Evaluation on the sanitation facilities in the Gegerkalong

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Evaluation on the sanitation facilities in the Gegerkalong Traditional Market, Bandung, Indonesia

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Abstract. Big cities in Indonesia still have many traditional markets whose activities and transactions are carried out directly person to person. The Gegerkalong Market is a traditional market with high activity due to the dense surrounding population. Traditional market activities require the availability of sanitation facilities to support commercial and domestic activities for sellers, buyers and visitors. This study aims to evaluate the sanitation facilities in the Gegerkalong Market, Bandung, Indonesia. The method used in this study is direct observation and data collection through questionnaires. The observation results were checked and analyzed with the reference requirements contained in the Decree of the Republic of Indonesia Minister of Health No. 519/Menkes/SK/VI/2008. While respondent data is processed using a Likert scale to obtain the level of satisfaction of respondents with sanitation facilities. Sanitation facilities observed included the provision of clean water, waste management, sewerage and drainage conditions, sales stall conditions, toilets and hand washing facilities. Based on the evaluation conducted, it was found that the condition of the Gegerkalong Market sanitation facilities was categorized in the unfavourable state. Nevertheless, respondents were satisfied with the existing facilities because they were already familiar with the existing conditions.

1. Introduction

The Sanitation, often called by environmental sanitation or environmental health, is often referred to an effort to control all factors existing in human's physical environment which probably tends to cause things that interfere to physical development, health or survival [1]. According to World Health Organization (WHO), its definition is limited to a supervising activity of community's drinking-water supply, feces disposal and water-waste, garbage disposal, disease vectors, housing conditions, food supply and handling, atmospheric condition and work environmental safety.

Although modern markets have already served as common places, there are still traditional markets operating actively [2,3]. Traditional market is a market in which its activities or transaction process is still carried out traditionally [4]. It means that seller and buyer directly meet in one place to do the trading, both for goods and services. Basically, this kind of market is located in an open place; most of them sell people's basic needs, including foods. Traditional market was built and maintained by local government, State-owned Enterprises, Regional-owned Enterprises or private party [5]. It is important for us to maintain environmental sanitation in the market because it is a public place where all diseases spread, especially those related to food, drink, air and water [6,7]. Other than that, the market is often considered as a breeding-ground place for infectious animals or vectors, such as cockroaches, flies and rats [8-11]. A market which has poor sanitation will also affect to people's health.

Maintaining sanitation in the market is one of the efforts to control and prevent disease spreading [12]. It is carried out by doing observation and examination on the influences caused by market's activities which can also lead to a disease spreading [13-16]. Based on the Letter of Decree of the Ministry of Health of Republic Indonesia, a healthy market is a place where all related parties could work together to provide safe and full-of-nutrition food, and healthy environments that meet the requirements as well (KepMenKes Nomor 519/ 2008).

The Gegerkalong Traditional Market is a Class-II Market, a market serving city-level trade. It has been operating since 1970 and is located in Jl. Gegerkalong Tengah No. 35, Kecamatan Sukasari, Bandung. It is one of the markets which sell various kind of people's daily needs. It operates every day from 4 AM to 5 PM. Gegerkalong Traditional Market occupies 2,965 m² with a building area of 680 m². It consists of 1 (one) floor only and has 3 (three) main accesses of entry and parking lot as well, as wide as 120 m². The number of buyers in the market is approximately 882 people daily. There are also 304 trading spaces in the market rented by traders/ producers who sell different kinds of merchandise.

Reviewed from its sanitation facilities and infrastructures, Gegerkalong Traditional Market has not met the requirements yet. This research aims to carry out an evaluation study of Gegerkalong Traditional Market by doing observation on the aspects of market sanitation, including the condition of clean water, waste management, sewerage and drainage, as well as toilets and hand-washing areas.

2. Research methodology

This research uses descriptive qualitative method which includes observation by using *checklist* form, interview by using *in-depth interview* or questionnaire and picture documentation. The analysis result will obtain a general description about the condition of sanitation facility in the Gegerkalong Traditional Market. This research took place in Gegerkalong Traditional Market, Jl. Gegerkalong Tengah No. 35, Kecamatan Sukasari, Bandung City. The focus on this research is the sellers and buyers who were also taken as research population. The number of samples is determined and calculated by using the Slovin formula.

Data is processed by reviewing observation and questionnaire result in the form of quantitative data converted into qualitative data by using Likert scale calculation. These results will be further analyzed and compared to the Regulation of Indonesian Minister of Health No. 519/ 2008 regarding the Implementation Guidance of Healthy Market in order to obtain research conclusion based on the processed data result.

3. Results and discussion

The questionnaires which have been given to the respondents are further calculated by Likert Scale. The results are seen in Table 1.

Table 1. Likert calculation results.

