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| **Table 1: Included epidemiological publication of autism and metals in hair** | | | | |
| **Author (year)** | **Population** | **ASD measurement** | **Metals** | **Results** |
| Skalny et al. (2017) | Cases: 74  Controls: 74  In Russia  Age 2-9 years | DSM-IV | Al  As  Be  Cd  Cr  Pb  Mn | Median (IQR) Al: 0.031 (0.021-0.058) µg/g in controls; 0.034 (0.021-0.044) µg/g in cases; p=0.353  Median (IQR) As: 0.031 (0.021-0.058) µg/g in controls; 0.034 (0.021-0.044) µg/g in cases; p=0.353  Median (IQR) Be: 0.0006 (0.0004-0.0020) µg/g in controls; 0.0004 (0.0001-0.0010) µg/g in cases; p<0.001  Median (IQR) Cd: 0.029 (0.015-0.059) µg/g in controls; 0.023 (0.014-0.035) µg/g in cases; p=0.150  Median (IQR) Cr: 0.155 (0.090-0.360) µg/g in controls; 0.110 (0.082-0.156) µg/g in cases; p=0.003  Median (IQR) Pb: 0.588 (0.383-0.930) µg/g in controls; 0.506 (0.330-0.673) µg/g in cases; p=0.179  Median (IQR) Mn: 0.221 (0.152-0.340) µg/g in controls; 0.230 (0.170-0.327) µg/g in cases; p=0.801 |
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| Skalny et al. (2016) | Cases: 33  Controls: 33  In Russia  Age 3-8 years | DSM-IV-TR | Ni | Median (IQR) Ni: 1.47 (0.12-0.20) µg/g in controls; 0.12 (0.12-0.14) µg/g in cases; p=0.471 |
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| Mohamed et al. (2015) | Cases: 100  Controls: 100  In Egypt  Age 2.5-15 years | DSM-IV | Al  Pb | Mean (SD) Al: 16.78 (17.31) mg/kg in controls; 59.19 (37.98) mg/kg in cases; p=0.0001  Mean (SD) Pb: 2.06 (2.45) mg/kg in controls; 3.31 (3.92) mg/kg in cases; p=0.015 |
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| Albizzati et al. (2012) | Cases: 17  Controls: 20  In Italy  Age 6-16 years | DSM-IV and ADOS | Al  Cd  Pb | Mean (SD) Al: 1.91 (0.46) ppb/mL in controls; 1.84 (0.50) ppb/mL in cases; p=0.703  Hair mean (SD) Cd: 0.08 (0.03) ppb/mL in controls; 0.07 (0.04) ppb/mL in cases; p=0.180  Hair mean (SD) Pb: 0.62 (0.26) ppb/mL in controls; 0.59 (0.22) ppb/mL in cases; p=0.474 |
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| Al-Farsi et al. (2012) | Cases: 27  Controls: 27  In Oman  Age 3-14 years | DSM-IV and CARS | Al  Cd  Cr  Ni | Median (IQR) Al: 1.2 (0.2) µg/g in controls; 2.3 (0.3) µg/g in cases; p=0.002  Median (IQR) Cd: 3.0 (0.4) µg/g in controls; 7.4 (0.9) µg/g in cases; p=0.001  Median (IQR) Cr: 9.9 (1.6) µg/g in controls; 23.6 (2.3) µg/g in cases; p=0.001  Median (IQR) Ni: 5.6 (0.7) µg/g in controls; 11.6 (0.89) µg/g in cases; p=0.003 |
| Al = Aluminum; Sb = Antimony; Be = Beryllium; Cd = Cadmium; Cr = Chromium; Pb = Lead; Mn = Manganese; Ni = Nickle  IQR = Interquartile range; SD = Standard deviation | | | | |

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| **Table 1** (continued) | | | | |
| **Author (year)** | **Population** | **ASD measurement** | **Metals** | **Results** |
| De Palma et al. (2012)\* | Cases: 44  Controls: 61  In Italy  Age 2-17 years | DSM-IV and CARS | Al  As  Cd  Cr  Pb  Mn  Ni | Median (IQR) Al: 8.75 (5.80-15.98) µg/g in controls; 11.65 (8.37-19.35) µg/g in cases; p=0.091  Median (IQR) As: 0.04 (0.012-0.07) µg/g in controls; 0.03 (0.01-0.06) µg/g in cases; p=0.297  Median (IQR) Cd: 0.01 (0.0003-0.04) µg/g in controls; 0.01 (0.006-0.03) µg/g in cases; p=0.373  Median (IQR) Cr: 0.22 (0.073-0.69) µg/g in controls; 0.20 (0.20-0.50) µg/g in cases; p=0.316  Median (IQR) Pb: 0.80 (0.46-1.65) µg/g in controls; 1.30 (0.52-2.50) µg/g in cases; p=0.052  Median (IQR) Mn: 0.20 (0.11-0.30) µg/g in controls; 0.20 (0.10-0.40) µg/g in cases; p=0.843  Median (IQR) Ni: 0.20 (0.10-0.31) µg/g in controls; 0.20 (0.10-0.40) µg/g in cases; p=0.742 |
