Avant Life Insurance

Of all the life insurance providers we looked at, only 4 made our LIST.

Finding the right life insurance can be time consuming, full of fine print, confusion and uncertainty. So, to make life easier, Avant looked at leading life insurance providers and came up with a list of 4 whose life policies, features and benefits we think doctors will value.

Dr Sofia Ambreen
General practitioner, NSW

THE DOCTORS'
LIST
LIFE INSURANCE SELECTION TOOL

The LIST makes Life easy for doctors.

The LIST, designed for doctors, is an Avant comparison tool that puts a curated list of life insurance providers at your fingertips. Simply compare policies and consider whether one is right for you.

It's fast, easy and you can apply by phone – we take care of the rest.

Compare, select, apply.

Call for the LIST on 1800 128 268
or visit avant.org.au/life

Avant
By doctors for doctors

Aust N Z J Obstet Gynaecol 2019; 59: 157–160

ANZJOG

DOI: 10.1111/ajo.12842

SHORT COMMUNICATION

A clinical audit of combined first trimester screening and non-invasive prenatal testing offered to pregnant women in a regional Australian hospital

Orit Abdalla[1,2], Cindy Woods[3] and Caroline de Costa[1]

[1]James Cook University College of Medicine, Cairns, Queensland, Australia

[2]Obstetrics and Gynaecology Department, Cairns Hospital, Cairns, Queensland, Australia

[3]School of Health, University of New England, Armidale, New South Wales, Australia

Correspondence: Dr Orit Abdalla, James Cook University College of Medicine, James Cook University, Cairns Clinical School, Cairns Hospital, Cairns, Queensland, Australia.
Email: orit.abdalla@my.jcu.edu.au

Conflicts of Interest: The authors report no conflicts of interest.

Received: 19 February 2018;
Accepted: 24 May 2018

The records of women attending a large Australian regional hospital for antenatal care were retrospectively analysed to determine what proportion had undergone or been offered first trimester screening for fetal abnormalities; only 609 (54%) of 1114 women had undergone or been offered screening. Younger women, multiparous women and women living in rural Australia were less likely to be offered screening. Barriers to screening and solutions for overcoming these need to be identified to improve access and equality in antenatal screening for all women.

KEYWORDS

first pregnancy trimester, general practitioners, prenatal care, prenatal diagnosis, Queensland

Over the past 30 years, prenatal screening programs using both ultrasound and biochemical markers have been developed to predict the risk of Down syndrome and other fetal chromosomal anomalies, prior to considering invasive testing for fetal karyotyping.[1–6] The current recommendation from the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) is that screening for Down syndrome and other aneuploidies should be offered to all pregnant women, and in Australia such screening is subsidised by Medicare.[7]

Current programs in Australia use combined first trimester screening (CFTS) which includes maternal age, ultrasound measurement of fetal nuchal translucency and sometimes other markers, and maternal serum marker levels (β human chorionic gonadotropin plus pregnancy-associated plasma protein A) to provide an overall risk for trisomy 21 and other aneuploidies.[6,7] Second trimester triple serum screening (STSS) is available free of charge in certain hospitals when a woman has booked too late for CFTS.[8] Non-invasive prenatal screening (NIPT) using cell-free fetal DNA (cfDNA) became commercially available in Australia in 2012. NIPT, which is significantly more sensitive than CFTS, especially in regard to Down syndrome, is not currently subsidised by Medicare and involves a direct cost to women of several hundred dollars.[9]

Concerns have frequently been expressed that access to screening, and to information about screening, has not been equal for all pregnant women in Australia.[2–6,8,10]

Cairns Hospital (CH) provides public antenatal care for women from Far North Queensland (FNQ), a vast region stretching from Innisfail to Thursday Island; much of the population lives in rural or remote areas. There are around 2600 births annually in the hospital. Antenatal care is provided at the hospital and by general practitioners (GPs) in Cairns, and by midwives and doctors at smaller maternity units or health centres in the region. Women wanting CFTS or NIPT must request this from the health professional at an initial visit in the first trimester, and be able to attend both a laboratory and an ultrasound service in a timely manner in order to access screening. Anecdotally, staff at CH are aware that many women do not access first trimester screening.

