268	2.48	0.68	
7 persons and more	41	2.61	0.59	
Access to hazardous waste management information				0.427
Low level (23 scores and lower)	332	2.47	0.70	
Moderate level (24-28 scores)	48	2.60	0.61	
High level (29 scores and higher)	20	2.50	0.61	
Knowledge about hazardous waste management				0.000***
Low level (10 scores and lower)	38	2.18	0.83	
Moderate level (11-13 scores)	99	2.36	0.71	
High level (14 scores and higher)	263	2.57	0.63	
Health value				0.000***
Low level (10 scores and lower)	65	0.97	0.75	
Moderate level (11-13 scores)	124	2.40	0.71	
High level (14 scores and higher)	211	2.69	0.54	

Note: *P-Value < 0.05, ** P-Value < 0.01, ***P-value < 0.001

Part III: Problems, obstacles and recommendations

From the study result, there are problems, obstacles and recommendations for household hazardous waste management as follows:

1. Problems and obstacles in household hazardous waste management of samples

1. The samples mentioned that a lack of correct knowledge about household hazardous waste management is the major problem in household hazardous waste management. The level of knowledge on hazardous waste management was still quite low, for example, the characteristics of household hazardous waste, kinds and categories of household hazardous waste, each types of household hazardous waste separation process that was proper and convenient for collection, proper household hazardous waste disposal, danger from household hazardous waste and give family members an information about household hazardous waste.

According to the above reason, the samples disregarded the household hazardous waste management and had following behaviors resulting in the problem of household hazardous waste management.

- Lack of cooperation from family members in hazardous waste separation.
- Being short of awareness of danger from household hazardous waste.
- Neglected household hazardous waste management due to working urgency and be used to usual behavior, including a small amount of hazardous waste in house.
- Being deficient in conduction of proper hazardous waste disposal.
- Misunderstanding on household hazardous waste management.
- Having a shortage of conscious and do not place importance on the problem from household hazardous waste.

2. Lack of hazardous waste containers including the grey bins with red lid of the Bangkok Metropolitan Administration and separated containers in each house.

For grey bins with red lid of the Bangkok Metropolitan Administration, the samples revealed that these bins were insufficient and not available thoroughly. The designated points are unsuitable resulting in inconvenient hazardous waste discarding and had to discard it with community solid waste because the grey bins with red lid

were difficult to be found. The bins were not in good condition and also very dirty. Each bin was too full that the people could not discard waste in it. That was because samples disposed of all waste in it without discrimination.

As for the household bin, samples commented that lack of household bin specified for hazardous waste separation was an obstacle in household hazardous waste management due to nowhere to place hazardous waste container such as in the commercial buildings and to place more than a bin in that building was cluttered. Lack of the standard bins and plastic bags for hazardous waste separation, including disappearance of the bin placing in front of the house were the problems that samples faced.

3. Inconvenience in hazardous waste separation from community waste, the samples referred to the hazardous waste separation that this process has many containers for each types of waste caused samples difficulty in arranging area for containers cleaning, separation and waste storage for categorization. It was burdensome to manage waste to each type containers consequently; household hazardous waste separation was disappearing as forecasted.

4. Inefficient household hazardous waste management program of the Bangkok Metropolitan Administration was another major problem that the samples faced. There were weaknesses of hazardous waste management resulting from disappearing of giving priority to performance collecting workers' duty, lack of integrated operation and trained manpower. Waste collection of collecting worker of the Bangkok Metropolitan Administration was inefficient. Separated hazardous waste bags were gathered with community solid waste. Delays collections were often occurred and spend much time in each collection make the containers full, also scattering collection. Hazardous waste like fluorescent light bulbs was not accepted to collecting. Waste collecting truck was not provided for servicing the suburb community. Public relations for giving information to people were inadequate resulting in improper hazardous waste management. Appointed time for hazardous waste collection of the Bangkok Metropolitan Administration was not announced to people to prepare the waste for disposal.

5. Scavengers rummaged the separated waste for selling and waste digging by dogs resulting for separated hazardous waste. Children may swallow a small hazardous waste that can pose their health hazard.

2. Participation of the enterprise in possesses the product with hazardous substances for the proper household hazardous waste management.

The samples revealed that

1. Private sector should be encouraged to reduce the chemicals using, reduce excessively, produce the environmentally friendly products and find the natural material to be production ingredient.

