

ANALYSIS OF ADOLESCENT FISH CONSUMPTION LEVELS AT VOCATIONAL HIGH SCHOOL LEVEL IN MEJAYAN DISTRICT, MADIUN REGENCY

Analisis Tingkat Konsumsi Ikan Remaja Pada Jenjang Sekolah Menengah Kejuruan di Kecamatan Mejayan, Kabupaten Madiun

Haendra Kusuma Putra Ashad^{1*}, Agnes Puspitasari Sudarmo¹, Abdul Kohar Mudzakir²

¹Master of Fisheries Management, Postgraduate, Indonesia Open University

²Department of Capture Fisheries, Faculty of Fisheries and Marine Sciences, Diponegoro University

Jl. Cabe Raya, Pondok Cabe, Pamulang, South Tangerang, Banten 15437

*Corresponding author: putrahaendra@gmail.com

(Received August 5th 2024; Accepted September 22th 2024)

ABSTRACT

School-age adolescents, especially vocational high school students, need sufficient nutritional intake because their learning system demands physical activity, namely practice. Fish contains quite high protein and fatty acids which affect nutritional status and academic achievement. Adolescent fish consumption in Mejayan District is relatively low. Many factors influence it, such as: parental income, maternal education, taste, perception of fish prices, knowledge about fish, and social media. This study aims to analyze the factors that influence fish consumption. The design of this study is a cross-sectional study with data collection through filling out questionnaires and interviews using the FFQ and 24-hour Food Recall methods. The Adjusted R² value is 0.438. The results of the hypothesis test show that taste factors, fish prices, and fish knowledge have a significant effect on the level of fish consumption as indicated by the sig. <0.05. Factors that do not have an effect are parental income, maternal education, and social media as indicated by the sig. >0.05.

Keywords: Fish Consumption, Mejayan, Vocational High School

ABSTRAK

Remaja usia sekolah khususnya SMK membutuhkan asupan gizi yang cukup, karena sistem pembelajarannya menuntut aktivitas fisik yaitu praktik. Ikan mengandung protein dan asam lemak cukup tinggi yang berpengaruh pada status gizi dan prestasi belajarnya. Konsumsi ikan remaja di Kecamatan Mejayan tergolong rendah. Banyak faktor yang mempengaruhinya seperti: pendapatan orangtua, pendidikan ibu, selera, persepsi harga ikan, pengetahuan tentang ikan, dan media sosial. Penelitian ini bertujuan untuk menganalisis faktor-faktor yang berpengaruh terhadap konsumsi ikan. Desain penelitian ini adalah *cross sectional study* dengan pengambilan data melalui pengisian kuesioner dan wawancara metode FFQ dan *Food Recall* 24 Jam. Nilai *Adjusted R²* sebesar 0,438. Hasil Uji hipotesis menunjukkan faktor selera, harga

ikan, dan pengetahuan ikan berpengaruh signifikan terhadap tingkat konsumsi ikan yang ditunjukkan nilai sig. < 0,05. Faktor yang tidak berpengaruh adalah pendapatan orang tua, pendidikan ibu, dan media sosial ditunjukkan dengan nilai sig. > 0,05.

Kata Kunci: Konsumsi Ikan, Mejayan, Sekolah Menengah Kejuruan

INTRODUCTION

Adolescence is a phase change from childhood aged 11 years to adulthood aged 21 years. The transition period from childhood to adulthood has several health and nutritional problems such as a tendency towards malnutrition or overnutrition. The nutritional status of adolescents aged 16-18 years has a prevalence of thinness of 8.1% consisting of 1.4% very thin and 6.7% thin, then the prevalence of obesity is 9.5% and obesity is 4.0% (Riskesdas, 2019). Lack of consumption of nutritious foods, such as protein, can result in low nutrition and inhibited cognitive development in children (Hendrawati & Zidni, 2017).

Animal food sources have better protein content than plants because animals contain more complete essential amino acids (Sutomo, 2008). One of the animal foods that has high protein and a lower price than other animal proteins is fish (Marpaung, 2008). The protein in fish consists of complete essential and non-essential amino acids. Fish protein can be absorbed by the body up to 90% (Damongilala & Jeane, 2021). The fat content in fish is in the form of omega-3 fatty acids (EPA and DHA). According to several studies, consuming fish in school children can improve cognition due to the EPA and DHA content so that it can help in their academics (Aberg *et al.*, 2009; Demmelmair *et al.*, 2019; Handeland *et al.*, 2017; Kim *et al.*, 2010).

