**Table I.** Sociodemographic characteristics and questions about toxic substances by perception on the effectiveness of laws and regulations.

|  |  |  |
| --- | --- | --- |
|  | Effectiveness of laws |  |
|  | **Yes** |  | **No** |  | **Do not know** |  |
| N | (%) |  | N | (%) |  | N | (%) | *p*-valuea |
|  |  |  |  |  |  |  |  |  |  |  |
| All participants | 127 | (16.5) |  | 453 | (58.9) |  | 189 | (24.6) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **Age** (years) |  |  |  |  |  |  |  |
| Mean ± SD | 46.0 ± 12.0 |  | 45.2 ± 11.2 |  | 43.7 ± 12.0 | 0.183 | b |
|  |  |  |  |  |  |  |  |  |  |  |
| **Occupational status** |  |  |  |  |  |  |  |  | 0.049 |  |
| Self-employed | 11 | (10.5) |  | 72 | (68.6) |  | 22 | (21.0) |  |  |
| Employed by others | 87 | (20.2) |  | 230 | (53.4) |  | 114 | (26.5) |  |  |
| Unemployed | 8 | (11.8) |  | 46 | (67.6) |  | 14 | (20.6) |  |  |
| Retired | 10 | (13.7) |  | 47 | (64.4) |  | 16 | (21.9) |  |  |
| Student and other situations | 11 | (12.0) |  | 58 | (63.0) |  | 23 | (25.0) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **Work with or study toxic substances** |  |  |  |  |  |  |  |  | 0.120 |  |
| Yes | 34 | (18.8) |  | 114 | (63.0) |  | 33 | (18.2) |  |  |
| No | 88 | (16.1) |  | 311 | (56.9) |  | 148 | (27.1) |  |  |
| Do not know | 5 | (12.2) |  | 28 | (68.3) |  | 8 | (19.5) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **Frequency of consultation of information****about toxic substances** |  |  |  |  |  |  |  |  | <0.001 | c |
| Often | 27 | (15.4) |  | 135 | (77.1) |  | 13 | (7.4) |  |  |
| Sometimes | 51 | (16.4) |  | 197 | (63.3) |  | 63 | (20.3) |  |  |
| Rarely | 42 | (18.9) |  | 98 | (44.1) |  | 82 | (36.9) |  |  |
| Never | 7 | (11.7) |  | 23 | (38.3) |  | 30 | (50.0) |  |  |
| Do not know | 0 |  |  | 0 |  |  | 1 | (100) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Often & sometimes | 78 | (16.0) |  | 332 | (68.3) |  | 76 | (15.6) | <0.001 |  |
| Rarely & never & do not know | 49 | (17.4) |  | 121 | (42.9) |  | 112 | (39.7) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **Sources of information** |  |  |  |  |  |  |  |  |  |  |
| Mass media | 94 | (16.3) |  | 326 | (56.7) |  | 155 | (27.0) | 0.028 |  |
| Clinicians, technicians, scientists or associations | 96 | (18.2) |  | 334 | (63.3) |  | 98 | (18.6) | <0.001 |  |
| Government | 52 | (30.2) |  | 81 | (47.1) |  | 39 | (22.7) | <0.001 |  |
| Workplace | 67 | (22.2) |  | 163 | (54.0) |  | 72 | (23.8) | 0.003 |  |
| Family and friends | 62 | (13.6) |  | 280 | (61.3) |  | 115 | (25.2) | 0.028 |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **Main means of information** |  |  |  |  |  |  |  |  |  |  |
| Experience | 32 | (18.5) |  | 109 | (63.0) |  | 32 | (18.5) | <0.001 |  |
| Interest | 48 | (19.5) |  | 156 | (63.4) |  | 42 | (17.1) | <0.001 | d |
| Little or no interest | 47 | (13.4) |  | 188 | (53.7) |  | 115 | (32.9) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **Number of correct answers about toxicity degree of certain substancese** |  |  |  |  |  |  |  |  | 0.003 |  |
| 0 – 4 | 4 | (6.7) |  | 34 | (56.7) |  | 22 | (36.7) |  |  |
| 5 – 7 | 64 | (15.8) |  | 229 | (56.7) |  | 111 | (27.5) |  |  |
| 8 – 9 | 59 | (19.3) |  | 190 | (62.3) |  | 56 | (18.4) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **The two most important factors for a substance to be toxic for humans** |  |  |  |  |  |  |  |  |  |  |
| Frequency of exposure and body concentration | 89 | (17.0) |  | 321 | (61.3) |  | 114 | (21.8) | 0.031 |  |
| Body concentration and own toxicity of substances | 93 | (17.8) |  | 302 | (57.7) |  | 128 | (24.5) | 0.377 |  |
| Frequency of exposure and own toxicity of substances | 78 | (17.2) |  | 275 | (60.7) |  | 100 | (22.1) | 0.157 |  |
|  |  |  |  |  |  |  |  |  |  |  |