Question	Result	Category
No smelly, scattered and rotten garbage piled up.	54.34	S
Availability of trash bin in every stalls	54.48	S
Availability of washbasin with sufficient flow of water	42.22	KS
Clean and odorless toilet	51.92	S
Lots of flies and rats	51.38	S

Scoring Interval: Index 0% - 24.99% = TS (Disagree); Index 25% - 49.99% = KS (Less Agree); Index 50% - 74.99% = S (Agree); Index 75% - 100% = SS (Strongly Agree)

Based on what people see and feel about the sanitation facilities condition in Gegerkalong Traditional Market, it can be concluded that it is necessary to improve the number of hand-washing facilities as well as efforts to control the breeding of flies and rats.

The observation of Gegerkalong Traditional Market was carried out by using checklist method as seen in Table 2.

Table 2. Observation results of sanitation condition.

No.	Substance Assessed	Assessment	
		Yes	No
A.	Garbage Dump		
1	Owning a temporary garbage dump	✓	
2	No smelly and scattered garbage		✓
3	Available trash bin in every stall		✓
4	Available trash bin in the market stall	✓	
5	Separation between dry and wet garbage		✓
B.	Waste Sewerage and Drainage		
1	Liquid waste sewerage/ drainage is closed and cemented by metal grids		✓
2	Smooth flow of drainage		✓
3	Sewerage/ waterways at the wet-stall have no water puddle (fish, meats, poultry, vegetables, coconut-grating stall)	✓	
C.	Public Restroom		
1	Available no-queueing restroom for both men and women		✓
2	Clean, odorless and larvae-less toilet	✓	
3	Owning a well-lit ventilation	✓	
4	Available and sufficient source of water		✓
5	Available washbasin equipped with soap		✓
6	Person-in-charge of toilet maintenance and cleanliness	✓	
D.	Clean Water		
	Available clean water in sufficient quantities and smooth flow of water	✓	
E.	Vector's Control		
1	Spraying pesticide on flies, mosquitoes, cockroaches and rats regularly, twice a year at minimum		✓
2	No pets (cats and dogs) wandering in the market		✓
F.	Hand-washing Facilities		
1	Available hand-washing facility with sufficient flow of water		✓
2	Equipped with soap, kept clean and located at accessible spot in the market	✓	

The assessment results are categorized and classified by looking at the number of answer of YES, as followed.

- Answer of YES >80% = Proper
- Answer of YES 65% - 79% = Less Proper
- Answer of YES ≤ 64% = Improper

Based on the observation table above, there are 7 answers of YES or as many as 36.8% after being calculated. Therefore, the sanitation condition of Gegerkalong Traditional Market is categorized as Less Proper. The results are described as followed.

3.1. Garbage dump
The market has temporary garbage dump locating approximately 5 meters from the market building. A close distance between the market and the dump makes it smelly and full of flies. It also causes poor condition of the goods and sellers' and buyers' comfort. There are also less amount of trash bins and not separated between dry and wet garbage.

3.2. Waste sewerage and drainage
The market liquid waste sewerage and drainage are not equipped with metal grid. There are even some sewerages which are let open, so that much garbage and things/ stuffs could go into the sewerage. Other than that, because of improper drainage condition and lots of garbage piled up, there are also no smooth flow of waste/ drainage.

3.3. Public restroom

Market restrooms consist of toilet (latrine included) and toilet (latrine not included, equipped with tub) and no separation between men and women. The restrooms have a well-lit ventilation and equipped with a washbasin.

3.4. Clean water

There are available sources of clean water in the market. They have and adequate amount and flows smoothly and are in colorless, odorless and tasteless condition. The distribution of clean water in the market only serves for public restrooms, offices, cooperatives and chicken slaughterhouses. Therefore, most sellers should get clean water from the public restroom's faucet in order to fulfill their daily need to trade. The amount of clean water available in Gegerkalong Traditional Market is 132.6 m^3/ day. If the amount of clean water that must be provided in the market is 12.16 m^3/day according to the regulations, the supply of clean water in the market has fulfilled these requirements.

3.5. Vector's control

Based on the Decree of Indonesian Minister of Health No. 519/SK/VI/2008, the pesticide spraying on flies, mosquitoes, cockroaches and rats should be carried out twice a year. The market itself does not meet the requirements that have been regulated by the Ministry. Other than that, there are no tools installed and used for controlling the breeding of flies and rats, both inside and outside the market.

3.6. Hand-washing facility

The hand-washing facility is only located at public toilet and not equipped with soap.

The assessment of sanitation condition of Gegerkalong Traditional Market uses 2 (two) instruments: questionnaire and observation. The questionnaire is used to observe how far the respondent's knowledge (traders and market buyers) regarding market sanitation condition, as well as to find out the level of satisfaction and perceptions, while the observation is used to directly observe the existing condition of market sanitation by using the *checklist* form whose result could be processed to become qualitative data.