Although fish have complete nutrition and research on fish consumption has been widely conducted, fish consumption in Indonesia is relatively low when compared to ASEAN countries (Chan *et al.*, 2017). The high and low levels of fish consumption are influenced by several interrelated factors such as: economic, demographic, and social factors (Koeshendrajana *et al.*, 2021). The low consumption of fish in Mejayan Regency, Madiun Regency is thought to be due to its geographical location which does not have a coastal area, people's ignorance of the importance of the benefits of consuming fish and the consumptive nature of adolescents who focus on lifestyle. According to (Handayani & Murniati, 2020), teenagers, especially school children, nowadays consider fish consumption to be difficult because of the incompatibility of taste, aroma, and how to consume fish which must be careful because of the bones in the fish.

Schools are formal educational institutions that aim to develop the quality of human resources. Schools at the vocational high school level have a role in producing quality human resources that focus on graduates who are ready to work. Learning activities in vocational high schools are 70% practical and 30% theoretical so that students are emphasized on physical activity with high concentration. In order to support this, good nutritional intake is needed, one of which is consuming animal foods. The frequency of sea fish consumption is significantly correlated with the level of energy and protein consumption (Farida & Roosita, 2019). Students who consume fish containing high EPA and DHA with sufficient frequency produce good learning achievements (Zulaihah & Widajanti, 2006).

The low level of fish consumption of vocational high school students in Mejayan District has several causes such as: family economy, low education of parents, especially mothers, about nutritious food or students' ignorance of the importance of fish consumption. Therefore, it is important to conduct an analysis of the factors that influence the level of fish consumption among vocational school students in Mejayan District so that the factors that cause the high and low levels of fish consumption are known.

METHODS

The study was conducted in four vocational high schools in Mejayan District, Madiun Regency, from January to March 2024. The design of this study was a cross-sectional study with a proportional stratified random sampling method, namely by collecting data on the number of students in grades X and XI and then determining the number of samples used in each section. The calculation of sample requirements using the Slovin method obtained 319 respondents, consisting of 163 respondents in grade X and 158 respondents in grade XI. This study aims to analyze what factors influence the level of fish consumption of vocational high school students in Mejayan District, Madiun Regency.

Data collection was carried out by filling out questionnaires, interviews using the 1X24-hour food recall method and FFQ (Food Frequency Questionnaire) with a duration of the last 1 week. The research instruments used were questionnaire sheets, weighing tools, microtoises, and student grades for the odd semester of 2023/2024.

The data that had been obtained were then analyzed using univariate analysis to see the characteristics of the respondents. The classical assumption test is used to see whether the equation is appropriate before the regression test, multiple linear regression test, and hypothesis test, namely the determination coefficient test, F test and t test.

RESULT

Respondent Characteristics

The characteristics of respondents in this study were analyzed using univariate analysis. The research variables used include: parental income, maternal education, taste, perception of fish prices, knowledge about fish, social media, and fish consumption levels.

1. Parental Income

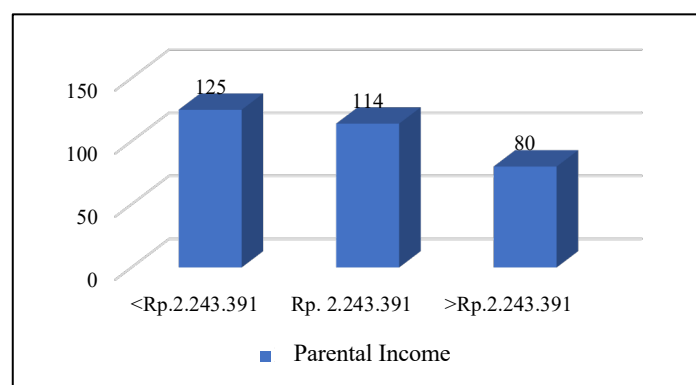


Figure 1. Parental Income

Based on Figure 1, the majority of students' parents' income is below the UMR (<Rp. 2,243,391) as many as 125 respondents, while the rest are according to the UMR (114 respondents) and above the UMR (80 respondents). Monthly income is related to the type of livelihood of each student's parents. The largest livelihood in Madiun Regency is a farmer/plantation 12.61%, private employees 12.25%, and self-employed 11.13% (LPPD, 2020).

