The correlation between daily fisherman's demographics and their catching behaviors in Tegal, Indonesia

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Article Info	ABSTRACT
	The majority of people in Tegal City work as daily fishermen. However, in the handling process, there are incompatibilities between fish caught quality and wholesaler standards. The causes are lack of experience, knowledge and less training about fish handling. Therefore, it needs to find the correlation between fishermen's socio-economic (demographic) and their catching behavior. This study uses quantitative methods. The collected data were statistically tested using ANOVA. The results showed income factor has significant correlation with poor fishing technique and fish slime. Departure time has significant correlation with poor fishing technique and wet ice handling. Fish damage percentage has significant correlation with stock of cooling media and fish quality decline. Thise factor is due to the lack of daily fishing capital and catching knowledge. Therefore, it needs cooperation from various parties to facilitate daily fishermen to gain optimal yields.

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1. INTRODUCTION

Most of the people of Tegal City work in the fishery sector (Sudarmo et al., 2016). These marine products have the nature of commodities that are easily damaged, so it is necessary to pay attention to how to catch and handle them (Nugroho et al., 2016). Improper handling of post-catch fish will result in defects and accelerate the declining quality. One of the factors is the lack of knowledge of post-catch fish handling (Litaay et al., 2020). Fish caught using vessels that are incomplete in storage facilities will experience a decrease in quality before the fish reaches the mainland by around 20-30% (Deni, 2015).

Low-quality fish can be seen in the eyes of the fish being cloudy, the eyes of the fish are not bright red, and the gills of the fish are not fresh (Naiu et al., 2018). Meanwhile, quality fish has the characteristics of more chewy meat, the meat is not separated from the bones, the eyes are brighter, and the fish does not smell bad (Naiu et al., 2018).

One of the main activities of fish handling on the sea is storage in styrofoam boxes in lower temperatures (Pandit, 2017). In addition, post-catch fish handling activities on board can affect the income and quality of fish caught (A'yun, 2017). The low income and fish quality are due to fishermen's low level of experience and knowledge (Wiyono & Mustaruddin, 2016). The problem also happened to daily fishermen in Tegal City. Furthermore, catching behavior is one of the cause of low quality of

caught fish. Behavior is an activity that begins with the process of inputting information from each individual (Jahi et al., 2011). Personal behavior is the result from learning process. In the case of daily fishermen, the lack of catches and improper handling indicates the required additional information to improve the quality and quantity of yields. Thus, the behavior of fishermen in fishing activities can be used as an entry point to develop a learning process.

Departure hours for daily fishermen in Tegal City are carried out from morning to evening, with uncertain departure times such as from 05.00-12.00 WIB, 04.00-13.00 WIB, 04.00-16.00 WIB. It depends on the readiness of the fishermen who will sail. The number of daily fishing members per boat is about 1-3 people.

Daily fishermen still have limitations such as working time, type of boat, equipment used, and skills (Rimawati, 2019). Based on this description, a study is needed to determine the effect of daily fishermen's socio-economic (demographic) on catching behavior. Daily fishermen mean fishermen who have simple equipment but have relatively more trips. The correlation between the socio-economic and behavior will give an insight to daily fishermen to improve their performance. Good performance will increase income and maintain the quality of the catch. The study area is this study focuses on daily fishermen, who are the majority in Tegal City.

2.   RESEARCH METHOD

The research was conducted in Tegal city. The method used is quantitative. The number of respondents were 104. The collected data included demographic data and daily fishermen behavior. Demographic data stated age of fishermen, the number of damaged fish, income, fishing capacity, and the cost of departure. Furthermore, the behavioral attributes of fishermen were summarized in Table 1.

Table 1. Attributes of the daily fisherman questionnaire in the City of Tegal

Behavior	Code	Description
Handling (Pianusa et al., 2015)	P1	The storage area above is too small
	P2	Using an inappropriate cooling medium
	P3	Fish storage time
	P4	Tools used to catch fish
Catching method (Prabowo et al., 2019)	P5	The length of time of fishing affects the quality of the fish
	P6	Weather factors affect the number of catches
	P7	The capacity of the boat affects the number of catches
Storage (Alhuda et al., 2016)	P9	Storage media using hatch
	P10	The estimation of the cooling media stock is not accurate
Factors Causing Fish Quality (Palawe et al., 2017)	P11	Poor fishing technique
	P12	Poor post-catch fish storage techniques
	P13	There are a lot of declining quality of fish
Physical Damage (Lestari et al., 2015)	P14	Un-fresh fish eye
	P15	Fish gills
	P16	Slime on fish's body surface
	P17	Fish flesh with a paler color
Cooling Media (Mboto et al., 2015)	P18	Handling uses wet ice
	P19	Handling uses dry ice
	P20	Handling uses cold water
	P21	Handling uses ice and salt
	P22	Handling uses sea water ice

