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| Table 1 Characteristics of participants in a nested case-control study within the EPIC-IBD study | | | | | | | |
| Category | Crohn's disease | |  |  | Ulcerative colitis | |  |
| Cases (n=110) | Controls (n=440) |  |  | Cases (n=244) | Controls (n=976) |  |
| Gender (female %) | 80(72.7) | 320(72.3) |  |  | 140(57.4) | 565(57.9) |  |
| Age at recruitment, years (mean ± SD) | 50.1(10.8) | 50.1(10.7) |  |  | 51.7(10.5) | 51.7(10.5) |  |
|  |  |  |  |  |  |  |  |
| Age at diagnosis years (mean ± SD) | 55.4(11.1) | - |  |  | 57.5(10.3) | - |  |
| Interval between recruitment & diagnosis (mean ± SD) | 5.5(2.9) | - |  |  | 5.8(3.3) | - |  |
|  |  |  |  |  |  |  |  |
| Education(%) |  |  |  |  |  |  |  |
| Primary school | 22(20.0) | 107(24.3) |  |  | 68(27.8) | 253(26.0) |  |
| Technical/professional school | 33(30.0) | 96(21.8) |  |  | 62(25.4) | 246(25.2) |  |
| Secondary school | 30(27.3) | 105(23.9) |  |  | 52(21.3) | 201(21.0) |  |
| Longer education(including university) | 25(22.7) | 125(28.4) |  |  | 54(22.1) | 245(25.1) |  |
| Missing | 0(0.0) | 7(1.6) |  |  | 8(3.3) | 31(3.2) |  |
|  |  |  |  |  |  |  |  |
| Smoking status (n, %) |  |  | \* |  |  |  | \* |
| Never smoked | 41(37.3) | 209(47.5) |  |  | 65(26.6) | 418(42.8) |  |
| Former smoker | 28(25.5) | 121(27.5) |  |  | 91(37.3) | 281(28.8) |  |
| Current smoker | 38(34.6) | 107(24.3) |  |  | 82(33.6) | 255(26.1) |  |
| Missing | 3(2.7) | 3(0.7) |  |  | 6(2.5) | 22(2.3) |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Daily median intakes (mg/day)(inter quartile range) | |  |  |  |  |  |  |
| Total polyphenols | 1091.6(848.8, 1517.4) | 1164.8(888.8,1517.4) |  |  | 1226.1(911.3,1598.5) | 1203.0(872.1,1595.3) |  |
| Flavonoids | 474.6(276.6, 770.6) | 462.8(293.4,707.8) |  |  | 512.2(306.6,739.8) | 475.5(311.4,762.6) |  |
| Anthocyanidins | 25.7(9.9, 53.7) | 30.4(13.8, 55.5) |  |  | 23.7(11.5, 49.7) | 24.0(11.5,49.0) |  |
| Flavanols | 318.4(192.6, 627.6) | 327.8 (192.7, 527.1) |  |  | 379.3(218.1, 581.1) | 338.2(203.7,585.1) |  |
| Flavonols | 28.2(15.2, 56.9) | 29.9(18.0, 52.7) |  |  | 30.6(17.0,59.5) | 31.5(17.8, 59.1) |  |
| Flavanones | 21.8(9.0, 48.9) | 24.8(11.3, 51.7) |  |  | 23.9(10.0,50.4) | 26.1(10.5, 59.3) |  |
| Flavones | 7.7(5.2, 14.4) | 9.5 (6.0, 14.1) |  |  | 9.5( 5.3,14.5) | 8.9(5.1,14.5) |  |
| Isoflavones | 0.04(0.01, 0.11) | 0.03(0.01, 0.08) |  |  | 0.03(0.01-0.08) | 0.03(0.01,0.08) |  |
|  |  |  |  |  |  |  |  |
| Lignans | 1.4(1.0, 2.0) | 1.4(1.1, 1.9) |  |  | 1.4(1.1, 2.0) | 1.4(1.0,2.0) |  |
|  |  |  |  |  |  |  |  |
| Stilbenes | 0.3(0.1, 1.3) | 0.5(0.1, 2.1) |  |  | 0.5(0.1-2.1) | 0.4( 0.1,2.1) |  |