[ Continued next page ]

**Table I.** Continued.

|  |  |  |
| --- | --- | --- |
|  | Effectiveness of laws |  |
|  | **Yes** |  | **No** |  | **Do not know** |  |
| N | (%) |  | N | (%) |  | N | (%) | *p*-valuea |
|  |  |  |  |  |  |  |  |  |  |  |
| All participants | 127 | (16.5) |  | 453 | (58.9) |  | 189 | (24.6) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **More presence of toxic substances in** |  |  |  |  |  |  |  |  | 0.011 |  |
| Food production, processing and distribution | 27 | (14.3) |  | 127 | (67.2) |  | 35 | (18.5) |  |  |
| Only food production and processing | 68 | (15.6) |  | 256 | (58.9) |  | 111 | (25.5) |  |  |
| Other responses | 32 | (22.1) |  | 70 | (48.3) |  | 43 | (29.7) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **Foods with higher concentrations of toxic substances are available in** |  |  |  |  |  |  |  |  | <0.001 |  |
| No stores | 32 | (27.1) |  | 35 | (29.7) |  | 51 | (43.2) |  |  |
| 1 – 2 food stores (neighbourhood shops included) | 17 | (16.7) |  | 65 | (63.7) |  | 20 | (19.6) |  |  |
| 1 – 2 food stores (neighbourhood shops not included) | 30 | (13.0) |  | 141 | (61.3) |  | 59 | (25.7) |  |  |
| 3 – 4 food stores | 46 | (15.2) |  | 205 | (67.7) |  | 52 | (17.2) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **Toxic substances in food may cause** |  |  |  |  |  |  |  |  | <0.001 |  |
| 0 – 3 health problems answered correctly | 35 | (17.5) |  | 88 | (44.0) |  | 77 | (38.5) |  |  |
| 4 – 5 health problems answered correctly | 47 | (17.1) |  | 167 | (60.7) |  | 61 | (22.2) |  |  |
| 6 – 7 health problems answered correctly | 43 | (15.5) |  | 191 | (68.7) |  | 44 | (15.8) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **Factors that increase the likelihood of toxic substances in food being harmful to human health** |  |  |  |  |  |  |  |  | 0.139 |  |
| 0 – 2 factors answered correctly | 32 | (17.9) |  | 94 | (52.5) |  | 53 | (29.6) |  |  |
| 3 – 4 factors answered correctly | 63 | (16.0) |  | 237 | (60.3) |  | 93 | (23.7) |  |  |
| 5 – 6 factors answered correctly | 26 | (15.5) |  | 110 | (65.5) |  | 32 | (19.0) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **Food groups with toxic substances concentrations harmful to human health** |  |  |  |  |  |  |  |  | <0.001 |  |
| 0 – 2 food groups | 25 | (20.0) |  | 51 | (40.8) |  | 49 | (39.2) |  |  |
| 3 – 5 food groups | 60 | (17.2) |  | 207 | (59.3) |  | 82 | (23.5) |  |  |
| 6 – 7 food groups | 36 | (13.5) |  | 183 | (68.8) |  | 47 | (17.7) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

Total N= 769.

SD: standard deviation.

a Unless otherwise specified, *p* value derived from Fisher exact test (two-tail).

b ANOVA.

c Excluding the “do not know”.

d Main means of information in two categories, “Informed by experience or interest¨ and “Little or not interested”.

e Number of correct answers about toxicity degree for human health of certain substances at high body concentrations.

**Table II.** Sociodemographic characteristics and questions about toxic substances by perception on the enforcement of laws and regulations.