2. Mother's Education Level

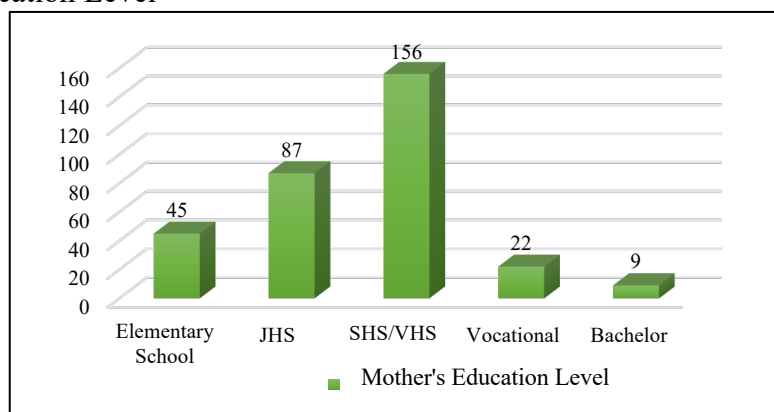


Figure 2. Mother's Education Level

Based on figure 2, the majority of students' mothers' last education was high school/vocational high school level as many as 156 respondents and the least was a Bachelor's degree as many as 9 respondents. The education of parents, especially mothers, has a central role in providing food in terms of quality and quantity.

3. Taste and Perception of Fish Price

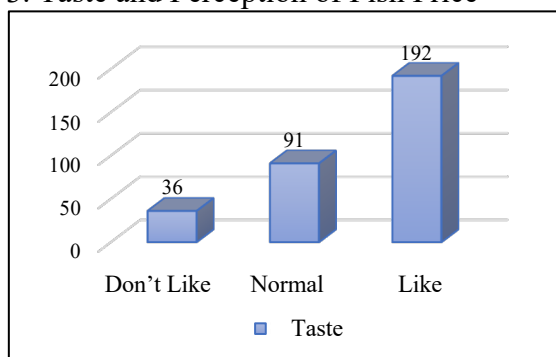


Figure 3. Fish Consumption Taste

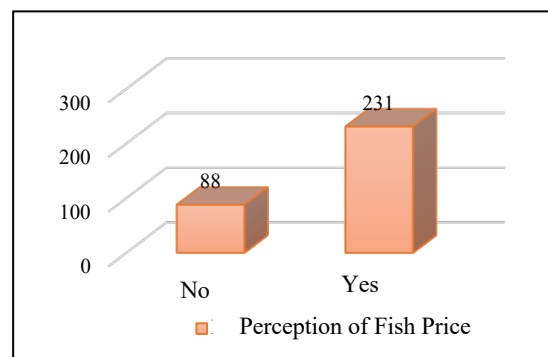


Figure 4. Perception of Fish Price

Based on figure 3, the taste variable, 192 respondents stated that they liked fish and the rest answered normal/neutral (91 respondents) and did not like (36 respondents). When viewed from the fish price perception variable, 231 respondents would still consume fish even though the price of fish had increased and 88 respondents chose not to consume fish and replaced it with other foods (figure 4).

4. Fish Knowledge Value

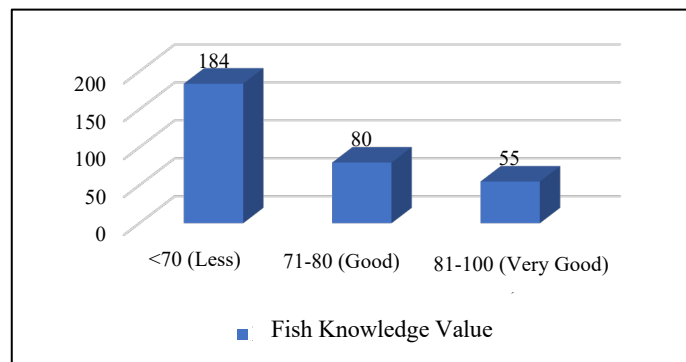


Figure 5. Fish Knowledge Value

The results showed that the majority of vocational high school students in Mejayan District had poor knowledge of fish nutrition with a value of ≤ 70 , namely 184 respondents (57.68%). Students who are categorized as good and very good are 80 respondents (25.08%) and 55 respondents (17.24%).

