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Adoption of Hygienic Practices in Fish Markets of Tripura

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Abstract

This study enunciates the infrastructural adequacy and adoption level of hygienic practices by the marketing personnel in selected fish markets of Tripura. Socio-economic parameters of the respondents were documented to provide the background of selected marketing personnel involved in fish marketing activities. The results revealed that overall availability index for the infrastructural facilities was 76.87%, and among various infrastructural facilities, icing (70.28%) and waste disposal facilities (71.66%) were reported to be scarce than other facilities. The overall adoption index of hygienic practices was 81.6%. The adoption of good hygienic practices was determined in maintaining personal cleanliness (90.04%), sorting of fish hygienically (85.28%), using clean container and polythene sheet (79.22%), using prompt method of waste disposal (79.22%), use of clean water for washing (78.35%) and use of ice to prevent fish spoilage (77.48%). The significant 'F' value in the multiple regression analysis revealed the overall significance of influence of seven independent variables when taken together in explaining the extent of adoption of good hygienic practices by the fish marketing personnel. The R^2 value indicated that the seven variables selected together explained 56% of variation in the adoption level.

Keywords: Hygienic practices, adoption index, availability index

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Introduction

Post harvest handling of catch is the most important step in the production of a high quality finished product (Devadasan, 2004). To achieve safe fish, the primary fish handlers and fish retailers must be educated on good hygiene and sanitation practices. Most of them are unaware that they are potential carriers of pathogenic microorganisms, and that poor personal hygiene makes the fish unsafe for consumption (Rao et al., 2005). Several studies indicate that better knowledge leads to better adoption of hygienic practices (Sanoria & Sharma, 1983; Pathak & Sasmal, 1992). The activities in the fish markets generate wastes of varying degrees and types which, if not properly handled, will lead to contamination of the product and degradation of the market environment (Sciortino & Ravikumar, 1999).

Various handling activities such as landing, sorting, packing and distribution take place in local fish markets, where fish goes through many risk factors generating additional sources of bacteria. Proper cleaning of equipments and facilities as well as cleanliness of fish retailer are effective ways to avoid risking the hygiene of fish. Hygiene measures involve not only the activities that deal with handling operations but also those focusing on the infrastructural facilities. Training on proper fish handling and maintenance practices for persons concerned with local fish markets would be especially important. On-site technical support from extension staff of central/local governments and resource persons are beneficial for improving and promoting quality control and hygiene measures in local fish markets. This paper aims to present the socio-personnel profile of the fish marketing personnel and to find out the extent of adoption of hygienic practices followed in the existing fish markets in Tripura.

Materials and Methods

The study was conducted among fish retailers in four retail fish markets from four districts of Tripura state *viz.*, Lake Choumouni market (West Tripura), Halhali market (Dhalai), Santirbazer market (South Tripura) and Kailasahar market (North Tripura). Seventy seven fish retailers covering the above districts were selected for the study using proportionate random sampling techniques which constitute the sample for the present study. Semi-structured interview schedules and observation methods were used to collect information from the primary sources through surveys and discussions with the major stakeholders comprising middlemen, retailers, vendors and officials of trade associations/ societies. The data were collected during May to December 2011. Socio-economic profile of the fish marketing personnel was studied by using mean and standard deviation (SD). Adequacy index for the availability of infrastructural facilities was calculated on a three-point rating scale *viz.*, adequate, partially adequate and not adequate, with the scoring pattern of 3, 2 and 1 respectively. For measuring the extent of adoption, six hygienic practices (Balasubramaniam & Srinath, 2003; Balasubramaniam et al., 2009) were selected *viz.*, use of clean water, maintenance of personal cleanliness, waste disposal, use of ice, hygienic sorting of the fish and use of clean containers. The adoption index of each improved practices by the marketing functionaries was measured on a three-point scale *viz.*, 'adopted', 'partially adopted' and 'not adopted' with the scoring pattern of 3, 2 and 1 respectively. From the response score, each index was calculated by the ratio of actual score obtained to the maximum score possible and expressed in percentage for each respondent (Balasubramaniam et al., 2000; Brajmohan et al., 2003; Ponnusamy et al., 2004). Mean ± SD value of the respondents was taken as index for the particular criterion. The data were analysed using various statistical tools *viz*., percentage, mean, SD, F test, correlation and regression by using statistical packages for social sciences (SPSS Ver. 16.0).

