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Community-based participatory on waste disposal management research in Yom's riverside community

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ABSTRACT

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This community-based participatory research was implemented to create the public awareness in the waste disposal management among riverside villagers and encourage the community to identify way to solve the problem themselves. The study consisted of three phases, which taked place continually. The first phase was started with an investigation of the riverside people's focusing on waste disposal problem and the second phase was to formulate solutions appropriate to the lifestyle of people. The last phase was to evaluated the solution. Sato community , Srisatchanalai district in Sukhothai province was purposively selected for the site of study. 65 participants were chosen to be participate in this study. Paired t-test and content analysis were used to analyse the data.

The results showed that along Yom River road there were community shops, and the places where they used to dump garbage could be seen. Some of it was left on the riverbank. Many houses dumped their garbage in these areas. Most of the rubbish was plastic foam, paper, and leftover fruit. The result of empower program showed that: all the mean scores of awareness and practice on waste disposal management were significantly increased after attending the empowerment program. The tangible result was that the 65 participants had applied the solution to put into practice. Those activities were, for instance, waste separation, building a garbage hole, and not dumping waste into the river. Finding the method to solve the waste problem in this research was based on the community based participatory. This framework can be used in other public-health problem-solving research studies, because it is problem-solving in accord with local wisdom and truth systems, which exist in nature.

Keywords Waste disposal Riverside community
Community based

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การใช้ชุมชนเป็นฐานในการจัดการขยะของชุมชนริมฝั่งแม่น้ำยม

บทคัดย่อ

ณรงค์ศักดิ์ หนูสอน ธนัช กนกเทศ อนุกูล มะโนทน. การใช้ชุมชนเป็นฐานในการจัดการขยะของชุมชนริมฝั่งแม่น้ำยม. ว.สาธารณสุขและการพัฒนา. 2554; 9(3): 301-11.

การวิจัยประยุกต์นี้มีวัตถุประสงค์เพื่อสร้างจิตสำนึกสาธารณะด้านการจัดการขยะริมน้ำ และเพื่อแก้ไขปัญหาผลกระทบจากขยะของชุมชนริมฝั่งแม่น้ำยมโดยชุมชน การศึกษาประกอบด้วย 3 ขั้นตอน เริ่มจากการศึกษาสภาพปัญหาการจัดการขยะของชุมชนริมฝั่งแม่น้ำยมระยะที่สองเป็นขบวนการแก้ไขปัญหาตามวิถีชีวิตของชุมชน ระยะสุดท้ายเป็นการประเมินผล พื้นที่ที่ใช้ในการศึกษาได้แก่ชุมชนบ้านสะท้อ อำเภอศรีสัชนาลัย จังหวัดสุโขทัย โดยการสุ่มแบบเฉพาะเจาะจงด้วยเหตุผลที่ว่าเป็นชุมชนริมแม่น้ำและมีความพร้อมตลอดจนมุ่งมั่นที่จะเข้าร่วมวิจัย กลุ่มตัวอย่างเป็นตัวแทนชุมชนจำนวน 65 คน การวิเคราะห์ข้อมูลด้วยสถิติ paired t-test และการวิเคราะห์เชิงเนื้อหา

ผลการวิจัยพบว่าริมฝั่งแม่น้ำยมที่เป็นที่ตั้งของชุมชนพบขยะถูกทิ้งอยู่ทั่วไป มีชาวบ้านทิ้งขยะไว้ตามริมตลิ่งประกอบไปด้วยพลาสติก โฟม กระดาษ เศษผลไม้ เมื่อกลุ่มชาวบ้านได้เข้าร่วมโปรแกรมการสร้างพลังอำนาจในการจัดการสิ่งแวดล้อมเพื่อส่งเสริมสุขภาพ คะแนนความตระหนักและคะแนนการปฏิบัติการจัดการขยะเพิ่มขึ้นจากก่อนการเข้าร่วมขบวนการอย่างมีนัยสำคัญทางสถิติ กลุ่มตัวอย่าง 65 คนมีการจัดการขยะโดยการคัดแยกขยะ ขุดหลุมขยะ และไม่ทิ้งขยะลงแม่น้ำ การแก้ไขปัญหาขยะในชุมชนจากการวิจัยครั้งนี้ได้ใช้ชุมชนเป็นฐาน รูปแบบการแก้ไขปัญหาแบบนี้สามารถนำไปใช้กับการวิจัยเพื่อแก้ไขปัญหาสาธารณสุขอื่นๆ ที่มีลักษณะใกล้เคียงกันเพราะว่าการใช้ชุมชนเป็นฐานนี้ เป็นการส่งเสริมการใช้ภูมิปัญญาท้องถิ่น และแก้ปัญหาบนพื้นฐานแห่งความเป็นจริงที่ปรากฏในพื้นที่