|  |  |  |
| --- | --- | --- |
|  | Enforcement of laws |  |
|  | **Oftena** |  | **Sometimesb** |  | **Neverc** |  | **Do not knowd** |  |
|  | N | (%) |  | N | (%) |  | N | (%) |  | N | (%) | *p*-valuee |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| All participants | 298 | (38.8) |  | 266 | (34.6) |  | 131 | (17.0) |  | 74 | (9.6) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Age** (years) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mean ± SD | 46.2 ± 11.6 |  | 45.6 ± 11.3 |  | 42.0 ± 11.6 |  | 43.1 ± 11.1 | 0.002 | f |
|  |  |  |  |  |  |  |  |  |  |
| **Gender** |  |  |  |  |  |  |  |  |  |  |  | 0.003 |  |
| Male | 126 | (47.2) |  | 85 | (31.8) |  | 39 | (14.6) |  | 17 | (6.4) |  |  |
| Female | 172 | (34.3) |  | 181 | (36.1) |  | 92 | (18.3) |  | 57 | (11.4) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Occupational status** (%) |  |  |  |  |  |  |  |  |  |  |  | <0.001 |  |
| Self-employed | 28 | (26.7) |  | 45 | (42.9) |  | 21 | (20.0) |  | 11 | (10.5) |  |  |
| Employed by others | 200 | (46.4) |  | 133 | (30.9) |  | 71 | (16.5) |  | 27 | (6.3) |  |  |
| Unemployed | 17 | (25.0) |  | 25 | (36.8) |  | 14 | (20.6) |  | 12 | (17.6) |  |  |
| Retired | 23 | (31.5) |  | 30 | (41.1) |  | 10 | (13.7) |  | 10 | (13.7) |  |  |
| Student and other situations | 30 | (32.6) |  | 33 | (35.9) |  | 15 | (16.3) |  | 14 | (15.2) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Work with or study toxic substances** |  |  |  |  |  |  |  |  |  |  |  | 0.284 |  |
| Yes | 77 | (42.5) |  | 63 | (34.8) |  | 21 | (11.6) |  | 20 | (11.0) |  |  |
| No | 204 | (37.3) |  | 192 | (35.1) |  | 102 | (18.6) |  | 49 | (9.0) |  |  |
| Do not know | 17 | (41.5) |  | 11 | (26.8) |  | 8 | (19.5) |  | 5 | (12.2) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Frequency of consultation of information about toxic substances** |  |  |  |  |  |  |  |  |  |  |  | <0.001 | g |
| Often | 71 | (40.6) |  | 64 | (36.6) |  | 14 | (8.0) |  | 26 | (14.9) |  |  |
| Sometimes | 115 | (37.0) |  | 130 | (41.8) |  | 38 | (12.2) |  | 28 | (9.0) |  |  |
| Rarely | 93 | (41.9) |  | 57 | (25.7) |  | 56 | (25.2) |  | 16 | (7.2) |  |  |
| Never | 19 | (31.7) |  | 15 | (25.0) |  | 22 | (36.7) |  | 4 | (6.7) |  |  |
| Do not know | 0 |  |  | 0 |  |  | 1 | (100) |  | 0 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | <0.001 |  |
| Often & sometimes | 186 | (38.3) |  | 194 | (39.9) |  | 52 | (10.7) |  | 54 | (11.1) |  |  |
| Rarely & never & do not know | 112 | (39.6) |  | 72 | (25.4) |  | 79 | (27.9) |  | 20 | (7.1) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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**Table II.** Continued.

