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The physical and mental health problems of refugee and migrant fathers: Findings from an Australian population-based study of children and their families

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ABSTRACT

Objectives: The aim of this study was to report on the physical and mental health of migrant and refugee fathers participating in a population-based study of Australian children and their families.

Design: Cross-sectional survey data drawn from a population-based longitudinal study

Setting: Population-based longitudinal study of Australian children (aged 4-5years) and their families

Participants: 8152 fathers participated in wave 3. There were 131 (1.5%) fathers of likely refugee background, 872 (10.7%) fathers who migrated from English-speaking countries, 1005 (12.4%) fathers who migrated from non-English speaking countries, and 6129 (75%) Australian born fathers.

Primary Outcome Measures: Fathers' psychological distress was assessed using the self-report Kessler-6. Information pertaining to physical health conditions, global or overall health, alcohol and tobacco use, and body mass index status were obtained.

Results. Fathers of likely refugee background (OR=2.39, 95%CI 1.22, 4.68) and fathers from non-English speaking countries (OR=1.92, 95%CI 1.46, 2.52) had higher odds of psychological distress compared to Australian born fathers. Refugee fathers were more likely to report poor overall health (OR=2.06, 95%CI 1.09, 3.89), daily tobacco cigarette smoking (OR=1.68, 95%CI 1.01, 2.80), and being underweight (OR=3.16, 95%CI 1.16, 8.60) compared to Australian born fathers.

Conclusion. Fathers of refugee background experience poorer mental health and poorer general health than Australian born fathers. Fathers who have migrated from non-English speaking countries also report greater psychological distress than Australian born fathers. This underscores the need for primary health care services to tailor efforts to reduce disparities in health outcomes for refugee populations that may be vulnerable due to circumstances and sequalae of forced migration, and to recognise the additional psychological stresses that may accompany fatherhood following migration from non-English speaking countries.

Keywords: refugees; migration; fathers; men; mental health; depression

STRENGTHS AND LIMITATIONS OF THIS STUDY

- Study strengths include its large population-based design to permit meaningful comparisons of mental and physical health between fathers of likely refugee background, fathers who migrated from English- and non-English speaking backgrounds.

- It was not possible to confirm refugee status as information pertaining to visa status was not collected.

- Families of non-English speaking backgrounds were underrepresented in LSAC, and were more likely to be lost to follow-up; therefore, the sample is likely to be representative of more socially and economically advantaged families with higher levels of English proficiency.

- Brief, self-report measures of mental and physical health were used.

INTRODUCTION

Mental health problems such as anxiety and depression affect 10-12% of fathers in the early years of parenting[1-5]. Although the prevalence of mental health problems is likely to be higher among fathers of refugee or migrant backgrounds, research with fathers who have migrated from other countries, and in particular those who have been forced to flee their homeland, is scarce. The focus on fathers is critical given the substantial stress and adjustment of migration and settlement, and the importance of fathers in their children's lives. It is also important given that migration is at its highest ever recorded in 2015 at 244 million individuals worldwide .[6]

Fathers from refugee backgrounds and other migrant fathers are likely to experience settlement and acculturation stressors that can increase their risk of mental health difficulties. For example, fathers of refugee background may face considerable challenges in finding employment even when highly educated,[7-9] finding affordable housing, and learning a new language. Specific challenges associated with being a migrant or refugee background father can include negotiating understandings about their role as a father in a new country, changes in their couple and parent-child relationships, and difficulty accessing services.[8-11] People of refugee background may have experienced traumatic events such as persecution, human rights violations, threats of harm to their life and the lives of their families and friends, witnessing harm or death to others, family separation, and time spent in detention and refugee camps. Flight from their country to seek safety often means lack of basic needs such as shelter, food, water and health care.[10, 12-13] Given this, we anticipated that fathers from refugee backgrounds may be more vulnerable to poor mental health and wellbeing outcomes than other fathers.

Whilst studies of refugee men more broadly have reported high levels of post-traumatic, depressive and anxiety symptoms,[14-17] as well as musculoskeletal, respiratory, cardiovascular, and infectious diseases,[10, 15, 18], few studies have focussed specifically on *fathers* of refugee background. In one study of 29 refugee fathers, resettled in the Netherlands, 86% reported symptoms of Post-Traumatic Stress Disorder (PTSD).[19] In another study of 50 refugee fathers from Vietnam, resettled in Norway, approximately 28% met the full or partial criteria for PTSD upon arrival. Approximately 23-24 years after arrival, 15% met the full or partial criteria for PTSD, and 20% met the clinical cut point on the General Symptom Inventory, which is indicative of a probable psychiatric disorder. No studies have reported on the physical health of refugee fathers.

The objective of this study was to investigate the mental health, general physical health and health behaviours of fathers of refugee and migrant backgrounds, drawing on data collected in a large population-based sample of 10,000 Australian children and their families.

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METHOD

Study design

Data were drawn from two cohorts of children and their families participating in Growing up in Australia: The Longitudinal Study of Australian Children. The design and field methods have been described elsewhere.[21-26]. Ethics approval was obtained from the Australian Institute of Family Studies Human Research Ethics Committee and Australian states and territories Education Departments. Briefly, both cohorts were recruited in 2004. The Birth cohort (B-cohort) was recruited when the children were less than 12 months of age, and the Kindergarten cohort (K-cohort) was recruited when the children were aged 4-5 years. Sampling was based on a two-stage process. First, approximately 10% of all Australian postcodes were selected. Second, a number of children proportional to population size for each postcode were randomly selected using the Australian universal health insurance database (Medicare). There were 5107 children recruited into the B-cohort (64% response rate), and 4983 into the K-cohort (59% response rate). The sample was broadly representative of children and parents in the Australian population; however, there was under-representation of mothers who had not completed Year 12 of their secondary education, children of non-English speaking background, and single parent families in both cohorts[25].

The cohorts were reassessed every two years via face-to-face and computer-assisted interviews, self-complete questionnaires, direct assessment of children's functioning, time use diaries, and linking to administrative data. At wave 3 (data used in this paper), 97 telephone interviews were conducted in a language other than English.[24] The most common languages requiring an interpreter were Arabic, Vietnamese and Cantonese. Fifty-eight interviews were interpreted by a family member or friend, 31 were interpreted by an Australian Bureau of Statistics interviewer fluent in the relevant language, and eight interviews were conducted using an accredited interpreter.

The sample size for the B-cohort when children were aged 0-1, 2-3, 4-5, 6-7, 8-9 years was 5107, 4606, 4386, 4242, and 4085 respectively. The sample size for the K-cohort when children were aged 4-5, 6-7, 8-9, 10-11, 12-13 years was 4983, 4464, 4331, 4169 and 3956, respectively. Retention was marginally lower for children with less highly educated parents and from non-English speaking background.[22]

Study Sample

The analytic sample for the current study was biological, step, adoptive or foster fathers participating in the B- and K-cohort. Data collected from fathers at the overlapping cohort stage when all children were aged 4-5 years (B-cohort at Wave 3 and K-cohort at Wave 1) was used. Previous analyses revealed no significant cohort effects.[21]

Country of birth was used to identify fathers who were Australian born or born in another country. Fathers from English-speaking or predominantly non-English speaking countries were identified using the official language of the country where they were born. To identify fathers of likely refugee background, we used country of birth and year of arrival in Australia to allow for matching to Australian migration trends. Two different methods were used depending on the father's year of arrival into Australia. From 1990, data on migration to Australia through humanitarian grounds by country of birth and year of arrival were accessed from the Australian Government's Settlement Reporting Facility.[27] Likely refugee background was defined as those countries where at least two thirds of migration from that country to Australia has been through the humanitarian stream. This approach was adopted from Gibson-Helm and colleagues [28] and an expert panel from the Murdoch Childrens Research Institute and the Victorian Foundation for Survivors of Torture.[29] Prior to 1990, complete immigration information was not made accessible by the Australian Government. Therefore, the approach by Hugo[30] was applied. This uses data from the Australian Bureau of Statistics 2006 Census on birthplace contribution of refugee-humanitarian migrants to ascertain those countries contributing likely refugee background populations to Australia from 1946 through to the 1990s.

Measures

Mental health. Psychological distress was assessed using the Kessler-6 (K6),[31]. On a 5-point scale (0-None of the time to 4-All or most of the time) participants rated the extent to which they experienced feeling nervous, hopeless, restless or fidgety, extremely sad, worthless, and like everything was an effort in the last 4 weeks. Two well-established cut points were used to describe the level of severity of distress. The symptomatic cut point was defined as a score of ≥8, indicating significant psychological distress. The clinical cut point was defined as a score of ≥13, indicating probable clinical diagnosis of a mental health condition. Cronbach's alpha for the current sample was .88 for fathers of refugee background, .81 for fathers of non-English speaking background, .80 for fathers who migrated from English speaking countries, and .83 for fathers born in Australia.

Physical health conditions. Participants indicated if they had any of the following conditions: sight and hearing problems, speech problems, difficulty learning or understanding, disfigurement or deformity, head injury, difficulty breathing, and chronic pain.

Global or overall health was rated on a 4-point scale ranging from 1=poor to 5=excellent, which was recoded into a 3-point scale (1=poor to fair health; 2=good health; 3=fair to poor health) due to low frequency of responses for poor health.

Alcohol use. Participants reported on whether they drink alcohol and how much they drink a day (Abstain; less than a monthly; light <2 drinks per day; moderate 2-4 drinks per day; hazardous 4-6 drinks

per day; harmful >6 drinks per day). This was then categorized into three groups (1=Abstain to occasional; 2=Light; 3=Moderate-Harmful), given the low frequency of responses for abstaining and occasional drinking and moderate to hazardous levels of drinking.

Cigarette smoking. Participants reported whether they smoke tobacco cigarettes and how much they smoke a day. This was dichotomized into 1=smoking at least once a day and 2= do not smoke at all/less than once a day.

Body Mass Index (BMI) status. Based on participant height and weight, BMI was calculated as weight/height squared and expressed as kg/m2. Participants were classified as being underweight (<.18.50), overweight (≥25.00-29.99), obese (≥30.00) and within the normal range (18.50-24.99) according to current World Health Organisation classification.[32]

Sociodemographic characteristics pertaining to fathers' age, country of birth, year of arrival in Australia, main language spoken at home, education, employment status, individual weekly gross income and number of children in the family were collected. Socio-economic position (SEP) was rated using a derived variable from combined parental income, education and occupational prestige.[33] Families with a standardised score ≤25th percentile were classified as 'low' SEP, those ≥75th percentile were classified as 'high' SEP, and the remainder were classified as 'medium' SEP. Continuous scores were used in all adjusted analyses. Socio-economic status was also assessed using the Index of Relative Socio-economic Disadvantage (SEIFA;[34]). Each participant was given an index score based on their postal code. The index is derived from levels of income, rates of unemployment and educational attainment within the postal area. The average score on the SEIFA is 1000, with higher scores indicating higher relative advantage for an area (i.e., fewer individuals with low income and unskilled occupations).[34]

Data analysis

Descriptive statistics were used to summarise the sample characteristics, and the proportions of fathers reporting psychological distress and physical health problems. One-way between-subjects ANOVA were conducted to assess for differences in psychological distress between the father groups on the K6 continuous variable, with and without adjusting for SEP. We also conducted further analyses adjusting for SEIFA Index of Relative Socio-economic Disadvantage. Given that the results were the same, we only present the results for when adjusting for SEP. Multinomial logistic regression analyses were conducted for the K6 cut points and the physical health variables, with and without adjustment for SEP. In all models, Australian-born fathers was the reference category.

RESULTS

Sample characteristics

There were 9369 children and their families participating at wave 3. Of these, 87% (n=8152) had a biological, adoptive, foster or step-father in the home and data available on at least one wave. There were 131 (1.5%) fathers of likely refugee background, 872 (10.7%) who had migrated from a predominantly non-English speaking country, 1005 (12.4%) who had migrated from an English-speaking country, and 6129 (75%) born in Australia. Table 1 presents the demographic characteristics for each group. The majority of fathers in all groups were biological in a two-parent household. Approximately, 70% of fathers of refugee background came from the Middle East and Southeast Asia, whilst the majority of fathers of non-English speaking background came from Southern and Central Asia, Southeast Asia, Southern and East Africa, and the Middle East. The vast majority of fathers who migrated from an English speaking country came from Great Britain or New Zealand. The average time since arrival was longest for fathers who migrated from an English-speaking country (21.1yrs), and this was significantly longer than for fathers of refugee background (15.9yrs) or those who had migrated from a non-English speaking country (17.3yrs).

There were notable differences between the groups of fathers with respect to education, employment, and socioeconomic status. The proportion of fathers who did not complete high school was significantly higher among fathers of refugee background and fathers born in Australia compared to fathers from English and non-English speaking countries. The number of fathers from non-English and English speaking countries who had completed tertiary education was higher than fathers of refugee background and fathers born in Australia. The proportion of fathers working part-time or currently unemployed was higher for fathers of refugee background and fathers from non-English speaking countries compared to the other groups. Full-time employment was lower for fathers of refugee background compared to all other groups. The proportion of fathers with an average weekly income of less than $500 was significantly higher among fathers of refugee background, and the proportion earning higher than $1000 was lowest for this group. On two measures of socioeconomic status (SEP and SEIFA), fathers of refugee background were of significantly lower socioeconomic status than all other groups. Socio-economic status, as measured by SEP and SEIFA, was significant lower for Australian born fathers compared to both migrant father groups, and there were no differences between the two migrant father groups. Finally, fathers from refugee backgrounds had significantly more children than all other father groups.

Table 1: Sample characteristics for fathers of likely refugee backgrounds, fathers who had migrated from non-English and English speaking countries, and fathers born in Australia

Demographic characteristics	Refugee (n=131)	Migrated from a non-English speaking country (n=874)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)	*F* or χ^2	*p*
Caregiver Type *(n, %)*						
Biological Father	131 (100.0%)	865 (99.2%)	980 (97.5%)	5967 (97.4%)		
Adoptive Father	0 (0.0%)	0 (0.0%)	1 (0.1%)	12 (0.2%)	15.98	.192
Step-Father	0 (0.0%)	7 (0.8%)	24 (2.4%)	147 (2.4%)		
Foster Father	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (<0.1%)		
Age *(M, SD)*	39.3 (5.94)	39.6 (6.31)	39.4 (6.07)	37.2 (5.83)	76.40	<.001
Country of Birth (n, %)						
New Zealand	0 (0.0%)	0 (0.0%)	246 (24.5%)	-		
Great Britain	0 (0.0%)	0 (0.0%)	553 (55.0%)	-		
North America	0 (0.0%)	0 (0.0%)	52 (5.2%)	-		
Melanesia	0 (0.0%)	0 (0.0%)	19 (1.9%)	-		
Polynesia	0 (0.0%)	56 (6.4%)	11 (1.1%)	-		
Western Europe	0 (0.0%)	62 (7.1%)	0 (0.0%)	-		
Southern Europe	0 (0.0%)	34 (3.9%)	0 (0.0%)	-		
South Eastern Europe	7 (5.3%)	36 (4.1%)	0 (0.0%)	-		
Eastern Europe	1 (0.8%)	20 (2.3%)	0 (0.0%)	-		
North Africa	8 (6.1%0	17 (1.9%)	0 (0.0%)	-		
Middle East	46 (35.4%)	84 (9.6%)	0 (0.0%)	-		
South east Asia	50 (38.2%)	131 (15.0%)	0 (0.0%)	-		

Demographic characteristics	Refugee (n=131)	Migrated from a non-English speaking country (n=874)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)	*F* or χ^2	*p*
North east Asia	0 (0.0%)	94 (10.8%)	0 (0.0%)	-		
Southern and Central Asia	6 (4.6%)	153 (17.5%)	0 (0.0%)	-		
South America	5 (3.8%)	10 (1.1%)	0 (0.0%)	-		
Central America	4 (3.1%)	1 (0.1%)	0 (0.0%)	-		
Southern and East Africa	4 (3.1%)	90 (10.3%)	0 (0.0%)	-		
Confidentialised	0 (0.0%)	86 (9.8%)	124 (12.3%)	-		
Time since arrival in years (M, SD)	15.88 (7.70)	17.33 (11.07)	21.14 (12.01)	-	31.22	<.001
English main language spoken at home	3 (2.3%)	228 (26.1%)	925 (92.0%)	5854 (95.5%)	3882.81	<.001
Speaks English						
Very well	45 (34.4%)	450 (62.7%)	87 (74.4%)	319 (93.3%)		
Well	50 (39.4%)	195 (27.2%)	25 (2.5%)	20 (5.8%)		
Not well	30 (23.6%)	62 (8.6%)	4 (3.4%)	3 (0.9%)	192.89	<.001
Not at all	2 (1.6%)	11 (1.5%)	1 (1.5%)	0 (0.9%)		
Education level						
Did not complete high school	53 (41.7%)	223 (26.0%)	385 (39.0%)	2838 (46.8%)	142.83	<.001
Tertiary education	33 (26.0%)	380 (44.2%)	350 (35.5%)	1672 (26.0%)	113.78	<.001
Employment status						
Not in the labour force	19 (14.5%)	44 (5.0%)	41 (4.1%)	225 (3.7%)		
Unemployed and looking for work	7 (5.4%)	26 (3.0%)	16 (1.6%)	87 (1.4%)	143.62	<.001
Part-time employment	20 (15.4%)	70 (8.0%)	36 (3.6%)	234 (3.8%)		
Full-time employment (30+hrs/wk)	84 (64.6%)	730 (83.9%)	910 (90.7%)	5578 (91.1%)		

Demographic characteristics	Refugee (n=131)	Migrated from a non-English speaking country (n=874)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)	*F* or χ^2	*p*
Weekly income (AUD$/week)						
Less than $500	51 (49.0%)	171 (23.4%)	112 (12.4%)	726 (13.0%)		
$500-999	32 (30.8%)	238 (32.5%)	257 (28.5%)	1828 (32.8%)	197.58	<.001
$1000-1999	18 (17.3%)	250 (34.2%)	368 (40.8%)	2320 (41.6%)		
$2000 or more	3 (2.9%)	73 (10.0%)	165 (18.3%)	700 (12.6%)		
Study child gender – Male	57 (43.5%)	438 (50.1%)	515 (51.2%)	3145 (51.3%)	3.49	.322
Number of children in household *(M, SD)*	3.09 (1.34)	2.48 (1.11)	1.53 (1.07)	1.52 (0.94)	15.02	<.001
Two parent household	131 (100.0%)	870 (99.5%)	995 (99.0%)	6087 (99.3%)	4.72	.581
Socio-economic position *(M, SD)*	-0.63 (1.08)	0.22 (1.07)	0.24 (0.94)	0.10 (0.93)	36.06	<.001
Socio-economic position category						
High	18 (13.7%)	276 (31.7%)	293 (29.2%)	1447 (23.6%)		
Medium	38 (29.0%)	378 (43.3%)	511 (50.8%)	3149 (51.4%)	120.20	<.001
Low	75 (57.3%)	218 (25.0%)	201 (20.0%)	1533 (25.0%)		
SEIFA Disadvantage *(M, SD)*	977.71 (73.17)	1018.17 (69.60)	1025.52 (62.17)	1013.87 (57.70)	28.85	<.001

Psychological Distress

Table 2 presents the proportion of fathers reporting psychological distress in the normal range, symptomatic and clinical cut points. With respect to continuous scores on the K6, a one-way between-subjects ANOVA revealed significant differences in psychological distress across the groups with and without adjusting for socio-economic position (Unadjusted for SEP: $F(3, 5911)=6.23$, $p<.001$, $\eta^2=.003$; Adjusted for SEP; $F(3, 5908)=6.33$, $p<.001$; $\eta^2=.003$). Tukey's post hoc tests revealed that fathers of refugee background reported higher psychological distress than Australian born fathers ($p=.006$) and fathers from English speaking countries ($p=.017$). Fathers migrating from a non-English speaking country reported higher distress than Australian born fathers ($p=.011$).

