Kidney Health Week / World Kidney Day 2017

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Obesity and chronic kidney disease: the hidden impact

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Foreword

The link between Australia's obesity epidemic and chronic conditions, including chronic kidney disease (CKD) is under the spotlight during Kidney Health Week this year, which – for the first time – will also align with World Kidney Day.

Obesity is a potent risk factor for the development of kidney disease. Excess weight has a direct impact on the development and progression of CKD and end stage kidney disease. In obese individuals the kidneys have to work harder, filtering more blood than normal to meet the metabolic demands of increased body weight. The increase in function can damage the kidneys and heightens the risk of developing CKD in the long-term. Obesity also has an indirect relationship by increasing the risk of developing diabetes and hypertension, which are both major risk factors for CKD.

"*Obesity and chronic kidney disease: the hidden impact*" highlights the evidence linking obesity to the development of CKD, kidney stones, and kidney cancer. National Health Survey data is also presented which shows that while obesity and CKD are issues of national importance, there are some regions in Australia that are disproportionately affected.

With it now more common for Australians to be overweight or obese than to be in the healthy weight range, there has never been a more appropriate time to take action.

The good news is that obesity, as well as chronic kidney disease, is largely preventable. Education and awareness of the risks of obesity and the benefits of adopting a healthy lifestyle, including proper nutrition and exercise, can make a dramatic impact on preventing obesity and kidney disease for all Australians.

Obesity and CKD statistics

The most commonly used measure of defining obesity is by calculation of body mass index (BMI). BMI is defined as an individual's body weight (mass) in kilograms divided by the square of their height in metres. Overweight is measured at a BMI of 25 or more with obesity determined at a BMI of 30 or more, and severe obesity a BMI greater than 35.

Australia is losing the obesity war and our kidneys are a hidden casualty.
Population surveys show that in many areas across Australia where obesity is skyrocketing, the average rate of CKD indicators in the population are also above average.

Furthermore, due to the unavailability of statistics for remote Australia the situation may even be worse than currently predicted.

A worsening epidemic

Sixty three per cent of Australians are overweight or obese[1] **and this** growing national health crisis has implications for kidney disease as obesity is a potent risk factor for both the development and progression of kidney conditions.

The prevalence of obesity and severe obesity among Australian adults is predicted to increase exponentially over the next decade[2]**. Severe obesity is projected to be 13 per cent (1 in 8) by 2025 (compared with 5 per cent in 1995). By 2025, it is projected that 1 in 6 women and 1 in 10 men will be severely obese.**

Projections forecast the **number of people on dialysis and transplantation is expected to rise by 60 per cent between 2011 and 2020** (19,780 patients in 2011 to 31,589 in 2020), although the Australian population will only increase by 13 per cent over this period[3].

Obesity and CKD

- One-third of chronic kidney disease cases in Australia could be related to excess weight[4].
- Being obese doubles your risk of developing CKD compared to someone who has a healthy body weight, while overweight people increase their risk of developing CKD by 1.5 times[4].
- In obese individuals the kidneys have to work harder, filtering more blood than normal to meet the metabolic demands of increased body weight. The increase in function can damage the kidneys and heightens the risk of developing CKD in the long-term.
- The risk of developing CKD is higher for obese women than for obese men[4].
- Being overweight is also associated with an increased risk of kidney stones[5].
- It is estimated that 17 per cent and 26 per cent of all kidney cancers in men and women could be related to excess weight[6].
- Obesity also indirectly impacts on CKD via the mediating effect on increasing the risk of developing diabetes and high blood pressure[7], which are the two most common causes of end-stage kidney disease in Australia[8].

Obesity: The current situation

Obesity is a significant risk factor for increased mortality and morbidity, and the burden is growing. In 2013, being overweight or obese accounted for 4.4 million deaths worldwide – an increase of 63 per cent from 1990[9]. Being overweight or obese is also a major risk factor for ischaemic heart disease, which is the number one cause of death in Australia.