| Resveratrol | 0.1(0.0, 0.2) | 0.1(0.0, 0.2) |  |  | 0.1(0.0-0.3) | 0.1(0.0,0.2) |  |
|  |  |  |  |  |  |  |  |
| Phenolic acids | 560.9(428.4, 806.9) | 573.4(396.1, 815.0) |  |  | 592.4(388.1,868.8) | 571.3(365.0,821.3) |  |
| Hydroxybenzoic acid | 23.7( 8.7, 79.0) | 26.1(11.1, 65.9) |  |  | 27.9(8.4, 82.7) | 28.6(10.4,79.8) |  |
| Hydroxycinnamic acid | 522.0(328.3. 777.4) | 529.3(341.1, 770.5) |  |  | 546.9(340.4,818.4) | 518.4(301.0,777.3) |  |
| Hydroxyphenylacetic | 0.1(0.0, 0.3) | 0.1(0.0, 0.3) |  |  | 0.1(0.0,0.34) | 0.1(0.0,0.3) |  |
| \* p<0.05 | | | | |  |  |  |
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| Table 2. Odds ratios (OR) of developing Crohn's disease according to quartiles of polyphenol intakes | | | | | | |
| Polyphenols |  | Quartile of Intake | | | | P value for trend |
|  | Quartile 1 | Quartile 2 | Quartile 3 | Quartile 4 |
| **Total polyphenols** | Cases(n) | 32 | 30 | 17 | 31 |  |
|  | OR (95%CI) | 1.00 | 0.78(0.41,1.47) | 0.38(0.18,0.79)\* | 0.70(0.33,1.49) | 0.17 |
|  |  |  |  |  |  |  |
| **Flavonoids** | Cases(n) | 32 | 23 | 23 | 32 |  |
|  | OR (95%CI) | 1.00 | 0.76(0.41,1.43) | 0.72(0.37,1.38) | 0.94(0.45,1.97) | 0.71 |
| Anthocyanidins | Cases(n) | 36 | 26 | 20 | 28 |  |
|  | OR (95%CI) | 1.00 | 0.80(0.43,1.48) | 0.56(0.29,1.11) | 0.67(0.33,1.36) | 0.18 |
| Flavanols | Cases(n) | 28 | 32 | 18 | 32 |  |
|  | OR (95%CI) | 1.00 | 1.14(0.63,2.05) | 0.67(0.34,1.34) | 1.11(0.51,2.42) | 0.75 |
| Flavonols | Cases(n) | 31 | 26 | 22 | 31 |  |
|  | OR (95%CI) | 1.00 | 0.80(0.42,1.51) | 0.68(0.32,1.44) | 1.00(0.45,2.22) | 0.89 |
| Flavanones | Cases(n) | 37 | 24 | 23 | 26 |  |
|  | OR (95%CI) | 1.00 | 0.64(0.35,1.17) | 0.57(0.30,1.10) | 0.60(0.32,1.13) | 0.11 |
| Flavones | Cases(n) | 36 | 32 | 12 | 30 |  |
|  | OR (95%CI) | 1.00 | 0.88(0.49,1.60) | 0.33(0.15,0.69)\* | 0.61(0.28,1.30) | 0.03\* |
| Isoflavones | Cases(n) | 22 | 20 | 40 | 28 |  |
|  | OR (95%CI) | 1.00 | 0.98(0.50,1.92) | 2.26(1.13,4.53)\* | 1.59(0.72,3.49) | 0.11 |
|  |  |  |  |  |  |  |
| **Lignans** | Cases(n) | 36 | 18 | 27 | 29 |  |
|  | OR (95%CI) | 1.00 | 0.47(0.24,0.93)\* | 0.71(0.37,1.38) | 0.67(0.30,1.48) | 0.43 |
|  |  |  |  |  |  |  |
| **Stilbenes** | Cases(n) | 37 | 32 | 25 | 21 |  |
|  | OR (95%CI) | 1.00 | 0.91(0.50,1.66) | 0.67(0.35,1.28) | 0.53(0.26,1.08) | 0.05 |
| Resveratrol | Cases(n) | 40 | 20 | 29 | 21 |  |
|  | OR (95%CI) | 1.00 | 0.47(0.25,0.90)\* | 0.60(0.32,1.11) | 0.40(0.20,0.82)\* | 0.02\* |
|  |  |  |  |  |  |  |
| **Phenolic acids** | Cases(n) | 24 | 32 | 28 | 26 |  |
|  | OR (95%CI) | 1.00 | 1.21(0.65,2.27) | 1.11(0.58,2.11) | 0.83(0.41,1.69) | 0.55 |
|  |  |  |  |  |  |  |
| Hydroxybenzoic acid | Cases(n) | 30 | 27 | 24 | 29 |  |
|  | OR (95%CI) | 1.00 | 0.82(0.43,1.59) | 0.77(0.37,1.59) | 0.85(0.37,1.95) | 0.66 |