5. Frequency of Social Media Use and Access to Information About Fish

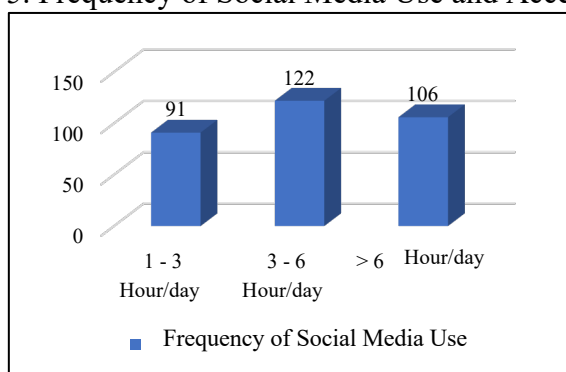


Figure 6. Frequency of Social Media Use

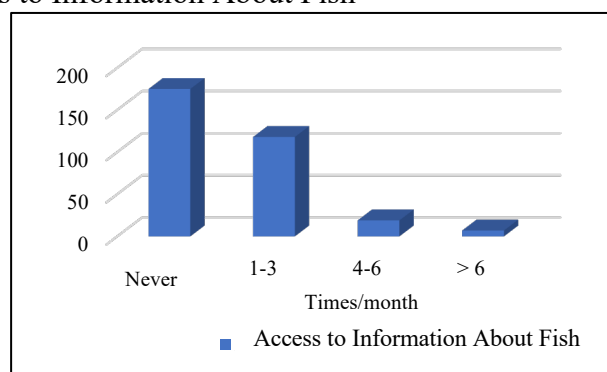


Figure 7. Access to Information About Fish

The majority of vocational high school students in Mejayan District access social media an average of 3 to 6 hours/day (figure 6). The high frequency of social media use is not accompanied by the frequency of respondents searching for information related to fish knowledge, which is shown by 175 respondents answering never (figure 7). Students use social media only to communicate and search for the most popular/viral information today. Research conducted by (Saputra, 2019) states that social media is used as a means of communication rather than as a means of seeking information.

6. Fish Consumption Level

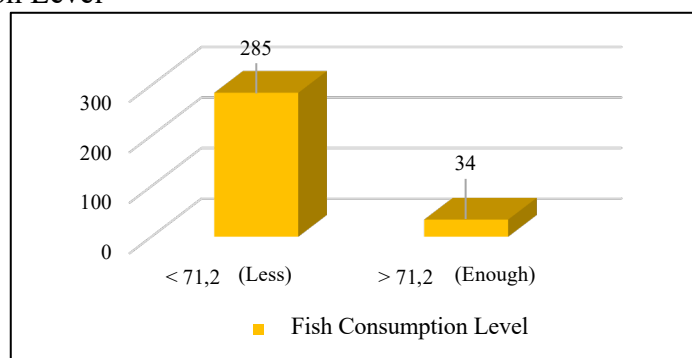


Figure 8. Fish Consumption Level

Based on figure 8, it can be concluded that the level of fish consumption among vocational school students in Mejayan District is relatively low, as many as 285 respondents have a consumption level of ≤ 71.2 gr/day and the rest (34 respondents) have sufficient fish consumption. The average fish consumption of vocational school students is 24.96 gr/day with the fish that is often consumed being catfish.

Table 1. Average Fish Consumption Per School in Mejayan District

School Name	Average Fish Consumption (gr/day)
State Vocational School 1 Mejayan	31.27
PGRI Vocational School 1 Mejayan	30.54
PGRI Vocational School 2 Mejayan	25.47

School Name	Average Fish Consumption (gr/day)
Bhakti Vocational School Mejayan	12.56
Average Total Fish Consumption	24.96

Source: Processed Primary Data, 2024

Classical Assumption Test

The classical assumption test is used to see whether the equation used in the regression model is acceptable before hypothesis testing is carried out. The results of the classical assumption test are as follows,

1. Normality Test

The Normality Test is a test to see whether the data obtained is normally distributed or not from a predetermined population. The Normality Test uses the Kolmogorov-Smirnov method with the Monte Carlo sig (2-tailed) approach and the alpha value is 0.05. The Monte Carlo approach can simulate 10,000 times and the forecasting accuracy is good with a small error value of 10% (Anastasia & Subhan, 2022).

Table 2. Normality Test

N		319
Normal Parameters	Mean	0.0000000
	Standar Deviasi	1.01351119
Asymp Sig. (2-tailed)		0.007
Monte Carlo Sig (2-tailed)	Sig	0.190

Source: Processed Primary Data, 2024

Based on table 2, it is concluded that the data in the study are normally distributed, this is indicated by the monte carlo sig value (2-tailed) $0.190 > 0.05$.