Table 2: Descriptive statistics and psychological distress at the clinical cut-points on the Kessler-6 for each father group

Outcomes	Refugee	Migrated from a non-English speaking country	Migrated from an English speaking country	Born in Australia
Psychological distress (continuous score)	4.48 (4.65)	3.58 (3.56)	3.17 (3.11)	3.15 (3.23)
Psychological distress (cut points)				
Normal range (<7)	49 (75.4%)	478 (85.1%)	664 (91%)	4131 (90.6%)
Symptomatic cut point (8-12)	11 (16.9%)	72 (12.8%)	47 (6.4%)	339 (7.4%)
Clinical cut point (13+)	5 (7.7%)	12 (2.1%)	19 (2.6%)	88 (1.9%)

The proportion of fathers reporting psychological distress at the symptomatic or clinical cut points on the K6 was 24.6% (16/65) for fathers of refugee background, 14.9% (84/564) for fathers from a non-English speaking country, 9.0% (66/730) for fathers from an English-speaking country, and 9.3% (427/4556) for Australian born fathers. Table 3 indicates that without adjustment for SEP, refugee fathers had the highest odds of reporting psychological distress in the symptomatic and clinical ranges compared to fathers born in Australia. Fathers from non-English speaking countries also had increased odds of reporting distress in the symptomatic range compared to Australian born fathers. These associations remained significant even when adjusting for SEP.

Table 3: Multinomial logistic regression results examining differences in psychological distress at the Kessler-6 clinical cut- between the father groups adjusted and unadjusted for socioeconomic position

Outcomes	Refugee[a]	Migrated from a non-English speaking country[a]	Migrated from an English speaking country[a]
Unadjusted for SEP			
Mental health (K6)			
Normal range (<7)	Ref.	Ref.	Ref.
Symptomatic cut point (8-12)	**2.73 (1.41, 5.31), .003**	**1.87 (1.40, 2.41), <.001**	0.86 (0.63, 1.18), .359
Clinical cut point (13+)	**4.79 (1.86, 12.31), .001**	1.18 (0.64, 2.17), .598	1.34 (0.81, 2.22), .250
Adjusted for SEP			
Mental health (K6)			
Normal range (<7)	Ref.	Ref.	Ref.
Symptomatic cut point (8-12)	**2.39 (1.22, 4.68), .011**	**1.92 (1.46, 2.52), <.001**	0.90 (0.66, 1.24), .515
Clinical cut point (13+)	**3.75 (1.43, 9.82), .007**	1.25 (0.68, 2.31), .468	1.43 (0.87, 2.37), .163

[a] Fathers born in Australia is the reference category

SEP, socioeconomic position

General Health and health behaviours

Table 4 presents the proportion of fathers in each group reporting physical health conditions, global health problems, alcohol use, cigarette smoking, and weight problems. The pattern of results for the multinomial logistic regression analyses with and without adjusting for SEP were the same; therefore, the adjusted results are presented in Table 5. Refugee fathers had the highest odds of fair to poor overall global health and daily cigarette smoking compared to fathers born in Australia. Refugee fathers and those from non-English speaking countries had lower odds of moderate to harmful alcohol use compared to Australian born fathers. Refugee fathers and those from non-English speaking countries had higher odds of being underweight compared to Australian born fathers. Fathers from English and non-English speaking countries had lower odds of being overweight or obese compared to Australian born fathers.

Table 4: Descriptive statistics for physical health conditions for each father group

Outcomes	Refugee	Migrated from a non-English speaking country	Migrated from an English speaking country	Born in Australia
Physical health issues				
None	121 (92.4%)	800 (91.7%)	913 (90.8%)	5528 (90.2%)
1 or more	10 (7.6%)	72 (8.3%)	92 (9.2%)	601 (9.8%)

Outcomes	Refugee	Migrated from a non-English speaking country	Migrated from an English speaking country	Born in Australia
Global health				
Very good – Excellent	34 (46.6%)	336 (56.5%)	434 (57.9%)	2649 (56.7%)
Good	25 (34.2%)	197 (33.1%)	243 (32.4%)	1556 (33.3%)
Fair – Poor	14 (19.2%)	62 (10.4%)	72 (9.6%)	467 (10.0%)
Alcohol use				
Abstain to occasional	45 (61.6%)	271 (47.0%)	146 (19.6%)	994 (20.5%)
Light (<2 drinks/day)	26 (35.6%)	264 (45.8%)	437 (58.7%)	2654 (57.5%)
Moderate to Harmful (>3 drinks/day to >6 drinks/day)	2 (2.7%)	42 (7.3%)	161 (21.6%)	1014 (22.0%)
Cigarette smoking				
Don't smoke at all	46 (63.9%)	446 (77.4%)	599 (81.4%)	3564 (77.9%)
Less than once a day	0 (0.0%)	17 (3.0%)	16 (2.2%)	107 (2.3%)
At least once a day	26 (36.1%)	113 (19.6%)	121 (16.4%)	903 (19.8%)
BMI status				
Underweight	5 (7.7%)	25 (4.5%)	18 (2.5%)	75 (1.7%)
Normal weight	23 (35.4%)	226 (40.8%)	233 (33.0%)	1253 (28.3%)
Overweight	23 (35.4%)	237 (42.8%)	332 (47.0%)	2188 (49.4%)
Obese	14 (21.5%)	66 (11.9%)	124 (17.5%)	911 (20.6%)

Table 5: Multinomial logistic regression results examining differences in physical health conditions between the father groups adjusted and unadjusted for socioeconomic position

Outcomes	Refugee[a]	Migrated from a non-English speaking country[a]	Migrated from an English speaking country[a]
Physical health conditions			
None	Ref.	Ref.	Ref.
1 or more	0.64 (0.34, 1.24), .186	0.85 (0.66, 1.10), .211	0.97 (0.77, 1.28), .765
Global health			
Very good – Excellent	Ref.	Ref.	Ref.

Outcomes	Refugee[a]	Migrated from a non-English speaking country[a]	Migrated from an English speaking country[a]
Good	1.25 (0.74, 2.11), .397	1.00 (0.83, 1.20), .985	0.95 (0.81, 1.13), .579
Fair – Poor	**2.06 (1.09, 3.89), .025**	1.09 (0.82, 1.45), .568	0.99 (0.75, 1.29), .913
Alcohol use			
Abstain to occasional	Ref.	Ref.	Ref.
Light (<2 drinks/day)	**0.24 (0.14, 0.39), <.001**	**0.32 (0.27, 0.39), <.001**	1.00 (0.82, 1.23), .990
Moderate to Harmful (>3 drinks/day to >6 drinks/day)	**0.04 (0.11, 0.18), <.001**	**0.14 (0.10, 0.20), <.001**	1.01 (0.79, 1.28), .970
Cigarette smoking			
Don't smoke at all/Less than once day	Ref.	Ref.	Ref.
At least once a day	**1.68 (1.01, 2.80), .047**	1.10 (0.87, 1.38), .427	0.90 (0.73, 1.12), .344
Weight status			
Normal weight	Ref.	Ref.	Ref.
Underweight	**3.16 (1.16, 8.60), .024**	**1.92 (1.19, 3.08), .007**	1.36 (0.79, 2.31), .264
Overweight	0.56 (0.31, 1.01), .052	**0.60 (0.50, 0.73), <.001**	**0.82 (0.69, 0.99), .034**
Obese	0.75 (0.38, 1.46), .391	**0.41 (0.31, 0.55), <.001**	**0.76 (0.60, 0.97), .024**

[a] Fathers born in Australia is the reference category

DISCUSSION

In a population-based study of over 10,000 Australian families, we identified 131 fathers of likely refugee background who arrived in Australia between 1951-2007 from countries such as Afghanistan, Iraq, Vietnam and Cambodia. There were 872 (10.7%) migrant fathers from predominantly non-English speaking countries, and a further 1005 (12.4%) migrant fathers from English speaking countries. These proportions are somewhat under-representative of migrant families in the general Australian population. Australian Census data indicate that a quarter (24.6%) of the Australian population was born overseas, and 43% had at least one overseas born parent.[35]

One in four fathers of likely refugee background reported high levels of psychological distress at the symptomatic and clinical cut points on the K6, compared with 15% of fathers from non-English speaking backgrounds, 9% of those from English speaking countries, and 9% of Australian born fathers. Fathers of likely refugee background had a two- to fourfold increased odds of psychological distress in

the symptomatic and clinical cut points compared to Australian born fathers. The odds were only marginally attenuated after adjusting for SEP. Given that people flee their country to seek safety have experienced traumatic and often life-threatening events,[10-13] it is not surprising that fathers of refugee background reported the highest rates of psychological distress. Fathers from non-English speaking countries were also at elevated risk of psychological distress, with a twofold increase in odds of psychological distress in the symptomatic range compared to Australian born fathers. We did not find any differences in psychological distress between fathers from English speaking countries and Australian born fathers.

Refugee fathers were also more likely to rate their general health as fair to poor, and had the highest odds of daily tobacco cigarette smoking, and being underweight compared to Australian born fathers. Fathers from non-English speaking countries were also more likely to be underweight compared to Australian born fathers. It is important to note that fathers of refugee and migrant background were less likely to report having a physical health condition, but these findings need to be interpreted with caution. Prior to 2011, refugees with disabilities were excluded from Australia's Humanitarian program, and it is possible that some fathers of refugee background were reluctant to disclose chronic health issues or disabilities. Research into the physical health of refugee fathers is critical given that many have experienced torture and trauma and difficult pre-arrival experiences.

Overall, these findings indicate that fathers of refugee background are more likely to experience a range of psychological and general health issues. Whilst migration is likely to be a time of adjustment for all fathers born overseas, those of refugee and non-English speaking background are more likely to experience significant stressors associated with language barriers, cultural differences, and access to services that may impact on their health and wellbeing. Many migrants from English-speaking countries come to Australia on a 'skilled visa' with recognised qualifications, and are less likely to experience difficulties finding employment and adequate income.[36] This is also the case for migrants of non-English speaking background who come to study and then remain in Australia. In contrast, fathers of refugee background may have a past history of torture and other traumatic events, disrupted or limited access to education and therefore be more likely to experience prolonged periods of social and economic disadvantage after settlement. Low employment rates and low household income were observed for these fathers in our study. Understanding how these factors impact on fathers health, wellbeing, and family relationships is important, along with a better understanding of what factors may facilitate positive outcomes in the longer term.

Strengths and limitations

To the best of our knowledge, this is the first study to identify fathers of likely refugee background and non-English speaking backgrounds in a population-based study large enough to permit meaningful group comparisons of mental and physical health. Although no information pertaining to visa status was collected, the best available methods to identify refugee status were employed. Ascertainment was based on country of birth and year of arrival, which are widely used as a proxy measure of likely refugee background.[28] Collecting information about refugee status can be problematic due to sensitivities regarding disclosure and changing status overtime. Whilst the approach used in our study may not accurately identify all fathers of refugee background, it demonstrates the value of using information pertaining to country of birth and year of arrival to identify people of likely refugee background [Yelland, Riggs, Szwarc, Vanpraag, Dawson, Brown, 2016]. The approach may be applied to administrative data sets as well as survey research as most health data sets now include both of these variables.

Similar issues are apparent for identifying fathers from non-English speaking countries. Countries such as South Africa, list English as an official language along with several other languages. Whilst participants were asked to report on their main language spoken at home, there was no provision made for other languages spoken at home. Accurately obtaining a picture of language spoken at home and in different contexts (i.e., between parents, between parents and children, in the community, at work), is an important but complex methodological issue. We opted to use the official language(s) of the country in which the fathers were born to distinguish between fathers from English or Non-English speaking countries. This may have led to some fathers being misclassified.

Another limitation is that families of non-English speaking backgrounds were underrepresented in LSAC, and were more likely to be lost to follow-up. The sample is likely to be representative of more socially and economically advantaged families with higher levels of English proficiency. This is likely to have resulted in the prevalence estimates of mental and physical health underestimating the true prevalence of poor health outcomes. Furthermore, non-English speaking families may have declined to participate due to lack of understanding about the study and what the information would be used for. Researchers have noted that people unaccustomed to research may be fearful, concerned, and worried about the information collected, who will have access to it and how it will be used.[37-38] Possible solutions require working in partnership with relevant community agencies to maximise inclusion of harder to reach groups and ensuring that appropriate steps are taken to address language barriers to participation, such as the us of professional interpreters and bicultural workers. Community input through consultation and engagement can inform the development of study protocols and measures to ensure cultural appropriateness and face validity. Establishing such strategies may support retention of the cohort over time.

Another limitation is that LSAC necessarily employed brief measures. Although the K6 is a widely used and psychometrically sound instrument, there has been limited assessment of its appropriateness for different cultural groups.[39] Using family members to interpret may have led to under-reporting of mental and physical health problems by fathers reluctant to disclose health issues to family members. Furthermore, no information about experiences, health or wellbeing prior to arrival in Australia was collected for fathers born overseas. The conclusions drawn from this study must be considered within the context of these limitations.

Implications and conclusions

Despite these limitations, our findings have important implications for future research, policy and practice. It is evident that fathers of likely refugee background and fathers who have migrated from non-English speaking countries are at heightened risk of poor health and wellbeing. Future research using culturally appropriate and sensitive qualitative methods is needed to gain an in depth understanding of fathers' experiences and their support needs. A better understanding of the impact of fathers' mental health on child and family outcomes in refugee and migrant populations is required. We recommend that future studies of refugee and migrant children include fathers wherever possible and appropriate. To ensure adequate representation, greater attention to methods tailored to engage refugee and migrant families is essential. This study is an important step in generating the evidence to inform services that are responsive and sensitive to the needs of fathers from a range of backgrounds. A commitment to cross-cultural research methods and instruments to encourage participation of 'hard to reach' populations in research is required. This is important for promoting the health and wellbeing of fathers, and their children and families.

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COMPETING INTERESTS

We have read and understood BMJ policy on declaration of interests and declare that we have no competing interests.

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CONTRIBUTORS

RG, ER, CL, DV, JY, JS, PD, LT, SC and SJB conceptualized the research questions and contributed to the interpretation of findings and identification of the implications. CL and DV identified fathers of likely refugee background using the method described. As a registered user of the Longitudinal Study of Australian Children, RG accessed data and conducted all analyses and prepared tables. RG drafted the manuscript. All authors, in particular ER, JY, JS and SJB critically revised the manuscript.

DATA SHARING STATEMENT

The Longitudinal Study of Australian Children is funded by Australian Government Department of Social Services. Data are available to registered data users. Information about data access is provided at http://www.growingupinaustralia.gov.au/

REFERENCES

1. Giallo R, D'Esposito F, Christensen D, et al. Father mental health during the early parenting period: Results of an Australian population based longitudinal study. Soc Psychiatry Psychiatr Epidemiol. 2012;47:1907-16.