| Hydroxycinnamic acid | Cases(n) | 25 | 32 | 26 | 27 |  |
|  | OR (95%CI) | 1.00 | 1.23(0.67,2.28) | 0.95(0.50,1.82) | 0.91(0.46,1.79) | 0.60 |
| Hydroxyphenylacetic | Cases(n) | 24 | 26 | 36 | 24 |  |
|  | OR (95%CI) | 1.00 | 0.94(0.50,1.78) | 1.39(0.76,2.56) | 0.77(0.37,1.60) | 0.87 |
| Adjusted for: educational level, smoking and total energy; \* p<0.05 | | | | | |  |
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| Table 3. Odds ratios (OR) of developing ulcerative colitis according to quartiles of polyphenols intake | | | | |  |  |
|  |  | Quartile of Intake | | | | P value for trend |
|  |  | Quartile 1 | Quartile 2 | Quartile 3 | Quartile 4 |
| **Total Polyphenols** | Cases(n) | 54 | 61 | 66 | 63 |  |
|  | OR (95%CI) | 1.00 | 1.46(0.93,2.31) | 1.59(0.97,2.61) | 1.52(0.88,2.63) | 0.16 |
|  |  |  |  |  |  |  |
| **Flavonoids** | Cases(n) | 66 | 43 | 78 | 57 |  |
|  | OR (95%CI) | 1.00 | 0.77(0.49,1.22) | 1.43(0.92,2.24) | 1.10(0.66,1.86) | 0.26 |
| Anthocyanidins | Cases(n) | 61 | 62 | 53 | 68 |  |
|  | OR (95%CI) | 1.00 | 1.15(0.76,1.74) | 1.03(0.65,1.62) | 1.31(0.82,2.10) | 0.36 |
| Flavanols | Cases(n) | 60 | 46 | 80 | 58 |  |
|  | OR (95%CI) | 1.00 | 0.85(0.54,1.35) | 1.71(1.09,2.69)\* | 1.30(0.76,2.20) | 0.07 |
| Flavonols | Cases(n) | 63 | 64 | 53 | 64 |  |
|  | OR (95%CI) | 1.00 | 1.10(0.71,1.71) | 0.91(0.55,1.50) | 1.22(0.73,2.03) | 0.63 |
| Flavanones | Cases(n) | 66 | 61 | 66 | 51 |  |
|  | OR (95%CI) | 1.00 | 1.00(0.66,1.52) | 1.06(0.70,1.62) | 0.79(0.50,1.24) | 0.38 |
| Flavones | Cases(n) | 62 | 50 | 67 | 65 |  |
|  | OR (95%CI) | 1.00 | 0.97(0.62,1.51) | 1.33(0.85,2.08) | 1.37(0.81,2.34) | 0.14 |
| Isoflavones | Cases(n) | 68 | 61 | 61 | 54 |  |
|  | OR (95%CI) | 1.00 | 0.91(0.59,1.40) | 0.84(0.52,1.37) | 0.66(0.37,1.20) | 0.19 |
|  |  |  |  |  |  |  |
| **Lignans** | Cases(n) | 70 | 56 | 48 | 70 |  |
|  | OR (95%CI) | 1.00 | 0.82(0.54,1.26) | 0.72(0.45,1.15) | 0.99(0.58,1.70) | 0.75 |
|  |  |  |  |  |  |  |
| **Stilbenes** | Cases(n) | 64 | 53 | 64 | 63 |  |
|  | OR (95%CI) | 1.00 | 0.96(0.62,1.49) | 1.16(0.74,1.82) | 1.09(0.68,1.75) | 0.57 |
|  |  |  |  |  |  |  |
| Resveratrol |  | 64 | 48 | 67 | 65 |  |
|  |  | 1.00 | 0.79(0.50,1.24) | 1.30(0.82,2.04) | 1.26(0.75,2.11) | 0.32 |
| **Phenolic acids** | Cases(n) | 55 | 59 | 60 | 70 |  |
|  | OR (95%CI) | 1.00 | 1.17(0.74,1.85) | 1.21(0.76,1.94) | 1.33(0.81,2.19) | 0.28 |
| Hydroxybenzoic acid | Cases(n) | 73 | 49 | 59 | 63 |  |
|  | OR (95%CI) | 1.00 | 0.67(0.43,1.04) | 0.83(0.53,1.32) | 1.00(0.59,1.58) | 0.92 |
| Hydroxycinnamic acid | Cases(n) | 52 | 61 | 56 | 75 |  |
|  | OR (95%CI) | 1.00 | 1.31(0.82,2.07) | 1.22(0.75,1.97) | 1.60(0.98,2.63) | 0.10 |