The National Health Survey data has revealed that there are now more people in Australia who are overweight or obese than people who have a healthy body weight[1]:

- 2 in 3 (63%) Australian adults are overweight (35%) or obese (28%)
- An estimated 11.2 million Australian adults are overweight (6.3 million) or obese (4.9 million)
- Only one-third (36%) of Australian adults have a healthy body weight
- Indigenous adults are 1.6 times as likely to be obese as non-Indigenous Australians[9]
- Men are more likely to be obese than women; this is reversed in the Indigenous population where women are more likely to be obese than men
- Being overweight or obese becomes more common as you age
- Childhood obesity is also increasing - one quarter of children aged 2–17 years are overweight (18%) or obese (7%)
- Childhood obesity is even more common in Indigenous populations, approximately one-third of children are overweight or obese[9]

Chronic kidney disease: The current situation

It is estimated that 1.7 million Australian adults have at least one clinical sign of CKD[10]. As CKD is largely asymptomatic, up to 90 per cent of kidney function can be lost before it is detected, and by then it is usually too late. However, with timely identification and appropriate management the otherwise inevitable deterioration in kidney function can be reduced by as much as 50 per cent and may even be reversible[11].

1 in 3 Australians is at increased risk of developing CKD[12].

Adult Australians are at an increased risk of chronic kidney disease if they:

- are obese with a body mass index (BMI) 30 or higher
- have diabetes
- have high blood pressure
- have established heart problems (heart failure or heart attack) or have had a stroke
- have a family history of kidney failure
- are a smoker
- are 60 years or older
- are of Aboriginal or Torres Strait Islander origin
- have a history of acute kidney injury.

While some risk factors such as age, family history, and racial background cannot be changed, lifestyle risk factors such as obesity can be modified and the risk reduced.

Latest data from the Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) show there are currently over 23,000 Australians with end stage kidney disease dependent on dialysis or living with a kidney transplant[8]. In 2015, 2,654 people commenced dialysis or received a kidney transplant. The population-based incidence of new dialysis or kidney transplant patients in Australia each year has stabilised in the last decade (Figure

1). The pattern for Aboriginal and Torres Strait Islander[1] patients has shown more fluctuation, and incidence varies markedly by remoteness. Nationally, a trend towards stabilisation of incidence amongst Aboriginal and Torres Strait Islander people may be emerging.

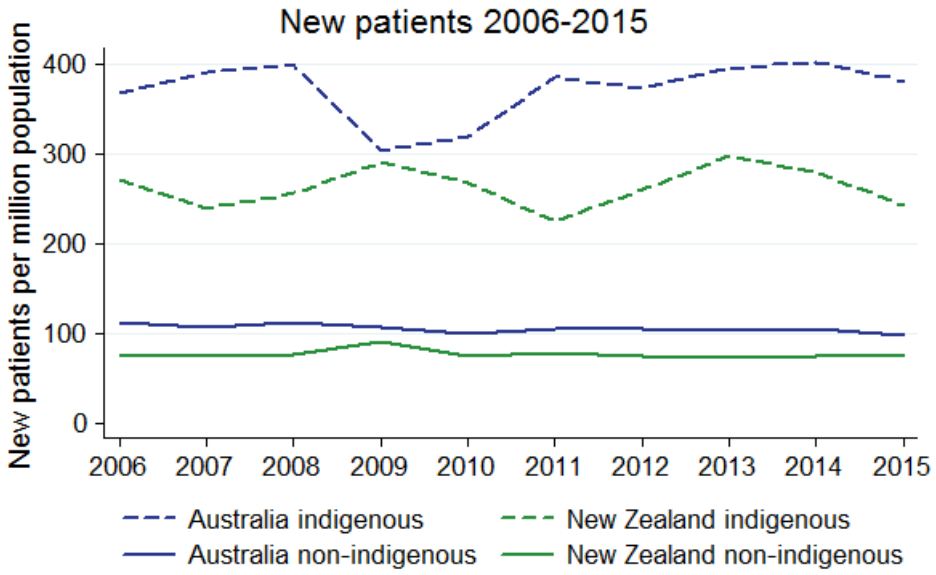

Figure 1. New kidney replacement therapy patients per million population in Australia, 2006-2015[8].

Projections forecast the number of people on dialysis and transplantation is expected to rise by 60 per cent between 2011 and 2020 (19,780 patients in 2011 to 31,589 in 2020), although the Australian population will only increase by 13 per cent over this period[3].

Obesity and chronic kidney disease by region

Data from the National Health Survey indicates that obesity rates across Australia are skyrocketing, with considerable variation according to geographical location[1]. Rates of overweight or obesity are disproportionately higher in regional or remote areas compared with major cities. As shown in Table 1, Country SA Primary Health Network (PHN) has the highest percentage of overweight or obese adults (73 per cent of adults), while Northern Sydney PHN has the lowest rate of overweight or obese adults (53 per cent of adults)[1].