2. Receiving product back should be available for the marketing strategies such as competition for the prize or reward, discount for the next purchase and provide the area for discarding the leftover from company product.

3. Labeling the product to spot potentially dangerous household hazardous chemicals, proper disposal and attached with warning sign. Manufacturers should inform consumers of any possible risk to human health. Additional information concerning potential risk to the environment is also included.

4. Encouraging private sector to set up a complete hazardous waste management center. Supporting finance and privileges for non-government organizations to monitoring, inspection and control household hazardous waste management were recommended. Appropriate and adequate funding should be allocated for hazardous waste disposal.

5. State agencies should impose progressive tax on the amount of waste to be disposed by private sector making the hazardous products. Manufacturers are required by law to make the reusable products. Survey hazardous product placed in the market should be conducted also continuously patrol the enterprise having the product consists of the hazardous substances which were harmful to human and environment.

3. Capability of the Bangkok Metropolitan Administration in hazardous waste management

Most samples mentioned that the Bangkok Metropolitan Administration had no adequate capability of hazardous waste management as expected. Hazardous waste containers were insufficient and damaged, covering lack of hazardous waste treatment facilities. Public relations were not available enough to give information to people. There is a shortage of hazardous waste management trained collecting worker in operating. Giving priority to performance of collecting workers' duty was

disappearing. Separated hazardous waste bags were gathered with community solid waste and were torn to seek for selling. Motivation for proper hazardous waste management of people did not emerge. Appointed time for hazardous waste collection of the Bangkok Metropolitan Administration was not being announced to people to prepare the waste for disposal.

4. The recommendations for household hazardous waste management

People

The samples had the recommendations for household hazardous waste management as follows:

1. People should properly separate waste and put it in the bin, plastic bag or container and tightly sealed it. They should throw waste away in the providing place so as to be convenient for worker to collect waste.

2. Awareness of family members regarding danger of hazardous waste should be raised and information and understanding about hazardous waste management should be given to family members, especially children and housekeeper in order to promote proper management of hazardous waste.

3. Keep hazardous waste out of reach of children.

4. Try to generate hazardous waste as least as possible by reducing chemicals usage or buy a non-hazardous or the least hazardous product. Read the detail in label before buying and using and be careful in using chemicals and hazardous products.

The Bangkok Metropolitan Administration

1. The Bangkok Metropolitan Administration should provide more hazardous waste containers (grey bin with red lid) along the roads and in the designate areas. The facilities for hazardous waste separation and disposal such as the containers and plastic bags should be available. The collecting truck should service around the community.

2. Emphasis will be placed on giving the public information in order to enhance the proper hazardous waste management. Raise public awareness regarding hazardous waste separation continually and thoroughly as well as particular attention should be given to children.

3. Upgrading the efficiency of hazardous waste management system by a more effective collection method, improvement in manpower, equipment and vehicles were recommended. In collection method, the fixed time for hazardous waste collection should be appointed and announced to the public in order to prepare waste in responding to the collection. Collection has to rigidly separate hazardous waste from community solid waste and should be punctual. Likewise, manpower as collecting workers and stuff worker involved should be trained in household hazardous waste management with hygienic practice, danger from hazardous waste, self-protection against the hazardous waste danger involving the safe separation and collection method for collecting workers. Employment of collecting worker should be increased. The safe and protective uniform of collecting worker was recommended in order to protect them from waste hazard while performing their duty. On time collection should be conducted, also the collecting worker could inform the public household hazardous waste management. Improvement in equipments and vehicles, the local authorities should provide the facilities for hazardous waste collection like hazardous waste containers (grey bin with red lid) especially in community area. Waste collecting truck should be designed to have type separated section of hazardous waste and split off the community solid waste, also obviously attached with labels. The only hazardous waste collecting truck should service to the public and community by appointing the fixed time for collection and announcing for preparing the waste for disposal.

4. A central authority should be assigned to the task of providing both information and the provisions necessary for the safe disposal of household hazardous waste. The Bangkok Metropolitan Administration should be responsible for hazardous waste separation and recycling, including the operation of the centralized treatment facilities.

5. The executive officers of The Bangkok Metropolitan Administration should pay more attention to hazardous waste management in Bangkok.

6. Law enforcement for proper household hazardous waste management should be legislated. Enforced measure and penalties should be released to the general public.