| Hydroxyphenylacetic | Cases(n) | 63 | 57 | 55 | 69 |  |
|  | OR (95%CI) | 1.00 | 1.01(0.66,1.55) | 0.93(0.59,1.46) | 1.14(0.72,1.82) | 0.67 |

adjusted for: educational level, smoking and total energy; \* p<0.05

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Table 4. Odds ratios (OR) of developing Crohn's disease according to quartiles of polyphenol intake in ever smokers | | | | | | |
| Polyphenols |  | Quartile of Intake | | | |  |
|  | Quartile 1 | Quartile 2 | Quartile 3 | Quartile 4 | P value for trend |
| **Total polyphenols** | Cases(n) | 20 | 19 | 9 | 18 |  |
|  | OR (95%CI) | 1.00 | 0.73(0.29,1.83) | 0.28(0.10,0.84)\* | 0.56(0.20,1.63) | 0.13 |
|  |  |  |  |  |  |  |
| **Flavonoids total** | Cases(n) | 22 | 14 | 10 | 20 |  |
|  | OR (95%CI) | 1.00 | 0.69(0.28,1.70) | 0.50(0.18,1.38) | 1.14(0.36,3.55) | 0.67 |
|  |  |  |  |  |  |  |
| Anthocyanidins | Cases(n) | 24 | 13 | 13 | 16 |  |
|  | OR (95%CI) | 1.00 | 0.65(0.26,1.66) | 0.51(0.20,1.28) | 0.69(0.24,1.96) | 0.30 |
| Flavanols | Cases(n) | 20 | 21 | 5 | 20 |  |
|  | OR (95%CI) | 1.00 | 1.35(0.57,3.20) | 0.21(0.05,0.82)\* | 1.82(0.51,6.51) | 0.66 |
| Flavonols | Cases(n) | 20 | 18 | 11 | 17 |  |
|  | OR (95%CI) | 1.00 | 1.14(0.46,2.83) | 0.89(0.28,2.82) | 1.07(0.31,3.65) | 0.99 |
| Flavanones | Cases(n) | 23 | 13 | 12 | 18 |  |
|  | OR (95%CI) | 1.00 | 0.33(0.13,0.82) \* | 0.37(0.13,1.06) | 0.40(0.17,0.97) \* | 0.07 |
| Flavones | Cases(n) | 25 | 19 | 5 | 17 |  |
|  | OR (95%CI) | 1.00 | 0.67(0.28,1.59) | 0.15(0.04,0.54) \* | 0.56(0.20,1.58) | 0.07 |
| Isoflavones | Cases(n) | 11 | 10 | 25 | 20 |  |
|  | OR (95%CI) | 1.00 | 0.96(0.32,2.87) | 3.69(1.15,11.85) \* | 2.32(0.66,8.11) | 0.12 |
|  |  |  |  |  |  |  |
| **Lignans** | Cases(n) | 23 | 14 | 14 | 15 |  |
|  | OR (95%CI) | 1.00 | 0.52(0.21,1.29) | 0.38(0.13,1.12) | 0.38(0.12,1.19) | 0.06 |
|  |  |  |  |  |  |  |
| **Stilbenes** | Cases(n) | 21 | 18 | 14 | 13 |  |
|  | OR (95%CI) | 1.00 | 1.03(0.43,2.51) | 0.66(0.25,1.73) | 0.57(0.20,1.64) | 0.19 |
| Resveratrol | Cases(n) | 25 | 9 | 19 | 13 |  |
|  | OR (95%CI) | 1.00 | 0.42(0.16,1.13) | 0.72(0.30,1.73) | 0.39(0.14,1.07) | 0.14 |
|  |  |  |  |  |  |  |
| **Phenolic acids** | Cases(n) | 14 | 22 | 16 | 14 |  |
|  | OR (95%CI) | 1.00 | 1.14(0.45,2.89) | 0.90(0.33,2.49) | 0.71(0.26,1.96) | 0.37 |
|  |  |  |  |  |  |  |
| Hydroxybenzoic acid | Cases(n) | 17 | 19 | 14 | 16 |  |
|  | OR (95%CI) | 1.00 | 1.28(0.49,3.35) | 1.32(0.47,3.74) | 1.42(0.39,5.15) | 0.58 |
| Hydroxycinnamic acid | Cases(n) | 14 | 22 | 14 | 16 |  |
|  | OR (95%CI) | 1.00 | 1.71(0.67,4.41) | 1.00(0.36,2.79) | 1.10(0.40,3.01) | 0.71 |
| Hydroxyphenylacetic | Cases(n) | 14 | 16 | 20 | 16 |  |
|  | OR (95%CI) | 1.00 | 0.82(0.33,2.04) | 1.56(0.64,3.80) | 1.01(0.37,2.74) | 0.56 |