Results and Discussion

The socio-economic profile of the fish marketing personnel of the study area is given in Table 1. The average age of the respondents was highest in the case of Lake Choumouni (41 years) followed by the respondents of Halhali (37.28 years), Kailasahar (36.5 years) and Santirbazer market (35.11 years). Overall mean age of the respondents was 37.81 years. Although educational status of the marketing personnel was found higher in the case of Lake Choumouni market, on an average, they had a background of middle and high school level of education. Respondents from Lake Choumouni market are more experienced in fish handling (21 years) than Kailasahar (18.5 years), Santirbazer (18.4 years) and Halhali (16 years). The mean investment by each respondent was highest in case of Lake Choumouni market (Rs. 45 000) and overall mean

Table 1. The socio-economic profile of the fish marketing personnel (n=77)

Variables	Overall (n=77) Mean±SD	Santirbazer (n=17) Mean±SD	Halhali (n=21) Mean±SD	Lake Choumouni (n=24) Mean±SD	Kailasahar (n=15) Mean±SD	'F' Value
Age (years)	37.81±4.32	35.11±2.75	37.28±3.59	41.00±3.96	36.50±4.47	6.328**
Education (scores)	2.87±0.61	2.51±0.55	2.95±0.38	3.16±0.80	2.73±0.28	2.281
Experience (years)	18.77±5.01	18.41±5.22	16.57±6.28	21.16±4.01	18.46±2.26	7.125**
Investment (Rs.)	35585.25± 21953.80	35090.17± 22881.32	28025.38± 21456.31	45040.00± 22722.00	28666.66± 12505.23	12.324**
No. of working days in a year	330.28±19.83	335.58±17.83	332.70±17.58	336.12±16.89	311.53±19.56	3.134*
Annual income (Rs.)	39053.00± 19998.78	36658.94± 17784.99	27899.00± 11374.50	52666.66± 23518.00	35600.00± 13860.52	5.541**
No. of marketing personnel	36.63±10.04	36.76±5.40	39.90±3.80	44.62±4.28	19.13±3.20	3.161*

*Significant at 5% level; **Significant at 1% level

investment was Rs.18 000. The average number of working days in a year was 330 with an average annual income of Rs. 39 000. The average number of marketing personnel involved in fish marketing was 36. The 'F' value showed highly significant differences among the marketing personnel of the four selected markets on the variables such as age, experience, investment and annual income.

The extent of available infrastructural facilities for each market studied is given in Table 2. Overall availability index was highest in Lake Choumouni market (85.47±6.31) followed by Halhali market (75.80±5.82), Kailasahar market (72.08±5.87) and Santirbazer market (70.29±5.82). Overall availability index for selected four markets were 76.87±4.47. Among the infrastructural facilities, availability index for electricity was highest (84.90±3.54), followed by drainage channel (80.71±7.69), cemented floor (79.71±11.00), clean water (79.71±6.05), transportation facilities (76.66±10.87), proper shed (76.42±6.49), hygienic toilet (75.16±6.36), clean ground condition (73.53±1.30), waste disposal facilities (71.66±4.13) and icing facilities (70.28±10.37). This reveals that all the markets are moderately developed with reference to infrastructure. The result implies the need of icing facilities in the existing market to prevent spoilage of fish. The 'F' value revealed that there were significant differences in the infrastructural facilities available in selected four markets.

Extent of adoption of hygienic practices among different fish marketing personnel are presented in Table 3, which showed that the overall adoption index was 81.60±4.97. Among the six hygienic practices measured, practices such as maintaining personal cleanliness (90.04±0.46), sorting of fish hygienically (85.28±0.52), using clean container & polythene sheet (79.22±0.56), using prompt method of waste disposal (79.22±0.51) and use of clean water for washing (78.35±0.53) were adopted by majority of the respondents. Lower adoption was observed in the case of using ice to prevent fish spoilage (77.48±0.54). This result implies the need for intervention for establishing ice making plants in the markets. Among the selected markets, adoption index was higher in Lake Choumouni market (90.04±4.42) followed by Halhali market (80.95±5.93), Kailasahar market (77.77±7.02) and Santirbazer market (73.85±5.90). The 'F' value shown in Table 3 revealed that there were significant differences among the marketing personnel of four markets in the adoption of all the six hygienic practices.