|  |  |  |
| --- | --- | --- |
|  | Enforcement of laws |  |
|  | **Oftena** |  | **Sometimesb** |  | **Neverc** |  | **Do not knowd** |  |
|  | N | (%) |  | N | (%) |  | N | (%) |  | N | (%) | *p*-valuee |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| All participants | 298 | (38.8) |  | 266 | (34.6) |  | 131 | (17.0) |  | 74 | (9.6) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Sources of information about toxic substances** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mass media | 220 | (38.3) |  | 204 | (35.5) |  | 109 | (19.0) |  | 42 | (7.3) | 0.001 |  |
| Clinicians, technicians, scientists or associations | 209 | (39.6) |  | 197 | (37.3) |  | 72 | (13.6) |  | 50 | (9.5) | 0.002 |  |
| Government | 91 | (52.9) |  | 46 | (26.7) |  | 28 | (16.3) |  | 7 | (4.1) | <0.001 |  |
| Workplace | 139 | (46.0) |  | 98 | (32.5) |  | 41 | (13.6) |  | 24 | (7.9) | 0.006 |  |
| Family and friends | 166 | (36.3) |  | 163 | (35.7) |  | 89 | (19.5) |  | 39 | (8.5) | 0.059 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Main means of information** |  |  |  |  |  |  |  |  |  |  |  | 0.031 |  |
| Experience | 72 | (41.6) |  | 62 | (35.8) |  | 20 | (11.6) |  | 19 | (11.0) | 0.006 | h |
| Interested | 103 | (41.9) |  | 90 | (36.6) |  | 34 | (13.8) |  | 19 | (7.7) |  |  |
| Little or not interested | 123 | (35.1) |  | 114 | (32.6) |  | 77 | (22.0) |  | 36 | (10.3) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **The two most important factors for a substance to be toxic for humans** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Frequency of exposure and body concentration | 204 | (38.9) |  | 177 | (33.8) |  | 90 | (17.2) |  | 53 | (10.1) | 0.870 |  |
| Body concentration and own toxicity of substances | 211 | (40.3) |  | 172 | (32.9) |  | 91 | (17.4) |  | 49 | (9.4) | 0.444 |  |
| Frequency of exposure and own toxicity of substances | 183 | (40.4) |  | 148 | (32.7) |  | 77 | (17.0) |  | 45 | (9.9) | 0.565 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **More presence of toxic substances in** |  |  |  |  |  |  |  |  |  |  |  | <0.001 |  |
| Food production, processing and distribution | 60 | (31.7) |  | 68 | (36.0) |  | 27 | (14.3) |  | 34 | (18.0) |  |  |
| Only food production and processing | 178 | (40.9) |  | 149 | (34.3) |  | 75 | (17.2) |  | 33 | (7.6) |  |  |
| Other response | 60 | (41.4) |  | 49 | (33.8) |  | 29 | (20.0) |  | 7 | (4.8) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Foods with higher concentrations of toxic substances are available in** |  |  |  |  |  |  |  |  |  |  |  | <0.001 |  |
| No stores | 57 | (47.9) |  | 21 | (18.5) |  | 33 | (27.7) |  | 7 | (5.9) |  |  |
| 1 – 2 food stores (neighbourhood shops included) | 37 | (36.3) |  | 45 | (44.1) |  | 12 | (11.8) |  | 8 | (7.8) |  |  |
| 1 – 2 food stores (neighbourhood shops not included) | 79 | (34.5) |  | 90 | (38.9) |  | 39 | (17.0) |  | 22 | (9.6) |  |  |
| 3 – 4 food stores | 117 | (38.6) |  | 107 | (35.3) |  | 43 | (14.2) |  | 36 | (11.9) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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**Table II.** Continued.

|  |  |  |
| --- | --- | --- |
|  | Enforcement of laws |  |
|  | **Oftena** |  | **Sometimesb** |  | **Neverc** |  | **Do not knowd** |  |
|  | N | (%) |  | N | (%) |  | N | (%) |  | N | (%) | *p*-valuee |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| All participants | 298 | (38.8) |  | 266 | (34.6) |  | 131 | (17.0) |  | 74 | (9.6) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Health problems related with toxic substances in food** |  |  |  |  |  |  |  |  |  |  |  | 0.010 |  |
| 0 – 3 of health problems answered correctly | 80 | (40.0) |  | 64 | (32.0) |  | 46 | (23.0) |  | 10 | (5.0) |  |  |
| 4 – 5 of health problems answered correctly | 113 | (41.1) |  | 93 | (33.8) |  | 42 | (15.3) |  | 27 | (9.8) |  |  |
| 6 – 7 of health problems answered correctly | 97 | (34.9) |  | 106 | (38.1) |  | 39 | (14.0) |  | 36 | (12.9) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Factors that increase the likelihood of toxic substances in food being harmful to human health** |  |  |  |  |  |  |  |  |  |  |  | 0.329 |  |
| 0 – 2 factors answered correctly | 71 | (39.7) |  | 66 | (36.9) |  | 25 | (14.0) |  | 17 | (9.5) |  |  |
| 3 – 4 factors answered correctly | 152 | (38.7) |  | 131 | (33.3) |  | 77 | (19.6) |  | 33 | (8.4) |  |  |
| 5 – 6 factors answered correctly | 62 | (36.9) |  | 61 | (36.3) |  | 23 | (13.7) |  | 22 | (13.1) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Food groups with toxic substances concentrations harmful to human health** |  |  |  |  |  |  |  |  |  |  |  | 0.008 |  |
| 0 – 2 food groups | 62 | (49.6) |  | 30 | (24.0) |  | 25 | (20.0) |  | 8 | (6.4) |  |  |
| 3 – 5 food groups | 124 | (35.5) |  | 135 | (38.7) |  | 61 | (17.5) |  | 29 | (8.3) |  |  |
| 6 – 7 food groups | 99 | (37.2) |  | 93 | (35.0) |  | 39 | (14.7) |  | 35 | (13.2) |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Total N=769.