Based on Table 1, the handling aspects include P1, P2, P3, and P4 on fish handling techniques on board to maintain the quality of the catch up to the TPI. In the aspect of fishing methods, including P5, P6, and P7, where daily fishermen still use traditional equipment to catch fish, determining where to catch fish is still using instinct and the capacity of the boat is limited or the size of the boat is relatively small. The storage aspect covered by codes P9 and P10 focuses on fish storage media and media estimates to maintain the quality of the above fish. Furthermore, aspects of the factors that cause fish quality consist of P11, P12, and P13 where there is a decrease in fish quality at TPI, caused by poor fishing, storage, and handling of fish. In the aspect of physical damage including P14, P15, P16, and P17 focused on damage that often occurs in the physical part of the fish, resulting in a decrease in the quality of the catch. Furthermore, the cooling media aspect is included in the codes P18, P19, P20, P21, and P22 where the cooling media used by daily fishermen varies.

The measurement of fishermen's behavior used a Likert scale with a value range of one to five, where one means strongly disagree and five means strongly agree. Then, collected data will be tested normality, validity, and reliability. ANOVA was conducted to test the hypothesis using Minitab 19 software. The hypothesis as follows,

H_1: The demographics of fishermen affect the behavior of daily fishermen in Tegal City.

3.   RESULTS AND DISCUSSIONS
3.1   Respondent Demographics
The demographics of fishermen can be seen in Figure 1. Figure 1(a) shows the most age of daily fishermen are more than 45 years old with a percentage of 77%. Figure 1(b) shows the amount of damage fish when arrives at wholesaler. The majority is less than 1 kg (53%) and the rest is more than 1 kg. Figure 1(c) depicts the daily income of fishermen. The majority is between IDR 150000-25000 per day (65%). Furthermore, Figure 1(d) presents the fishing cost and the majority is around less than IDR 100000. The last figure is catching capacity and the majority of daily fishermen catch around 4-8 kg per day (97%) (Figure 1(d).
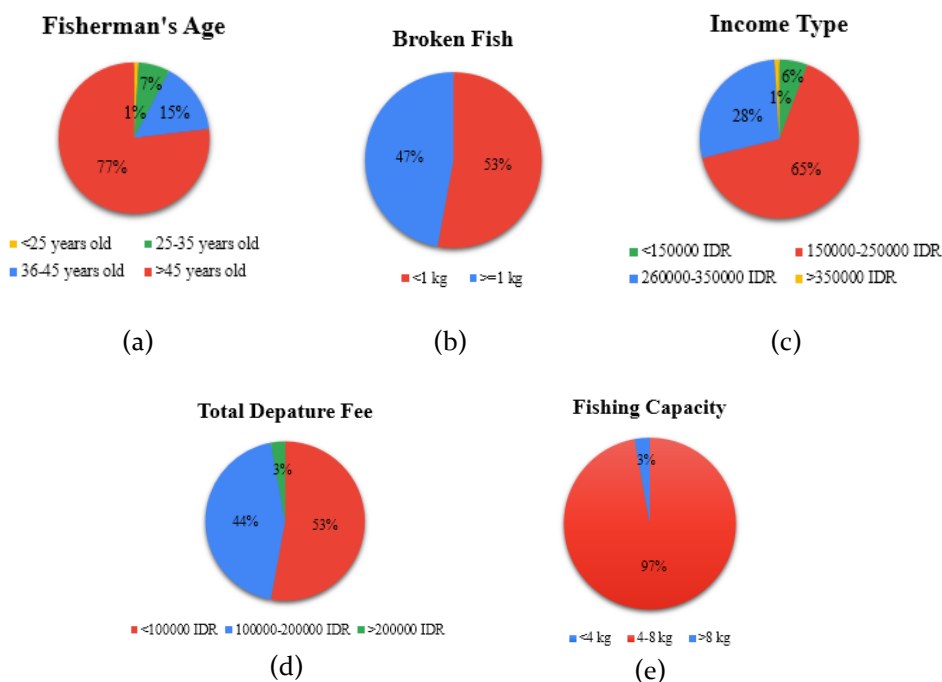

(a)   (b)   (c)

(d)   (e)

Figure 1. Demographics of daily fishermen in Tegal City

3.2   Validity, Reliability, and Normality Test Results

Validity test, reliability test, normality test was used to test the feasibility of the data before testing to ANOVA. The results of the validity, reliability, and normality tests can be seen in Table 2.