Among all the socio-personnel parameters of marketing personnel studied, the variables *viz.*, age, experience, investment, number of working days,

Table 2. Availability of infrastructural facilities in different fish markets of Tripura

Infrastructural facilities	Availability Index (Mean±SD)					'F' Value
	Santirbazer (n=17)	Halhali (n=21)	Lake Choumouni (n=24)	Kailasahar (n=15)	Overall (n=77)	
Cemented floor	66.94±1.63	82.19±4.95	92.79±2.58	69.80±1.61	79.71±11.00	8.235**
Clean water	73.41±3.62	80.33±4.38	86.54±1.31	75.06±1.43	79.71±6.05	7.243**
Drainage channel	76.05±0.96	73.90±1.81	91.66±1.78	78.00±1.19	80.71±7.69	6.452**
Waste disposal facility	66.05±1.19	70.47±1.43	76.37±1.90	72.13±1.95	71.66±4.13	4.648**
Clean ground conditions	74.41±1.17	73.57±1.02	73.70±1.04	72.20±1.20	73.53±1.30	2.836**
Transportation facilities	64.58±1.22	76.76±1.26	91.12±1.39	67.06±0.88	76.66±10.87	8.458**
Icing facility	60.82±1.18	64.95±2.08	85.29±1.04	64.46±0.91	70.28±10.37	3.624**
Hygienic toilet	68.94±0.96	75.04±1.56	83.58±1.61	68.93±0.96	75.16±6.36	4.761**
Electricity	79.76±1.75	85.19±2.20	88.50±1.17	84.60±1.05	84.90±3.54	3.683**
Proper shed	71.94±1.02	75.61±1.11	85.20±1.10	68.60±0.91	76.42±6.49	3.263**
Overall	70.29±5.82	75.80±5.82	85.47±6.31	72.08±5.87	76.87±4.47	5.837**

*Significant at 5% level; **Significant at 1% level

Table 3. Extent of adoption of hygienic practices among different fish marketing personnel

Hygienic practices	Adoption indices (Mean±SD)					'F' Value
	Santirbazer (n=17)	Halhali (n=21)	Lake Choumouni (n=24)	Kailasahar (n=15)	Overall (n=77)	
Use of clean water for washing	68.62±0.55	80.95±0.50	83.33±0.51	77.76±0.48	78.35±0.53	4.456**
Maintaining personal cleanliness	84.31±0.51	87.30±0.49	97.22±0.28	88.88±0.48	90.04±0.46	3.853**
Using prompt method of waste disposal	72.54±0.52	76.19±0.46	90.27±0.46	73.33±0.41	79.22±0.51	5.213**
Using ice to prevent fish spoilage	68.62±0.65	77.77±0.48	88.87±0.48	68.88±0.25	77.48±0.54	7.546**
Sorting of fish done hygienically	76.47±0.58	88.87±0.48	90.27±0.46	82.22±0.51	85.28±0.52	5.567**
Using clean container & polythene sheet	72.54±0.52	74.60±0.62	90.27±0.46	75.55±0.45	79.22±0.56	8.786**
Overall	73.85±5.90	80.95±5.93	90.04±4.42	77.77±7.02	81.60±4.97	7.894**

*Significant at 5% level; **Significant at 1% level

Table 4. Correlation and regression analysis between the socio-economic variables and adoption scores among the fish marketing personnel (n=77)

Variables	Correlation coefficients (r)	Regression coefficients (b)	SE of 'b'	't'
Age	0.001	0.010	0.015	0.653
Education	0.384**	0.340	0.107	3.189**
Experience	-0.021	0.004	0.013	0.343
Investment	-0.046	Negligible	0.000	0.783
No. of working days	0.074	0.002	0.004	0.506
Annual income	-0.139	Negligible	0.000	-0.956
No. of marketing personnel	0.045	0.048	0.007	-0.087