The enterprise in possesses the product with hazardous substances

1. Private sector should be encouraged to reduce the chemicals using, reduce excessively produce the environmentally friendly products.

2. To receiving product back, one of the marketing strategies such as competition for the prize or reward, discount for the next purchase and provide the area for discarding the leftover from product of the company such as used product receiving box at dealer shop or selling point should be promoted. Producers should be responsible for disposal and take full responsibility in the products of their firm. Manufacturers and importers should store and dispose chemicals material according to the defined standards.

3. Labeling the product to spot potentially dangerous household hazardous chemicals and proper disposal printed with obviously large fonts should be provided. Manufacturers should inform consumers about any possible risk to human health, additional information concerning potential risk to the environment is also included.

4. Product packaging should be degradable packaging. Packaging for unused product should be designed with safe disposal attached with the product. The package should be convenient to use and be safe and sealed container, including the caution remark “HAZARDOUS WASTE” should be printed on the product package.

CHAPTER 5
DISCUSSION

This survey research is to study the household hazardous waste management behavior of people in Bangkok from 400 cases. The findings could be discussed as identified below:

5.1 Discussion of the research result from the objectives

Objective 1 To study the level of the household hazardous waste management behavior of people in Bangkok.

The result of research found that a high level of samples behavior to household hazardous waste management does not relate to predicted hypothesis that people has the household hazardous waste management behavior at a moderate level. Since hazardous waste pollution problem was more critical, people aware of arising danger that adverse effect on public health both directly and indirectly. Therefore, people had household hazardous waste management behavior at a high level.

Objective 2 To study the factors affecting the household hazardous waste management behavior of people in Bangkok.

The study showed that the factors affecting the household hazardous waste management behavior of people in Bangkok, namely; age, residential area, education level, knowledge about hazardous waste management and health value. The results were discussed as follows:

Gender

Based on statistical test, it found that both female and male made no significant difference in household hazardous waste management behavior. The hypothesis was rejected. The reason might be that both female and male were educated

equally and had self-protection from hazardous waste pollution. They had equivalent opportunity in perception of knowledge about hazardous waste management.

Age

Based on statistical test, it found that age made a difference in the household hazardous waste management behavior of people in Bangkok at statistical significant at 0.01 level. The result confirmed to assumed hypothesis.

Residential area

Based on statistical test, it found that residential area made a difference in the household hazardous waste management behavior of people in Bangkok at statistical significant at 0.01 level. The result confirmed to assumed hypothesis.

Educational level

Based on statistical test, it found that educational level made a difference in the household hazardous waste management behavior of people in Bangkok at statistical significant at 0.05 levels. The result confirmed to assumed hypothesis.

Occupation

Based on statistical test, it found that occupation made no significant difference in household hazardous waste management behavior. The hypothesis was rejected. The reason might be that whatever the occupation most samples were high educated and had the city lifestyle. It did not make the difference of receiving knowledge about hazardous waste management. Occupation make no difference in that behavior.

Monthly income

Based on statistical test, it found that monthly income made no significant difference in household hazardous waste management behavior. The hypothesis was

rejected. The reason might be that whatever people have monthly income, they have household hazardous waste management in their own house in order to make a good health and safety of their family.

Number of family members

Based on statistical test, it found that number of family members made no significant difference in household hazardous waste management behavior. The hypothesis was rejected. The reason might be that no matter how people have number of family members, they have household hazardous waste management in their own house in order to make a good health and safety of their family.

Access to hazardous waste management information

Based on statistical test, it found that access to hazardous waste management information made no significant difference in household hazardous waste management behavior. The hypothesis was rejected. The reason might be that most samples were in working age, so knowledge about hazardous waste management of samples was received in educational process. Moreover, the information also were rarely public though all media. Access to hazardous waste management information was not effect on household hazardous waste management behavior.

Knowledge about hazardous waste management

Based on statistical test, it found that knowledge about hazardous waste management made a difference in the household hazardous waste management behavior of people in Bangkok at statistical significant at 0.001 level. The result confirmed to assumed hypothesis.

Health value

Based on statistical test, it found that health value made a difference in the household hazardous waste management behavior of people in Bangkok at statistical significant at 0.001 level. The result confirmed to assumed hypothesis.

Objective 3 To study problems, obstacles, and recommendations for the household hazardous waste management behavior of people in Bangkok.