In 2017 we analysed the medical records of all women giving birth over a six months period to determine what proportion had undergone prenatal screening during pregnancy.

METHODS

Ethics approval was granted by the FNQ Human Research Ethics Committee (HREC) and the James Cook University (JCU) Research Ethics Committee (approval number HREC/17/QCH/39).

Data were collected via the Queensland Health electronic pregnancy record on ieMR. Specific data regarding first trimester screening, age, parity and geographical classification of 1114 participants were collected between 1 July and 31 December, 2016.

Women 'offered' the screening were those who had documentation available electronically to state that CFTS or NIPT was discussed or their test results were accessible. This information was gathered from referral letters from GPs, midwives and doctors at smaller maternity units or health centres in the Cairns region as well as electronically documented progress notes during antenatal care clinics in CH. Those who declined the test were included in the 'offered' group. The group that were 'not offered' CFTS or NIPT were women who had no documentation or evidence to state the test was discussed or performed.

Data was entered into SPSS v23 (IBM SPSS, Armonk, NY, USA). Age, location and parity were compared based on whether prenatal screening was or was not offered using χ^2 tests and Mann–Whitney *U*-tests. Significant variables were included in a logistic regression model to examine predictors of prenatal screening. The model contained three independent variables (age, location and parity). The dependent variable was prenatal screening coded as 0 = not offered and 1 = offered. Independent variables included: age groups with <18 years as the reference category, location coded as 0 = rural (reference category) and 1 = urban, and parity, a continuous variable with P0 as the reference category. Preliminary analyses were conducted to check the assumptions of multicollinearity were not violated. Tolerance values were above 0.1 and variance inflation factor was well below 10.

RESULTS

A total of 1114 women gave birth in CH in the study period. Of these, 609 (54%) were 'not offered' prenatal screening.

The demographic characteristics of those who were and were not offered prenatal screening were compared (Table 1). There were significant differences between the two groups. All three independent variables (age, location and parity) were statistically and clinically significant and were included in the regression model (Table 2).

Direct logistic regression was performed to assess the impact of age, location and parity on the likelihood that prenatal screening would be offered. The logistic regression model was statistically significant, χ^2 (7, N = 1114) = 209.65, P < 0.001, and explained between 17.2% and 22.9% of the variance in offer of prenatal screening.

The results show that as age increases, women are increasingly likely to be offered prenatal screening (Table 2). The strongest

TABLE 1 Demographic characteristics of sample (***n*** (%))

Characteristic	Fetal screening not offered	Fetal screening offered*	Total	*P*-value
Age in years†				<0.001
<18	16 (2.6)	5 (1.0)	21 (1.9)	
18–24	216 (35.5)	68 (13.4)	284 (25.5)	
25–30	200 (32.9)	170 (33.6)	370 (33.2)	
31–35	130 (21.4)	155 (30.6)	285 (25.6)	
36–40	40 (6.6)	90 (17.8)	130 (11.7)	
41+	6 (1.0)	18 (3.6)	24 (2.2)	
Location†				<0.001
Rural	247 (40.6)	134 (26.5)	381 (34.2	
Urban	362 (59.4)	372 (73.5)	734 (65.8)	
Parity‡				<0.001
P0	67 (11.0)	61 (12.1)	128 (11.5)	
P1	203 (33.3)	210 (41.5)	413 (37.0)	
P2	155 (25.5)	138 (27.3)	293 (26.3)	
P3	74 (12.2)	71 (14.0)	145 (13.0)	
P4	50 (9.9)	20 (4.0)	70 (6.3)	
P5+	60 (9.9)	6 (1.2)	66 (5.9)	

*Approximately ten women were offered non-invasive prenatal screening, in some cases as second-tier screening, the remainder were offered combined first trimester screenng.
†χ^2 test.
‡Mann–Whitney *U*-test.