2. Giallo R, D'Esposito F, Cooklin A, et al. Psychosocial risk factors associated with fathers' mental health in the postnatal period: Results from a population-based study. Soc Psychiatry Psychiatr Epidemiol. 2013;48:563-73.
3. Giallo R, D'Esposito F, Cooklin A, et al. Factors associated with trajectories of psychological distress for fathers across the early parenting period: A national Australian study. Soc Psychiatry Psychiatr Epidemiol. 2014;49:1961-71.
4. Paulson J, Bazemore S. Prenatal and postpartum depression in fathers and its association with maternal depression. JAMA. 2010;303:1961-9.
5. Leach L, Poyser C, Cooklin A, et al. Prevalence and course of anxiety disorders (and symptom levels) in men during the perinatal period: A systematic review. J Affect Disord. 2015;190:675-86.
6. International Orgnanisation for Migration. IOM Releases Global Migration Trends 2015 Factsheet 2016 [16.9.16]. Available from: https://www.iom.int/news/iom-releases-global-migration-trends-2015-factsheet.
7. Este D, Tachble A. Fatherhood in the Canadian context: Perceptions and experiences of Sudanese refugee men. Sex Roles. 2009;60:456-66.
8. Este D, Tachble A. The perceptions and experiences of Russian immigrant and Sudanese refugee men as fathers in an urban enter in Canada. Ann Am Acad Pol Soc Sci. 2009;624:139-55.
9. Riggs E, Yelland J, Szwarc J, et al. Fatherhood in a new country: a qualitative study exploring the experiences of Afghan men and implications for health services. Birth. 2016;43:86-92.
10. Correa-Velez I, Barnett A, Gifford S. Working for a better life: Longitudinal evidence on the predictors of employment among recently arrived refugee migrant men living in Australia. Int Migr. 2013;53:321-337.
11. Lamb M, Bougher L. How does migration affect mothers' and fathers' roles within their families? Reflections on some recent research. Sex Roles. 2009;60:611-4.
12. Ager A, Strang, A. Understanding integration: A conceptual framework. J Refug Studies. 2008:166-91.
13. Victorian Foundation for the Survivors of Torture. Rebuilding Shattered Lives. Melbourne1998.
14. Carlsson JM ME, Kastrup M. Predictors of mental health and quality of life in male tortured refugees. Nord J Psychiatry. 2006;60:51-7.
15. Bischoff A, Schneider M, Denhaerynck K, et al. Health and ill health of asylum seekers in Switzerland: an epidemiological study. Eur J Public Health. 2009;19:59-64.
16. Lie B. A 3-year follow-up study of psychosocial functioning and general symptoms in settled refugees. Acta Psychiatr Scand. 2002;106 415-25.

17. Silove D, Steel Z, Bauman A, et al. PTSD and the longer-term mental health burden amongst Vietnamese refugees : a comparison with the Australian-born population. Soc Psychiatry Psychiatr Epidemiol. 2007;42:467-76.
18. Hollander A, Bruce D, Ekberg J, et al. Longitudinal study of mortality among refugees in Sweden. Int J Epidemiol. 2012;41:1153-61.
19. van Ee E, Sleijpen M, Kleber R, et al. Father involvement in a refugee sample: relations between posttraumatic stress and caregiving. Fam Process. 2013;52:723-35.
20. Vaage A, Thomsen P, Rousseau C, et al. Paternal predictors of the mental health of children of Vietnamese refugees. Child Adolesc Psychiatry Ment Health. 2011;5:1-11.
21. Australian Institute of Family Studies. Longitudinal Study of Australian Children Data User Guide. Melbourne: Australian Institute of Family Studies.; 2011.
22. Daraganova G, Sipthorp M. Wave 4 weights (LSAC Technical Paper No. 9) Melbourne: Australian Institute of Family Studies, 2011.
23. Mission S, Sipthorp M. LSAC Technical paper No. 5: Wave 2 weighting and non-response. Melbourne: Australian Institute of Family Studies, 2007.
24. Sipthorp M, Mission S. LSAC Technical paper No. 6. Wave 3 weighting and non-response. Melbourne, Australia: Australian Institute of Family Studies, 2009.
25. Soloff C, Lawrence D, Misson S, Johnstone R. LSAC Technical paper No. 3: Wave 1 weighting and non-response. . Melbourne: Australian Institute of Family Studies, 2006.
26. Soloff C, Lawrence D, Johnstone R. Sample design (LSAC Technical Paper, No. 1). Melbourne: Australain Institute of Family Studies, Commonwealth of Australia; 2005.
27. Australian Government. Australian Government's Settlement Reporting Facility 2016. Available from: http://www.immi.gov.au/settlement/srf/
28. Gibson-Helm M, Boyle J, Block A, et al Use of country of birth as an indicator of refugee background in health datasets. BMC Med Res Methodol. 2014;14.
29. Yelland J, Riggs E, Szwarc J, et al. Bridging the Gap: using an interrupted time series design to evaluate systems reform addressing refugee maternal and child health inequalities. Implement Sci. 2015;10:62.
30. Hugo G. Economic, social and civic contributions of first and second generation humanitarian entrants: A final report to the Department of Immigration and Citizenship Australia. University of Adelaide, 2011.
31. Kessler R, Barker P, Cople L, et al. Screening for serious mental illness in the general population. Arch Psychiatry. 2003;60:184-9.

32. World Health Organisation. BMI Classifications 2006. Available from: http://apps.who.int/bmi/index.jsp?introPage=intro_3.html.

33. Blakemore T, Strazdins L, Gibbings J. Measuring family socioeconomic position. Aust Soc Policy. 2009;8:121-68.

34. Trewin D. Socio-economic indexes for areas, Australia 20012003. Available from: http://www.abs.gov.au/websitedbs/D3110124.NSF/f5c7b8fb229cf017ca256973001fecec/a17dc48d988ecf63ca256dad00005ea3!OpenDocument.

35. Australian Bureau of Statistics. 3412.0 Migration, Australia, 2014-2015. Canberra: Australian Bureau of Statistics, 2016.

36. Australian Bureau of Statistics. 3418.0 Personal Income of Migrants, Australia, Experimental, 2010-11. Canberra: Australian Bureau of Statistics, 2015.

37. Block K, Riggs E, Haslam N. Ethics in Research With Refugees and Asylum Seekers: Processes, Power and Politics. In: Block K, Riggs, E., Haslam, N. (Eds). Values and vulnerabilities : the ethics of research with refugees and asylum seekers Queensland, Australia: Australian Academic Press; 2013; 2013.

38. Riggs E, Yelland J, Szwarc J, et al. Promoting the inclusion of Afghan women and men in research: reflections from research and community partners involved in implementing a 'proof of concept.'. Int J Equity Health. 2015;14:13.

39. Stolk Y, Kaplan I, Szwarc J. Clinical use of the Kessler psychological distress scales with culturally diverse groups. Int J Methods Psychiatr Res. 2014;23:161-83.

40. Giallo R, Cooklin A, Wade C, et al. Fathers' postnatal mental health and child well-being at age five: The mediating role of parenting behavior. J Fam Issues. 2013;35:1543-62

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The physical and mental health problems of refugee and migrant fathers: Findings from an Australian population-based study of children and their families

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The physical and mental health problems of refugee and migrant fathers: Findings from an Australian population-based study of children and their families

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ABSTRACT

Objectives: The aim of this study was to report on the physical and mental health of migrant and refugee fathers participating in a population-based study of Australian children and their families.

Design: Cross-sectional survey data drawn from a population-based longitudinal study when children were aged 4-5 years.

Setting: Population-based study of Australian children and their families

Participants: 8137 fathers participated in the study when their children were aged 4-5 years. There were 131 (1.5%) fathers of likely refugee background, 872 (10.7%) fathers who migrated from English-speaking countries, 1005 (12.4%) fathers who migrated from non-English speaking countries, and 6129 (75%) Australian-born fathers.

Primary Outcome Measures: Fathers' psychological distress was assessed using the self-report Kessler-6. Information pertaining to physical health conditions, global or overall health, alcohol and tobacco use, and body mass index status were obtained.

Results. Fathers of likely refugee background (aOR= 3.17, 95%CI 2.13, 4.74) and fathers from non-English speaking countries (aOR= 1.79 (95%CI 1.51, 2.13) had higher odds of psychological distress compared to Australian-born fathers. Refugee fathers were more likely to report fair-poor overall health (aOR=1.95, 95%CI 1.06, 3.60), and being underweight (aOR=3.49, 95%CI 1.57, 7.74) compared to Australian-born fathers. Refugee fathers and those from non-English speaking countries were less likely to report light (aOR=0.25, 95%CI 0.15, 0.43 and aOR=0.30, 95%CI 0.24, 0.37, respectively) and moderate to harmful alcohol use (aOR=0.04, 95%CI 0.10, 0.17 and aOR=0.14, 95%CI 0.10, 0.19, respectively) than Australian-born fathers. Finally, fathers from non-English and English speaking countries were less likely to be overweight (aOR=0.62, 95%CI 0.51, 0.75 and aOR=0.84, 95%CI 0.68, 1.03, respectively) and obese (aOR=0.43, 95%CI 0.32, 0.58 and OR=0.77, 95%CI 0.61, 0.98, respectively) than Australian-born fathers.

Conclusion. Fathers of refugee background experience poorer mental health and poorer general health than Australian-born fathers. Fathers who have migrated from non-English speaking countries also report greater psychological distress than Australian-born fathers. This underscores the need for primary health care services to tailor efforts to reduce disparities in health outcomes for refugee populations that may be vulnerable due to circumstances and sequelae of forced migration, and to recognise the additional psychological stresses that may accompany fatherhood following migration from non-English speaking countries. It is important to note that refugee and migrant fathers report less alcohol use and are less likely to be overweight and obese than Australian-born fathers.

Keywords: refugees; migration; fathers; men; mental health; depression

STRENGTHS AND LIMITATIONS OF THIS STUDY

- To our knowledge this is the first population-based birth cohort study in a high income country to identify and report mental and physical health outcomes for fathers of likely refugee background.

- The design of the study and size of the sample enabled us to compare mental and physical health outcomes and health behaviours in fathers of refugee background with Australian-born fathers and migrant fathers of non-English speaking and English speaking backgrounds.

- We used a proxy measure to ascertain refugee background. While this may have resulted in some misclassification, confirmation of refugee status is rarely possible in administrative data sets. Even when visa status is collected it is not necessarily a reliable indicator.

- Migrant families of non-English speaking backgrounds were underrepresented in the study and were more likely to be lost to follow-up. The sample is likely to be representative of more socially and economically advantaged families with higher levels of English proficiency.

Migration around the world is at its highest ever recorded, with 244 million individuals crossing international borders in 2015.[1] Whilst many people willingly leave their home country for education and employment opportunities, there are currently over 65 million people who have been forcibly displaced from their homes due to conflict, persecution and human rights abuse. [2] Many of these displaced people will seek protection from another country as a refugee. The process of settlement and acculturation can be a time of significant stress for both migrants and refugees. Common sources of stress include learning a new language, finding employment and housing, navigating unfamiliar health and education services, and adjusting to changing family relationships,[3-6]. For people of refugee background these stresses may be compounded by having endured traumatic events, such as experiencing or witnessing harm, death or threats to others; family separation; time spent in detention and refugee camps; and long periods of limited access to basic needs such as food, water, shelter and safety [3, 6].

For people of migrant and refugee background, settlement and acculturative experiences can increase the risk of physical and mental health difficulties. For instance, a meta-analysis of 35 studies reported prevalence estimates for depression and anxiety of approximately 20% among migrants and 40% among refugees. Symptoms may persist for many years post-settlement [7, 8], leading to concerns about potential intergenerational impact within families. Internationally, there has been considerable interest in the mental health of women of refugee and migrant backgrounds during and after pregnancy. [9, 10]. Australian research has shown that women of refugee and migrant background are more likely to experience depressive symptoms after childbirth, compared to women born in Australia [11-13]. There is also evidence that women of refugee and migrant background have higher rates of stillbirth, fetal death in utero and perinatal mortality compared with Australian-born women [14]. This has also been demonstrated internationally for other high-income countries [15].

Much less is known about fathers of refugee and migrant background. The focus on fathers of young children is critical given their important role in supporting their families to adjust to life in their new country [16] [5], and to the health, wellbeing and development of their children [17]. Mental health problems such as anxiety and depression affect 10-12% of fathers in the general population in the early years of parenting [18-22]. Although the prevalence of mental health problems is likely to be higher among fathers of refugee or migrant backgrounds, research in this area is scarce. A study conducted almost a decade ago found that migrant fathers can feel undermined in their traditional role as the head of the household when they experience difficulty finding suitable employment. This may lead to migrant fathers feeling alienated and disrespected at a broader societal level and within their own families [5].

Whilst studies of refugee men more broadly have reported high levels of post-traumatic, depressive and anxiety symptoms,[7, 23-25] as well as musculoskeletal, respiratory, cardiovascular, and infectious diseases,[4, 24, 26], few studies have focussed specifically on *fathers* of refugee background.

In a study of 29 refugee fathers, resettled in the Netherlands, 86% reported symptoms of Post-Traumatic Stress Disorder (PTSD).[27] In another study of 50 refugee fathers from Vietnam, resettled in Norway [17], approximately 28% met the full or partial criteria for PTSD upon arrival. Approximately 23-24 years after arrival, 15% met the full or partial criteria for PTSD, and 20% met the clinical cut point on the General Symptom Inventory, which is indicative of a probable psychiatric disorder. No studies have reported on the physical health or health behaviours (i.e., cigarette smoking, alcohol use) of refugee fathers.

Taken together, this small but important body of research, suggests that fathers of migrant and refugee background might be at risk of increased mental and physical health problems. Determining the extent to which these fathers experience physical and mental health problems is critical to the development of health policy and services to better meet their needs in the critical early years of their children's lives. This is particularly important in Australia given that in 2015-16, Australia admitted around 190,000 permanent migrants (mainly for skills and labour) and over 17,500 on humanitarian (mainly refugees) grounds. Furthermore, our previous research has shown that when health professionals interact with refugee fathers, they are unlikely to inquire about the health and wellbeing needs of men themselves, therefore missing opportunities to provide care and support [28].

The objective of this paper was to investigate the mental and physical health, and health behaviours of fathers of refugee and migrant backgrounds in an existing population-based sample of over 8000 Australian children (aged 4-5 years) and their families participating in the Longitudinal Study of Australian Children (LSAC). Although LSAC was not designed specifically to investigate the needs of refugee and migrant families, rich data on psychological distress, physical health problems, body mass index, alcohol use and cigarette smoking are available. We draw upon the data available when children were aged 4-5 years – a critical and formative time during early childhood. The specific aim of the current study was to compare the mental and physical health, and health behaviours of refugee fathers and those who had migrated from an English and non-English speaking country to Australian-born fathers.

METHOD

Study design

Data were drawn from two cohorts of children and their families participating in Growing up in Australia: The Longitudinal Study of Australian Children. The design and field methods have been described elsewhere.[29-34] Ethics approval was obtained from the Australian Institute of Family Studies Human Research Ethics Committee and Australian states and territories Education Departments. Briefly, both cohorts were recruited in 2004. The Birth cohort (B-cohort) was recruited when the children were less than 12 months of age, and the Kindergarten cohort (K-cohort) was recruited when the children were

aged 4-5 years. Sampling details are outlined below. Each cohort has been followed up every two years. As a result, the age of the children in the two cohorts began to overlap at Wave 3 when the B cohort children were 4-5 years of age. The present study utilised data from the overlapping cohorts at age 4-5 (B-Cohort Wave 3, K-cohort Wave 1). Preliminary analysis of the data failed to reveal any significant cohort effects [29], therefore, both cohorts were combined for this paper.

Sampling was based on a two-stage process. First, approximately 10% of all Australian postcodes were selected. Second, a number of children proportional to population size for each postcode were randomly selected using the Australian universal health insurance database (Medicare). There were 5107 children recruited into the B-cohort (64% response rate), and 4983 into the K-cohort (59% response rate). The sample was broadly representative of children and parents in the Australian population; however, there was under-representation of mothers who had not completed Year 12 of their secondary education, children of non-English speaking background, and single parent families in both cohorts.[33]

The cohorts were reassessed every two years via a combination of face-to-face and computer-assisted interviews, self-complete questionnaires, direct assessment of children's functioning, time use diaries, and linking to administrative data. To increase the involvement of parents from non-English speaking backgrounds at wave 3 (B-cohort) and wave 1 (K-cohort), telephone interviews were conducted in a language other than English with 97 parents.[32] Fifty-eight interviews were interpreted by a family member or friend, 31 were interpreted by an Australian Bureau of Statistics interviewer fluent in the relevant language, and eight interviews were conducted using an accredited interpreter. The most common languages requiring an interpreter were Arabic, Vietnamese and Cantonese.

The sample size for the B- and K-cohorts when children were aged 4-5 years was 4386 and 4983, respectively.

Study Sample

The analytic sample for the current study was biological, step, adoptive or foster fathers participating in the B- and K-cohort. Data collected from fathers at the overlapping cohort stage when all children were aged 4-5 years (B-cohort at Wave 3 and K-cohort at Wave 1) was used. Previous analyses revealed no significant cohort effects.[29]

Country of birth was used to identify fathers who were Australian-born or born in another country. Fathers from English-speaking or predominantly non-English speaking countries were identified using the official language of the country where they were born. To identify fathers of likely refugee background, we used country of birth and year of arrival in Australia to allow for matching to Australian migration trends. Two different methods were used depending on the father's year of arrival into Australia. From 1990, data on migration to Australia through humanitarian grounds by country of birth

and year of arrival were accessed from the Australian Government's Settlement Reporting Facility.[35] Likely refugee background was defined as those countries where at least two thirds of migration from that country to Australia has been through the humanitarian stream. This approach was adopted from Gibson-Helm and colleagues [36] and an expert panel from the Murdoch Childrens Research Institute and the Victorian Foundation for Survivors of Torture.[37, 38]. Prior to 1990, complete immigration information was not made accessible by the Australian Government. Therefore, the approach by Hugo [39] was applied. This uses data from the Australian Bureau of Statistics 2006 Census on birthplace contribution of refugee-humanitarian migrants to ascertain those countries contributing likely refugee background populations to Australia from 1946 through to the 1990s. The composition of migrant flows changed during the study period. For example, migrants from Asian countries (e.g. China, India) have overtaken those from the UK and Europe. Refugees have been drawn from a variety of countries of origin, the main recent groups being from the Middle East, Asia and Africa. This information was taken into account in the algorithm used to ascertain fathers of likely refugee background.