1. Problems and obstacles in household hazardous waste management

The sample revealed that

1.1 Lack of knowledge about hazardous waste management made the samples disregarded for household hazardous waste management. They has a shortage of consciousness and do not place importance on the problem from household hazardous waste resulting in inefficient household hazardous waste management behavior.

1.2 The facilities for hazardous waste collection were inadequate.

1.3 Inconvenient in hazardous waste separation from community waste.

1.4 Inefficient household hazardous waste management program of the Bangkok Metropolitan Administration in collection facilities and insufficient public educated.

1.5 Scavengers rummaged for selling and waste digging by dogs.

2. Recommendations for the household hazardous waste management

The samples had the recommendations for household hazardous waste management of people that any household should properly separate waste and put it in the bin, plastic bag or container and tightly sealed it. They should throw waste away in the provided place. Awareness of family members regarding danger of hazardous waste should be raised and information and understanding about hazardous waste management should be give to family members, especially children and housekeeper as well as try to generate the least hazardous waste by chemicals using reduction.

The samples recommended that the Bangkok Metropolitan Administration should provide more hazardous waste containers (grey bin with red lid) and give the public information in the hazardous waste and proper hazardous waste management, including raise public awareness regarding hazardous waste separation continually. A central authority should be assigned to the task of providing both information and the provisions necessary for the safe disposal of household hazardous waste. The

executive officers of The Bangkok Metropolitan Administration should pay more attention to hazardous waste management. Law enforcement for proper household hazardous waste management should be legislated. Upgrading the efficiency of hazardous waste management system by a more effective collection method also, improvement in manpower, equipment and vehicles were recommended. Appoint the fixed time for collection and announce for preparing the waste for disposal were involved. Collecting workers and stuff worker involved should be trained for household hazardous waste management and employment of collecting worker should be increased. The local authorities should provide the facilities for hazardous waste collection. Waste collecting truck should be designed to have type separated section of hazardous waste, split off the community solid waste and attached with type's labels.

The enterprise in possesses the product with hazardous substances, the samples recommended that private sector should be encouraged to reduce the chemicals using and produce the environmentally friendly products. To receiving product back, one of the marketing strategies such as competition for the prize or reward should be promoted. Labeling the product to spot potentially dangerous household hazardous chemicals and proper disposal should be provided. In addition, appropriate and adequate funding should be allocated for hazardous waste disposal. State agencies should impose progressive tax on the amount of waste to be disposed by private sector making the hazardous products. Manufacturers should be required by law to make the reusable products.

5.2 Research discussion

From the study of household hazardous waste management behavior of people in Bangkok, the result of such procedures could be complied into discussion as following description.

Knowledge about hazardous waste management

The result of the study indicated that most samples had knowledge about hazardous waste management at a high level, however; a part of them had incorrect

knowledge in the issue of regulation of Bangkok Metropolitan Administration, household hazardous products storage, hazardous symbol in products label, specifically hazardous waste separation and proper hazardous waste discarding. The incorrectly knowledge about household hazardous waste management of samples can affect an incorrect household hazardous waste management behavior. Therefore, Bangkok Metropolitan Administration and relevant organizations should publicize the correct knowledge about household hazardous waste management, law and regulation about hazardous waste, household hazardous products storage, hazardous symbol and the advantages knowledge for people. Some exhibitions, brochures, and pamphlets could be distributed to give the information thoroughly. It was consistent that people would like to receive the additional information in the topic of proper hazardous waste discarding, hazardous waste separation, hazardous waste law and regulation and hazardous waste storage.

Household hazardous waste management behavior

From the study result of household hazardous waste management behavior of people in Bangkok found that most samples had household hazardous waste management behavior at a high level. The researcher was considering household hazardous waste management behavior by aspects. It found that hazardous waste separation and hazardous waste discarding have some interested remarks as follows:

Hazardous waste separation most of the sample had household hazardous waste separation behavior at a low level. Having been considered by items, it found that some of the sample still had incorrect and inconsistent in household hazardous waste management behavior in the point as follows: “You separate hazardous waste from the other waste.” Most samples 56.5% practiced sometimes, “You store all kind of waste without separating for disposal in community bin.” Most samples 57.0% practiced sometimes, “You separate spray can, insecticide spray, toilet bowl cleaner bottle from community waste and put them to sealed bag.” Most samples 51.5% practiced sometimes.