adjusted for educational level and total energy; \* p<0.05

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| Table 5. Odds ratios (OR) of developing ulcerative colitis and polyphenol intake in ever smokers | | | | |  |  |
| Polyphenols |  | Quartile of Intake | | | | P value for trend |
|  | Quartile 1 | Quartile 2 | Quartile 3 | Quartile 4 |
| **Total polyphenols** | Cases(n) | 39 | 38 | 49 | 47 |  |
|  | OR (95%CI) | 1.00 | 1.41(0.76, 2.64) | 2.00(1.04,3.85)\* | 2.04(0.95,4.36) | 0.05 |
|  |  |  |  |  |  |  |
| **Flavonoids total** | Cases(n) | 49 | 33 | 53 | 38 |  |
|  | OR (95%CI) | 1.00 | 0.86(0.48,1.55) | 1.41(0.79,2.52) | 1.23(0.61,2.47) | 0.30 |
|  |  |  |  |  |  |  |
| Anthocyanidins | Cases(n) | 43 | 44 | 40 | 46 |  |
|  | OR (95%CI) | 1:00 | 1.45(0.83,2.52) | 1.37(0.75,2.49) | 1.50(0.81,2.78) | 0.27 |
| Flavanols | Cases(n) | 47 | 35 | 52 | 39 |  |
|  | OR (95%CI) | 1:00 | 0.89(0.51,1.56) | 1.44(0.81,2.57) | 1.26(0.64,2.51) | 0.26 |
| Flavonols | Cases(n) | 49 | 48 | 36 | 40 |  |
|  | OR (95%CI) | 1:00 | 0.97(0.55,1.74) | 0.70(0.36,1.36) | 1.06(0.54,2.09) | 0.88 |
| Flavanones | Cases(n) | 42 | 46 | 47 | 38 |  |
|  | OR (95%CI) | 1:00 | 1.71(0.97,3.03) | 1.33(0.76,2.32) | 1.05(0.58,1.91) | 0.95 |
| Flavones | Cases(n) | 47 | 31 | 51 | 44 |  |
|  | OR (95%CI) | 1:00 | 0.93(0.52,1.65) | 1.55(0.88,2.74) | 1.34(0.66,2.72) | 0.19 |
| Isoflavones | Cases(n) | 47 | 45 | 42 | 39 |  |
|  | OR (95%CI) | 1:00 | 1.04(0.59,1.80) | 0.80(0.43,1.50) | 0.55(0.26,1.16) | 0.12 |
|  |  |  |  |  |  |  |
| **Lignans** | Cases(n) | 50 | 41 | 36 | 46 |  |
|  | OR (95%CI) | 1:00 | 0.96(0.56,1.65) | 0.78(0.43,1.42) | 1.00(0.48,2.08) | 0.74 |
|  |  |  |  |  |  |  |
| **Stilbenes** | Cases(n) | 44 | 41 | 45 | 43 |  |
|  | OR (95%CI) | 1:00 | 1.08(0.60,1.94) | 1.21(0.65,2.25) | 0.98(0.52,1.87) | 0.99 |
| Resveratrol | Cases(n) | 44 | 38 | 46 | 45 |  |
|  | OR (95%CI) | 1:00 | 0.92(0.51,1.65) | 1.37(0.76,2.47) | 1.02(0.54,1.90) | 0.69 |
|  |  |  |  |  |  |  |
| **Phenolic acids** | Cases(n) | 31 | 43 | 46 | 53 |  |
|  | OR (95%CI) | 1:00 | 1.70(0.88,3.29) | 2.11(1.06,4.22)\* | 2.14(1.03,4.46)\* | **0.05** |
|  |  |  |  |  |  |  |
| Hydroxybenzoic acid | Cases(n) | 56 | 36 | 41 | 40 |  |
|  | OR (95%CI) | 1:00 | 0.71(0.41,1.23) | 0.78(0.43,1.40) | 0.85(0.45,1.61) | 0.60 |
| Hydroxycinnamic acid | Cases(n) | 28 | 46 | 44 | 55 |  |
|  | OR (95%CI) | 1:00 | 1.85(0.96,3.56) | 2.01(0.99,4.07) | 2.35(1.13,4.91) \* | 0.04\* |
| Hydroxyphenylacetic | Cases(n) | 48 | 41 | 36 | 48 |  |
|  | OR (95%CI) | 1:00 | 0.93(0.53,1.63) | 0.61(0.33,1.15) | 1.01(0.54,1.88) | 0.78 |
| adjusted for educational level and total energy; \* p<0.05 | | | | | | |
|  | | | | | |  |