2. Multicollinearity Test

The multicollinearity test aims to test whether there is a regression model that is highly correlated between independent variables. A good regression model is one that has no relationship between independent variables. The basis for decision making in the multicollinearity test is the tolerance value < 1 and the VIF value < 10 .

Table 3. Multicollinearity Test Results

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
Parental income	0.897	1.115
Mother's education	0.930	1.075
Taste	0.969	1.032
Fish price perception	0.947	1.056
Knowledge about fish	0.948	1.055
Social media	0.964	1.037

Source: Processed Primary Data, 2024

Based on table 3, it shows that there are no symptoms of multicollinearity in the regression model. This is evidenced by the tolerance value not greater than 1 and the VIF value not greater than 10 in each independent variable.

3. Heteroscedasticity Test

Heteroscedasticity test is conducted to see whether there is an imbalance in variance and residuals from one observation to another in the regression model.

Table 4. Heteroscedasticity Test Results

Model	t	Sig.
(Constant)	3.561	0.000
Parental ncome	-1.356	0.176
Mother's education	-1.206	0.229
Taste	-0.249	0.804
Fish price perception	-1.319	0.188
Knowledge about fish	0.002	0.998
Social media	-0.479	0.633

Source: Processed Primary Data, 2024

Based on table 4, the results of the heteroscedasticity test using the Glejser test, it can be concluded that the research data does not experience heteroscedasticity, indicated by the significance value (p-value) of all research variables greater than 0.05 ($P > 0.05$).

Multiple Linear Regression Analysis

Multiple linear regression analysis is used to analyze the influence between independent variables such as: parental income, maternal education, taste, perception of fish prices, knowledge about fish, and social media) on the dependent variable, namely the level of fish consumption. The results of the multiple linear regression analysis test in this study are presented in Table 5.

Table 5. Results of the Output of the Multiple Linear Regression Test

Model	Unstandarized B	Coefficients Std. Error
(Constant)	0.487	0.315
Parental ncome	-0.122	0.077
Mother's education	0.048	0.065
Taste	0.304	0.084
Fish price perception	1.784	0.132
Knowledge about fish	0.020	0.003
Social media	-0.021	0.083

Source: Processed Primary Data, 2024

Based on table 5, the multiple regression equation can be written as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + e$$

$$Y = 0,487 - 0,122X_1 + 0,048X_2 + 0,304X_3 + 1,784X_4 + 0,20X_5 - 0,021X_6 + e$$

Based on the equation above, the explanation of the relationship between all independent variables, namely parental income (X1), maternal education (X2), taste (X3), fish price (X4), fish knowledge (X5), and social media (X6) is as follows:

- Constant value of 0.487, which means that if parental income, maternal education, taste, fish price, fish knowledge, and social media are nonexistent or have a value of 0, then the level of fish consumption will be constant with a value of 0.487.
- Parental income (X1) = -0.122, the negative value produced states that every increase in parental income, the level of fish consumption will decrease.

- c. Maternal education (X2) = 0.048, the positive value obtained explains that the higher the mother's education, the level of fish consumption will increase.
- d. Taste (X3) = 0.304, the positive value produced explains that every increase in taste, the level of fish consumption will increase.
- e. Fish price perception (X4) = 1.784, the positive value produced explains that every increase in fish price perception will increase the level of fish consumption.
- f. Knowledge about fish (X5) = 0.020, the positive value produced explains that the increasing knowledge of fish will increase the level of fish consumption.
- g. Social media (X6) = -0.011, the negative value produced explains that the higher the use of social media, the lower the level of fish consumption.

Hypothesis Test

1. Determination Coefficient Test

Table 6. Results of Determination Coefficient Test

Model	R	R ²	Adjusted R ²
1	0.670	0.449	0.438

Source: Processed Primary Data, 2024

Based on table 6, the reading of the regression results refers to the Adjusted R2 value because the individual samples used were selected randomly (Pratama, 2019). The Adjusted R2 value is 0.438. The value of the independent variables used in this study determines the level of fish consumption by 43.8%, while the remaining 56.2% is determined by variables other than the variables that have been determined in the regression model.

2. F Test

The F test in this study is used to see the influence of the factors used (independent variables) simultaneously such as; parental income (X1), parental education (X2), taste (X3), perception of fish prices (X4), knowledge about fish (X5), and social media (X6) on the dependent factor (dependent factor) namely the level of fish consumption (Y).