Hazardous waste discarding most sample had household hazardous waste discarding behavior at a moderate level. Having been considered by items, it found that some of the sample still had incorrect household hazardous waste management

behavior in the issue of “manage the unused mobile battery by placing it down the mobile battery receiving box for return it to the manufacturers”. Most samples 53.3% never practiced, 27.3% practiced sometimes and 19.4% practiced regularly in consequence Thailand determined all batteries are hazardous substances according to The Hazardous Substances Act 1992 because many kind of poisonous substances was inside batteries for example lead, manganese, cadmium, mercury and nickel. In the event of improper useless battery disposal and management, it has many adverse effects on human being and environment. Nowadays, cell phone and support equipments consuming quantity exceedingly grows, the degenerate mobile battery also considerably increase. The organizations involved launching the campaign to persuade the consumer take their unused mobile battery to place it down the mobile battery receiving box. Then the mobile firms will collect and transfer the batteries waste to proper and safe treatment process. (Kwanrudee Chotchanatthaweewong, B.E.2546: 8)

The samples had hazardous waste separation behavior at a low level and hazardous waste discarding behavior at a moderate level because the economics and society today make hurried working. It does not have much time to separate household hazardous waste and inconvenience of separation that is the household hazardous waste management problem which samples facing, including the lack of awareness on the importance of hazardous waste separation. There are non-beneficial in money unlike newspapers separation that can sell its. Enforcement penalty also was not available for no separation. These reasons resulted in discarding behavior. When there is not separate hazardous waste resulting for improper hazardous waste discarding. Therefore, relevant agencies should encourage the public to be conscious and aware of hazardous waste separation and proper discarding by arrange an activity and exhibition.

From the above behaviors, they are related to the additional household hazardous waste management information requirement in many topics. It found that most of the samples required the additional information in topics of the proper hazardous waste discarding in order to practice properly in hazardous waste discarding and self-protection from danger of hazardous waste discarding, including hazardous waste separation due to the samples depreciated in hazardous waste separation.

CHAPTER 6
CONCLUSION

The objectives of the study on household hazardous waste management behavior of people in Bangkok was to study the level of household hazardous waste management behavior of people in Bangkok, to study the factors affecting household hazardous waste management behavior of people in Bangkok and the problems, obstacles and recommendations for household hazardous waste management. The researcher collected data from 400 cases of samples by using questionnaires. The results of study were as follows:

6.1 Research conclusion

6.1.1 General characteristics of the samples

The personal factors of the samples were found that most of the samples 69.3% were female, 47.8% aged 35-45 years old, 21.0% have lived in Srinakarin group area, 50.0% held bachelor degree and higher, 33.3% worked as commerce/self-employed, 41.3% earned 15,001-50,000 baht per month, 67.0% lived with the family members 4-6 persons.

In terms of motive factors, it was discovered that most of the samples 42.49% had contaminated container as household hazardous waste, 83.0% gained access to hazardous waste management information at a low level, 65.8% had knowledge about hazardous waste management at a high level and 52.8% had health value at a high level.

6.1.2 The level of household hazardous waste management behavior

Household hazardous waste management behavior of most samples 59.3% was at a high level. Most samples 50.5% had hazardous waste minimization behavior at a high level, 37.5% had hazardous waste separation behavior at a low level, 73.0% had hazardous waste storage behavior at a high level and 50.0% had hazardous waste discarding behavior at a moderate level.

6.1.3 The analysis of the correlation of factors with the household hazardous waste management behavior. (One Way Analysis of Variance)

The findings of factors related to household hazardous waste management behavior indicated that knowledge on household hazardous waste management and health value both of which made a significant difference in household hazardous waste management behavior. (at $p<0.001$) Age and residential area also made a significant difference in household hazardous waste management behavior. (at $p<0.01$) Likewise, educational level made a significant difference in household hazardous waste management behavior. (at $p<0.05$) Gender, occupation, number of family members, monthly income and access to hazardous waste management information made no significant difference in household hazardous waste management behavior.

6.2 Problems, obstacles and recommendations

Problems and Obstacles

1. Lack of knowledge about hazardous waste management.
2. The facilities for hazardous waste collection were inadequate.
3. Inconvenient in hazardous waste separation from community waste.
4. Inefficient household hazardous waste management program of the Bangkok Metropolitan Administration and insufficient public educated.
5. Scavengers rummaged for selling and waste digging by dogs.