Measures

Mental health. Psychological distress was assessed using the Kessler-6 (K6),[40]. On a 5-point scale (0-None of the time to 4-All or most of the time) participants rated the extent to which they experienced feeling nervous, hopeless, restless or fidgety, extremely sad, worthless, and like everything was an effort in the last 4 weeks. Two well-established cut points were used to describe the level of severity of distress. The symptomatic cut point was defined as a score of ≥8, indicating significant psychological distress. The clinical cut point was defined as a score of ≥13, indicating probable clinical diagnosis of a mental health condition. Cronbach's alpha for the current sample was .88 for fathers of refugee background, .81 for fathers of non-English speaking background, .80 for fathers who migrated from English speaking countries, and .83 for fathers born in Australia.

Physical health conditions. Participants indicated if they had any of the following conditions: sight and hearing problems, speech problems, difficulty learning or understanding, disfigurement or deformity, head injury, difficulty breathing, and chronic pain.

Global or overall health was rated on a 4-point scale ranging from 1=poor to 5=excellent, which was recoded into a 3-point scale (1=poor to fair health; 2=good health; 3=excellent health) due to low frequency of responses for poor health.

Alcohol use. Participants reported on whether they drink alcohol and how much they drink a day (0=Abstain; 1=Occasional less than a monthly; 2=Light <2 drinks per day; 3=Moderate 2-3 drinks per day; 4=Hazardous 4-6 drinks per day; 5=Harmful >6 drinks per day). This was recoded into three groups

(1=Abstain to Occasional; 2=Light; 3=Moderate-Harmful), given the low frequency of responses for abstaining and occasional drinking and moderate to hazardous levels of drinking.

Cigarette smoking. Participants reported whether they smoke tobacco cigarettes and how much they smoke a day. This was dichotomised into 1=smoking at least once a day and 2= do not smoke at all/less than once a day.

Body Mass Index (BMI) status. Based on participant self-report of height and weight, BMI was calculated as weight/height squared and expressed as kg/m^2. Participants were classified as being underweight (<18.5), overweight (≥25.0-29.9), obese (≥30.0) and within the normal range (18.5-24.9) according to current World Health Organisation classification.[41]

Sociodemographic characteristics pertaining to fathers' age, country of birth, year of arrival in Australia, main language spoken at home, education, employment status, individual weekly gross income and number of children in the family were collected. Socio-economic position (SEP) was rated using a derived variable from combined parental income, education and occupational prestige.[42] Families with a standardised score ≤25th percentile were classified as 'low' SEP, those ≥75th percentile were classified as 'high' SEP, and the remainder were classified as 'medium' SEP. Continuous scores were used in all adjusted analyses. Socio-economic status was also assessed using the Index of Relative Socio-economic Disadvantage (SEIFA;[43]). Each participant was given an index score based on their postcode. The index is derived from levels of income, rates of unemployment and educational attainment within the postal area. The average score on the SEIFA is 1000, with higher scores indicating higher relative advantage for an area (i.e., fewer individuals with low income and unskilled occupations).[43]

Data analysis

Descriptive statistics were used to summarise the sample characteristics, and the proportions of fathers reporting psychological distress (Kessler-6), physical health problems (specific health problems and overall physical health), and health behaviours (alcohol use, cigarette smoking, body mass index). Chi-square and t-tests were computed to assess for significant differences in socio-demographic characteristics between the father groups. One-way between-subjects ANOVA were conducted to assess for differences in psychological distress between the father groups on the Kessler-6 continuous variable, with and without adjusting for SEP. We also conducted further analyses adjusting for SEIFA Index of Relative Socio-economic Disadvantage using general linear modelling. Given that the results were similar, we only present the results when adjusting for SEP. Multinomial logistic regression analyses were conducted for the Kessler-6 cut points and the categorical physical health variables, with and without adjustment for SEP. In all models, Australian-born fathers was the reference category.

Missing data for all study variables were handled using multiple imputation. Twenty complete datasets were imputed using a multivariate normal model incorporating all variables used in the analyses. We obtained pooled estimates for all proportions and model parameter estimates. All analyses were conducted using cases with complete data only, as well as the total sample with imputed data. Given that the analyses yielded similar results, only those using imputed data are presented here. All analyses were conducted using SPSS Version 21.0.

RESULTS

Sample characteristics

There was a total of 9369 children and their families participating in both cohorts when they were 4-5 years of age. Of these, 86.9% (n=8137) had a biological, adoptive, foster or step-father in the home and data available on at least one wave. There were 131 (1.6%) fathers of likely refugee background, 872 (10.7%) who had migrated from a predominantly non-English speaking country, 1005 (12.4%) who had migrated from an English-speaking country, and 6129 (75.3%) born in Australia. Table 1 presents the demographic characteristics for each group. The majority of fathers in all groups were biological in a two-parent household. Approximately, 70% of fathers of refugee background came from the Middle East and Southeast Asia, whilst the majority of fathers of non-English speaking background came from Southern and Central Asia, Southeast Asia, Southern and East Africa, and the Middle East. The vast majority of fathers who migrated from an English speaking country came from Great Britain or New Zealand. The average time since arrival was longest for fathers who migrated from an English-speaking country (21.1yrs), and this was significantly longer than for fathers of refugee background (15.9yrs) or those who had migrated from a non-English speaking country (17.3yrs).

There were significant differences between the groups of fathers with respect to education, employment, and socioeconomic status. The proportion of fathers who did not complete high school was significantly higher among fathers of refugee background and fathers born in Australia than fathers from English and non-English speaking countries. The number of fathers from non-English and English speaking countries who had completed tertiary education was higher than fathers of refugee background and fathers born in Australia. The proportion of fathers working part-time or currently unemployed was higher for fathers of refugee background and fathers from non-English speaking countries than the other groups. Full-time employment was lower for fathers of refugee background compared to all other groups. The proportion of fathers with an average weekly income of less than $500 was significantly higher among fathers of refugee background, and the proportion earning higher than $1000 was lowest for this group. The proportion of fathers to have low SEP was highest among fathers of refugee background, and

their SEIFA scores were significantly lower compared to the other groups. Migrant fathers (both English speaking and non-English speaking) were morely likely to have high SEP compared to Australian born fathers. SEIFA scores were significantly lower for Australian-born fathers compared to both migrant father groups, and there were no significant differences between the two migrant father groups. Finally, fathers from refugee backgrounds were more likely to have larger number of children compared to all other father groups.

Table 1: Sample characteristics for fathers of likely refugee backgrounds, fathers who had migrated from non-English and English speaking countries, and fathers born in Australia

Demographic characteristics	Refugee (n=131)	Migrated from a non-English speaking country (n=872)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)	*F* or χ^2	*p*
Caregiver Type *(n, %)*						
Biological Father	131 (100.0%)	865 (99.2%)	980 (97.5%)	5967 (97.4%)		
Adoptive Father	0 (0.0%)	0 (0.0%)	1 (0.1%)	12 (0.2%)	16.0	.192
Step-Father	0 (0.0%)	7 (0.8%)	24 (2.4%)	147 (2.4%)		
Foster Father	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (<0.1%)		
Age *(Mean)*	39.3	39.6	39.4	37.2	76.4	<.001
Country/Region of Birth (n, %)						
New Zealand	0 (0.0%)	0 (0.0%)	246 (24.5%)	-		
Great Britain	0 (0.0%)	0 (0.0%)	553 (55.0%)	-		
North America	0 (0.0%)	0 (0.0%)	52 (5.2%)	-		
Melanesia	0 (0.0%)	0 (0.0%)	19 (1.9%)	-		
Polynesia	0 (0.0%)	56 (6.4%)	11 (1.1%)	-		
Western Europe	0 (0.0%)	62 (7.1%)	0 (0.0%)	-		
Southern Europe	0 (0.0%)	34 (3.9%)	0 (0.0%)	-		
South Eastern Europe	7 (5.3%)	36 (4.1%)	0 (0.0%)	-		
Eastern Europe	1 (0.8%)	20 (2.3%)	0 (0.0%)	-		
North Africa	8 (6.1%0	17 (1.9%)	0 (0.0%)	-		
Middle East	46 (35.4%)	84 (9.6%)	0 (0.0%)	-		
South east Asia	50 (38.2%)	131 (15.0%)	0 (0.0%)	-		

Demographic characteristics	Refugee (n=131)	Migrated from a non-English speaking country (n=872)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)	*F* or χ^2	*p*
North east Asia	0 (0.0%)	94 (10.8%)	0 (0.0%)	-		
Southern and Central Asia	6 (4.6%)	153 (17.5%)	0 (0.0%)	-		
South America	5 (3.8%)	10 (1.1%)	0 (0.0%)	-		
Central America	4 (3.1%)	1 (0.1%)	0 (0.0%)	-		
Southern and East Africa	4 (3.1%)	90 (10.3%)	0 (0.0%)	-		
Confidentialised	0 (0.0%)	87 (9.9%)	124 (12.3%)	-		
Time since arrival in years (Mean)	15.9	17.3	21.1	-	31.2	<.001
English main language spoken at home	3 (2.3%)	228 (26.1%)	925 (92.0%)	5854 (95.5%)	3882.8	<.001
Speaks English						
Very well	45 (34.4%)	450 (51.6%)	87 (8.6%)	319 (5.2%)		
Well	50 (38.2%)	195 (22.4%)	25 (2.5%)	20 (0.3%)		
Not well	30 (22.9%)	62 (7.0%)	4 (0.4%)	3 (0.1%)	192.9	<.001
Not at all	2 (1.5%)	11 (1.3%)	1 (0.1%)	0 (0%)		
Not reported/Not relevant	4 (3.0%)	154 (17.7%)	888 (88.4%)	5787 (94.4%)		
High school completion						
Did not complete high school	55 (42.0%)	230 (26.4%)	397 (39.5%)	2884 (47.1%)	139.5	<.001
Completed high school	76 (58.0%)	642 (73.6%)	608 (60.5%)	3245 (52.9%)		
Tertiary education						
No tertiary education	97 (74.0%)	490 (56.2%)	653 (65.0%)	4451 (72.6%)	111.31	<.001
Completed tertiary education	34 (26.0%)	382 (43.8%)	352 (35.0%)	1678 (27.4%)		
Employment status						

Demographic characteristics	Refugee (n=131)	Migrated from a non-English speaking country (n=872)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)	*F* or χ^2	*p*
Not in the labour force	19 (14.5%)	44 (5.0%)	41 (4.1%)	225 (3.7%)		
Unemployed and looking for work	7 (5.3%)	26 (3.0%)	16 (1.6%)	87 (1.4%)	143.6	<.001
Part-time employment	20 (15.3%)	72 (8.3%)	38 (3.8%)	233 (3.8%)		
Full-time employment (30+hrs/wk)	85 (64.9%)	730 (83.7%)	910 (90.5%)	5580 (91.0%)		
Weekly income (AUD$/week)						
Less than $500	51 (40.0%)	171 (19.6%)	112 (11.1%)	726 (11.8%)		
$500-999	32 (24.4%)	238 (27.3%)	257 (25.6%)	1828 (29.8%)		
$1000-1999	18 (13.7%)	250 (28.7%)	368 (37.0%)	2320 (37.9%)	197.6	<.001
$2000 or more	3 (2.3%)	73 (8.4%)	165 (16.4%)	700 (11.4%)		
Not reported	27 (20.6%)	140 (16.1%)	103 (10.2%)	555 (9.1%)		
Study child gender – Male	57 (43.5%)	438 (50.2%)	515 (51.2%)	3145 (51.3%)	3.5	.322
Number of children in household *(Mean)*	3.1	2.5	2.5	2.5	15.0	<.001
Two parent household	131 (100.0%)	868 (99.5%)	995 (99.0%)	6089 (99.3%)	4.7	.581
Socio-economic position *(M, SD)*	-0.64	0.22	0.24	0.10	36.9	<.001
Socio-economic position category						
High	18 (13.7%)	276 (31.7%)	293 (29.2%)	1447 (23.6%)		
Medium	38 (29.0%)	378 (43.3%)	511 (50.8%)	3149 (51.4%)	120.2	<.001
Low	75 (57.3%)	218 (25.0%)	201 (20.0%)	1533 (25.0%)		
SEIFA Disadvantage *(M, SD)*	977.7	1018.2	1025.5	1013.9	28.8	<.001

Psychological Distress

The extent of missing data across all study variables including the Kessler-6 was approximately 17.6%. These were handled using multiple imputation. Table 2 presents the proportion of fathers reporting psychological distress in the normal range or the symptomatic and clinical cut points. With respect to continuous scores on the Kessler-6, a one-way between-subjects ANOVA revealed significant differences in psychological distress across the groups with and without adjusting for socio-economic position (Unadjusted for SEP: $F(3, 8132)=34.29$, $p<.001$, $\eta^2=.012$; Adjusted for SEP; $F(3, 8132)=28.38$, $p<.001$; $\eta^2=.01$). Tukey's post hoc tests revealed that fathers of refugee background reported significantly higher psychological distress than Australian-born fathers, and fathers from English speaking countries. Fathers migrating from a non-English speaking country reported significantly higher distress than Australian-born fathers.

Table 2: Descriptive statistics (unadjusted) for psychological distress measured by the Kessler-6 for each father group when their children were aged 4-5 years

Outcomes	Refugee (n=131)	Migrated from a non-English speaking country (n=872)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)
Psychological distress (continuous score), Mean	9.03	6.4	5.5	5.2
Psychological distress (cut points)				
Normal range (<7), n (%)	57 (43.5%)	554 (63.5%)	739 (73.5%)	4590 (74.9%)
Symptomatic or clinical cut point (8+), n (%)	74 (56.5%)	318 (36.5%)	266 (26.5%)	1539 (25.1%)

Table 2 indicates that the proportion of fathers reporting psychological stress at the symptomatic or clinical cut points on the Kessler-6 was highest for fathers of refugee background, followed by fathers from a non-English speaking country. Table 3 indicates that without adjustment for SEP, refugee fathers had the highest odds of reporting psychological distress in the symptomatic or clinical ranges compared to fathers born in Australia. Fathers from non-English speaking countries also had increased odds of reporting distress in the symptomatic or clinical range compared to Australian-born fathers. There were no significant differences between fathers from English-speaking countries and Australian-born fathers. These associations remained significant even when adjusting for SEP.

Table 3: Multinomial logistic regression results examining differences in psychological distress at the Kessler-6 clinical cut- between the father groups adjusted and unadjusted for socioeconomic position when their children were aged 4-5 years.

Outcomes	Refugee[a]	Migrated from a non-English speaking country[a]	Migrated from an English speaking country[a]
Unadjusted for SEP			
Mental health (K6)			
Normal range (<7)	Ref.	Ref.	Ref.
Symptomatic or Clinical cut point (8-12)	**3.93 (2.66, 5.81), <001**	**1.71 (1.44, 2.03), <.001**	1.07 (0.91, 1.27), .403
Adjusted for SEP			
Mental health (K6)			
Normal range (<7)	Ref.	Ref.	Ref.
Symptomatic or Clinical cut point (8-12)	**3.17 (2.13, 4.74), <.001**	**1.79 (1.51, 2.13), <.001**	1.13 (0.95 1.33), .169

[a] Fathers born in Australia is the reference category

SEP, socioeconomic position

General Health and health behaviours

Table 4 presents the proportion of fathers in each group reporting physical health conditions, global health problems, alcohol use, cigarette smoking, and weight problems. The pattern of results for the multinomial logistic regression analyses with and without adjusting for SEP were similar; therefore, the adjusted results are presented in Table 5. Refugee fathers had the highest odds of fair to poor overall

global health compared to fathers born in Australia. Refugee fathers and those from non-English speaking countries had lower odds of moderate to harmful alcohol use than Australian-born fathers. Refugee fathers and those from non-English speaking countries had higher odds of being underweight compared to Australian-born fathers. Fathers from English and non-English speaking countries had lower odds of being overweight or obese than Australian-born fathers.

Table 4: Descriptive statistics for physical health conditions for each father group when their children were aged 4-5 years

Outcomes	Refugee (n=131)	Migrated from a non-English speaking country (n=872)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)
Physical health issues				
None	121 (92.4%)	800 (91.7%)	913 (90.8%)	5528 (90.2%)
1 or more	10 (7.6%)	72 (8.3%)	92 (9.2%)	601 (9.8%)
Global health				
Very good – Excellent	54 (41.2%)	452 (51.8%)	539 (53.6%)	3279 (53.5%)
Good	45 (34.4%)	301 (34.5%)	338 (33.6%)	2089 (34.1%)
Fair – Poor	32 (24.4%)	120 (13.8%)	128 (12.7%)	761 (12.4%)
Alcohol use				
Abstain to occasional	84 (64.1%)	426 (48.9%)	206 (20.5%)	1277 (20.8%)
Light (<2 drinks/day)	44 (33.6%)	380 (43.6%)	573 (57.0%)	3463 (56.5%)
Moderate to Harmful (>3 drinks/day to >6 drinks/day)	3 (2.3%)	66 (7.6%)	226 (22.5%)	1389 (22.7%)
Cigarette smoking				
Don't smoke at all/Less than once per day	78 (59.5%)	674 (77.3%)	814 (81.0%)	4786 (78.1%)
At least once a day	53 (40.5%)	198 (22.7%)	191 (19.0%)	1343 (21.9%)
BMI status				
Underweight	18 (13.7%)	60 (6.9%)	42 (4.2%)	147 (2.4%)
Normal weight	41 (31.3%)	333 (38.2%)	313 (31.1%)	1675 (27.3%)
Overweight	47 (35.9%)	376 (43.1%)	478 (47.6%)	3074 (50.2%)
Obese	25 (19.1%)	103 (11.8%)	172 (17.1%)	1233 (20.1%)

Table 5: Multinomial logistic regression results examining differences in physical health conditions between the father groups adjusted and unadjusted for socioeconomic position when their children were aged 4-5 years

Outcomes	Refugee[a]	Migrated from a non-English speaking country[a]	Migrated from an English speaking country[a]
Physical health conditions			
None	Ref.	Ref.	Ref.
1 or more	0.59 (0.31, 1.14), .119	0.85 (0.74, 0.97), .209	0.97 (0.86, 1.09), .804
Global health			
Very good – Excellent	Ref.	Ref.	Ref.
Good	1.17 (0.71, 1.91), .540	1.07 (0.86, 1.32), .557	1.01 (0.85, 1.20), .939
Fair – Poor	**1.95 (1.06, 3.60), .033**	1.18 (0.88, 1.58), .264	1.07 (0.80, 1.43), .639
Alcohol use			
Abstain to occasional	Ref.	Ref.	Ref.
Light (<2 drinks/day)	**0.25 (0.15, 0.43), <.001**	**0.30 (0.24, 0.37), <.001**	0.97 (0.80, 1.17), .724
Moderate to Harmful (>3 drinks/day to >6 drinks/day)	**0.04 (0.10, 0.17), <.001**	**0.14 (0.10, 0.19), <.001**	0.98 (0.79, 1.22), .880
Cigarette smoking			
Don't smoke at all/Less than once day	Ref.	Ref.	Ref.
At least once a day	1.39 (0.84, 2.30), .201	1.11 (0.88, 1.41), .382	0.92 (0.75, 1.14), .455
Weight status			
Normal weight	Ref.	Ref.	Ref.
Underweight	**3.49 (1.57, 7.74), .003**	**2.10 (1.31, 3.35), .003**	1.59 (0.92, 2.74), .095
Overweight	0.60 (0.33, 1.10), .101	**0.62 (0.51, 0.75), <.001**	**0.84 (0.68, 1.03), .087**
Obese	0.69 (0.35, 1.6), .277	**0.43 (0.32, 0.58), <.001**	**0.77 (0.61 0.98), .030**

[a] Fathers born in Australia is the reference category

DISCUSSION

In a population-based study of over 8000 Australian families, we identified 131 fathers of likely refugee background who arrived in Australia between 1951-2007 from countries such as Afghanistan,

Iraq, Vietnam and Cambodia. Ten percent were migrant fathers from predominantly non-English speaking countries, and a further 12% were migrant fathers from English speaking countries. These proportions are somewhat under-representative of migrant families in the general Australian population. Australian Census data indicate that a quarter (24.6%) of the Australian population was born overseas, and 43% had at least one overseas born parent [44].

