

### 2.2.21 Other haematopoietic malignancies

#### (a) Myeloid leukaemia

##### (i) Cohort studies

There have been only two prospective studies of BMI and/or weight in relation to total myeloid leukaemia incidence (Table 2.2.20a, web only, available at: <http://publications.iarc.fr/570>). In the Japan Collaborative Cohort Study, compared with BMI 18.5–24 kg/m<sup>2</sup>, BMI ≥ 30 kg/m<sup>2</sup> was associated with a statistically significantly higher risk (Fujino et al., 2007). In the EPIC cohort, BMI was positively associated with risk in women ( $P_{\text{trend}} = 0.04$ ), but no association was found in men (Saber Hosnijeh et al., 2013).

Statistically significant positive associations between BMI and risk of AML were observed in postmenopausal women in the USA (Ross et al., 2004), in the United States Veterans cohort (Samanic et al., 2004), and in a Norwegian cohort (Engeland et al., 2007). However, there were no associations of BMI or weight with risk in other studies in European men (Samanic et al., 2006; Fernberg et al., 2007; Saber Hosnijeh et al., 2013) or women (Saber Hosnijeh et al., 2013). Of six individual prospective studies of BMI and/or weight in relation to CML incidence (Samanic et al., 2004, 2006; Engeland et al., 2007; Fernberg et al., 2007; Kabat et al., 2013; Saber Hosnijeh et al., 2013), only one (Engeland et al., 2007) found clear evidence of a positive association. In a meta-analysis of prospective studies, obesity was associated with a statistically significant 52% higher risk of AML and a 26% higher risk of CML compared with normal weight (Larsson & Wolk, 2008).

Only two studies have examined associations of abdominal obesity with risk of myeloid leukaemia. In the Iowa Women's Health Study, waist circumference was positively associated with risk of AML ( $P_{\text{trend}} = 0.04$ ) (Ross et al., 2004). Similarly, in the EPIC cohort, there was suggestive evidence for an association of waist

circumference with risk of AML in women ( $P_{\text{trend}} = 0.06$ ), but not in men (Saber Hosnijeh et al., 2013). In that study, there were also no associations of waist circumference with CML incidence in either men or women (Saber Hosnijeh et al., 2013).

##### (ii) Case-control studies

Three case-control studies have evaluated the relationship between BMI and the risk of developing various subtypes of leukaemia (Table 2.2.20b, web only, available at: <http://publications.iarc.fr/570>). In a study of 420 cases of AML from the Minnesota Cancer Surveillance System, Poynter et al. (2016) found a non-significant increase in risk of AML with high BMI in women only. Kasim et al. (2005) found an increased risk of all leukaemia, AML, and CML in obese versus normal-weight individuals in a case-control study of 1068 people with leukaemia from the Canadian Enhanced Survival Surveillance System. Finally, Strom et al. (2009) found a trend towards an increased risk of CML with BMI at age 25 years, at age 40 years, and at diagnosis in a case-control study of 253 cases of CML from MD Anderson Cancer Center in the USA.

#### (b) Leukaemia not otherwise specified

At least six individual cohort studies found no association between BMI and total leukaemia incidence or mortality (Table 2.2.20a, web only, available at: <http://publications.iarc.fr/570>; Oh et al., 2005; Samanic et al., 2006; Andreotti et al., 2010; De Roos et al., 2010; Saber Hosnijeh et al., 2013; Batty et al., 2015). Conversely, positive associations were found in at least eight other studies, conducted in the Republic of Korea, Taiwan, China, the United Kingdom, and the USA (Calle et al., 2003, in men only; Ross et al., 2004; Samanic et al., 2004; Chiu et al., 2006; Reeves et al., 2007; Song et al., 2008; Chu et al., 2011; Bhaskaran et al., 2014). Positive associations in men and in women were found in a meta-analysis of seven

prospective studies ([Renehan et al., 2008](#)). In a meta-analysis of 10 studies in men and women combined, there was a 39% increased risk of leukaemia incidence for obese versus normal BMI ([Larsson & Wolk, 2008](#)). Similarly, in the Asia-Pacific Cohort Studies Collaboration, there was a positive association between BMI and leukaemia mortality ([Parr et al., 2010](#)). However, a pooled analysis of almost 1 million people found no association between BMI and leukaemia mortality ([Whitlock et al., 2009](#)).

Although waist circumference was not associated with total leukaemia incidence in the Iowa Women's Health Study ([Ross et al., 2004](#)) or in the EPIC cohort ([Saberli Hosnijeh et al., 2013](#)), in the MJ Health Screening Center study, in Taiwan, China, abdominal obesity (waist circumference of  $\geq 90$  cm in men and  $\geq 80$  cm in women) was associated with an 87% higher risk of death from leukaemia compared with lower waist circumference ([Chu et al., 2011](#)).

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