Recommendations of the study

1. Most samples mentioned that grey containers with red lid for hazardous waste separation were inadequate. Therefore, the responsible organization like Department of Public Cleansing, District offices and relevant organizations should provide more the hazardous waste containers (grey containers with red lid) for people requirements, find the suitable point to place the containers and always keep the containers clean and frequently collect the waste from that containers.

2. Most samples identified that the Bangkok Metropolitan Administration lacked an efficient household hazardous waste management program. Therefore, the local authorities involved should improve the efficiency of hazardous waste management system by a more effective collection method also, improvement in manpower, equipment and vehicles were recommended.

3. In order to establish the efficient hazardous waste management system, state agency and related organizations particularly Department of Public Cleansing, Bangkok Metropolitan Administration, Department of Pollution Control and Department of Environmental Quality Promotion should establish a central authority and assign to the task of providing both information and the provisions necessary for the safe disposal of household hazardous waste. It might be proceed in the pattern of hazardous waste management development project. This authority should improve and develop the management system, monitoring and evaluation continuously, including to study to legislate law for conscientiously enforcement, should impose the obviously policy in hazardous waste management and can be concrete and traditional performance in Bangkok and the vicinity.

4. Private sector should decrease hazardous substances in production process for hazardous waste reduction, increase natural, recycle and reusable ingredients. In additional, product label must declare the consumers about hazardous substances in that product, the proper and safe method to eliminate it after using. Implement of the useless product retrieval measure conscientiously by setting the receiving box for sending the unused product back in selling area should be available. It might be in marketing strategies such as the discount for the next purchasing. For this purpose, the government sector should have a measure to control the product with hazardous

substances, an incentive measure for promoting the participation of private sector and play the crucial role in hazardous waste minimization seriously.

5. Even if from the result found that most samples had household hazardous waste management behavior at a high level, currently 140,000 tons of hazardous waste from households and small commercial establishments is disposed with municipal solid waste, directly deposited into sewers or dumped indiscriminately.(The World Bank, 2003:2) For promoting people to have the proper hazardous waste management behavior in all aspects, government sector and organizations involved particularly Department of Public Cleansing, Bangkok Metropolitan Administration, Department of Pollution Control and Department of Environmental Quality Promotion should publicize knowledge and understanding of hazardous waste problems, the adverse impact on health and environment especially the proper household hazardous waste management. Knowledge and information of hazardous waste management should be disseminated to people, community and local administrative unit. Encouraging on awareness of harmfulness from household hazardous products should be publicized in all broadly media that people can perceive such as television, billboard and newspapers and arrange short training by asking for cooperation from academy and state sector. Rising participate in community activities about hazardous waste management of people were recommended with continuously and constantly.

6.3 Recommendations for the further studies

1. To study the alternative model of the household hazardous waste management in Bangkok in order to develop efficient household hazardous waste management program in separation, storage and discarding and also find the concrete form in appropriate household hazardous waste management.

2. To study the process of information distribution, the people evaluation on receiving information, gratification, utility of hazardous waste management and the future trend.

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APPENDIX

QUESTIONNAIRE

Questionnaire

Household Hazardous Waste Management Behavior of People in Bangkok

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Part 1 Personal Information
Note: Please check ✓ in front of the selected answer or fill in your information

1. Gender ( ) Male ( ) Female

2. Age……..years (over 6 months count for 1 years)

3. You are living in…….district

4. Highest educational level

( ) Uneducated ( ) Primary School
( ) Secondary School ( ) High School/Vocational School
( ) Highest Vocational School ( ) Bachelor degree
( ) Higher than Bachelor degree ( ) others (please specify)…….

5. Occupation

( ) Commerce/Self-employed ( ) Government/State Enterprise Officer
( ) Employee/Private Company Officer ( ) Agriculture
( ) Unemployed ( ) Housewife
( ) others (please specify)…….