Approximately half the fathers of likely refugee background reported high levels of psychological distress at the symptomatic and/or clinical cut points on the K6, compared with approximately a third of fathers from non-English speaking backgrounds, and approximately one quarter of those from English speaking countries and Australian-born fathers. Fathers of likely refugee background were three to four times more likely to report psychological distress in the symptomatic and/or clinical cut points compared to Australian-born fathers. The odds were only marginally attenuated after adjusting for SEP. These findings are in line with studies reporting high rates of mental health problems for refugees [7, 23, 25], and higher than the two studies reporting on post-traumatic stress symptoms of refugee fathers [8, 27]. We also found that fathers migrating to Australia from non-English speaking countries were at elevated risk of psychological distress, with an almost twofold increase in odds of psychological distress in the symptomatic and/or clinical range compared to Australian-born fathers. We did not find any significant differences in psychological distress between fathers from English speaking countries and Australian-born fathers. Given that people fleeing their country to seek safety have experienced traumatic and often life-threatening events, [3-6] it is not surprising that fathers of refugee background reported the highest rates of psychological distress.

Refugee fathers were also more likely to rate their general health as fair to poor, and were more likely to be underweight than Australian-born fathers. Fathers from non-English speaking countries were also more likely to be underweight than Australian-born fathers. There were no significant findings for physical health conditions such as chronic pain, sight or hearing problems, or difficulty breathing. This was somewhat surprising given that some studies of refugee men more broadly have reported that they are at increased risk of musculoskeletal, respiratory, cardiovascular, and infectious diseases [4, 24, 26]. We interpret these findings with caution because prior to 2011, refugees with disabilities were excluded from Australia's Humanitarian program, and it is possible that some fathers of refugee background were reluctant to disclose chronic health issues or disabilities. Further research into the physical health of refugee fathers is critical given that many have experienced torture and trauma and difficult pre-arrival experiences.

It is also important to note that refugee and migrant fathers had some protective health behaviours. For instance, refugee fathers and those from non-English speaking countries had lower odds of light to harmful alcohol use than Australian-born fathers. Furthermore, fathers from English speaking

countries and non-English speaking countries had lower odds of being overweight or obese than Australian-born fathers.

Overall, the findings indicate that fathers of refugee background are more likely than Australian-born fathers to experience a range of psychological and general health issues. Migrant fathers of non-English speaking background also appear to experience greater psychological morbidity than Australian-born fathers. Whilst migration is likely to be a time of adjustment for all fathers born overseas, those of refugee and non-English speaking background are more likely to experience significant stressors associated with language barriers, cultural differences, and access to services that may impact on their health and wellbeing. Many migrants from English-speaking countries come to Australia on a 'skilled visa' with recognised qualifications, and are less likely to experience difficulties finding employment and adequate income.[45] This is also the case for migrants of non-English speaking background who come to study and then remain in Australia. In contrast, fathers of refugee background may have a past history of torture and other traumatic events, disrupted or limited access to education and therefore be more likely to experience prolonged periods of social and economic disadvantage after settlement. Low employment rates and low household income were observed for these fathers in our study. Understanding how these factors impact on fathers' health, wellbeing, and family relationships is important, along with a better understanding of what factors may facilitate positive outcomes in the longer term.

Strengths and limitations

To our knowledge, this is the first population-based birth cohort study in a high income country to identify and report mental and physical health outcomes for fathers of likely refugee background. The design of the study and size of the sample enabled us to compare mental and physical health outcomes and health behaviours in fathers of refugee background with Australian-born fathers and migrant fathers of non-English speaking and English speaking backgrounds. In the context of increasing global economic and forced migration, it is important for public health methods to evolve in ways that permit meaningful description of population health trends. Although no information pertaining to parental or children's visa status was collected in the Longitudinal Study of Australian Children, by combining data on fathers' country of birth and year of arrival in Australia, we were able to identify fathers of likely refugee background. This method is increasingly being used as the best proxy measure of likely refugee background.[36, 38]Whilst using this approach may have led to some misclassification of fathers of refugee background in our sample, it constitutes a reasonable approximation. Furthermore, collecting information about visa status can be problematic due to sensitivities regarding disclosure and changing status over time. Hence, even when data regarding visa starus are available, this information may not represent a gold standard measure.

Similar issues are apparent for identifying fathers from non-English speaking countries. Whilst participants were asked to report on their main language spoken at home, there was no provision made for other languages spoken at home. Accurately obtaining a picture of language spoken at home and in different contexts (i.e., between parents, between parents and children, in the community, at work), is an important but complex methodological issue. We opted to use the official language(s) of the country in which the fathers were born to distinguish between fathers from English or Non-English speaking countries. This may have led to some fathers being misclassified.

Another limitation is that families of non-English speaking backgrounds were underrepresented in LSAC, and were more likely to be lost to follow-up. The sample is likely to be representative of more socially and economically advantaged families with higher levels of English proficiency. This is likely to have resulted in the prevalence estimates of mental and physical health underestimating the true prevalence of poor health outcomes. Furthermore, non-English speaking families may have declined to participate due to lack of understanding about the study and what the information would be used for. Researchers have noted that people unaccustomed to research may be fearful, concerned, and worried about the information collected, who will have access to it and how it will be used.[46-48] Possible solutions require working in partnership with relevant community agencies to maximise inclusion of harder to reach groups and ensuring that appropriate steps are taken to address language barriers to participation, such as the use of professional interpreters and bicultural workers. Community input through consultation and engagement can inform the development of study protocols and measures to ensure cultural appropriateness and face validity. Establishing such strategies may support retention of the cohort over time.

Another limitation is that the Longitudinal Study of Australian Children necessarily employed brief measures. Although the Kessler-6 is a widely used and psychometrically sound instrument, there has been limited assessment of its appropriateness for different cultural groups.[49] Using family members to interpret may have led to under-reporting of mental and physical health problems by fathers reluctant to disclose health issues to family members. Furthermore, no information about experiences, health or wellbeing prior to arrival in Australia was collected for fathers born overseas. The conclusions drawn from this study must be considered within the context of these limitations.

Implications and conclusions

Internationally, it is estimated that 5-10% of fathers experience mental health difficulties in the early years of their children's lives [18] [21, 50, 51]. Our findings suggest that fathers of refugee background and those who have migrated from countries with different main languages to the destination country, might be particularly vulnerable to poor paternal health. These are important findings given the

small but growing body of evidence demonstrating links between fathers' mental health and their children's health, wellbeing and development [52, 53].

Building on the analyses presented in this paper, we have an opportunity to examine fathers' mental health over time, and to assess longitudinally the relationship between the mental and physical health of refugee and migrant fathers and their children's health and wellbeing. However, we are also mindful that the picture that can be obtained from longitudinal studies needs to be supplemented by qualitative research using culturally appropriate and sensitive methods to gain in depth understanding of fathers' experiences and support needs, and the longer term impacts of economic and forced migration on family functioning and wellbeing.

We recommend that future longitudinal studies take steps to increase the involvement of refugee and migrant families, and include fathers wherever possible and appropriate. To ensure adequate representation, greater attention to methods tailored to engage and identify migrant and refugee families is essential. Overcoming barriers that limit engagement and identification of 'harder to reach' populations is critical if population studies are to be a useful vehicle for informing and tailoring services to meet the needs of increasingly diverse populations in high income countries.

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COMPETING INTERESTS

We have read and understood BMJ policy on declaration of interests and declare that we have no competing interests.

CONTRIBUTORS

RG, ER, CL, DV, JY, JS, PD, LT, SC and SJB conceptualised the research questions and contributed to the interpretation of findings and identification of the implications. CL and DV identified fathers of likely refugee background in the LSAC data set using the method described. As a registered user of the

Longitudinal Study of Australian Children, RG accessed data and conducted all analyses and prepared tables. RG drafted the manuscript. All authors, in particular ER, JY, JS and SJB critically revised the manuscript.

DATA SHARING STATEMENT

The Longitudinal Study of Australian Children is funded by Australian Government Department of Social Services. Data are available to registered data users. Information about data access is provided at http://www.growingupinaustralia.gov.au/

REFERENCES

1. International Orgnanisation for Migration. *IOM Releases Global Migration Trends 2015 Factsheet*. 2016 16.9.16]; Available from: https://www.iom.int/news/iom-releases-global-migration-trends-2015-factsheet.
2. United Nations High Commissioner for Refugees, *Global Trends. Forced displacement in 2015*. 2016, UNHCR: Geneva, Switzerland.
3. Ager, A. and A. Strang, *Understanding integration: A conceptual framework.* Journal of Refugee Studies, 2008. 2008: p. 166-191.
4. Correa-Velez, I., A. Barnett, and S. Gifford, *Working for a better life: Longitudinal evidence on the predictors of employment among recently arrived refugee migrant men living in Australia. International Migration.* . 2013.
5. Lamb, M. and L. Bougher, *How does migration affect mothers' and fathers' roles within their families? Reflections on some recent research.* Sex Roles, 2009. 60: p. 611-614.
6. Victorian Foundation for the Survivors of Torture, *Rebuilding Shattered Lives*. 1998, Melbourne.
7. Silove, D., et al., *Trauma, PTSD and the longer-term mental health burden amongst Vietnamese refugees : a comparison with the Australian-born population.* Social Psychiatry and Psychiatric Epidemiology, 2007. 42: p. 467-476.
8. Vaage, A., et al., *Long-term mental health of Vietnamese refugees in the aftermath of trauma.* Br J Psychiatry, 2010. 196: p. 122-125.
9. Dennis, C., L. Merry, and G. AJ, *Postpartum depression risk factors among recent refugee, asylum-seeking, non-refugee immigrant, and Canadian-born women: results from a prospective cohort study.* . Social Psychiatry and Psychiatric Epidemiology, 2017. early view.
10. Fellmeth, G., M. Fazel, and P. E., *Migration and perinatal mental health in women from low- and middle-income countries: a systematic review and meta-analysis.* . An International Journal of Obstetrics and Gynaecology, 2016. 124: p. 742-752.

11. Brandyopadhyay, M., et al., *Life with a new baby: how do immigrant and Australian born women's experiences compare?* . Aust NZ J Public Health, 2010. 34: p. 412-421.
12. Lansakara, N., B. S., and D. Gartland, *Birth outcomes, postpartum health and primary care contacts of immigrant mothers in an Australian nulliparous pregnancy cohort study.* Maternal and Child Health, 2010. 14: p. 807-816.
13. Small, R., J. Lumley, and J. Yelland, *Cross-cultural experiences of maternal depression: associations and contributing factors for Vietnamese, Turkish and Filipino immigrant women in Victoria, Australia* Ethnicity and Health, 2003. 8: p. 189-206.
14. Drysdale, H., et al., *Ethnicity and the risk of late-pregnancy stillbirth.* The Medical Journal of Australia, 2012. 197: p. 278-281.
15. Flenady, V., et al., *Stillbirths: recall to action in high-income countries.* Lancet, 2016. 387: p. 691-702.
16. Este, D. and A. Tachble, *Fatherhood in the Canadian context: Perceptions and experiences of Sudanese refugee men.* Sex Roles, 2009. 60: p. 456-466.
17. Vaage, A., et al., *Paternal predictors of the mental health of children of Vietnamese refugees.* Child & Adolescent Psychiatry & Mental Health, 2011. 5: p. 1-11.
18. Giallo, R., et al., *Father mental health during the early parenting period: Results of an Australian population based longitudinal study.* Social Psychiatry and Psychiatric Epidemiology, 2012. 47(12): p. 1907-1916.
19. Giallo, R., et al., *Psychosocial risk factors associated with fathers' mental health in the postnatal period: Results from a population-based study.* Social Psychiatry and Psychiatric Epidemiology, 2013. 48: p. 563-573.
20. Giallo, R., et al., *Factors associated with trajectories of psychological distress for fathers across the early parenting period: A national Australian study.* Social Psychiatry and Psychiatric Epidemiology, 2014. 49: p. 1961-1971.
21. Paulson, J. and S. Bazemore, *Prenatal and postpartum depression in fathers and its association with maternal depression.* The Journal of the American Medical Association, 2010. 303(9): p. 1961-1969.
22. Leach, L., et al., *Prevalence and course of anxiety disorders (and symptom levels) in men during the perinatal period: A systematic review.* Journal of Affective Disorders, 2015. 190: p. 675-686.
23. Carlsson JM, Mortensen, E., Kastrup M., *Predictors of mental health and quality of life in male tortured refugees* Nordic Journal of Psychiatry, 2006. 60: p. 51-57.
24. Bischoff, A., et al., *Health and ill health of asylum seekers in Switzerland: an epidemiological study.* European Journal of Public Health, 2009. 19: p. 59-64.

25. Lie, B., *A 3-year follow-up study of psychosocial functioning and general symptoms in settled refugees.* Acta Psychiatr Scand, 2002. 106 p. 415-425.
26. Hollander, A., et al., *Longitudinal study of mortality among refugees in Sweden.* International Journal of Epidemiology, 2012. 41: p. 1153-1161.
27. van Ee, E., et al., *Father-involvement in a refugee sample: relations between posttraumatic stress and caregiving.* Family Process, 2013. 52: p. 723-735.
28. Riggs, E., et al., *Fatherhood in a new country: a qualitative study exploring the experiences of Afghan men and implications for health services.* Birth, 2016. 43: p. 86-92.
29. Studies., A.I.o.F., *Longitudinal Study of Australian Children Data User Guide*. 2011, Melbourne: Australian Institute of Family Studies.
30. Daraganova, G. and M. Sipthorp, *Wave 4 weights (LSAC Technical Paper No. 9)* 2011, Australian Institute of Family Studies: Melbourne.
31. Mission, S. and M. Sipthorp, *LSAC Technical paper No. 5: Wave 2 weighting and non-response*. 2007, Australian Institute of Family Studies: Melbourne.
32. Sipthorp, M. and S. Mission, *LSAC Technical paper No. 6. Wave 3 weighting and non-response*. 2009, Australian Institute of Family Studies: Melbourne, Australia.
33. Soloff, C., et al., *LSAC technical paper No. 3: Wave 1 weighting and non-response.* . 2006, Australian Institute of Family Studies: Melbourne.
34. Soloff, C., Lawrence, D, and R. Johnstone, *Sample design (LSAC Technical Paper, No. 1)*. 2005, Melbourne: Australain Institute of Family Studies, Commonwealth of Australia.
35. Government., A. *Australian Government's Settlement Reporting Facility*. 2016; Available from: http://www.immi.gov.au/settlement/srf/
36. Gibson-Helm, M., et al., *Use of country of birth as an indicator of refugee background in health datasets.* BMC Med Res Methodol, 2014. 14(27).
37. Yelland, J., et al., *Bridging the Gap: using an interrupted time series design to evaluate systems reform addressing refugee maternal and child health inequalities.* Implementation Science, 2015. 10: p. 62.
38. Yelland, J., et al., *Improving the ascertainment of refugee-background people in health datasets and health services.* Australian Health Review, 2017, early view.
39. Hugo, G., *Economic, social and civic contributions of first and second generation humanitarian entrants: A final report to the Department of Immigration and Citizenship Australia*. 2011, University of Adelaide.
40. Kessler, R., et al., *Screening for serious mental illness in the general population.* Archives of Psychiatry, 2003. 60: p. 184-189.