คำสำคัญ การจัดการขยะ ชุมชนริมน้ำ ชุมชนเป็นฐาน

INTRODUCTION

By almost any form of evaluation, solid waste management is a growing environmental and financial problem in developing countries. Despite significant efforts in the last decades, the majority of municipalities in the developing countries cannot manage the growing volume of waste produced in their cities.[1] The problem has acquired an alarming dimension during the last few decades. The quantity of solid waste generated has increased significantly and its characteristics have changed as a result of the change in the peoples' lifestyles due to swift industrialization and urbanization. Rapid population growth and increase of economic activities combined with a lack of training in modern solid waste management practices complicate the efforts to improve the solid waste service.[2] Municipal solid waste management (MSWM) services in most developing countries are unsatisfactory and the most common problems associated with it in these countries are lack of financial, technical and human resources and are therefore not capable or willing to deliver and maintain urban basic services.[3-4] These problems also have socio-economic consequences. Poor environmental quality of cities can deprive citizens of a good quality of life as it affects their health and well being.[5] Current problems of solid waste management in Thailand showed that Thailand lack of law and regulation to cover entire system of solid waste management and Lack of law and regulation to cover entire system of solid waste management.[6]

In Yom riverside community, solid waste treatment facilities are inadequate because of lack of human resource, financial capital and technical reasons. As a result, waste from different sources is mostly and directly discharged to nearby water bodies. The water acts as the passive carrier of the infectious or chemical agent. The practice of throwing waste into the river causes breeding of microorganisms and also can be an important vehicle for transmitting chemical toxicants, which may lead to the epidemic of water borne diseases. Water borne diseases are those transmitted through the ingestion of contaminated water. Water borne diseases are cholera and typhoid fever. Diseases caused by pathogenic bacteria, viruses, protozoan, and helminthes are transmitted through the fecal-oral route from human to human or animal to human. It is estimated that about 10 million people die every year due to typhoid, and cholera.[7] The Yom River, running through Sukhothai province, is one of four tributaries flowing into the Chao Phaya River and it can influence the water quality of the Chao Phaya, which is regarded as the bloodline of the Thai people.

The waste disposal management around Yom riverside found that, Many houses did not remove the garbage. Many of them dug a large pit for burning the garbage. Some houses tied the garbage bags and left them behind their houses awaiting disposal. Most of the garbage would be at the back of the house or in the kitchen area, since the inhabitants usually dumped the garbage when they cooked. The garbage left on the ground floor was neglected. Due to the fact that the Yom riverside community is the main source of agricultural and livestock waste as well as domestic waste, no system has been developed as yet for collection and disposal of waste in this area. The municipalities generally collect only 30 percent of the solid waste generated each day around riverside, therefore, much of the solid waste generated remains

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uncollected each day. There was no official group at all to deal with the waste issue. However, some people, such as the village head, the abbot, teachers, etc. tried to push the issue of garbage management from time to time. Although the people paid little interest to the community's garbage problem, several households failed to understand the causes and effects of the problem, so that it was not possible to form a working group to manage these problems directly. This reflected their awareness of paying attention to the problem and creating a mentality in the community to utilize the correct methods, leading to eventual action.

To contribute to the solution of waste problems. In the last decades it has been realized that community participation is essential to maintain those services.[8] In the 1990s community-based approaches to environmental problems have become widespread, since there is an emerging global consensus that the implementation of sustainable development should be based on local-level solutions and community participation. Community participation has several benefits, which can be divided in benefits for the community and benefits for the project. On the one hand, community participation can be seen as an end in itself and a way to strengthen the community. On the other hand, community participation can be seen as a means to execute projects in a more efficient way.

As with any community based waste services, there are three main elements to defining participation: awareness, education and management. Each element is equally important and the level of participation required depends upon who is rendering the service and what the community wants. At the end of the spectrum is that of participation on a committee that plans and manages the programmer in its entirety.[9]

This research, therefore, was conducted to create the awareness in the waste disposal management among the riverside villagers and encourage the community to identify the way to solve the waste problem by themselves. The research focuses on waste disposal management by community base and the properly problem-solving strategies that originates from the riverside villager's perspectives. They should be given opportunities to develop and create problem-solving activities without any pressure. This is ideally the right movement for the beginning of the sustainable problem-solving approach.