6. The average monthly income is……..baht before deduct any expenses

7. The number of household members are……..persons (included yourself)

Part 2 Types of Household Hazardous Waste
Note : Please arrange the household hazardous waste quantity ranking by adding number 1 in the most quantity…until the less add number 6 or 0 for none

…..**1.Light bulb:** Fluorescent light bulb, light bulb and other electric lights

…..**2.Dry Cell:** Dry cell for flashlight and any size of dry cell

…..**3.Spray:** Spray paint and other aerosol cans

…..**4.Comtaminated Container:** Hazardous substance contaminated container like toilet bowl cleaner, chlorine bleach, expired cosmetic, outdated medicines, pesticides, ant-roach killers, motor oil, brake and transmission fluid, furniture polish, wood varnish, sliver polish, paints, adhesive, thinners, lacquer, herbicides, chemical fertilizers, photographic chemicals and other contaminated containers

…..**5.Battary:** Automobile batteries, any phone batteries, emergency batteries and power supply batteries

…..**6.Others:** The hazardous wastes apart from five groups above such as printer ink cartridge, aluminum foil, mosquito repelling mat, electronic wastes, etc

Part 3 The access to hazardous waste management information
Note: Please check ✓ in front of the selected answer or fill in your information.

Media	Frequency				
	everyday	**3-4 times a week**	**1-2 times a week**	**1-2 times a month**	**Never**
Newspaper					
Television					
Radio					
Billboards					
Pamphlets/Brochures					
Magazines/Journals					
Verbal Communications					
Formal Publication					
Academic institution/Library					
Internet					

Do you prefer to obtain household hazardous waste management information?

( ) Yes

Please specify a topic that you prefer:

( ) The household hazardous waste minimization
( ) The household hazardous waste separation
( ) The household hazardous waste storage
( ) The proper household hazardous waste discarding
( ) Hazardous waste treatment
( ) The law related to hazardous waste

Please specify a media that you prefer:

( ) Newspaper
( ) Television
( ) Radio
( ) Billboards
( ) Pamphlets/Brochures
( ) Magazine/Journals
( ) Training/Meeting/Seminar
( ) Formal Publication
( ) Academic institution/Library
( ) Internet

( ) No because……

Part 4 Knowledge about hazardous waste management
Note: Please check ✓ in the defined box for the corrected answer.

Content	Yes	No
1. Hazardous waste refer to waste that is composed or contaminated hazardous substances such as ignitability, reactivity, corrosive, toxicity or any hazardous substance that can be harm to public health and environment.		
2. Hazardous waste storage with community waste is properly taken.		
3. Any kinds of household hazardous waste have the same disposal process.		
4. Hazardous substance in hazardous waste can widespread and stay around the environment but no harm to human.		
5. Mix up with community waste is the best method to manage hazardous waste like useless spray can and insecticide can.		
6. Paint, aluminum foil, automobile battery, ink cartridge, herbicide can make fetus disabled. (Teratogenic)		
7. The flammable products like benzene, kerosene and gasoline should be stored in a cool area.		
8. Grey bin with red lid keep for hazardous waste disposal only.		
9. Separate hazardous waste from community waste like batteries is convenient to collect and safe for worker.		
10.Nail polish, hair spray and hair color are safe for public health and environment.		
11.The best solution of hazardous waste pollution problem is household hazardous product minimization.		
12.BMA's regulation defines to put all kind of waste into plastic bag or specified bag and firmly tie before bringing the bag to BMA's bin.		
13.A chemical which is consisting of hazardous waste cannot be widespread in the air.		
14.Lead, tungsten and manganese are the active chemicals of dry cell battery.		
15.Aerosol cans, spray cans and insecticide sprays can be exploded in fire.		
16.Bleach and stain removers can pour down to the backyard swamp and safety for environment.		
17.Automobile waste oil can pour down in the drain.		
18.  is the sign of dangerous product that can explode.		

Part 5 Health value
Note: Please check ✓ in the defined box for your information.

Content	Yes	No
1. You always eat food fully 5 groups nutrients.		
2. You exercise minimum 3 times a week and each 20-30 minutes.		
3. You usually drink fresh water at least 8 glasses a day.		
4. You always smoke cigarette.		
5. You drink liquor more than 3 glasses a week.		
6. You usually have an annual check-up.		
7. You have health insurance at least 1 issue.		
8. You always wash your hands before and after eating and after going restroom.		
9. You wear gloves every time when you touch the dirty or hazardous substances.		
10. You regularly wear shoes when you get out of home.		
11. You avoid being in pollution area like traffic congestion area.		
12. You often dispose of all waste in the same bin.		
13. You read detail in food packaging label every time before purchasing.		
14. You buy uncovered food that sold on the footpath.		
15. You avoid purchasing instant food, convenient food or dining out.		
16. You usually nourish with dietary supplement products that you believe it will benefit you.		
17. You avoid eating high fat food, high sweeten or salted food.		
18. You normally eat high fiber food like vegetables, fresh fruits.		