41. World Health Organisation, *BMI Classifications*. 2006; Available from: http://apps.who.int/bmi/index.jsp?introPage=intro_3.html.
42. Blakemore, T., L. Strazdins, and J. Gibbings, *Measuring family socioeconomic position.* Australian Social Policy, 2009. 8: p. 121-168.
43. Trewin, D. *Socio-economic indexes for areas, Australia 2001*. 2003.
44. Australian Bureau of Statistics, *3412.0 Migration, Australia, 2014-2015*. 2016, Australian Bureau of Statistics: Canberra.
45. Australian Bureau of Statistics, *3418.0 Personal Income of Migrants, Australia, Experimental, 2010-11*. 2015, Australian Bureau of Statistics: Canberra.
46. Block, K., E. Riggs, and N. Haslam, *Ethics in Research With Refugees and Asylum Seekers: Processes, Power and Politics.* , in *Values and vulnerabilities : the ethics of research with refugees and asylum seekers.* , K. Block, Riggs, E., Haslam, N. , Editor. 2013, Australian Academic Press; 2013: Queensland, Australia.
47. Ellis, B., et al., *Ethical Research in Refugee Communities and the Use of Community Participatory Methods.* Transcult Psychiatry, 2007. 44: p. 459-481.
48. Riggs, E., et al., *Promoting the inclusion of Afghan women and men in research: reflections from research and community partners involved in implementing a 'proof of concept.'.* Int J Equity Health, 2015. 14: p. 13.
49. Stolk, Y., I. Kaplan, and J. Szwarc, *Clinical use of the Kessler psychological distress scales with culturally diverse groups.* Int J Methods Psychiatr Res., 2014. 23: p. 161-183.
50. Liu, C.H., et al., *U.S. parents with mental health problems: Parenting experiences and children's functioning.* . Archives of Psychiatric Nursing, 2016. 30: p. 753-760.
51. Paulson, J., S. Dauber, and J. Leiferman, *Individual and combined effects of postpartum depression in mothers and fathers on parenting behavior.* Pediatrics, 2006. 118: p. 659-668.
52. Fletcher, R.J., et al., *The effects of early paternal depression on children's development.* The Medical Journal of Australia, 2011. 195(11-12): p. 685.
53. Ramchandani, P. and L. Psychogiou, *Paternal psychiatric disorders and children's psychosocial development.* Lancet, 2009. 374(9690): p. 646-653.

STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology*

Checklist for cohort, case-control, and cross-sectional studies (combined)

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any pre-specified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	6
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	n/a
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	*7-8*
Bias	9	Describe any efforts to address potential sources of bias	6
Study size	10	Explain how the study size was arrived at	6-7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8-9
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8-9
		(*b*) Describe any methods used to examine subgroups and interactions	7-9
		(*c*) Explain how missing data were addressed	9
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed	n/a

		Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	n/a
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9
		(b) Give reasons for non-participation at each stage	9
		(c) Consider use of a flow diagram	n/a
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	9-11
		(b) Indicate number of participants with missing data for each variable of interest	14
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	n/a
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary measures	15, 17
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	16,18
		(*b*) Report category boundaries when continuous variables were categorized	15-17
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	n/a
Discussion			
Key results	18	Summarise key results with reference to study objectives	18-19
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	20
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	21
Generalisability	21	Discuss the generalisability (external validity) of the study results	21
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	22

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.
Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

The physical and mental health problems of refugee and migrant fathers: Findings from an Australian population-based study of children and their families

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The physical and mental health problems of refugee and migrant fathers: Findings from an Australian population-based study of children and their families

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ABSTRACT

Objectives: The aim of this study was to report on the physical and mental health of migrant and refugee fathers participating in a population-based study of Australian children and their families.

Design: Cross-sectional survey data drawn from a population-based longitudinal study when children were aged 4-5 years.

Setting: Population-based study of Australian children and their families

Participants: 8137 fathers participated in the study when their children were aged 4-5 years. There were 131 (1.6%) fathers of likely refugee background, 872 (10.7%) fathers who migrated from English-speaking countries, 1005 (12.4%) fathers who migrated from non-English speaking countries, and 6129 (75.3%) Australian-born fathers.

Primary Outcome Measures: Fathers' psychological distress was assessed using the self-report Kessler-6. Information pertaining to physical health conditions, global or overall health, alcohol and tobacco use, and body mass index status were obtained.

Results. Fathers of likely refugee background (adjusted Odds Ratio [aOR]= 3.17, 95%CI 2.13, 4.74) and fathers from non-English speaking countries (aOR= 1.79 (95%CI 1.51, 2.13) had higher odds of psychological distress compared to Australian-born fathers. Refugee fathers were more likely to report fair-poor overall health (aOR=1.95, 95%CI 1.06, 3.60), and being underweight (aOR=3.49, 95%CI 1.57, 7.74) compared to Australian-born fathers. Refugee fathers and those from non-English speaking countries were less likely to report light (aOR=0.25, 95%CI 0.15, 0.43 and aOR=0.30, 95%CI 0.24, 0.37, respectively) and moderate to harmful alcohol use (aOR=0.04, 95%CI 0.10, 0.17 and aOR=0.14, 95%CI 0.10, 0.19, respectively) than Australian-born fathers. Finally, fathers from non-English and English speaking countries were less likely to be overweight (aOR=0.62, 95%CI 0.51, 0.75 and aOR=0.84, 95%CI 0.68, 1.03, respectively) and obese (aOR=0.43, 95%CI 0.32, 0.58 and OR=0.77, 95%CI 0.61, 0.98, respectively) than Australian-born fathers.

Conclusion. Fathers of refugee background experience poorer mental health and poorer general health than Australian-born fathers. Fathers who have migrated from non-English speaking countries also report greater psychological distress than Australian-born fathers. This underscores the need for primary health care services to tailor efforts to reduce disparities in health outcomes for refugee populations that may be vulnerable due to circumstances and sequelae of forced migration, and to recognise the additional psychological stresses that may accompany fatherhood following migration from non-English speaking countries. It is important to note that refugee and migrant fathers report less alcohol use and are less likely to be overweight and obese than Australian-born fathers.

Keywords: refugees; migration; fathers; men; mental health; depression

STRENGTHS AND LIMITATIONS OF THIS STUDY

- To our knowledge this is the first population-based birth cohort study in a high income country to identify and report mental and physical health outcomes for fathers of likely refugee background.

- The design of the study and size of the sample enabled us to compare mental and physical health outcomes and health behaviours in fathers of refugee background with Australian-born fathers and migrant fathers of non-English speaking and English speaking backgrounds.

- We used a proxy measure to ascertain refugee background. While this may have resulted in some misclassification, confirmation of refugee status is rarely possible in administrative data sets. Even when visa status is collected it is not necessarily a reliable indicator.

- Migrant families of non-English speaking backgrounds were underrepresented in the study and were more likely to be lost to follow-up. The sample is likely to be representative of more socially and economically advantaged families with higher levels of English proficiency.

Migration around the world is at its highest ever recorded, with 244 million individuals crossing international borders in 2015.[1] Whilst many people willingly leave their home country for education and employment opportunities, there are currently over 65 million people who have been forcibly displaced from their homes due to conflict, persecution and human rights abuse. [2] Many of these displaced people will seek protection from another country as a refugee. The process of settlement and acculturation can be a time of significant stress for both migrants and refugees. Common sources of stress include learning a new language, finding employment and housing, navigating unfamiliar health and education services, and adjusting to changing family relationships,[3-6]. For people of refugee background these stresses may be compounded by having endured traumatic events, such as experiencing or witnessing harm, death or threats to others; family separation; time spent in detention and refugee camps; and long periods of limited access to basic needs such as food, water, shelter and safety [3, 6].

For people of migrant and refugee background, settlement and acculturative experiences can increase the risk of physical and mental health difficulties. For instance, a meta-analysis of 35 studies reported prevalence estimates for depression and anxiety of approximately 20% among migrants and 40% among refugees. Symptoms may persist for many years post-settlement [7, 8], leading to concerns about potential intergenerational impact within families. Internationally, there has been considerable interest in the mental health of women of refugee and migrant backgrounds during and after pregnancy. [9, 10]. Australian research has shown that women of refugee and migrant background are more likely to experience depressive symptoms after childbirth, compared to women born in Australia [11-13]. There is also evidence that women of refugee and migrant background have higher rates of stillbirth, fetal death in utero and perinatal mortality compared with Australian-born women [14]. This has also been demonstrated internationally for other high-income countries [15].

Much less is known about fathers of refugee and migrant background. The focus on fathers of young children is critical given their important role in supporting their families to adjust to life in their new country [16] [5], and to the health, wellbeing and development of their children [17]. Mental health problems such as anxiety and depression affect 10-12% of fathers in the general population in the early years of parenting [18-22]. Although the prevalence of mental health problems is likely to be higher among fathers of refugee or migrant backgrounds, research in this area is scarce. A study conducted almost a decade ago found that migrant fathers can feel undermined in their traditional role as the head of the household when they experience difficulty finding suitable employment. This may lead to migrant fathers feeling alienated and disrespected at a broader societal level and within their own families [5].

Whilst studies of refugee men more broadly have reported high levels of post-traumatic, depressive and anxiety symptoms,[7, 23-25] as well as musculoskeletal, respiratory, cardiovascular, and infectious diseases,[4, 24, 26], few studies have focussed specifically on *fathers* of refugee background.

In a study of 29 refugee fathers, resettled in the Netherlands, 86% reported symptoms of Post-Traumatic Stress Disorder (PTSD).[27] In another study of 50 refugee fathers from Vietnam, resettled in Norway [17], approximately 28% met the full or partial criteria for PTSD upon arrival. Approximately 23-24 years after arrival, 15% met the full or partial criteria for PTSD, and 20% met the clinical cut point on the General Symptom Inventory, which is indicative of a probable psychiatric disorder. No studies have reported on the physical health or health behaviours (i.e., cigarette smoking, alcohol use) of refugee fathers.

Taken together, this small but important body of research, suggests that fathers of migrant and refugee background might be at risk of increased mental and physical health problems. Determining the extent to which these fathers experience physical and mental health problems is critical to the development of health policy and services to better meet their needs in the critical early years of their children's lives. This is particularly important in Australia given that in 2015-16, Australia admitted around 190,000 permanent migrants (mainly for skills and labour) and over 17,500 on humanitarian (mainly refugees) grounds. Furthermore, our previous research has shown that when health professionals interact with refugee fathers, they are unlikely to inquire about the health and wellbeing needs of men themselves, therefore missing opportunities to provide care and support [28].

The objective of this paper was to investigate the mental and physical health, and health behaviours of fathers of refugee and migrant backgrounds in an existing population-based sample of over 8000 Australian children (aged 4-5 years) and their families participating in the Longitudinal Study of Australian Children (LSAC). Although LSAC was not designed specifically to investigate the needs of refugee and migrant families, rich data on psychological distress, physical health problems, body mass index, alcohol use and cigarette smoking are available. We draw upon the data available when children were aged 4-5 years – a critical and formative time during early childhood. The specific aim of the current study was to compare the mental and physical health, and health behaviours of refugee fathers and those who had migrated from an English and non-English speaking country to Australian-born fathers.

METHOD

Study design

Data were drawn from two cohorts of children and their families participating in Growing up in Australia: The Longitudinal Study of Australian Children. The design and field methods have been described elsewhere.[29-34] Ethics approval was obtained from the Australian Institute of Family Studies Human Research Ethics Committee and Australian states and territories Education Departments. Briefly, both cohorts were recruited in 2004. The Birth cohort (B-cohort) was recruited when the children were less than 12 months of age, and the Kindergarten cohort (K-cohort) was recruited when the children were

aged 4-5 years. Sampling details are outlined below. Each cohort has been followed up every two years. As a result, the age of the children in the two cohorts began to overlap at Wave 3 when the B cohort children were 4-5 years of age. The present study utilised data from the overlapping cohorts at age 4-5 (B-Cohort Wave 3, K-cohort Wave 1). Preliminary analysis of the data failed to reveal any significant cohort effects [29], therefore, both cohorts were combined for this paper.

Sampling was based on a two-stage process. First, approximately 10% of all Australian postcodes were selected. Second, a number of children proportional to population size for each postcode were randomly selected using the Australian universal health insurance database (Medicare). There were 5107 children recruited into the B-cohort (64% response rate), and 4983 into the K-cohort (59% response rate). The sample was broadly representative of children and parents in the Australian population; however, there was under-representation of mothers who had not completed Year 12 of their secondary education, children of non-English speaking background, and single parent families in both cohorts.[33]

The cohorts were reassessed every two years via a combination of face-to-face and computer-assisted interviews, self-complete questionnaires, direct assessment of children's functioning, time use diaries, and linking to administrative data. To increase the involvement of parents from non-English speaking backgrounds at wave 3 (B-cohort) and wave 1 (K-cohort), telephone interviews were conducted in a language other than English with 97 parents.[32] Fifty-eight interviews were interpreted by a family member or friend, 31 were interpreted by an Australian Bureau of Statistics interviewer fluent in the relevant language, and eight interviews were conducted using an accredited interpreter. The most common languages requiring an interpreter were Arabic, Vietnamese and Cantonese.

The sample size for the B- and K-cohorts when children were aged 4-5 years was 4386 and 4983, respectively.

Study Sample

The analytic sample for the current study was biological, step, adoptive or foster fathers participating in the B- and K-cohort. Data collected from fathers at the overlapping cohort stage when all children were aged 4-5 years (B-cohort at Wave 3 and K-cohort at Wave 1) was used. Previous analyses revealed no significant cohort effects.[29]

Country of birth was used to identify fathers who were Australian-born or born in another country. Fathers from English-speaking or predominantly non-English speaking countries were identified using the official language of the country where they were born. To identify fathers of likely refugee background, we used country of birth and year of arrival in Australia to allow for matching to Australian migration trends. Two different methods were used depending on the father's year of arrival into Australia. From 1990, data on migration to Australia through humanitarian grounds by country of birth

and year of arrival were accessed from the Australian Government's Settlement Reporting Facility.[35] Likely refugee background was defined as those countries where at least two thirds of migration from that country to Australia has been through the humanitarian stream. This approach was adopted from Gibson-Helm and colleagues [36] and an expert panel from the Murdoch Childrens Research Institute and the Victorian Foundation for Survivors of Torture.[37, 38]. Prior to 1990, complete immigration information was not made accessible by the Australian Government. Therefore, the approach by Hugo [39] was applied. This uses data from the Australian Bureau of Statistics 2006 Census on birthplace contribution of refugee-humanitarian migrants to ascertain those countries contributing likely refugee background populations to Australia from 1946 through to the 1990s. The composition of migrant flows changed during the study period. For example, migrants from Asian countries (e.g. China, India) have overtaken those from the UK and Europe. Refugees have been drawn from a variety of countries of origin, the main recent groups being from the Middle East, Asia and Africa. This information was taken into account in the algorithm used to ascertain fathers of likely refugee background.

Measures

Mental health. Psychological distress was assessed using the Kessler-6 (K6),[40]. On a 5-point scale (0-None of the time to 4-All or most of the time) participants rated the extent to which they experienced feeling nervous, hopeless, restless or fidgety, extremely sad, worthless, and like everything was an effort in the last 4 weeks. Two well-established cut points were used to describe the level of severity of distress. The symptomatic cut point was defined as a score of ≥8, indicating significant psychological distress. The clinical cut point was defined as a score of ≥13, indicating probable clinical diagnosis of a mental health condition. Cronbach's alpha for the current sample was .88 for fathers of refugee background, .81 for fathers of non-English speaking background, .80 for fathers who migrated from English speaking countries, and .83 for fathers born in Australia.

Physical health conditions. Participants indicated if they had any of the following conditions: sight and hearing problems, speech problems, difficulty learning or understanding, disfigurement or deformity, head injury, difficulty breathing, and chronic pain.

Global or overall health was rated on a 4-point scale ranging from 1=poor to 5=excellent, which was recoded into a 3-point scale (1=poor to fair health; 2=good health; 3=excellent health) due to low frequency of responses for poor health.

Alcohol use. Participants reported on whether they drink alcohol and how much they drink a day (0=Abstain; 1=Occasional less than monthly; 2=Light <2 drinks per day; 3=Moderate 2-3 drinks per day; 4=Hazardous 4-6 drinks per day; 5=Harmful >6 drinks per day). This was recoded into three groups

(1=Abstain to Occasional; 2=Light; 3=Moderate-Harmful), given the low frequency of responses for abstaining and occasional drinking and moderate to hazardous levels of drinking.

Cigarette smoking. Participants reported whether they smoke tobacco cigarettes and how much they smoke a day. This was dichotomised into 1=smoking at least once a day and 2= do not smoke at all/less than once a day.

Body Mass Index (BMI) status. Based on participant self-report of height and weight, BMI was calculated as weight/height squared and expressed as kg/m^2. Participants were classified as being underweight (<18.5), overweight (≥25.0-29.9), obese (≥30.0) and within the normal range (18.5-24.9) according to current World Health Organisation classification.[41]

Sociodemographic characteristics pertaining to fathers' age, country of birth, year of arrival in Australia, main language spoken at home, education, employment status, individual weekly gross income and number of children in the family were collected. Socio-economic position (SEP) was rated using a derived variable from combined parental income, education and occupational prestige.[42] Families with a standardised score ≤25th percentile were classified as 'low' SEP, those ≥75th percentile were classified as 'high' SEP, and the remainder were classified as 'medium' SEP. Continuous scores were used in all adjusted analyses. Socio-economic status was also assessed using the Index of Relative Socio-economic Disadvantage (SEIFA;[43]). Each participant was given an index score based on their postcode. The index is derived from levels of income, rates of unemployment and educational attainment within the postal area. The average score on the SEIFA is 1000, with higher scores indicating higher relative advantage for an area (i.e., fewer individuals with low income and unskilled occupations).[43]

Data analysis

Descriptive statistics were used to summarise the sample characteristics, and the proportions of fathers reporting psychological distress (Kessler-6), physical health problems (specific health problems and overall physical health), and health behaviours (alcohol use, cigarette smoking, body mass index). Chi-square and t-tests were computed to assess for significant differences in socio-demographic characteristics between the father groups. One-way between-subjects ANOVA were conducted to assess for differences in psychological distress between the father groups on the Kessler-6 continuous variable, with and without adjusting for SEP. We also conducted further analyses adjusting for SEIFA Index of Relative Socio-economic Disadvantage. Given that the results were similar, we only present the results when adjusting for SEP. Multinomial logistic regression analyses were conducted for the Kessler-6 cut points and the categorical physical health variables, with and without adjustment for SEP. In all models, Australian-born fathers was the reference category.

