Behavior Water Users in Urban Communities with Integrated Behavioral Model (IBM) Approach

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ABSTRACT

The need for clean water is increasing, especially in urban areas; there are still residents using piped clean water, the rest using groundwater sources, but not all water sources are adequately protected so that they are potentially contaminated. This study aims to analyze using clean water in urban communities. The study was conducted on 188 respondents in Makassar. The survey was conducted using a questionnaire and observations on piped water sources (local water company), protected wells, and unprotected wells at the research site. The Integrated Behavior Model (IBM) approach is expected to know the effect of using clean water in urban communities. The results showed that the importance of using clean water influenced the protected well users' behavior. In the case of unprotected well users, the factors of intention, environmental barriers, and habits influence using clean water. The factors that influence behavior, especially in urban slum areas, vary based on the source of clean water used, so health promotion efforts to change behavior must be developed according to the type of water source used.

Keywords: Water sources, Water Treatment, Attitudes and Behaviors, Clean water, Sanitation.

1. INTRODUCTION

The problem of clean water is a vital problem for human life. We need clean water for daily drinking, cooking, bathing, washing, latrines [1]. The provision of clean water is essential to study, considering that water is a basic need that is constantly consumed by the community and can significantly influence the smooth running of the community's activities [2]. The limited supply of quality clean water for the community can affect public health, economic productivity, and quality of life.

Clean water and proper sanitation are basic human needs. The fulfilment of clean water and proper sanitation is still a problem worldwide. For this reason, the fulfilment of the need for clean water, drinking water, and sanitation is a sustainable development goal. From 2015 to 2019, household access to safe drinking water has increased in urban and rural areas. Currently, it is estimated that around 1.1 billion people have not had access to safe drinking water since 2002, so 6,500 children die from diarrhea every day [3]. In general, deaths from diarrhea in children globally reach 42,000 cases/week, 6,000 cases/day, 4 cases/minute, and one death/14 seconds [4]. Urban residents have increased sharply, especially in developing countries, due to rapid urbanization, creating many slum areas and lacking access to clean water.

Most of the population in Indonesia still uses healthy water as a source of clean water to meet their daily needs. With increasing activity and population, humans' amount of clean water needed will increase [5], [6]. Globally, the quantity of land and water resources is relatively constant, while the quality decreases day by day. Realizing that clean water is one of the sources of human life, humans will not survive without water. To continue to live, the need for water must always be met. Therefore, the provision of clean water or healthy drinking water has always been a demand for every human being, including the people of Indonesia, especially the people of Makassar.

Several different factors can influence community behavior in determining clean water sources. Not all residents choose piped water, and although the local government's water distribution network for drinking water is available, some residents still rely on groundwater sources which are more at risk of contamination because there are still many people's behaviors that do not use healthy latrines. There are still many residents who use well water sources who ignore the requirements for making good wells, so some are still unprotected sources [7], [8].

Integrated Behavioral Model (IBM) is a health behavior theory that focuses on the individual who is the most crucial target in expected behavior change. Information about the individual's role in behavior change is needed to develop an intervention plan. IBM

emphasizes the importance of intention as a motivation to behave. A particular behavior is most likely to occur if a person has a solid intention to perform it, has the knowledge and skills to perform it, no severe environmental constraints are preventing it, the behavior is believed to be necessary, and the person has performed the behavior previously as a habit [9]. The most crucial factor is the intention determined by attitudes towards behavior, perceived norms, and personal factors. The behavior of using clean water is the basis for assessing the factors of clean and healthy living behavior in the household. Behavioral determinants are used to understand behavior and determine intervention strategies to produce the desired behavior change.

This study aims to determine what factors are the most dominant influencing behavior towards the use of clean water sources, especially in urban communities; the most suitable theory to be applied is the Integrated Behavioral Model (IBM) theory because this theory integrates individual internal influences and the effects of environmental barriers. The results of this study are also expected to increase intervention efforts in infectious disease prevention programs, significantly to develop proper health promotion in the use of clean water.

2. METHOD

This study uses confirmatory factor analysis with independent variables consisting of knowledge, interest in behavior (salience of the behavior), intention to implement behavior (intention to perform the behavior), environmental constraints (environmental constraints), and habits (habits). Respondents were divided based on the source of clean water using water from the Regional Drinking Water Company, protected wells, unprotected wells, refilled water, bottled water.

The population of this study was all households in the Barombong Village, Tamalate District, Makassar City, South Sulawesi Province. The research sample was determined by a simple random method with the indicator that the source of clean water used in the house could consist of more than one water source. The number of samples is 188 for the Makassar City area.

Respondents are household members who know about clean water in the house. Data were taken through a questionnaire tested for validity and reliability and an observation checklist adopted from the WHO guidelines. Data were analyzed by multivariate confirmatory factor analysis.