Part 6 Household Hazardous Waste Management Behavior
Note: Please check ✓ in the defined box for your information.

6.1 Hazardous Waste Minimize Behaviors

Content	Regularly	Some times	Never
1. You discard all kind of waste in house bin.			
2. You read packaging label, warning and instruction when you buy hazardous products such as dry cell, battery, ant killer and toilet bowl cleaner.			
3. You buy the natural products or herbal materials like micro-bacteria fertilizer, lemongrass mosquito repellant.			
4. You buy refillable product for package reduction.			
5. You purchase slim type fluorescent for long-life working.			
6. You buy reusable product like rechargeable battery.			
7. You use insecticide chemicals, toilet bowl cleaner and bleach liquid only what you need to do the job, using only necessary.			
8. You buy the product assured standardization by Thai Industrial Standards Institute, The Food and Drug Administration.			

6.2 Hazardous Waste Separated Behaviors

Content	Regularly	Some times	Never
1. You separate hazardous waste from the other waste.			
2. You put hazardous waste into tied bag or sealed container.			
3. You store all kind of waste without separation for disposal in community bin.			
4. You wash your hands after touching dirty or hazardous waste.			
5. You separate dead mobile battery and put it in sealed bag.			
6. You separate spray can, insecticide spray, toilet bowl cleaner bottle from community waste and put them to sealed bag.			
7. You separate waste that can be harm like ink cartridge by putting it to sealed bag for separating it from community waste.			
8. You cooperate with your community in hazardous waste separation.			

6.3 Hazardous Waste Storage Behaviors

Content	Regularly	Some times	Never
1. You practice follow label instructions or directions on insecticide packaging either how to use or dispose of the product after using.			
2. You pay more attention to store hazardous waste in house.			
3. You store all household hazardous products in the locked cabinets and keep its out of reach of children and pets.			
4. You tell your family members to be aware of touching and using hazardous substances in daily life.			
5. When you change a new light, you put the old one into the new box before disposal of it for light broken protecting.			
6. You store insecticide, windshield cleaner and cleaner liquid in the same area for safety and convenient using.			
7. You store motor oil, kerosene, oil paint to separate them from daily used stuff.			
8. You check the expiration date of daily cosmetic and medicines.			

6.4 Hazardous Waste Discarding Behaviors

Content	Regularly	Some times	Never
1. You read and follow the instruction, suggestion, usage and product disposal direction.			
2. You lay down the packed dead fluorescent in front of house for clearly see and convenient collecting of worker.			
3. You pour the rest of bleach liquid, bathroom cleaner down the drain because it may help you clean up your drain.			
4. You often pour the waste chemicals down the drain because it is the most safety hazardous waste management for you.			
5. When you change car, motorcycle and any engines oil, you leave the waste oil at the transmission shop.			
6. You dispose of dry cell or dead battery by separating them in the sealed bag or locked container.			
7. You manage the unused mobile battery by placing it down the mobile battery receiving box for return it to the manufacturers.			
8. You bring the entire storage hazardous waste in the sealed bag and place it in front of house or remarked point for waiting BMA collecting.			

6.5 Household hazardous waste management that you regularly done
Note: Please check ✓ in the defined box for your information

Waste Types	**Household hazardous waste management**					
	Discarded in general bin with unwrapping	Separated in plastic bag and discarded in general bin	Separated in plastic bag and discard in specify bin	Discarded in Grey bin with red lid of BMA's	Discarded in nearby vacant place	Others
Light bulb						
Dry cell						
Spray can						
Contaminated container						
Battery						
Others like ink						

Part 7 Problems Obstacles and Recommendations
Note: Please fill in your opinion.

1. Problems and obstacles in household hazardous waste management
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……
……
2. For the proper household hazardous waste management, what role of the enterprise in possesses the product with hazardous substances should participate?
……
……
……
3. Do you think Bangkok Metropolitan Administration ready for household hazardous waste management? And Have you any suggestion for Bangkok Metropolitan Administration?
……
……
……
4. The recommendations for household hazardous waste management
……
……
……

Thank you for your answer

BIOGRAPHY

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