Missing data for all study variables were handled using multiple imputation. Twenty complete datasets were imputed using a multivariate normal model incorporating all variables in the analyses. The descriptive, ANOVA and logistic regression analyses were conducted using complete cases as well as with the total sample using multiply imputed data. Given that the analyses yielded similar results, only those using imputed data are presented here. For these analyses, we obtained pooled estimates for all proportions and model parameter estimates. All analyses were conducted using SPSS Version 21.0.

RESULTS

Sample characteristics

There was a total of 9369 children and their families participating in both cohorts when they were 4-5 years of age. Of these, 86.9% (n=8137) had a biological, adoptive, foster or step-father in the home. There were 131 (1.6%) fathers of likely refugee background, 872 (10.7%) who had migrated from a predominantly non-English speaking country, 1005 (12.4%) who had migrated from an English-speaking country, and 6129 (75.3%) born in Australia. Table 1 presents the demographic characteristics for each group. The majority of fathers in all groups were biological in a two-parent household. Approximately, 70% of fathers of refugee background came from the Middle East and Southeast Asia, whilst the majority of fathers of non-English speaking background came from Southern and Central Asia, Southeast Asia, Southern and East Africa, and the Middle East. The vast majority of fathers who migrated from an English speaking country came from Great Britain or New Zealand. The average time since arrival was longest for fathers who migrated from an English-speaking country (21.1yrs), and this was significantly longer than for fathers of refugee background (15.9yrs) or those who had migrated from a non-English speaking country (17.3yrs).

There were significant differences between the groups of fathers with respect to education, employment, and socioeconomic status. The proportion of fathers who did not complete high school was significantly higher among fathers of refugee background and fathers born in Australia than fathers from English and non-English speaking countries. The number of fathers from non-English and English speaking countries who had completed tertiary education was higher than fathers of refugee background and fathers born in Australia. The proportion of fathers working part-time or currently unemployed was higher for fathers of refugee background and fathers from non-English speaking countries than the other groups. Full-time employment was lower for fathers of refugee background compared to all other groups. The proportion of fathers with an average weekly income of less than $500 was significantly higher among fathers of refugee background, and the proportion earning higher than $1000 was lowest for this group. The proportion of fathers to have low SEP was highest among fathers of refugee background, and

their SEIFA scores were significantly lower compared to the other groups. Migrant fathers (both English speaking and non-English speaking) were morely likely to have high SEP compared to Australian born fathers. SEIFA scores were significantly lower for Australian-born fathers compared to both migrant father groups, and there were no significant differences between the two migrant father groups. Finally, fathers from refugee backgrounds were more likely to have larger number of children compared to all other father groups.

Table 1: Sample characteristics for fathers of likely refugee backgrounds, fathers who had migrated from non-English and English speaking countries, and fathers born in Australia

Demographic characteristics	Refugee (n=131)	Migrated from a non-English speaking country (n=872)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)	*F* or χ^2	*p*
Caregiver Type *(n, %)*						
Biological Father	131 (100.0%)	865 (99.2%)	980 (97.5%)	5967 (97.4%)		
Adoptive Father	0 (0.0%)	0 (0.0%)	1 (0.1%)	12 (0.2%)	16.0	.192
Step-Father	0 (0.0%)	7 (0.8%)	24 (2.4%)	147 (2.4%)		
Foster Father	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (<0.1%)		
Age *(Mean)*	39.3	39.6	39.4	37.2	76.4	<.001
Country/Region of Birth (n, %)						
New Zealand	0 (0.0%)	0 (0.0%)	246 (24.5%)	-		
Great Britain	0 (0.0%)	0 (0.0%)	553 (55.0%)	-		
North America	0 (0.0%)	0 (0.0%)	52 (5.2%)	-		
Melanesia	0 (0.0%)	0 (0.0%)	19 (1.9%)	-		
Polynesia	0 (0.0%)	56 (6.4%)	11 (1.1%)	-		
Western Europe	0 (0.0%)	62 (7.1%)	0 (0.0%)	-		
Southern Europe	0 (0.0%)	34 (3.9%)	0 (0.0%)	-		
South Eastern Europe	7 (5.3%)	36 (4.1%)	0 (0.0%)	-		
Eastern Europe	1 (0.8%)	20 (2.3%)	0 (0.0%)	-		
North Africa	8 (6.1%0	17 (1.9%)	0 (0.0%)	-		
Middle East	46 (35.4%)	84 (9.6%)	0 (0.0%)	-		
South east Asia	50 (38.2%)	131 (15.0%)	0 (0.0%)	-		

Demographic characteristics	Refugee (n=131)	Migrated from a non-English speaking country (n=872)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)	*F* or χ^2	*p*
North east Asia	0 (0.0%)	94 (10.8%)	0 (0.0%)	-		
Southern and Central Asia	6 (4.6%)	153 (17.5%)	0 (0.0%)	-		
South America	5 (3.8%)	10 (1.1%)	0 (0.0%)	-		
Central America	4 (3.1%)	1 (0.1%)	0 (0.0%)	-		
Southern and East Africa	4 (3.1%)	90 (10.3%)	0 (0.0%)	-		
Confidentialised	0 (0.0%)	87 (9.9%)	124 (12.3%)	-		
Time since arrival in years (Mean)	15.9	17.3	21.1	-	31.2	<.001
English main language spoken at home	3 (2.3%)	228 (26.1%)	925 (92.0%)	5854 (95.5%)	3882.8	<.001
Speaks English						
Very well	45 (34.4%)	450 (51.6%)	87 (8.6%)	319 (5.2%)		
Well	50 (38.2%)	195 (22.4%)	25 (2.5%)	20 (0.3%)		
Not well	30 (22.9%)	62 (7.0%)	4 (0.4%)	3 (0.1%)	192.9	<.001
Not at all	2 (1.5%)	11 (1.3%)	1 (0.1%)	0 (0%)		
Not reported/Not relevant	4 (3.0%)	154 (17.7%)	888 (88.4%)	5787 (94.4%)		
High school completion						
Did not complete high school	55 (42.0%)	230 (26.4%)	397 (39.5%)	2884 (47.1%)	139.5	<.001
Completed high school	76 (58.0%)	642 (73.6%)	608 (60.5%)	3245 (52.9%)		
Tertiary education						
No tertiary education	97 (74.0%)	490 (56.2%)	653 (65.0%)	4451 (72.6%)	111.31	<.001
Completed tertiary education	34 (26.0%)	382 (43.8%)	352 (35.0%)	1678 (27.4%)		
Employment status						

Demographic characteristics	Refugee (n=131)	Migrated from a non-English speaking country (n=872)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)	*F* or χ^2	*p*
Not in the labour force	19 (14.5%)	44 (5.0%)	41 (4.1%)	225 (3.7%)		
Unemployed and looking for work	7 (5.3%)	26 (3.0%)	16 (1.6%)	87 (1.4%)	143.6	<.001
Part-time employment	20 (15.3%)	72 (8.3%)	38 (3.8%)	233 (3.8%)		
Full-time employment (30+hrs/wk)	85 (64.9%)	730 (83.7%)	910 (90.5%)	5580 (91.0%)		
Weekly income (AUD$/week)						
Less than $500	51 (49.0%)	171 (23.4%)	112 (12.4%)	726 (11.8%)		
$500-999	32 (30.8%)	238 (32.5%)	257 (28.5%)	1828 (29.8%)		
$1000-1999	18 (17.3%)	250 (34.2%)	368 (40.8%)	2320 (37.9%)	197.6	<.001
$2000 or more	3 (2.9%)	73 (9.9%)	165 (18.3%)	700 (11.4%)		
Not reported	27	140	103	555 (9.1%)		
Study child gender – Male	57 (43.5%)	438 (50.2%)	515 (51.2%)	3145 (51.3%)	3.5	.322
Number of children in household *(Mean)*	3.1	2.5	2.5	2.5	15.0	<.001
Two parent household	131 (100.0%)	868 (99.5%)	995 (99.0%)	6089 (99.3%)	4.7	.581
Socio-economic position *(M, SD)*	-0.64	0.22	0.24	0.10	36.9	<.001
Socio-economic position category						
High	18 (13.7%)	276 (31.7%)	293 (29.2%)	1447 (23.6%)		
Medium	38 (29.0%)	378 (43.3%)	511 (50.8%)	3149 (51.4%)	120.2	<.001
Low	75 (57.3%)	218 (25.0%)	201 (20.0%)	1533 (25.0%)		
SEIFA Disadvantage *(M, SD)*	977.7	1018.2	1025.5	1013.9	28.8	<.001

Psychological Distress

The extent of missing data across all study variables including the Kessler-6 was approximately 17.6%, and approximately 20% of cases had missing data. Twenty complete datasets were imputed to ensure that the number of imputations was as least as large as the percentage of missing data [44]. Table 2 presents the proportion of fathers reporting psychological distress in the normal range or the symptomatic and clinical cut points. With respect to continuous scores on the Kessler-6, a one-way between-subjects ANOVA revealed significant differences in psychological distress across the groups with and without adjusting for socio-economic position (Unadjusted for SEP: $F(3, 8132)=34.29$, $p<.001$, $\eta^2=.012$; Adjusted for SEP; $F(3, 8132)=28.38$, $p<.001$; $\eta^2=.01$). Tukey's post hoc tests revealed that fathers of refugee background reported significantly higher psychological distress than Australian-born fathers, and fathers from English speaking countries. Fathers migrating from a non-English speaking country reported significantly higher distress than Australian-born fathers.

Table 2: Descriptive statistics (unadjusted) for psychological distress measured by the Kessler-6 for each father group when their children were aged 4-5 years

Outcomes	Refugee (n=131)	Migrated from a non-English speaking country (n=872)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)
Psychological distress (continuous score), Mean	9.03	6.4	5.5	5.2
Psychological distress (cut points)				
Normal range (<7), n (%)	57 (43.5%)	554 (63.5%)	739 (73.5%)	4590 (74.9%)
Symptomatic or clinical cut point (8+), n (%)	74 (56.5%)	318 (36.5%)	266 (26.5%)	1539 (25.1%)

Table 2 indicates that the proportion of fathers reporting psychological stress at the symptomatic or clinical cut points on the Kessler-6 was highest for fathers of refugee background, followed by fathers from a non-English speaking country. Table 3 indicates that without adjustment for SEP, refugee fathers had the highest odds of reporting psychological distress in the symptomatic or clinical ranges compared to fathers born in Australia. Fathers from non-English speaking countries also had increased odds of reporting distress in the symptomatic or clinical range compared to Australian-born fathers. There were no significant differences between fathers from English-speaking countries and Australian-born fathers. These associations remained significant even when adjusting for SEP.

Table 3: Multinomial logistic regression results examining differences in psychological distress at the Kessler-6 clinical cut- between the father groups adjusted and unadjusted for socioeconomic position when their children were aged 4-5 years.

Outcomes	Refugee[a]	Migrated from a non-English speaking country[a]	Migrated from an English speaking country[a]
Unadjusted for SEP			
Mental health (K6)			
Normal range (<7)	Ref.	Ref.	Ref.
Symptomatic or Clinical cut point (8-12)	**3.93 (2.66, 5.81), <001**	**1.71 (1.44, 2.03), <.001**	1.07 (0.91, 1.27), .403
Adjusted for SEP			
Mental health (K6)			
Normal range (<7)	Ref.	Ref.	Ref.
Symptomatic or Clinical cut point (8-12)	**3.17 (2.13, 4.74), <.001**	**1.79 (1.51, 2.13), <.001**	1.13 (0.95 1.33), .169

[a] Fathers born in Australia is the reference category

SEP, socioeconomic position

General Health and health behaviours

Table 4 presents the proportion of fathers in each group reporting physical health conditions, global health problems, alcohol use, cigarette smoking, and weight problems. The pattern of results for the multinomial logistic regression analyses with and without adjusting for SEP were similar; therefore, the adjusted results are presented in Table 5. Refugee fathers had the highest odds of fair to poor overall

global health compared to fathers born in Australia. Refugee fathers and those from non-English speaking countries had lower odds of moderate to harmful alcohol use than Australian-born fathers. Refugee fathers and those from non-English speaking countries had higher odds of being underweight compared to Australian-born fathers. Fathers from English and non-English speaking countries had lower odds of being overweight or obese than Australian-born fathers.

Table 4: Descriptive statistics for physical health conditions for each father group when their children were aged 4-5 years

Outcomes	Refugee (n=131)	Migrated from a non-English speaking country (n=872)	Migrated from an English speaking country (n=1005)	Born in Australia (n=6129)
Physical health issues				
None	121 (92.4%)	800 (91.7%)	913 (90.8%)	5528 (90.2%)
1 or more	10 (7.6%)	72 (8.3%)	92 (9.2%)	601 (9.8%)
Global health				
Very good – Excellent	54 (41.2%)	452 (51.8%)	539 (53.6%)	3279 (53.5%)
Good	45 (34.4%)	301 (34.5%)	338 (33.6%)	2089 (34.1%)
Fair – Poor	32 (24.4%)	120 (13.8%)	128 (12.7%)	761 (12.4%)
Alcohol use				
Abstain to occasional	84 (64.1%)	426 (48.9%)	206 (20.5%)	1277 (20.8%)
Light (<2 drinks/day)	44 (33.6%)	380 (43.6%)	573 (57.0%)	3463 (56.5%)
Moderate to Harmful (>3 drinks/day to >6 drinks/day)	3 (2.3%)	66 (7.6%)	226 (22.5%)	1389 (22.7%)
Cigarette smoking				
Don't smoke at all/Less than once per day	78 (59.5%)	674 (77.3%)	814 (81.0%)	4786 (78.1%)
At least once a day	53 (40.5%)	198 (22.7%)	191 (19.0%)	1343 (21.9%)
BMI status				
Underweight	18 (13.7%)	60 (6.9%)	42 (4.2%)	147 (2.4%)
Normal weight	41 (31.3%)	333 (38.2%)	313 (31.1%)	1675 (27.3%)
Overweight	47 (35.9%)	376 (43.1%)	478 (47.6%)	3074 (50.2%)
Obese	25 (19.1%)	103 (11.8%)	172 (17.1%)	1233 (20.1%)

Table 5: Multinomial logistic regression results examining differences in physical health conditions between the father groups adjusted and unadjusted for socioeconomic position when their children were aged 4-5 years

Outcomes	Refugee[a]	Migrated from a non-English speaking country[a]	Migrated from an English speaking country[a]
Physical health conditions			
None	Ref.	Ref.	Ref.
1 or more	0.59 (0.31, 1.14), .119	0.85 (0.74, 0.97), .209	0.97 (0.86, 1.09), .804
Global health			
Very good – Excellent	Ref.	Ref.	Ref.
Good	1.17 (0.71, 1.91), .540	1.07 (0.86, 1.32), .557	1.01 (0.85, 1.20), .939
Fair – Poor	**1.95 (1.06, 3.60), .033**	1.18 (0.88, 1.58), .264	1.07 (0.80, 1.43), .639
Alcohol use			
Abstain to occasional	Ref.	Ref.	Ref.
Light (<2 drinks/day)	**0.25 (0.15, 0.43), <.001**	**0.30 (0.24, 0.37), <.001**	0.97 (0.80, 1.17), .724
Moderate to Harmful (>3 drinks/day to >6 drinks/day)	**0.04 (0.10, 0.17), <.001**	**0.14 (0.10, 0.19), <.001**	0.98 (0.79, 1.22), .880
Cigarette smoking			
Don't smoke at all/Less than once day	Ref.	Ref.	Ref.
At least once a day	1.39 (0.84, 2.30), .201	1.11 (0.88, 1.41), .382	0.92 (0.75, 1.14), .455
Weight status			
Normal weight	Ref.	Ref.	Ref.
Underweight	**3.49 (1.57, 7.74), .003**	**2.10 (1.31, 3.35), .003**	1.59 (0.92, 2.74), .095
Overweight	0.60 (0.33, 1.10), .101	**0.62 (0.51, 0.75), <.001**	**0.84 (0.68, 1.03), .087**
Obese	0.69 (0.35, 1.6), .277	**0.43 (0.32, 0.58), <.001**	**0.77 (0.61 0.98), .030**

[a] Fathers born in Australia is the reference category

DISCUSSION

In a population-based study of over 8000 Australian families, we identified 131 fathers of likely refugee background who arrived in Australia between 1951-2007 from countries such as Afghanistan,

Iraq, Vietnam and Cambodia. Ten percent were migrant fathers from predominantly non-English speaking countries, and a further 12% were migrant fathers from English speaking countries. These proportions are somewhat under-representative of migrant families in the general Australian population. Australian Census data indicate that a quarter (24.6%) of the Australian population was born overseas, and 43% had at least one overseas born parent [45].

Approximately half the fathers of likely refugee background reported high levels of psychological distress at the symptomatic and/or clinical cut points on the K6, compared with approximately a third of fathers from non-English speaking backgrounds, and approximately one quarter of those from English speaking countries and Australian-born fathers. Fathers of likely refugee background were three to four times more likely to report psychological distress in the symptomatic and/or clinical cut points compared to Australian-born fathers. The odds were only marginally attenuated after adjusting for SEP. These findings are in line with studies reporting high rates of mental health problems for refugees [7, 23, 25], and higher than the two studies reporting on post-traumatic stress symptoms of refugee fathers [8, 27]. We also found that fathers migrating to Australia from non-English speaking countries were at elevated risk of psychological distress, with an almost twofold increase in odds of psychological distress in the symptomatic and/or clinical range compared to Australian-born fathers. We did not find any significant differences in psychological distress between fathers from English speaking countries and Australian-born fathers. Given that people fleeing their country to seek safety have experienced traumatic and often life-threatening events, [3-6] it is not surprising that fathers of refugee background reported the highest rates of psychological distress.