Table 7. Results of ANOVA Calculations

Model		df	Mean Square	F	Sig.
1	Regression	6	44.336	42.347	0.000 ^b
	Residual	312	1.047		
	Total	318			

Source: Processed Primary Data, 2024

Based on table 7, the F_{count} value is $42.347 > F_{table} 2.128$, with a significance of $0.00 < 0.05$. This means that the variables of parental income, maternal education, taste, perception of fish prices, knowledge about fish and social media have a simultaneous effect on the level of fish consumption significantly at a 95% confidence interval.

3. t-test

The t-test was conducted to determine the dominant factors that influence the level of fish consumption in vocational high school students in Mejayan District. Based on the results of the data calculation, the t_{table} value is 2.827.

Table 8. Results of the t-test

Model	t	Sig.
(Constant)	1.545	0.123
Parental income	-1.588	0.113
Mother's education	0.741	0.459
Taste	3.602	0.000
Fish price perception	13.544	0.000
Knowledge about fish	6.543	0.000
Social media	-0.252	0.801

Source: Processed Primary Data, 2024

Based on the calculation results, it shows that the factors that influence students' fish consumption levels are taste, perception of fish prices, and knowledge about fish indicated by the t_{count} value $>$ from t_{table} . Factors such as parental income, maternal education, and social media have no effect indicated by the t_{count} value $<$ t_{table} .

DISCUSSION

The independent variable in influencing the level of fish consumption is 43.8% with a significance level of 5% (0.05). The variables of parental income, maternal education, taste, perception of fish prices, knowledge about fish and social media have a simultaneous effect on the level of fish consumption of vocational high school students in Mejayan District with an F_{count} value of 42.347 $>$ F_{table} 2.128.

The results of the hypothesis show that parental income (X1) does not have a significant effect on the level of fish consumption with a probability value of sig 0.113 $>$ 0.05. Faqih & Rangga (2021), explained that income does not affect household fish consumption, because people can get fish according to their economic ability. The results of the study on this variable are not in accordance with Keynesian consumption theory. The variation in consumer considerations and decisions in purchasing goods is the basis for the inequality of consumption theory with the facts in the field. Consumer considerations that often occur in the field are that the goods purchased are included in mandatory or additional needs. If it is included in the mandatory needs, no matter how much it costs, it will still be purchased (Aprianto *et al.*, 2017).

The mother's education level (X2) is related to a mother's knowledge of food nutrition. The mother's education in this study did not have a significant effect on the level of fish consumption, as indicated by a probability value of sig 0.459 $>$ 0.00. The education level of mothers of vocational high school students was dominated by high school/vocational high school graduates. This shows that the level of fish consumption of vocational high school students in Mejayan District is not only determined by the level of formal education of the mother, but knowledge of the benefits of fish consumption can be obtained from the environment, experience and non-formal education.

The taste variable (X3) has a significant effect on the level of fish consumption with a probability value of sig 0.00 $<$ 0.05. The results of this study are in line with research conducted by (Muhtar *et al.*, 2023) and (Mar'ie *et al.*, 2022), that taste influences and is a dominant factor in the level of fish consumption. Alamsyah (2008) explains that taste is closely related to feelings of sensation that give rise to pleasure and are done repeatedly.

The perception of fish prices (X4) of vocational high school students in Mejayan District is not in line with the law of demand which explains that the higher the price of an item, the lower the demand for that item. This is because the probability value sig 0.000 $<$ 0.05 so that the fish price perception variable affects the amount of fish consumption. Price perception is an important variable in consumer decisions to continue buying products or not, especially fish (Azizah & Maskur, 2024).

An individual's knowledge of food can influence behavior or attitudes when choosing and determining the food to be consumed (Fitriani *et al.*, 2020). Fish knowledge (X5) has a significant effect on the level of fish consumption with a probability value of $\text{sig } 0.000 < 0.05$. The fish knowledge factor shows that respondents generally know about basic fish knowledge which can later be applied in their daily consumption. The knowledge of a school teenager is not only obtained from formal education but can also be obtained from various sources such as: social media, the family environment or personal experience (Rizawati *et al.*, 2023). Knowledge is very important because behavior based on knowledge of a food ingredient will give rise to good consumption behavior compared to no knowledge.