TABLE 2 Factors associated with fetal anomaly screening – logistic regression

Variables	β	Wald	aOR	95% CI for OR		*P*-value
				Lower	Upper	
Age <18 (Ref)						
Age 18–24	0.26	0.23	1.29	0.45	3.71	0.631
Age 25–30	1.49	7.86	4.44	1.57	12.59	0.005
Age 31–35	1.91	12.69	6.77	2.36	19.39	<0.001
Age 36–40	2.84	25.11	17.19	5.65	52.33	<0.001
Age 41+	3.31	20.57	27.46	6.56	114.93	<0.001
Rural location (Ref)						
Urban location	0.60	72.58	1.82	1.38	2.41	<0.001
Parity	-0.49	4.95	0.61	0.55	0.69	<0.001

aOR, adjusted odds ratio.

predictor of offer for prenatal screening was older age: age groups 36–40 (odds ratio (OR) = 17.19), and 41+ years (OR = 27.46). This indicates that women in the 36–40 years age group and women in the 41+ years age group were 17 and 27 times (respectively) more likely to be offered prenatal screening than women aged <18 years, controlling for all the other factors in the model.

In addition, women residing in urban locations were nearly twice as likely (OR = 1.82) to be offered prenatal screening than women residing in rural locations. Multiparous women were less likely to be offered screening: increasing parity meant decreasing likelihood of screening. For each additional child, women were 0.61 times less likely to be offered prenatal screening (OR = 0.61).

DISCUSSION

A 2007 study looked at population-based trends in Down syndrome birth rates in Queensland, 1990–2004, comparing rates by rurality and antenatal care provider (public or private) before and after the introduction of CFTS from 2000 onward.[6] Results showed a marked fall in maternal age-adjusted rates of Down syndrome births among women living in urban areas and women receiving private antenatal care but not among women living in rural areas or those receiving public antenatal care. The authors suggest unequal access to screening tests as the most likely cause for these differences.

Several other studies since 2007 have shown low participation rates in prenatal screening programs across Australia, with Aboriginal women, younger women, women of higher parity and women from remote areas more likely not to have been screened.[2,10]

More recently, a study from Western Sydney compared women who had a diagnosis of Down syndrome made antenatally with those whose diagnosis was made in the neonate;[8] 25% of women in whom the diagnosis was made after birth had not been offered screening despite attending their GPs in the first trimester, or the hospital antenatal clinic, where second trimester serum screening is offered free of charge. Nearly 70% of these women not offered screening were aged <30 years, compared to just 20% of those who were offered screening.

In 2015, Robson and Hui demonstrated a significant decrease in the number of invasive diagnostic procedures (chorionic villous biopsy and amniocentesis) nationally following the introduction of NIPT,[11] and in 2018 Hui *et al.* reported their analysis of population-based data from Victoria, demonstrating significant disparities in screening indications (CFTS, STSS or NIPT) for invasive testing, according to socioeconomic region.[12] In particular, women from the most advantaged regions were more likely to have sought invasive testing as a result of NIPT than women from disadvantaged regions. These authors note that data from other countries have demonstrated definite advantages where NIPT has been made available to all women.

Our study demonstrated that in our large region of Australia younger women, those living rurally and women of increasing parity are less likely to be offered screening. Unplanned pregnancies in younger women may result in late presentation for antenatal care, and assumptions may be made by healthcare workers that screening for younger women is unnecessary due to the overall low risk of abnormalities. Women of higher parity or their healthcare providers may assume previous deliveries of normal children or previously normal CFTS/NIPT results imply a low risk result for their current pregnancy; women with a history of several low-risk pregnancies may also present late for antenatal care and may also have difficulty accessing ultrasound services. CFTS involves the input of trained sonographers; for women living in rural locations, access to such services may be limited. Our findings indicate the importance of identifying barriers and potential solutions to improve access and equity in screening both in FNQ and nationally.

Limitations to our study included possible lack of documentation and absent information: a small number of women who were documented as receiving 'minimal antenatal care' with no evidence of screening in their electronic files were included in the 'not offered' group, while women transferred from rural and remote regions with obstetric emergencies sometimes

arrived with paper medical files which may not always have been fully transferred onto ieMR. However, most women from regional centres have fully documented antenatal notes and can reasonably be assumed to have either presented too late for screening or not to have been offered it. The wide 95% confidence intervals for those aged 41+ is likely due to the small sample size in this age group.