Refugee fathers were also more likely to rate their general health as fair to poor, and were more likely to be underweight than Australian-born fathers. Fathers from non-English speaking countries were also more likely to be underweight than Australian-born fathers. There were no significant findings for physical health conditions such as chronic pain, sight or hearing problems, or difficulty breathing. This was somewhat surprising given that some studies of refugee men more broadly have reported that they are at increased risk of musculoskeletal, respiratory, cardiovascular, and infectious diseases [4, 24, 26]. We interpret these findings with caution because prior to 2011, refugees with disabilities were excluded from Australia's Humanitarian program, and it is possible that some fathers of refugee background were reluctant to disclose chronic health issues or disabilities. Further research into the physical health of refugee fathers is critical given that many have experienced torture and trauma and difficult pre-arrival experiences.

It is also important to note that refugee and migrant fathers had some protective health behaviours. For instance, refugee fathers and those from non-English speaking countries had lower odds of light to harmful alcohol use than Australian-born fathers. Furthermore, fathers from English speaking

countries and non-English speaking countries had lower odds of being overweight or obese than Australian-born fathers.

Overall, the findings indicate that fathers of refugee background are more likely than Australian-born fathers to experience a range of psychological and general health issues. Migrant fathers of non-English speaking background also appear to experience greater psychological morbidity than Australian-born fathers. Whilst migration is likely to be a time of adjustment for all fathers born overseas, those of refugee and non-English speaking background are more likely to experience significant stressors associated with language barriers, cultural differences, and access to services that may impact on their health and wellbeing. Many migrants from English-speaking countries come to Australia on a 'skilled visa' with recognised qualifications, and are less likely to experience difficulties finding employment and adequate income.[46] This is also the case for migrants of non-English speaking background who come to study and then remain in Australia. In contrast, fathers of refugee background may have a past history of torture and other traumatic events, disrupted or limited access to education and therefore be more likely to experience prolonged periods of social and economic disadvantage after settlement. Low employment rates and low household income were observed for these fathers in our study. Understanding how these factors impact on fathers' health, wellbeing, and family relationships is important, along with a better understanding of what factors may facilitate positive outcomes in the longer term.

Strengths and limitations

To our knowledge, this is the first population-based birth cohort study in a high income country to identify and report mental and physical health outcomes for fathers of likely refugee background. The design of the study and size of the sample enabled us to compare mental and physical health outcomes and health behaviours in fathers of refugee background with Australian-born fathers and migrant fathers of non-English speaking and English speaking backgrounds. In the context of increasing global economic and forced migration, it is important for public health methods to evolve in ways that permit meaningful description of population health trends. Although no information pertaining to parental or children's visa status was collected in the Longitudinal Study of Australian Children, by combining data on fathers' country of birth and year of arrival in Australia, we were able to identify fathers of likely refugee background. This method is increasingly being used as the best proxy measure of likely refugee background.[36, 38]Whilst using this approach may have led to some misclassification of fathers of refugee background in our sample, it constitutes a reasonable approximation. Furthermore, collecting information about visa status can be problematic due to sensitivities regarding disclosure and changing status over time. Hence, even when data regarding visa starus are available, this information may not represent a gold standard measure.

Similar issues are apparent for identifying fathers from non-English speaking countries. Whilst participants were asked to report on their main language spoken at home, there was no provision made for other languages spoken at home. Accurately obtaining a picture of language spoken at home and in different contexts (i.e., between parents, between parents and children, in the community, at work), is an important but complex methodological issue. We opted to use the official language(s) of the country in which the fathers were born to distinguish between fathers from English or Non-English speaking countries. This may have led to some fathers being misclassified.

Another limitation is that families of non-English speaking backgrounds were underrepresented in LSAC, and were more likely to be lost to follow-up. The sample is likely to be representative of more socially and economically advantaged families with higher levels of English proficiency. This is likely to have resulted in the prevalence estimates of mental and physical health underestimating the true prevalence of poor health outcomes. Furthermore, non-English speaking families may have declined to participate due to lack of understanding about the study and what the information would be used for. Researchers have noted that people unaccustomed to research may be fearful, concerned, and worried about the information collected, who will have access to it and how it will be used.[47-49] Possible solutions require working in partnership with relevant community agencies to maximise inclusion of harder to reach groups and ensuring that appropriate steps are taken to address language barriers to participation, such as the use of professional interpreters and bicultural workers. Community input through consultation and engagement can inform the development of study protocols and measures to ensure cultural appropriateness and face validity. Establishing such strategies may support retention of the cohort over time.

Another limitation is that the Longitudinal Study of Australian Children necessarily employed brief measures. Although the Kessler-6 is a widely used and psychometrically sound instrument, there has been limited assessment of its appropriateness for different cultural groups.[50] Using family members to interpret may have led to under-reporting of mental and physical health problems by fathers reluctant to disclose health issues to family members. Furthermore, no information about experiences, health or wellbeing prior to arrival in Australia was collected for fathers born overseas. The conclusions drawn from this study must be considered within the context of these limitations.

Implications and conclusions

Internationally, it is estimated that 5-10% of fathers experience mental health difficulties in the early years of their children's lives [18] [21, 51, 52]. Our findings suggest that fathers of refugee background and those who have migrated from countries with different main languages to the destination country, might be particularly vulnerable to poor paternal health. These are important findings given the

small but growing body of evidence demonstrating links between fathers' mental health and their children's health, wellbeing and development [53, 54].

Building on the analyses presented in this paper, we have an opportunity to examine fathers' mental health over time, and to assess longitudinally the relationship between the mental and physical health of refugee and migrant fathers and their children's health and wellbeing. However, we are also mindful that the picture that can be obtained from longitudinal studies needs to be supplemented by qualitative research using culturally appropriate and sensitive methods to gain in depth understanding of fathers' experiences and support needs, and the longer term impacts of economic and forced migration on family functioning and wellbeing.

We recommend that future longitudinal studies take steps to increase the involvement of refugee and migrant families, and include fathers wherever possible and appropriate. To ensure adequate representation, greater attention to methods tailored to engage and identify migrant and refugee families is essential. Overcoming barriers that limit engagement and identification of 'harder to reach' populations is critical if population studies are to be a useful vehicle for informing and tailoring services to meet the needs of increasingly diverse populations in high income countries.

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COMPETING INTERESTS

We have read and understood BMJ policy on declaration of interests and declare that we have no competing interests.

CONTRIBUTORS

RG, ER, CL, DV, JY, JS, PD, LT, SC and SJB conceptualised the research questions and contributed to the interpretation of findings and identification of the implications. CL and DV identified fathers of likely refugee background in the LSAC data set using the method described. As a registered user of the

Longitudinal Study of Australian Children, RG accessed data and conducted all analyses and prepared tables. RG drafted the manuscript. All authors, in particular ER, JY, JS and SJB critically revised the manuscript.

DATA SHARING STATEMENT

The Longitudinal Study of Australian Children is funded by Australian Government Department of Social Services. Data are available to registered data users. Information about data access is provided at http://www.growingupinaustralia.gov.au/

REFERENCES

1. Migration., I.O.f. *IOM Releases Global Migration Trends 2015 Factsheet*. 2016 16.9.16]; Available from: https://www.iom.int/news/iom-releases-global-migration-trends-2015-factsheet.

2. United Nations High Commissioner for Refugees, *Global Trends. Forced displacement in 2015*. 2016, UNHCR: Geneva, Switzerland.

3. Ager, A. and A. Strang, *Understanding integration: A conceptual framework.* Journal of Refugee Studies, 2008. **2008**: p. 166-191.

4. Correa-Velez, I., A. Barnett, and S. Gifford, *Working for a better life: Longitudinal evidence on the predictors of employment among recently arrived refugee migrant men living in Australia. International Migration.* . 2013.

5. Lamb, M. and L. Bougher, *How does migration affect mothers' and fathers' roles within their families? Reflections on some recent research.* Sex Roles, 2009. **60**: p. 611-614.

6. Victorian Foundation for the Survivors of Torture, *Rebuilding Shattered Lives*. 1998, Melbourne.

7. Silove, D., et al., *Trauma, PTSD and the longer-term mental health burden amongst Vietnamese refugees : a comparison with the Australian-born population.* Social Psychiatry and Psychiatric Epidemiology, 2007. **42**: p. 467-476.

8. Vaage, A., et al., *Long-term mental health of Vietnamese refugees in the aftermath of trauma.* Br J Psychiatry, 2010. **196**: p. 122-125.

9. Dennis, C., L. Merry, and G. AJ, *Postpartum depression risk factors among recent refugee, asylum-seeking, non-refugee immigrant, and Canadian-born women: results from a prospective cohort study.* . Social Psychiatry and Psychiatric Epidemiology, 2017. **early view.**

10. Fellmeth, G., M. Fazel, and P. E., *Migration and perinatal mental health in women from low- and middle-income countries: a systematic review and meta-analysis.* . An International Journal of Obstetrics and Gynaecology, 2016. **124**: p. 742-752.

11. Brandyopadhyay, M., et al., *Life with a new baby: how do immigrant and Australian born women's experiences compare?* . Aust NZ J Public Health, 2010. **34**: p. 412-421.

12. Lansakara, N., B. S., and D. Gartland, *Birth outcomes, postpartum health and primary care contacts of immigrant mothers in an Australian nulliparous pregnancy cohort study.* Maternal and Child Health, 2010. **14**: p. 807-816.

13. Small, R., J. Lumley, and J. Yelland, *Cross-cultural experiences of maternal depression: associations and contributing factors for Vietnamese, Turkish and Filipino immigrant women in Victoria, Australia* Ethnicity and Health, 2003. **8**: p. 189-206.

14. Drysdale, H., et al., *Ethnicity and the risk of late-pregnancy stillbirth.* The Medical Journal of Australia, 2012. **197**: p. 278-281.

15. Flenady, V., et al., *Stillbirths: recall to action in high-income countries.* Lancet, 2016. **387**: p. 691-702.

16. Este, D. and A. Tachble, *Fatherhood in the Canadian context: Perceptions and experiences of Sudanese refugee men.* Sex Roles, 2009. **60**: p. 456-466.

17. Vaage, A., et al., *Paternal predictors of the mental health of children of Vietnamese refugees.* Child & Adolescent Psychiatry & Mental Health, 2011. **5**: p. 1-11.

18. Giallo, R., et al., *Father mental health during the early parenting period: Results of an Australian population based longitudinal study.* Social Psychiatry and Psychiatric Epidemiology, 2012. **47**(12): p. 1907-1916.

19. Giallo, R., et al., *Psychosocial risk factors associated with fathers' mental health in the postnatal period: Results from a population-based study.* Social Psychiatry and Psychiatric Epidemiology, 2013. **48**: p. 563-573.

20. Giallo, R., et al., *Factors associated with trajectories of psychological distress for fathers across the early parenting period: A national Australian study.* Social Psychiatry and Psychiatric Epidemiology, 2014. **49**: p. 1961-1971.

21. Paulson, J. and S. Bazemore, *Prenatal and postpartum depression in fathers and its association with maternal depression.* The Journal of the American Medical Association, 2010. **303**(9): p. 1961-1969.

22. Leach, L., et al., *Prevalence and course of anxiety disorders (and symptom levels) in men during the perinatal period: A systematic review.* Journal of Affective Disorders, 2015. **190**: p. 675-686.

23. Carlsson JM, M.E., Kastrup M., *Predictors of mental health and quality of life in male tortured refugees* Nordic Journal of Psychiatry, 2006. **60**: p. 51-57.

24. Bischoff, A., et al., *Health and ill health of asylum seekers in Switzerland: an epidemiological study.* European Journal of Public Health, 2009. **19**: p. 59-64.

25. Lie, B., *A 3-year follow-up study of psychosocial functioning and general symptoms in settled refugees.* Acta Psychiatr Scand, 2002. **106** p. 415-425.

26. Hollander, A., et al., *Longitudinal study of mortality among refugees in Sweden.* International Journal of Epidemiology, 2012. **41**: p. 1153-1161.

27. van Ee, E., et al., *Father-involvement in a refugee sample: relations between posttraumatic stress and caregiving.* Family Process, 2013. **52**: p. 723-735.

28. Riggs, E., et al., *Fatherhood in a new country: a qualitative study exploring the experiences of Afghan men and implications for health services.* Birth, 2016. **43**: p. 86-92.

29. Studies., A.I.o.F., *Longitudinal Study of Australian Children Data User Guide*. 2011, Melbourne: Australian Institute of Family Studies.

30. Daraganova, G. and M. Sipthorp, *Wave 4 weights (LSAC Technical Paper No. 9)* 2011, Australian Institute of Family Studies: Melbourne.

31. Mission, S. and M. Sipthorp, *LSAC Technical paper No. 5: Wave 2 weighting and non-response*. 2007, Australian Institute of Family Studies: Melbourne.

32. Sipthorp, M. and S. Mission, *LSAC Technical paper No. 6. Wave 3 weighting and non-response*. 2009, Australian Institute of Family Studies: Melbourne, Australia.

33. Soloff, C., et al., *LSAC technical paper No. 3: Wave 1 weighting and non-response.* . 2006, Australian Institute of Family Studies: Melbourne.

34. Soloff, C., D. Lawrence, and R. Johnstone, *Sample design (LSAC Technical Paper, No. 1)*. 2005, Melbourne: Australain Institute of Family Studies, Commonwealth of Australia.

35. Government., A. *Australian Government's Settlement Reporting Facility*. 2016; Available from: http://www.immi.gov.au/settlement/srf/

36. Gibson-Helm, M., et al., *Use of country of birth as an indicator of refugee background in health datasets.* BMC Med Res Methodol, 2014. **14**(27).

37. Yelland, J., et al., *Bridging the Gap: using an interrupted time series design to evaluate systems reform addressing refugee maternal and child health inequalities.* Implementation Science, 2015. **10**: p. 62.

38. Yelland, J., et al., *Improving the ascertainment of refugee-background people in health datasets and health services.* Australian Health Review, 2017, early view.

39. Hugo, G., *Economic, social and civic contributions of first and second generation humanitarian entrants: A final report to the Department of Immigration and Citizenship Australia*. 2011, University of Adelaide.

40. Kessler, R., et al., *Screening for serious mental illness in the general population.* Archives of Psychiatry, 2003. **60**: p. 184-189.

41. Organisation., W.H. *BMI Classifications*. 2006; Available from: http://apps.who.int/bmi/index.jsp?introPage=intro_3.html.

42. Blakemore, T., L. Strazdins, and J. Gibbings, *Measuring family socioeconomic position.* Australian Social Policy, 2009. **8**: p. 121-168.

43. Trewin, D. *Socio-economic indexes for areas, Australia 2001*. 2003.

44. White, I., P. Royston, and A. Wood, *Multiple imputation using chained equations: Issues and guidance for practice.* Statistics in Medicine 2011. **30**: p. 377-399.

45. Statistics., A.B.o., *3412.0 Migration, Australia, 2014-2015*. 2016, Australian Bureau of Statistics: Canberra.

46. Statistics., A.B.o., *3418.0 Personal Income of Migrants, Australia, Experimental, 2010-11*. 2015, Australian Bureau of Statistics: Canberra.

47. Block, K., E. Riggs, and N. Haslam, *Ethics in Research With Refugees and Asylum Seekers: Processes, Power and Politics.* , in *Values and vulnerabilities : the ethics of research with refugees and asylum seekers.* , K. Block, Riggs, E., Haslam, N. , Editor. 2013, Australian Academic Press; 2013: Queensland, Australia.

48. Ellis, B., et al., *Ethical Research in Refugee Communities and the Use of Community Participatory Methods.* Transcult Psychiatry, 2007. **44**: p. 459-481.

49. Riggs, E., et al., *Promoting the inclusion of Afghan women and men in research: reflections from research and community partners involved in implementing a 'proof of concept.'.* Int J Equity Health, 2015. **14**: p. 13.

50. Stolk, Y., I. Kaplan, and J. Szwarc, *Clinical use of the Kessler psychological distress scales with culturally diverse groups.* Int J Methods Psychiatr Res., 2014. **23**: p. 161-183.

51. Liu, C.H., et al., *U.S. parents with mental health problems: Parenting experiences and children's functioning.* . Archives of Psychiatric Nursing, 2016. **30**: p. 753-760.

52. Paulson, J., S. Dauber, and J. Leiferman, *Individual and combined effects of postpartum depression in mothers and fathers on parenting behavior.* Pediatrics, 2006. **118**: p. 659-668.

53. Fletcher, R.J., et al., *The effects of early paternal depression on children's development.* The Medical Journal of Australia, 2011. **195**(11-12): p. 685.

54. Ramchandani, P. and L. Psychogiou, *Paternal psychiatric disorders and children's psychosocial development.* Lancet, 2009. **374**(9690): p. 646-653.

STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology*

Checklist for cohort, case-control, and cross-sectional studies (combined)

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any pre-specified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	6
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	n/a
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	*7-8*
Bias	9	Describe any efforts to address potential sources of bias	6
Study size	10	Explain how the study size was arrived at	6-7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8-9
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8-9
		(*b*) Describe any methods used to examine subgroups and interactions	7-9
		(*c*) Explain how missing data were addressed	9
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed	n/a

		Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	n/a
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9
		(b) Give reasons for non-participation at each stage	9
		(c) Consider use of a flow diagram	n/a
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	9-11
		(b) Indicate number of participants with missing data for each variable of interest	14
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	n/a
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary measures	15, 17
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	16,18
		(*b*) Report category boundaries when continuous variables were categorized	15-17
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	n/a
Discussion			
Key results	18	Summarise key results with reference to study objectives	18-19
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	20
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	21
Generalisability	21	Discuss the generalisability (external validity) of the study results	21
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	22

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.
Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.