METHODS

This applied research consisted of three phases, which taked place continually. It started with an investigation of the riverside people's focusing on waste disposal by applying community base to investigate the cause of problems. These methods would enable the riverside villagers and the researchers to know, understand, and realize the real cause of waste relating to their lifestyle and allowed them to consider and analyzed the origin of problems. This guided them to find the solution of problems that comes from local wisdom, systematic brainstorming process and reliable methods. This study linked the cause of problems which had been identified earlier in the study to formulate solutions appropriate to the lifestyle of people and the needs of the community mainly based on the health promotion empowerment approach. After obtaining the solution, the riverside villagers developed process and mechanism for participatory evaluation with the assistance of the researchers. The evaluation assessed whether the solution for waste materials problem met the need

of community. Obviously, the consequence was perceptible and beneficial.

This study was conducted with the approval of the ethics review committee of the Naresuan University. The researchers chosed Sato community of Srisachanalai, Sukhothai province as the location to study because of purposeful sampling to identify information rich cases. Regarding the community pilot survey, it is found that, there were sixty five of key person in riverside community, Therefore the researchers were selected all sixty five of them for participants. The participants was be classified as follows:

- Informal community organizations; i.e., 22 public health volunteers, 20 agricultural volunteers, 5 housewife group, 2 youth groups and 5 elder people group.
- Informal community leaders; 3 leaders in the village.
- Formal community organizations; i.e., 3 sub-district organization administration officers.
- Local officers; i.e., Deputy Chief of sub-district Administrative Office, 2 health workers, and 2 teachers.

To conduct this study systematically and smoothly, the researchers developed an activity plan as follows:

1. Identified problems by studying the lifestyle. The study of the riverside community's lifestyle was the gateway to the social facts discovered through the process of relative reacts between partnerships. It also leaded to the knowledge and understanding about the thought and behavior that causes the waste disposal into Yom river.

1.1 Observation : Observing the lifestyle of people living by riverside was to keep watching a phenomenon carefully and systematically especially for observation of waste eliminating behavior.

1.2 Focus groups : Focus group conducted in this study consisted of 65 peoples in total.(readiness and willingness to participation) The researchers created a guideline to be used in the focus group based on the aim of the study. The guideline, which was listed by topics and arranged in order, was written in the form of conversation with an elaboration of each step.

2. Implemented program of empowerment on waste disposal problem-solving used the group process as a guideline of this study. The empowerment program consist of the initial phase that focused at establishing the relationship between the group leader(researchers) and the member and also among members themselves. Working phase, the members started to express their thoughts and feelings, exchanged experience and be more open. The members concentrated on waste disposal problem and tried to seek solutions with support from other members. Opportunities for them to discuss and exchange experience brought in new ideas to solve problems in the community. Final phase, the researchers made a summary of all ideas in the study. This helped the research team to assess the progress, positive changes and success of the group.

The group process was the central resource of concepts and experience of various groups of people who met and felt satisfied with their relationships with one another. Their interaction in the group helped them meet awareness and find a way to solve problems. The solution of waste disposal problem in the riverside community needed participation from both official and non-official organizations. Both should have met to discuss and found out methods to solve the problem together. They were linked by the coordination of the participants using group

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process as the resource of ideas and concepts from members. Both official and unofficial organizations met to formulate a guideline to solve problems together, resulting in their agreement on the solution of the problem. It triggered the learning process and created the consciousness of being responsible for the river as well as public consciousness, leading to behavioral changes in accordance with the new role of stakeholders.

3. To evaluate the formation of problem solving whether it fit with the need of people, if it was possible to bring to practices, how it was be expanded to the public, as well as, what the reaction of people was.

Data analysis

The qualitative data, the researchers analyzed by using content analysis technique. The researchers arranged the information collected from the fieldtrip in order and defined its meaning, categorized components as well as connected and found out relationships of data to be able to understand the lifestyle of the people living by the riverside. The researchers categorized and organized data (Typology-Taxonomy) in order to understand meanings and social behaviors concerning waste disposal in the context of Yom riverside. Data categorization and organizing could explain meanings and the relationship of the phenomenon from the villagers' perspective. For the quantitative data, the researchers analyzed by using paired t-tests.