**Significant at 1% level; *significant at 5% level; R^2=0.56; F = 1.993*

annual income and number of marketing personnel involved in existing market did not have association with the adoption of hygienic practices (Table 4). Only the variable, 'education' was found to have positive correlation with the adoption scores. Further, the analysis revealed that a unit change in the component 'education', *ceteris paribus*, would result in increasing the adoption behaviour of marketing personnel by 0.340 units. The R^2 value indicated that, all the variables taken together cause for only 56% of variation in the adoption level. The significant 'F' value in the multiple regression analysis revealed the overall significance of influence of seven independent variables when taken together in explaining the extent of adoption of good hygienic practices by the fish marketing personnel.

Improvement of hygienic conditions in fish markets is most important in consumers' view point. In this regard, extension agents play an important role in diffusion of new innovations/ technologies and awareness creation. The study suggests that adoption of hygienic practices in fish market can be improved by providing informal education to the marketing personnel, training, technical guidance

and mass media exposure. Further, the findings of the present study would also be helpful in planning and implementing suitable extension programmes to popularize hygienic practices in fish markets of Tripura.

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References

Balasubramaniam, S. and Srinath, K. (2003) Impact of the institutional training on the quality control practices in fish processing centres. In: Seafood Safety (Surendran, P.K., Mathew, P.T., Thampuran, N., Nambiar, V.N., Joseph, J., Boopendranath, M.R., Lakshmanan, P.T. and Nair, P.G.V., Eds), pp 642-650, Society of Fisheries Technologists (India), Cochin

Balasubramaniam, S., Jeeva, J.C. and Srinath, K. (2009) Adoption of hygienic practices at fish landing centres and markets. Fish. Technol. 46 (2): 177-184

Balasubramaniam, S., Pravin, P., Sreevalsan, J.M., Brajmohan and Singh, D.P. (2000) Adoption of improved practices and annual fish catches among mechanized boat owners. Fish. Technol. 37 (2): 137-143

Brajmohan, Singh, D.P. and Thiagarajan, R. (2003) Technology gap in the adoption of post harvest technology. In: Seafood Safety (Surendran, P.K., Mathew, P.T., Thampuran, N., Nambiar, V.N., Joseph, J., Boopendranath, M.R., Lakhsmanan, P.T. and Nair, P.G.V., Eds), pp 580-588, Society of Fisheries Technologists (India), Cochin

Devadasan, K. (2004) Diversification in fish processing – recent trends in post harvest technology of fish, In: Current Scenario and Future Needs of Indian Fisheries. 22 p, Decennial Publication of Forum of Fisheries Professionals, Visakhapatnam

Pathak, S. and Sasmal, B.C. (1992) Adoption of jute technologies. Ind. J. Extn. Edn. 28 (1 & 2): 77-80

Ponnusamy, K., Jayanthi, M., Kumaran, M. and Thenmathi, N. (2004) Influence of socio-economic profile of shrimp farmers on the extent of adoption of shrimp culture technologies. Fish. Technol. 42 (2): 226

Rao, B.M., Jeeva, J.C. and Khasim, D.I. (2005) Palm Impression Technique: a simple tool to popularize good hygiene and sanitation practices among fish handlers. In: Sustainable Fisheries Development: Focus on Andhra Pradesh (Boopendranath, M.R., Mathew, P.T., Gupta, S.S., Pravin, P. and Jeeva, J.C., Eds), pp 248-252, Society of Fisheries Technologists (India), Cochin

Sanoria, Y.C. and Sharma, D.K. (1983) Comparative analysis of adoption behaviour of beneficiaries of farm development programmes. Ind. J. Extn. Edn. 19 (1 & 2): 84-86

Sciortino, J.A. and Ravikumar, R. (1999) Fishery Harbour Manual on the Prevention of Pollution- Bay of Bengal Programme. http://www.fao.org/docrep/x5624e/x5624e00.htm#Contents (Accessed 07 July 2011)