CFTS is more time-consuming and less sensitive than NIPT and is less accessible to rural women. The UK has commenced introducing NIPT within the National Health Service, offering it to women considered at high risk of having fetal aneuploidy, with the idea of moving to universal screening.[13,14] Offering NIPT to all Australian women as publicly funded screening would appear to have a number of advantages in terms of the need for a single maternal blood test, the high sensitivity of NIPT and decreasing need for invasive tests; for women in regional Australia it would also mean greater ease of access to testing, and less need to travel for diagnostic testing.[15] We believe the results of our study may help in the debate around the introduction of NIPT into public antenatal care in Australia.

ACKNOWLEDGEMENTS

We would like to thank Dr. Samantha Scherman, Ms Nerissa Ward and the staff of the antenatal clinic at Cairns Hospital for their help.

REFERENCES

1. O'Leary PC, Bower C, Crowhurst J, *et al.* The impact of maternal serum screening for Down syndrome in Western Australia 1980-94. *Aust N Z J Obstet Gynaecol* 1996; **36**: 385–388.
2. O'Leary P, Breheny N, Reid G, *et al.* Regional variations in prenatal screening across Australia: stepping towards a national policy framework. *Aust N Z J Obstet Gynaecol* 2006; **46**(5): 427–432.
3. Lawrence K, Crowther C. Survey of current prenatal screening for Down syndrome in Australian hospitals providing maternity care. *Aust N Z J Obstet Gynaecol* 2003; **43**: 222–225.
4. Wallace EM. Down syndrome screening in Australia: more luck than choice. *Aust J NZ J Obstet Gynaecol* 2006; **46**(5): 370–371.
5. Rowe H, Fisher J, Quinlivan J. Are pregnant Australian women well informed about prenatal genetic screening? A systematic investigation using the multidimensional measure of informed choice. *Aust N Z J Obstet Gynaecol* 2006; **46**(5): 433–439.
6. Coory M, Roselli T, Carroll H. Antenatal care implications of population-based trends in Down syndrome birth rates by rurality and antenatal care provider, Queensland, 1990-2004. *Med J Aust* 2007; **186**(5): 230–234.
7. HGSA/RANZCOG Joint Committee on Prenatal Diagnosis and Screening. *Prenatal Screening And Diagnosis Of Chromosomal And Genetic Conditions In The Fetus In Pregnancy*. Melbourne: RANZCOG, 2015. Available from URL www.ranzcog.edu.au/Statements-Guidelines/C-Obs59 accessed 1/12/2017
8. Moses R, Brown J, Wright D, *et al.* Who is and isn't having Down syndrome babies in western Sydney: a 10-year tertiary hospital cohort study. *Aust N Z J Obstet Gynaecol* 2017; **57**(2): 146–151.
9. Dickinson JE, de Costa CM. Non invasive prenatal testing: the new era in reproductive medicine. *Med J Aust* 2015; **203**(2): 57–58.
10. Maxwell S, Brameld K, Bower C, *et al.* Socio-demographic disparities in the uptake of prenatal screening and diagnosis in Western Australia. *Aust N Z J Obstet Gynaecol* 2011; **51**: 9–16.
11. Robson S, Hui L. National decline in invasive prenatal diagnostic procedures in association with uptake of combined first trimester and cell-free DNA aneuploidy screening. *Aust N Z J Obstet Gynaecol* 2015; **55**: 507–510.
12. Hui L, Barclay J, Poulton A, *et al.* Prenatal diagnosis and socioeconomic status in the non-invasive prenatal testing era: a population-based study. *Aust N Z J Obstet Gynaecol* 2018; 58(4): 404–410.
13. Chitty LS, Wright D, Hill M, *et al.* Uptake, outcomes and costs of implementing non-invasive prenatal testing for Down's syndrome into NHS maternity care: prospective cohort study in eight diverse maternity units. *BMJ* 2016; **354**: i3426.
14. Boseley S. NHS to offer safer Down's syndrome test to pregnant women. Available from URL www.theguardian.com/society/2016/safer-downs-syndrome-test-nhs-pregnant-women-nipt accessed 7/2/2018
15. Rieder W, White S, McGillivray G, Hui L. Contemporary prenatal aneuploidy screening practice in Australia: frequently asked questions in the cell-free DNA era. *Aust NZ J Obstet Gynaecol* 2018; **58**(4):397-403.