RESULTS

Waste from houses in the community

Regarding the observation and separation of the riverside garbage. The step in the collection process was to sot the garbage by type and grouped. The types of garbage that were included in Yom's river-side community waste are grouped into four different categories. Percentages were used to express how large/small one quantity is. it was to be grouped into categories as follows: most of garbage were leftover food 62% followed by plastics 33% and paper 4% respectively. (Table 1)

Table 1 Composition of the garbage in Sato community.

Type	Percent
Leftover food	62.0
Plastics	33.0
Paper	4.0
Metals	1.0
Total	100.0

Source: Observation and separation of the riverside garbage

Along the road, through the village and along the Yom River, houses could be observed along both sides of the Yom River. These houses were close to each other, without fences. Away from the Yom riverbank were fruit gardens, and then residential buildings. Along Yom River road there were community shops, and the places where riverside villagers used to dump garbage. Some of it was left on the riverbank. Many houses dumped their garbage in these areas. Most of the rubbish was plastic foam, paper, and leftover fruit.

As the village was located close to riverbank, there was consequently a problem about throwing garbage into the river, especially animal remains. The headman of Village 3 (Moo 3) talked about the problem of throwing dead animal remains into the river. He said that all villagers normally thought the river was a place to throw all garbage. The situation of garbage management around riverside found that, municipalities generally collect 70 percent of the solid waste generated each day. While around riverside the average solid waste collection is 30 percents only; therefore, much of the solid waste generated remains uncollected each day.

The meaning of garbage from the people's perspective

Garbage was always to be found beneath the houses in these community. The riverbank revealed the location for burning the garbage. Most of riverside villagers were pits filled with garbage to be burnt. According to one discussion group, waste in the people's opinion meant whatever was absolutely useless; such as scraps that were unwanted, what we excrete from the body, equipment that was inoperative, animal corpses, rotten fish, dead chickens, and dead dogs. These are what they called "waste". Things that are completely unwanted such as fallen leaves, rotten vegetables, and plastic bags that could not be reused. These are what they call "garbage". Two types of garbage were found in Sator community; i.e., 1) sellable (recyclable) garbage, and 2) unsellable garbage. The sellable garbage consisted of paper, beverage cans, beer bottles, plastic water bottles, paper boxes, small pieces of leather, rubber tires, and old shoes. Garbage that was not recyclable was leftover food, leftover vegetables, clothes strips, dirty plastic bags, foam, broken glass bottles, batteries, rock/sand, electric tubes, insecticide cans, tile chips, baskets for vegetables, ruined woven baskets, etc.

The effect of garbage to community, it causes natural waters to be unfit as an environment for fish, unsuitable for recreation, preventing the enjoyment of swimming, boating and similar waterside activities and aesthetically offensive and the most importance is that it affects the health of people. Waste has far-reaching, long-term and irreversible consequences for human health and the environmental.

The awareness in the waste disposal management among the villagers

The result of empower program showed that: all the mean scores of awareness and practice on waste disposal management were significantly increased after attending the program. The total awareness of ownership, and practice scores were increased. Details of comparisons of mean scores of knowledge, and practice are shown in Table 2.

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Table 2 Comparisons of mean scores before and after applying the health promotion empowerment process on awareness, and practice on waste disposal management.

Participants group Variables	Total score	Pre		Post		Mean Different	P-value
		Mean	S.D.	Mean	S.D.		
Awareness score	30	19.33	3.14	24.31	2.21	4.98	< 0.001
Practice score	24	4.93	4.09	15.46	3.02	10.53	< 0.001

Waste disposal problem-solving by Yom riverside community.

The participants team's work consisted of working together as a multilateral group. All members had made decisions together as partners, or stakeholders of the community. They participated in finding the way to solve the problem, planning and evaluation together. Every member had an equal right to discuss and express ideas democratically to find the solution and to know the good or bad outcomes according to the principles of the community base approach. They discussed information from related groups, especially information from their observations as stakeholders. At last, they obtained the final solution of the group by using the final decision that had been made and studied together. This was a skill, and a lesson gained from teamwork.

The tangible result was that the 65 participants had applied the solution to put into practice as an example for the community. Those activities were, for instance, waste separation, building a garbage hole, setting up a sign not to throw any garbage on the banks of the river and not dumping waste into the river (Table 3). Those activities had excited the people who had just experienced propagation of the result from the participants team. This was successful in making the people in the community better understand and care about their residential area. The success was a key, heartening the team to work together again. The practices of the participants were regarded as the changes to the society that affected their behaviors, and at the same time, they could use it to affect other people's behaviors.