Table 2. Validity, Reliability, and Normality Test Results

Code	Validity (p-value)	Code	Validity (p-value)	Cronbach's Alpha	Kolmogorov Smirnov (p-value)
P1	0.000	P12	0.000	0.7197	0.221
P2	0.000	P13	0.000		
P3	0.000	P14	0.000		
P4	0.000	P15	0.000		
P5	0.000	P16	0.001		
P6	0.100	P17	0.000		
P7	0.011	P18	0.003		
P8	0.599	P19	0.007		
P9	0.000	P20	0.000		
P10	0.000	P21	0.000		
P11	0.000	P22	0.000		

Based on Table 2, the results of the validity test show that all data are valid except for P8. P8 is invalid because the p-value is greater than 0.05. Therefore, P8 is not included in the following testing stage. In the reliability test, the *Cronbach's Alpha* value is shown 0.7197. It means the data is declared reliable because the value of *Cronbach's Alpha* greater than 0.70. In the normality test, the p-value was 0.221. It shows data is normally distributed because the p-value is greater than 0.05.

3.3   ANOVA Test Results

After testing the validity, reliability, and normality, the data was tested by ANOVA. The results is shown in Table 3.

Table 3. ANOVA results

Factor	Response	P-Value
Income	P11	0.005
Income	P16	0.049
Departure time	P11	0.026
Departure time	P18	0.009
Percentage of fish damaged	P10	0.020
Percentage of fish damaged	P13	0.033

There are two significant responses for income factor (P11 and P16). In response P11 or fishing techniques that are not good effect the income level of the fishermen. It means the low quality of fish catches affect the daily income of fishermen.

In response to P16 or damage to the mucus on the surface of the fish's body affects income. Whereas, the parameter of fish freshness is fish slime (Manggaprouw et al., 2019). It can occur due to a lack of ice cube stock estimation, the length of time the fish is in the box, or too dense storage. Therefore, it needs a innovative handling maintain quality of the fish caught (A'yun, 2017) and if the quality of fish caught is appropriate it will affect to fishermen income (Ridha, 2017).

In response to P11, it shows that inappropriate fishing techniques are influenced by fishermen's departure time. This shows the importance of understanding the exact departure time when catching fish (Aryanto & Sudarti, 2017). In fact, catching fish on shore for longer periods and over longer distances allows for more yields when the season is favorable. This is due to seasonal factors affect catches, unstable fish prices, and decrease fishermen's income. Whereas, big advantage for fishermen is to gain more good-quality catches (Alhuda et al., 2016).

Departure time factor affects handling using ice for caught fish (P18). It means the incorrect departure time affects fishing techniques. It needs to determine the exact departure time and find the

appropriate way to catch fish. Furthermore, by using a lot of wet ice results in space limitation and it will reduce the caught fish space. Therefore, there will be less fish that can be caught and loaded on board even though temperature is one of the factors that can affect the rapid decline in fish quality (Syafitri et al., 2016). Fishermen who are less effective in handling fish can determine the level of freshness before the fish arrives to port. This condition causes fishermen's catches to be less than optimal (Deni, 2015).

The percentage of damaged fish significantly affected the responses of P10 and P13. The damage is influenced by the fisherman's inaccurate estimation of the stock of cooling media (P10). Cooling media such as ice cubes can maintain the freshness of fish if the amount is sufficient (Nugroho et al., 2017). This is because the use of ice is one of the easiest and cheapest ways. Furthermore, the factor of the percentage of damaged fish significantly affects the number of decreased fish quality (P13). It means an inappropriate place for fish is one factor that decreases fish quality; for example, fish are placed at high temperatures, exposed to direct sunlight, and in dirty places (Sri et al., 2021).

A significant decrease in fish quality will cause a lot of fish to be damaged. The decline in fish quality is usually caused by improper post-catch fish handlings, such as lack of ice cubes, lack of fishing techniques, and improper handling. Those practices cause to the caught fish injuries. Therefore, it needs to conduct appropriate fish handling to maintain the quality (Syafitri et al., 2016).

The daily behavior of fishermen is influenced by income, time of departure, and the percentage of damaged fish. This is due to the lack of daily fishing capital and the lack of information as additional knowledge to improve the quality and quantity of catches. Therefore, cooperation from various parties is needed to facilitate daily fishermen to compete economically. Daily fishermen with maximum effort and supported but limited knowledge, they tend to gain less optimal yields (Jahi et al., 2011).

4.   CONCLUSION

This research was conducted to determine the relationship between daily fishermen's demographics and fishermen's behavior in Tegal City. Demographics influencing fishermen's behavior include income, time of departure, and the percentage of damaged fish. The income factor affects the response of poor fishing techniques and the appearance of mucus due to poor storage. Departure time affects fishing techniques that are not good, such as weather factors and the use of wet ice, which melts faster. Furthermore, the percentage of damaged fish affects the quality of the fish when it arrives at port and the estimation of the cooling media stock is not accurate. The approach taken is the collaboration of various parties to assist daily fishermen with capital and provide additional knowledge related to fishing methods and good fish handling. It aims to increase the capacity and quality of fish caught.

Future research can be done by focusing on fish handling with the unsold one. The handling the unsold fish by adding value and it can be additional fishermen income. Moreover, it is a need for research on media information type that is suitable for fishermen. The media can be a learning sources for them to catch based on fish standard quality.

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