Social media is one of the tools that can change a person's mindset in consuming food in the current era. The social media variable (X6) in this study did not affect the level of fish consumption as shown by a probability value of $\text{sig } 0.801 > 0.05$. The absence of social media's influence is because not all student respondents access information about fish, either from basic fish knowledge, fish processing or the benefits of fish consumption. According to Firdausi *et al.* (2022), there is no significant relationship between the use of social media and student food consumption because not all information obtained from social media is always directly applied to change consumption behavior.

CONCLUSION

Factors that influence the level of fish consumption of vocational high school students in Mejayan District are taste, perception of fish prices, and knowledge about fish as indicated by the calculated $t_{\text{value}} > t_{\text{table}}$ and $\text{sig. value} < 0.05$. Factors that do not have an effect are parental income, maternal education, and social media as indicated by the calculated $t_{\text{value}} < t_{\text{table}}$ and $\text{sig. value} > 0.05$.

ACKNOWLEDGEMENT

Our gratitude goes to all vocational high schools in Mejayan District, Madiun Regency for helping in the research process and all parties who helped with this research.

REFERENCES

- Aberg, M. A. L., Aberg, N., Brisman, J., Sundberg, R., Winkvist, A., & Torén, K. (2009). Fish intake of Swedish male adolescents is a predictor of cognitive performance. *Acta Paediatrica*, 98(3), 555–560. <https://doi.org/10.1111/j.1651-2227.2008.01103.x>
- Anastasia, V., & Subhan, M. (2022). Simulasi Monte Carlo dan penerapannya dalam menentukan probabilitas pergerakan saham indeks LQ-45. *Journal of Mathematics UNP*, 7(4), 1. <https://doi.org/10.24036/unpjomath.v7i4.13769>
- Aprianto, N., Nusril, & Sriyoto. (2017). Analysis of fish consumption patterns in Bengkulu City. *Jurnal AGRISEP*, 16(2), 237–250. <https://doi.org/10.31186/jagrisep.16.2.237-250>
- Azizah, A. N., & Maskur, A. (2024). Pengaruh kualitas produk, persepsi harga, citra toko dan lokasi terhadap keputusan pembelian: Studi pada konsumen ikan asin di Kabupaten Rembang. *Jesya (Jurnal Ekonomi dan Ekonomi Syariah)*, 7(1), 68–79. <https://doi.org/10.36778/jesya.v7i1.1336>
- Chan, C. Y., Tran, N., Chi Dao, D., Sulser, T. B., Phillips, M. J., Batka, M., Wiebe, K., & Preston, N. (2017). *Fish to 2050 in the ASEAN region*. Penang, Malaysia: WorldFish and Washington, DC, USA: International Food Policy Research Institute (IFPRI).
- Damongilala, J. L. (2021). *Kandungan gizi pangan ikani* (1st ed.). Bandung: CV. Patra Media Grafindo Bandung.
- Demmelair, H., Øyen, J., Pickert, T., Rauh-Pfeiffer, A., Stormark, K. M., Graff, I. E., Lie, Ø., Kjellevoid, M., & Koletzko, B. (2019). The effect of Atlantic salmon consumption