The result on respondent's assessment based on questionnaire obtained an answer of Less Agree on 1 aspect, which is availability of washing-hand facility; while the rest of them answered Agree. It means that the respondents are satisfied to the market facility.

On the other hand, the result on respondent's assessment based on observation showed only 7 out of 19 aspects which meet the requirements. Therefore, according to KepMenKes No. 519/Menkes/SK/VI/2008, Gegerkalong Traditional Market is categorized in the unfavourable state. In order to improve the condition of market sanitation, it is necessary for the market management to identify some components or parts that has not yet met the requirements.

The difference between questionnaire and observation assessment can be affected by several factors, including people's lack of knowledge about sanitation and the limited time for filing out the questionnaire. Therefore, respondents were either careless in filling out the questions, or they did not care and feel right about the market sanitation condition.

Based on the results and discussion, the technical recommendations are following below:

3.6.1. Clean water. The quality of clean market in the market is checked once every 6 months.

3.6.2. Restroom and toilet

- There should be separation between men and women's restroom.
- There should 5 restrooms and 5 toilets available in the market according to KepMenKes No 519/ 2008. Based on the observation in Gegerkalong Traditional Market, it is necessary to provide more 3 restrooms to meet the requirements. The number of restroom is seen in the table below based on the Republic of Indonesia Department of Health Decree no. 519/2008.
- A restroom and a toilet should be provided if there is addition of 40-100 people

- Toilet's location is separated at least 10 m from the food stall.
- The length, width and height of the restroom and toilet are each 80 x 160 x 220 cm according to the requirements of the 2004 Standard of Indonesian Public Toilet by the Ministry of Culture and Tourism.
- The restroom floor is made of ceramic tiles: waterproof, flat, not slippery, not cracked and easy to clean. The slope toward the *floor drain* is 1% of the floor length/ width to get a slope of 0.005.
- Each restroom and toilet are equipped with a closed trash bin.
- Each restroom and toilet are equipped by *floor drain* with a minimum diameter of 80 mm and a height of 5.5 cm - 80 cm.
- Toilet, tub and urinal spot are placed at a minimum 15 cm above the floor face.
- The urinal spot attached to the walls should be safe and securely mounted to the walls as well.
- The recommended size of washbasin is as followed:
  a. Width: 80 cm
  b. Width of basin: 60 cm
  c. Height of basin: 80 cm
  d. Distance between the edge of the basin: 45 cm

3.6.3. Garbage management
- Garbage dump is at least 10 m from the market building.
- Every stall/ alley should be equipped with wet and dry trash bin, made from waterproof material. It should also be strong, close, uneasy to rust and easy to clean.
- The recommended dimension of trash bin at every stall is as followed:
  a. Width×Length×Height : 13.5 cm×20 cm×38 cm
  b. Capacity : 8 l
- The recommended dimension of trash bin at the alley is as followed:
  a. Width×Length×Height : 48 cm×32 cm×90 cm
  b. Capacity : 120 l

The trash bins in each alley are also wheel-equipped, in order to make it easier for cleaning officers to put garbage to the dump.

3.6.4. Drainage
- The market sewerage/ drainage is closed with metal grid to avoid garbage/ other stuffs got in into the sewerage.
- Liquid waste from the stall is shifted to the Wastewater Treatment Plant after being dumped into the public sewerage to avoid water pollution.
- The drainage is cleaned once every 3 days in order not to cause flood when raining.
- Quality test of liquid waste should be regularly carried out once every 6 months.
- The recommended size of drainage is as followed (a) Semicircular-shaped sewerage with diameter of 20 cm, (b) Sewerage slope of 2%, (c) Sewerage depth of 40 cm, (d) Concrete-made building materials

3.6.5. Hand-washing facility
- Hand-washing facility is soap-equipped.
- Hand-washing facilities are available in sufficient quantities, placed in each alley, especially in the wet-food section so that buyers can easily wash their hands after carrying out activities in the market. The facilities should be placed in an accessible spot.

3.6.6. Vector's control
- Food-section stall should be free of flies, mosquitoes, cockroaches and rats, by placing vector repellent.

- Spraying pesticide on flies, mosquitoes, cockroaches and rats should be carried out at least twice a year.

4. Conclusion
Based on questionnaire result which was calculated using a Likert scale, it is obtained that respondents, both sellers and buyers, agree to the sanitation condition in Gegerkalong Traditional Market. Meanwhile, according to KepMenKes No. 519/ Menkes/ SK/ VI/ 2008, the observation result showed that the sanitation condition in Gegerkalong Traditional Market is in unfauvorable state.

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