Table 3 Comparisons of percentages before and after applying the health promotion empowerment process on waste disposal management activity.

Waste Disposal Management	Before (n=65)		After (n=65)	
	Number	Percent	Number	Percent
1. Building the garbage holes	7	10.8	18	27.7
2. Sorting out the garbage	25	38.5	58	89.2
3. Recycling the garbage	21	32.3	63	96.9
4. Re-using the garbage	17	26.2	65	100.0
5. Setting up a sign not to throw any garbage on the banks of the river	1	1.5	12	18.4
6. Producing fuel from dry garbage	10	15.4	23	35.4
7. Burying wet garbage in the farms or gardens	12	18.5	31	47.7
8. Using other materials instead of the materials, which are difficult to be decomposed	14	21.5	65	100.0

The evaluation was conducted with 65 houses by observation and interrogation of house representative. It was found that after applying the health promotion empowerment process on waste disposal management activity 100% reusing the garbage, which was the most common method of waste disposal. 96.9% recycle the garbage and 89.2% sorting out the garbage respectively.

DISCUSSION

The study found that , along Yom River road there were community shops, and the places where riverside villagers used to dump garbage. Some of it was left on the riverbank. Many houses dumped their garbage in these areas. Most of the rubbish was plastic foam, paper, and leftover fruit. The outcome enables the community to know and understand the real situation and processes leading to the causes of waste materials. People in the community realized the problem as well as developed their self-understanding in order to analyze the origin and consequence of the problems. Such understanding was enable the community to be deeply aware of the facts of situations and social behavior which might be specific characteristic of the riverside community that caused water pollution. All of the outcomes were used as a guideline for solving problems as well as for making plans appropriate for the community to tackle the problems efficiently, leading to the sustainable problem-solving approach, which conforms with the concepts of Heron & Reason.[10] who remarked that co-operative inquiry is a participatory action methodology that does research with people not on to or about them. This process engages people in a transformative process of change by cycling through several iterations of action and reflection. Co-operative inquiry consists of a series of logical steps including; identifying the issues/questions to be researched, developing an

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explicit model/framework for practice, putting the model into practice and recording what happens and, reflecting on the experience and making sense out of the whole venture

The result of empower program showed that: all the mean scores of awareness and practice on waste disposal management were significantly increased after attending the program. The empowerment program focused at establishing the relationship among members themselves. The members expressed their thoughts and feelings, exchanged experience and be more open. The members concentrated on waste disposal problem and tried to seek solutions with support from other members. Opportunities for them to discuss and exchange experience brought in new ideas to solve problems in the community. This helped promote the learning environment in the community which conforms with the concepts of Park,[10] points out that the knowledge does not come from analysis of data about other human beings but "from sharing a life-world together – speaking with one another and exchanging actions against the background of common experience, tradition, history, and culture". He also emphasizes that "this engagement and its impact on ways of looking and developing knowledge are more important than the articulation of a set of techniques that can be mimicked".

The evaluation result was found that the 65 participants had applied the solution to put into practice as an example for the community. Those activities were, for instance, waste separation, building a garbage hole, setting up a sign not to throw any garbage on the banks of the river and not dumping waste into the river. It showed that problem solving in the community was always carried out by groups or existing community organizations or newly established one to solve this problem. They were representatives of the community to solve various problems. Problem solving through the group process was much more effective than by individual because the group process provided better ways and a variety of solutions to tackle problems. In addition, was also the central resources of people for solving problems and errors were frequently detected. Being members of the group were more motivating to solve problems than being an individual. In essence, it is a joint operation by people in the community. Sometimes, a group meeting might be successful or unsuccessful, but this is not as important as the joint learning of the participants. The local participants had the opportunity to practice and learn at the same time, which conforms with the concepts of Israel & Checkoway,[12] who remarked that joint research, it promotes learning from practice. A sense of invention will be developed after the joint learning. Lessons are learned from successful conditions and obstructions that led to failure; then, the negative conditions or obstructions are gradually minimized until the method is acceptable to the community.

RECOMMENDATIONS

1. Implementation of the solution to the waste problem in the community, or other problems, must be evaluated by finding a change agent. This may start with a community leader, organization, community or with people in the community itself who

possess understanding and a broad mind in initiating the solution to the problem as a learning approach, understanding the community as a whole.

2. Finding the method to solve the waste problem in this research was based on the community base. This framework can be used in other public-health problem-solving research studies, because it is problem-solving in accord with local wisdom and truth systems, which exist in nature.

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