SD: standard deviation.

a Individuals who consider that the laws and regulations are always or often enforced.

b Individuals who consider that the laws and regulations are enforced occasionally.

c Individuals who consider that the laws and regulations are rarely or never enforced.

d Individuals who do not know if laws and regulations are enforced.

e Unless otherwise specified, *p* value derived from Fisher’s exact test (two-tail).

f ANOVA.

g Excluding the “do not know”.

h Main means of information in two categories, “Informed by experience or interest” and “Little or not interested”.

**Table III.** Associations between sociodemographic characteristics and questions about toxic substances and the probability of answering that laws and regulations on toxic substances in food are always or often enforced (vs. other answers).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **ORa** | (95% CI) | *p-*valueb |  |
| **Age** (years) |  | 1.01 | (1.00 | ,1.03) | 0.056 |  |
| **Gender** |  |  |  |  |  |  |
| Male |  | 1.00 | Ref |  | 0.001 |  |
| Female |  | 0.60 | (0.44, | 0.82) |  |  |
| **Occupational status** |  |  |  |  |  |  |
| Self-employed |  | 1.00 | Ref |  | <0.001 |  |
| Employed by others |  | 2.38 | (1.48, | 3.83) |  |  |
| Unemployed |  | 0.93 | (0.46, | 1.87) |  |  |
| Retired |  | 1.10 | (0.55, | 2.19) |  |  |
| Student and other situations |  | 1.63 | (0.87, | 3.07) |  |  |
| **Work with or study toxic substances** |  |  |  |  |  |  |
| Yes |  | 1.00 | Ref |  | 0.193 |  |
| No or do not know |  | 0.80 | (0.56, | 1.12) |  |  |
| **Frequency of consultation of information about toxic substances** |  |  |  |  |  |  |
| Rarely & never & do not know |  | 1.00 | Ref |  | 0.661 |  |
| Often & sometimes |  | 0.93 | (0.69, | 1.27) |  |  |
| **Main means of information** |  |  |  |  |  |  |
| Little or not interested |  | 1.00 | Ref |  | 0.065 |  |
| Informed by experience or interest |  | 1.32 | (0.98, | 1.78) |  |  |
| **More presence of toxic substances in** |  |  |  |  |  |
| Food production, processing and distribution |  | 1.00 | Ref |  | 0.191 |  |
| Only food production and processing |  | 1.37 | (0.95, | 1.98) |  |  |
| Other responses |  | 1.42 | (0.90, | 2.25) |  |  |
| **Foods with higher concentrations of toxic substances are available in** |  |  |  |  |  |  |
| No stores |  | 1.00 | Ref |  | 0.149 |  |
| 1 – 2 food stores (neighbourhood shops included) |  | 0.64 | (0.37, | 1.11) |  |  |
| 1 – 2 food stores (neighbourhood shops not included) |  | 0.59 | (0.37, | 0.93) |  |  |
| 3 – 4 food stores |  | 0.70 | (0.45, | 1.07) |  |  |
| **Toxics in food may cause** |  |  |  |  |  |  |
| 0 – 3 health problems |  | 1.00 | Ref |  | 0.484 |  |
| 4 – 5 health problems |  | 1.07 | (0.74, | 1.56) |  |  |
| 6 – 7 health problems |  | 0.87 | (0.59, | 1.27) |  |  |
| **Factors that increase the likelihood of toxic substances in food being harmful to health** |  |  |  |  |  |  |
| 0 – 2 factors answered correctly |  | 1.00 | Ref |  | 0.616 | c |
| 3 – 4 factors answered correctly |  | 0.95 | (0.66, | 1.37) |  |  |
| 5 – 6 factors answered correctly |  | 0.89 | (0.58, | 1.39) |  |  |
| **Food groups with toxic substances concentrations harmful to health** |  |  |  |  |  |  |
| 0 – 2 food groups |  | 1.00 | Ref |  | 0.031 |  |
| 3 – 5 food groups |  | 0.58 | (0.38, | 0.87) |  |  |
| 6 – 7 food groups |  | 0.63 | (0.41, | 0.97) |  |  |
| **Throughout life you may have accumulated toxic substances potentially harmful to your health** |  |  |  |  |  |  |
| Yes |  | 1.00 | Ref |  | 0.038 |  |
| No or do not know |  | 1.60 | (1.03, | 2.49) |  |  |

OR: Odds ratio; CI: Confidence interval; Ref.: Reference category (OR = 1.00).

a Adjusted for age and gender. b Unless otherwise specified, *p*-value derived from Wald’s test.

c Test for linear trend (multivariate analogue of Mantel’s extension test).