The Integrated Behavioral Model or IBM develops two theories: the theory of reason action (TRA) and planned behavior (TPB), emphasizing that behavioral intention is the most important determinant of behavior. Without motivation, a person is unlikely to carry out the recommended behavior. Four other components influence behavior directly. Three of them are essential in determining whether behavioral intention can lead to

implemented behavior (behavioral performance). First, even if a person has a full behavioral intention, he or she needs knowledge and skills to carry out the behavior. Second, a few environmental constraints should make implementing the behavior difficult or impossible. Third, the behavior must be prominent, visible, and quickly recognized or realized. Finally, the experience of implementing the behavior can make it a habit, so that intention becomes less critical in determining the performance of individual behavior.
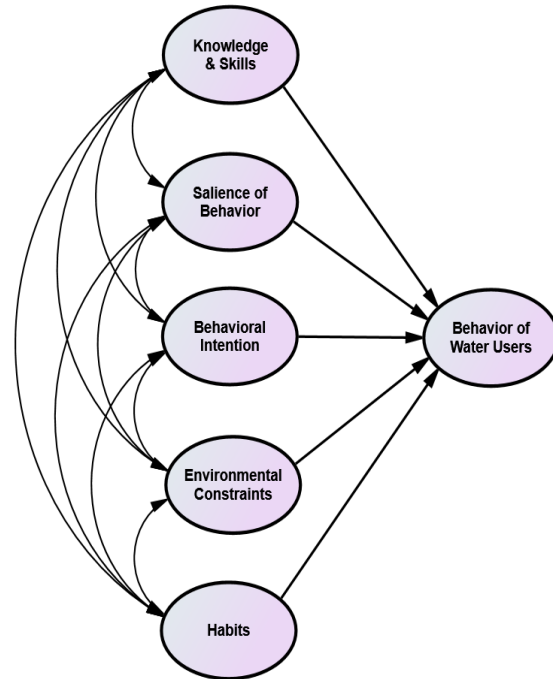

Figure 1. Integrated Behavioral Model (IBM) [10].

In this study, the Integrated Behavioral Model (IBM) consists of 6 variables as follows Knowledge and Skills (KS), Salience of the Behavior (SB), Intention to Perform the Behavior (IPB), Environmental Constraints (EC), Habits (HA) and Behavior of Water User (BWU).

3. RESULT AND DISCUSSION

Residents use various sources of clean water, namely water used for daily needs such as washing, bathing, and as a source of water to obtain drinking water with the requirement that the number of Coliform bacteria is less than 1 liter. Some residents use piped clean water sourced from the Regional Drinking Water Company. However, there is a distribution of the Regional Drinking Water Company pipe network in residential areas, and this is because the water from the Regional Drinking Water Company does not flow every day for 24 hours; the water from the Regional Drinking Water Company is more frequent. It only flows at night for 3-4 hours.

Some other residents still depend on groundwater sources such as wells and springs because it is easy to obtain and cheaper. Some of the wells used by the community are protected wells, but there are still many that are unprotected wells which are at high risk for contamination; residents with clean water from unprotected wells are possible due to insufficient knowledge of the importance of quality clean water and what are the requirements for making standard wells.

Table 1. Characteristics of Respondents

Criteria	Frequency (n=188)	Percentage
Gender		
Man	78.00	41.49%
Women	110.00	58.51%
Education		
Primary School	17.00	9.04%
Junior High School	35.00	18.62%
Senior High School	108.00	57.45%
College	28.00	14.89%
Job		
Government Employees'	25.00	13.30%
Private Employees'	45.00	23.94%
Entrepreneur	87.00	46.28%
Freelance	31.00	16.49%
Source of water		
Water Company	32.00	17.02%
Protected Wells	61.00	32.45%
Unprotected Wells	47.00	25.00%
Refill Water	36.00	19.15%
Bottled Water	12.00	6.38%

The characteristics of the respondents also vary based on the type of water source they use, as described in Table 1. Respondents who use water sources from regional drinking water companies mostly work as civil servants with 17.02%. Private and freelance workers dominated respondents who consumed refilled water. The most extensive water use is through protected water sources (deep well) with 32.45%, which is used for almost every type of work. Respondents from protected water sources generally use the highest water per day. All respondents generally treat drinking water by cooking or filtering.

Table 2. Standard Regression Estimations

			Estimate	Probability
KS	→	BWU	0.514	0.011[*]
SB	→	BWU	0.357	0.014[*]
IPB	→	BWU	0.241	0.002[**]
EC	→	BWU	0.432	0.016[*]
HA	→	BWU	0.175	0.422

** significant ($p<0.01$), * significant ($p<0.05$)

Table 1 shows the factors that influence choosing clean water sources based on IBM's theory; the results are as follows: attitudes, perceived norms, and personal factors on the respondents of regional drinking water companies that affect intentions. Only attitude affects respondents with protected water sources, and only personal factors affect intentions for respondents with unprotected water sources. According to research in several countries, attitudes can affect using clean water [11]. Attitude is a readiness or willingness to act and not the implementation of a particular motive. Attitude is not yet an action or activity but is a predisposition to behavior [12].