There are a number of factors that influence whether someone is overweight or obese, such as age, gender, education, genetic and metabolic factors, lifestyle behaviours, socioeconomic status and presence of other comorbid conditions. These factors may explain some of the variation seen across PHN areas in Australia.

As shown in Table 1, 11 of the 16 (69%) of PHN areas with above average obesity rates have also been previously identified as CKD 'hot spots'[13], and this is likely to be an underestimate of the problem as it does not encompass the full scope of CKD in remote Indigenous communities.

South Eastern NSW PHN has an estimated rate of CKD which is double the national average (20 per cent), and also has an estimated 69 per cent of overweight or obese adults.

[1] The terms Aboriginal and Torres Strait Islander and Indigenous Australians are interchangeable in this report. The term Indigenous is used with reference and respect to Australian Aboriginal and Torres Strait Islanders.

Similarly, the Darling Downs and West Moreton PHN in Queensland has estimated rates of 16 per cent for CKD and 70 per cent for overweight and obesity, both significantly higher than the national averages.

As previously noted, the PHN data included in Table 1 was restricted to urban and rural areas in all states and territories. This impacts most on the Northern Territory data, as 23 per cent of the population of this jurisdiction reside in Very Remote areas. It also does not fully quantify the scope of CKD in Indigenous populations. Previous mapping exercises utilising postcode of usual residence have revealed that the incidence of end stage kidney disease among Indigenous Australians is highest in the remote regions of Tennant Creek, Aputula and Jabiru in the Northern Territory, Warburton and Kalgoorlie in Western Australia (Country WA PHN), and Ceduna in South Australia (Country SA PHN)[13].

Table 1: Estimated adult obesity and CKD rates across Primary Health Network (PHN) areas, 2014-15

PHN Area	Estimated Obesity Rates	Estimated CKD rates#
Australia	63%	10%
Country SA	73%	8%
Western NSW	71%	9%
Darling Downs & West Moreton (Qld)	70%	16%
Western Victoria	70%	14%
South Eastern NSW	69%	20%
Murray (Vic & part NSW)	68%	14%
Hunter New England & Central Coast (NSW)	68%	12%
Tasmania	68%	11%
Country WA	67%	14%
Central Qld, Wide Bay & Sunshine Coast	67%	13%
Nepean Blue Mountains (NSW)	67%	6%
Eastern Melbourne (Vic)	66%	14%
Northern Queensland	66%	13%
Western Sydney (NSW)	65%	12%
Northern Territory*	64%	8%
Australian Capital Territory	64%	7%
Adelaide (SA)	63%	9%
Brisbane South (Qld)	62%	12%
Perth South (WA)	61%	15%
Gold Coast (Qld)	61%	6%
North Western Melbourne (Vic)	60%	13%
North Coast (NSW)	60%	6%
South Eastern Melbourne (Vic)	59%	14%
Brisbane North (Qld)	58%	9%
South Western Sydney (NSW)	58%	9%
Central & Eastern Sydney (NSW)	57%	15%
Perth North (WA)	57%	8%
Northern Sydney (NSW)	53%	7%
Murrumbidgee (NSW)	NP	13%
Gippsland (Vic)	NP	NP
Western Queensland	NP	NP

Shaded cells represent PHN's with rates of overweight/obesity or CKD higher than the national average

* ~25% of the population live in very remote area and discrete Aboriginal & Torres Strait Islander communities, and are excluded from these data.

\# These rates are estimations only, and may be an underestimation in some PHN's that incorporate rural and/or very remote areas.

NP Not available for publication but included in totals where appropriate

Source Australian Institute of Health and Welfare[1] and Kidney Health Australia[13]

What does the future hold?

Diseases of the kidneys are among the more insidious effects of obesity, but with wide-ranging effects on mortality, morbidity, quality of life and excess costs to society. This report highlights the relationship between obesity and CKD and reaffirms that population-wide interventions to control obesity could have beneficial effects in preventing the development or delaying the progression of CKD. Effective population-based obesity prevention strategies, including proper nutrition and exercise, can make a dramatic impact on preventing obesity and kidney disease for all Australians.

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