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| Blaurock-Busch et al. (2011) | Cases: 25  Controls: 25  In Saudi Arabia  Age 3-9 years | DSM-IV | Al  As  Be  Cd  Cr  Mn  Ni | Mean (SD) Al: 0.58 (0.73) µg/g in controls; 0.55 (0.83) µg/g in cases; p=0.89  Mean (SD) As: 0.09 (0.08) µg/g in controls; 0.06 (0.06) µg/g in cases; p<0.05  Mean (SD) Be: 0.00 (0.0002) µg/g in controls; 0.0001 (0.0003) µg/g in cases; p=0.6  Mean (SD) Cd: 0.06 (0.5) µg/g in controls; 0.23 (0.27) µg/g in cases; p=0.003  Mean (SD) Cr: 0.10 (0.09) µg/g in controls; 0.09 (0.06) µg/g in cases; p=0.64  Mean (SD) Mn: 0.41 (0.34) µg/g in controls; 0.38 (0.24) µg/g in cases; p=0.71  Mean (SD) Ni: 0.58 (0.73) µg/g in controls; 0.55 (0.83) µg/g in cases; p=0.89 |
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| Lakshmi et al. (2011) | Cases: 45  Controls: 50  In India  Age 4-12 years | M-CHAT | Pb | Mean (SD) Pb: 1.56 (0.18) µg/g in controls; 17.97 (2.15) µg/g in low functioning cases (p<0.01); 3.24 (0.38) in mid functioning cases (p<0.01); 2.04 (0.24) µg/g in high functioning cases (p<0.01) |
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| Obrenovich et al. (2011) | Cases: 26  Controls: 39  In Ohio, USA  Age <6 years | DSM-IV | As  Pb  Mn  Ni | Mean (SD) As: not specified; concentrations in cases higher than in controls p<0.0001  Mean (SD) Pb not specified; difference in means p=NS  Mean (SD) Mn not specified; difference in means p=NS  Mean (SD) Ni not specified; difference in means p=NS |
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| Kern et al. (2007) | Cases: 45  Controls: 45  In Texas, USA  Age 1-6 years | DSM-IV, CARS, and M-CHAT | As  Cd  Pb | Mean (SD) As: 0.09 (0.08) µg/g in controls; 0.06 (0.06) µg/g in cases; p<0.05  Mean (SD) Cd: 0.82 (0.64) µg/g in controls; 0.58 (0.45) µg/g in cases; p<0.05  Mean (SD) Pb: 0.20 (0.37) µg/g in controls; 0.19 (0.65) µg/g in cases; p<0.05 |
| Al = Aluminum; Sb = Antimony; Be = Beryllium; Cd = Cadmium; Cr = Chromium; Pb = Lead; Mn = Manganese; Ni = Nickle  IQR = Interquartile range; SD = Standard deviation  \* Study assessed sex differences | | | | |

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| **Table 1** (continued) | | | | |
| **Author (year)** | **Population** | **ASD measurement** | **Metals** | **Results** |
| Adams et al. (2006) | Cases: 51  Controls: 40  In Arizona, USA  Age 3-15 years | Previous diagnosis | Al  Sb  As  Be  Cd  Cr  Pb  Mn  Ni | Mean Al: 20.9 µg/g in controls; 17.5 µg/g in cases; p=0.05  Mean Sb: 0.08 µg/g in controls; 0.19 µg/g in cases; p=NS  Mean As: 0.095 µg/g in controls; 0.088 µg/g in cases; p=NS  Mean Be: 0.00 µg/g in controls; 0.00 µg/g in cases; p=NS  Mean Cd: 0.138 µg/g in controls; 0.126 µg/g in cases; p=NS  Mean Cr: 0.30 µg/g in controls; 0.35 µg/g in cases; p=NS  Mean Pb: 0.81 µg/g in controls; 0.62 µg/g in cases; p=NS  Mean Mn: 0.16 µg/g in controls; 0.24 µg/g in cases; p=NS  Mean Ni: 0.22 µg/g in controls; 0.24 µg/g in cases; p=NS |
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| Al-Ayadhi (2005) | Cases: 65  Controls: 80  In Saudi Arabia  Age ≤14 years | Autism Research Institute, Form E2 | Al  Sb  As  Cd  Pb  Mn  Ni | Mean (SD) Al: 2.4 (0.8) ppm in controls; 2.2 (1.2) ppm in cases; p=NS  Mean (SD) Sb: 0.002 (0.007) ppm in controls; 0.02 (0.01) ppm in cases; p<0.05  Mean (SD) As: 0.23 (0.05) ppm in controls; 1.8 (0.16) ppm in cases; p<0.05  Mean (SD) Cd: 0.003 (0.001) ppm in controls; 0.008 (0.003) ppm in cases; p<0.05  Mean (SD) Pb: 0.96 (0.16) ppm in controls; 3.48 (0.22) ppm in cases; p<0.05  Mean (SD) Mn: 0.6 (0.06) ppm in controls; 0.33 (0.04) ppm in cases; p<0.05  Mean (SD): 0.42 (0.03) ppm in controls; 0.18 (0.02) ppm in cases; p=NS |
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| Fido et al. (2005) | Cases: 40  Controls: 40  In Kuwait  Age 4-8 years | DSM-IV | Al  Sb  As  Be  Cd  Pb | Median Al: 62 µg/g in controls; 61.0 µg/g in cases; p=NS  Median Sb: 0.06 µg/g in controls; 0.08 µg/g in cases; p=NS  Median As: 0.13 µg/g in controls; 0.13 µg/g in cases; p=NS  Median Be: 0.02 µg/g in controls; 0.05 µg/g in cases; p=NS  Median Cd: 0.16 µg/g in controls; 0.14 µg/g in cases; p=NS  Median Pb: 3.20 µg/g in controls; 6.75 µg/g in cases; p<0.01 |
| Al = Aluminum; Sb = Antimony; Be = Beryllium; Cd = Cadmium; Cr = Chromium; Pb = Lead; Mn = Manganese; Ni = Nickle  IQR = Interquartile range; SD = Standard deviation | | | | |