The norm variable that influences the intention to use clean water in the respondents of the regional drinking water company is following research which shows that there is an influence of norms obtained from social pressure from others with the individual's own intention to perform a behavior [13], [14] Perceptions of norms are defined as social pressures to display or not display a behavior [15]. Subjective norms are individual perceptions of social pressures that encourage him to carry out or not carry out a behavior,[16] also emphasize trust in the sense of personal belief in assessing individuals or groups to agree or disagree with the behavior that will be carried out [14]. Respondents of regional drinking water companies show a substantial influence value of attitudes, perceived norms, and personal factors that indicate respondents are affected by the perception that using local water companies is a source of the best clean water.

For respondents with protected water sources, only attitudes that strongly influence intentions to use clean water indicate that respondents for protected water sources have confidence in using drilled wells or closed dug wells with pumps. Trust is one aspect of attitude that presents information about the behavior taken, normative expectations from the immediate environment, and the difficulties experienced in displaying the behavior [14].

Individuals who have strong beliefs about the benefits of using clean water sources and protected water sources will also have a positive attitude towards using clean water. Respondents of protected water sources think that the water sources they use are suitable and generate benefits, such as financial benefits. For respondents, water sources are not protected. Only personal factors have a strong influence on intentions. Personal factors are factors from the individual himself, indicated by the perception of control and self-efficacy. This indicates a firm intention of its own to use unprotected water sources. Personal factors are self-confidence or the ability to display behavior. If the attitude sees the belief in the consequences of the behavior performed and subjective norms express the normative belief, then the personal factor is the belief in resources and opportunities to display behavior. Attitudes and norms are considered not to affect intentions because respondents from unprotected water sources lack the intention to clean the water sources they use and do not care about the opinion of the environment and those closest to them who use other sources of clean water for consumption.

For respondents, local drinking water companies and protected water sources, knowledge, interests in using clean water, intentions to use clean water, and environmental barriers are also affected. At the same time, habits do not affect using clean water. In respondents, water sources are not protected. Only the intention to use clean water and habits can influence using clean water. Most respondents from regional drinking water companies and protected water sources have decent jobs and education, following research that shows knowledge influences interventions to prevent microbial pollution in household drinking water [11].

The occupation and education of the respondent's household head of a regional drinking water company and well-protected water sources and the ability to pay for the family's needs for a month are the backgrounds for the behavior of using clean water. This situation affects their ability to finance their monthly needs, especially for respondents from regional drinking water companies, so that they can choose the best source of clean water by subscribing to a regional drinking water company that is believed to be standardized, clean water compared to using groundwater sources which are cheaper in terms of cost, but its safety is not guaranteed. However, users of regional drinking water companies do boil before drinking if there is still contamination of the water they consume, possibly due to improper storage of water in containers or a leak in the pipes of the regional drinking water company so that the water remains contaminated. After the boiling process of drinking water, microbial contamination can result from water stored in containers with a wide mouth diameter, open containers, and water touched when removed from the container. Water pollution is affected by water storage, risks from plumbing, and household water management practices [3].

The importance of using clean water also affects the behavior of using clean water, according to research that shows a strong relationship between a behavior and a person's belief to feel important in doing that behavior [14], [17]. The interest in the behavior of using clean water becomes the basis of someone's consideration to intending to do something.

If he considers what he is going to do is important, then in the next stage, he will have intentions supported by attitudes, perceived norms, and personal conditions [18]. Intentions and environmental barriers affect using clean water in the household setting [17], [19]. Environmental barriers to using clean water have good scores on all respondents. People assume that the environment is already slum and that the water from drilled and dug wells is easier and cheaper to reach. They think that the installed septic tank will not affect their health so much that they are no longer needed. People think installing a septic tank creates air pollution for residents near communal septic tanks, causing discomfort.

There is no influence between the habits and behavior of using clean water in the three respondents from water sources, contrary to research which shows an effect of [18]–[20] safe because it is colorless, tasteless, and odorless. The community also assumes that the disease they experience is a disease commonly experienced so that it does not move them to look for better sources of clean water. People are used to using the same water source for a long time and have no desire to change their clean water source because it is considered safe enough even for infants and toddlers.

According to the WHO classification, unprotected water sources consist of open dug wells and dug wells with buckets that are only partially closed [21]. In this study, many unprotected water sources in slum areas are public facilities that do not meet the requirements of the Minister of Health. Dug wells that are included in unprotected water sources provide water that comes from a layer of soil that is relatively close to the ground surface so that it is easily contaminated through seepage originating from human latrines and animal waste, as well as from well waste itself, either because of the walls wells and sewers that are not impermeable to water. This does not make residents hesitate to use water from open dug wells because they are ordinary people with less socioeconomic status.

4. CONCLUSION

The factors that influence clean water sources in urban communities vary based on the selected water source. Attitude factors, perceived norms, and personal factors affect the respondents' intentions with the water source of the Regional Drinking Water Company. Only attitude affects respondents with protected water sources, and for respondents with unprotected water sources, only personal factors affect the intention to use clean water. The influence of knowledge factors, the importance of using clean water, intentions to use clean water, and environmental barriers are considered influential. In contrast, habits are considered not to affect using clean water in respondents with clean water sources from regional drinking water companies and protected water sources. However, water sources are not protected for respondents with clean water sources. Only the intention to use clean water and habits are considered to affect using clean water.

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