- on the cognitive performance of preschool children: A randomized controlled trial. *Clinical Nutrition*, 38(6), 2558–2568. <https://doi.org/10.1016/j.clnu.2018.11.031>
- Demu, Y. D. B., Costa, S. L. D. V. da, Maria, R. M., & Kemenkes Kupang, P. (2023). Pengaruh pola konsumsi anak sekolah dasar terhadap status gizi (IMT/U) di Desa Oeltua Kecamatan Taibenu Kabupaten Kupang. *Jurnal Ilmiah Multidisiplin*, 2(11).
- Faqih, A., & Rangga, K. K. (2021). Analisis faktor-faktor yang mempengaruhi permintaan ikan pada tingkat rumah tangga: Kasus di Desa Kaliwulu Kecamatan Plered Kabupaten Cirebon. *Agros wagati Jurnal Agronomi*, 9(1), 10. <https://doi.org/10.33603/agros wagati.v9i1.4883>
- Farida, & Roosita, K. (2019). Kebiasaan konsumsi ikan laut, tingkat konsumsi, status gizi, dan prestasi belajar siswa sekolah dasar di daerah pantai dan bukan pantai. *Jurnal Gizi dan Pangan Soedirman*, 2(2), 1. <https://doi.org/10.20884/1.jgps.2018.2.2.1360>
- Firdausi, A., Khomsan, A., & Rahman, P. H. (2022). Hubungan penggunaan Instagram dengan pengetahuan gizi, perilaku makan, aktivitas fisik, dan status gizi mahasiswa IPB. *Jurnal Ilmu Gizi dan Dietetik*, 1(1), 16–24. <https://doi.org/10.25182/jigd.2022.1.1.16-24>
- Fitriani, R., Purwara Dewanti, L., Kuswari, M., Gifari, N., & Wahyuni, Y. (2020). The relationship between balanced nutrition knowledge, body images, sufficiency level of energy and macro nutrition with nutritional status. *Gorontalo Journal Health and Science Community*, 4(1), 29–38.
- Handayani, I. A. P., & Murniati, D. E. (2020). Pembuatan mackerel chees tart dengan substitusi tengiri untuk era milenial. *Jurnal Prosiding Pendidikan Teknik Boga Busana FT UNY*, 15(1).
- Handeland, K., Øyen, J., Skotheim, S., Graff, I. E., Baste, V., Kjellevoid, M., Frøyland, L., Lie, Ø., Dahl, L., & Stormark, K. M. (2017). Fatty fish intake and attention performance in 14-15 year old adolescents: FINS-TEENS - A randomized controlled trial. *Nutrition Journal*, 16(1), 64. <https://doi.org/10.1186/s12937-017-0287-9>
- Hendrawati, S., & Zidni, I. (2017). Gambaran konsumsi ikan pada keluarga dan anak PAUD RW 07 Desa Cipacing. *Jurnal Pengabdian Kepada Masyarakat*, 1(2), 101–106.
- Kim, J., Winkvist, A., Åberg, M. A., Åberg, N., Sundberg, R., Torén, K., & Brisman, J. (2010). Fish consumption and school grades in Swedish adolescents: A study of the large general population. *Acta Paediatrica*, 99(1), 72–77. <https://doi.org/10.1111/j.1651-2227.2009.01545.x>
- Koeshendrajana, S., Yulia Arthatiani, F., & Virgantari, F. (2021). Price and income elasticities of selected fish commodities in Indonesia: A multi-stage budgeting framework. *IOP Conference Series: Earth and Environmental Science*, 860(1), 012059. <https://doi.org/10.1088/1755-1315/860/1/012059>
- Mar'ie, M., Saifullah, & Istiqamah, N. (2022). Faktor-faktor yang mempengaruhi tingkat konsumsi ikan pada masyarakat di Kecamatan Sajad. *NEKTON: Jurnal Perikanan dan Ilmu Kelautan*, 2(1), 27–34. <https://doi.org/10.47767/nekton.v2i1.323>
- Muhtar, D. I., Wahid, A., Tahang, H., Made, S., & Hasani, M. C. (2023). Consumer decisions in purchasing consumed fish at PPI Lonrae, Bone Regency. *PONGGAWA: Journal of Fisheries Socio-Economic*, 2(2), 115–123. <https://doi.org/10.35911/pong gawa.v2i2.20129>
- Riskesdas. (2019). *Laporan Riskesdas 2018 nasional*. Jakarta: Badan Penelitian dan Pengembangan Kesehatan.
- Rizawati, R., Alshendra, A., & Rusilanti, R. (2023). Perbedaan pendapatan, pengetahuan gizi dan perilaku konsumsi ikan pada masyarakat Kecamatan Cimanggis Depok pada saat dan pasca pandemi Covid-19. *Journal of Comprehensive Science (JCS)*, 2(8), 1359–1376. <https://doi.org/10.59188/jcs.v2i8.471>

- Saputra, A. (2019). Survei penggunaan media sosial di kalangan mahasiswa Kota Padang menggunakan teori uses and gratifications. *Jurnal Dokumentasi dan Informasi*, 40(2), 207. <https://doi.org/10.14203/j.baca.v40i2.476>
- Saputro, A. D. R. (2020). *Laporan penyelenggara pemerintah daerah (LPPD) Kabupaten Madiun tahun 2020 Provinsi Jawa Timur*. Madiun: LPPD Kabupaten Madiun.
- Sutomo, B. (2008). *Sukses wirausaha kue kering*. Depok: Kriya Pustaka.
- Zulaihah, S., & Widajanti, L. (2006). Hubungan kecukupan asam eikosapentanoat (EPA), asam dokosaheksanoat (DHA) ikan dan status gizi dengan prestasi belajar siswa. *The Indonesian Journal of Nutrition*, 1(2), 15–25. <https://doi.org/10.14710/jgi.1.2>.