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# Effects of misreporting on agreement of methods to measure sodium status in the National Diet and Nutrition Survey

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High sodium intake is associated with hypertension which in turn is a significant risk factor for cardiovascular disease[1]. Accurate measurement of dietary sodium intake is essential to quantify relationships between intake and health outcomes[2]. While sodium intake can be predicted from either urinary excretion or dietary assessment, the 'gold standard' method is 24-hour urine collection as around 90% of ingested sodium is excreted in urine[3]. However, due to high participant and analytical burdens, large scale population surveys usually rely on dietary records. Previous studies have investigated the agreement between 24-hour urinary sodium excretion and 24-hour dietary recalls, but not with food diaries2. Therefore, the aims of this study were (i) to identify misreporting of dietary sodium in the latest NDNS and (ii) to measure agreement between 4-day food diaries and 24-hour urinary sodium excretion. Firstly, the extent of misreporting of energy intake (subsequently used as a measure of misreporting of sodium) was measured in the most recent years (2016/2017 to 2018/2019) using an adaptation of Goldberg's method4. Then, those years with both urine collection and dietary records (between 2008/2009 and 2012/2013) were analysed for both the extent of misreporting and to quantify inter-method agreement. The degree of method agreement was determined using Bland Altman Analysis (BAA) by plotting means (average of 24-hour urinary sodium excretion and dietary sodium) against the difference of the two measures (24-hour urinary sodium excretion *minus* dietary sodium). Initially, BAA was conducted in males and females including all valid urine collection data. Then, BAA was conducted again after exclusion of misreporters of diet. The prevalence of misreporting of sodium intake during the years 2016/2017 to 2018/2019 was thirty nine percent ($n = 1279$). When stratified by age, dietary sodium intake was significantly higher in valid reporters compared to misreporters in all those aged >10 years old ($p < 0.001$). Sixty one percent of the 11–18-year-olds misreported dietary sodium intake. The prevalence of misreporting increased with increasing BMI; with 34%, 45% and 58% misreporting in the normal, overweight and obese groups, respectively. When misreporters were excluded from the 2008/2009 to 2012/2013 data, BAA showed that inter-method bias reduced from 688 (1261) mg/day to 359 (1058) mg/day and limits of agreement reduced from (3159, -1738 mg/day) to (2432, -1714 mg/day) in females. There was a similar trend in males. There was a trend towards a lower absolute inter-method bias in females (359 (1058) mg/day) compared to males (607 (1417) mg/day) amongst valid reporters. Exclusion of misreporters appears to improve inter-method agreement between 24-hour urinary sodium excretion and food diaries. Therefore, accounting for misreporting in food diaries may improve their validity. Nonetheless, the WHO still recommends to use urinary assessment to measure population sodium intake5.

## References

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