Parental knowledge of prematurity and related issues

Ling Z J, Lian W B, Ho S K Y, Yeo C L

ABSTRACT

Introduction: Current medical advances have increased the survival rate of the premature infant with its complications. Risk factors for prematurity include maternal diabetes mellitus, hypertension, smoking and alcohol intake.

Methods: A true/false questionnaire survey focusing on risk factors, outcomes/follow-up and costs was administered to adults attending a parenting-related public forum. One point was awarded per correct answer. Entire prematurity knowledge and section T-scores were calculated, (a pass mark was defined as at least 50 percent for each T-score). Missing answers and affected T-scores were considered invalid.

Results: There were 81 respondents: predominantly within 21–40 years of age, Chinese, female, public-housing dwellers, first-time parents-to-be and with graduate or higher-level qualifications. A pass in entire and prematurity knowledge T-scores was achieved in 69 percent (median 13 [range 3–21]) and 62 percent (median 12 [range 0–19]) respectively. A pass in section T-scores on risk factors, outcomes and costs was achieved in 62, 53 and 75 percent, respectively. Awareness of risks and outcomes did not correlate with awareness of costs. Logistic regression did not reveal any factors contributing to a pass or higher T-scores.

Conclusion: Although the majority achieved a pass in all T-scores, general knowledge among this childbearing group was deemed inadequate by the median scores. As survival improves, awareness of prematurity and its risks has to be improved, with a target to reduce the incidence of prematurity and to support those infants who require resource-intensive follow-up.

Keywords: antenatal care, infants, neonatal risk factors, parental knowledge, preterm labour

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Department of Neonatal and Developmental Medicine, Singapore General Hospital, Outram Road, Singapore 169608

Ling ZJ
Medical Student

Lian WB, MBBS, MMed, MRCP
Consultant

Ho SKY, MBBS, MMed, MRCPCH
Consultant

Yeo CL, MBBS, MMed, FAMS
Senior Consultant and Head

Correspondence to:
Dr Lian Wee Bin
Tel: (65) 6321 4597
Fax: (65) 6227 3670
Email: lian.wee.bin@sgh.com.sg

INTRODUCTION

The premature infant is defined as a child born earlier than 37 completed weeks of gestation. In Singapore, it is estimated that the overall proportion of premature births is 10%–12%.[1] Earlier reports have revealed that overall preterm births constituted 3.6% of the total births in the late eighties and early nineties.[2] Survival of extremely low birth weight (ELBW) infants is now close to 100% for babies approaching 1,000 g.[3] As medical technology advances and specialist care improves, more premature infants are being born and the cut-off gestation for survival from the preterm infant has also been lowered to 22 weeks over the years.[4,5] More preterm infants are surviving, some with significant morbidities such as cerebral palsy, chronic lung disease and visual or hearing impairment.[6-8] The premature infant faces greater challenges in adapting to the extrauterine environment, and multiple interventions are therefore required to reduce mortality and such morbidities, often resulting in high costs and a significant financial burden on the family.

Prevention of prematurity is the key to management, which can be done by addressing some common risk factors such as smoking, alcohol intake, diabetes mellitus (DM) and hypertension, factors that are relatively prevalent in Singapore.[9] Among the many medical conditions, hypertensive disorders commonly occur during pregnancy,[10] while preterm delivery occurs in up to 25% of those with pre-pregnancy DM.[11] Recent reports have also revealed a rising trend in alcohol intake as well as smoking among Singaporean youths,[12] who will form a large majority of childbearing females over the subsequent years. Thus, it was deemed important to examine the level of public knowledge with regard to such risk factors as well as the outcomes related to prematurity. Therefore, this survey was conducted with the intention of assessing parental knowledge of risk factors for preterm labour, the issues associated with prematurity both in the short term and the long term, and the costs incurred. This will enable an assessment of the need to promote awareness on these issues, with the aim of improving antenatal care and reducing the incidence of prematurity.

METHODS

Questionnaires were distributed prior to the start of

a seminar given in English on pregnancy care, child development and parenting. The questionnaire comprised two parts administered in English, with demographical data being collected in the first part. Age categories were classified into younger (age < 30 years) and older (age ≥ 30 years). Public housing was defined as either Housing Development Board (HDB) flat or executive condominium, both being governmental housing schemes. Chinese vs. non-Chinese groups were used for further racial grouping analysis. Higher education was defined as the attainment of at least diploma qualifications. Knowledge was assessed in the second part, which was subdivided into three sections (A, B and C) on risk factors, outcomes and costs. True-false questions were administered, with one point given for every correct answer. The answer option "Don't know" was made available for all true-false questions and was treated as an incorrect answer in the analysis, as it was deemed to be indicative of a knowledge deficit. Correct answers to set questions were determined based on current clinical knowledge and expert opinion established by neonatal consultants in this department. To avoid a knowledge bias, questions were unrelated to the seminar topics. The questionnaires were collected after the seminar.

For Section A, knowledge on risk factors predisposing towards preterm labour was studied and the Section A T-score was generated from the correct answers to the five questions. A blank response for any question in that section would render that section T-score invalid for that participant. For Section B, knowledge on the potential problems associated with the preterm infant was tested. This section was subdivided into questions related to short-term and long-term complications. The scoring was then done as for Section A. T-scores for Sections A and B were combined for a prematurity knowledge T-score. Section C assessed knowledge on the cost of care with two questions. The entire T-score was computed from the sum of the Section A T-score, Section B T-score and Section C T-score. A pass would be awarded if the T-score was more than 50%. This applied to both section T-scores and prematurity knowledge and entire T-scores. Invalid T-scores were excluded from the analysis of means and medians, and the comparison of data.

Data was analysed using a computer-based software package, the Statistical Package for the Social Sciences version 10.0 (SPSS Inc, Chicago, IL, USA). Medians were used to describe continuous variables that were not normally distributed. A comparison of skewed data was done using non-parametric tests, such as the Kruswal-Wallis and Mann-Whitney tests. Categorical variables were compared using Pearson's chi-square test and Fisher's exact test (when cell frequency < 5). For categorical analysis, further groupings as indicated in earlier definitions were carried out to study the impact of demographical factors. A p-value < 0.05 was deemed significant. Logistic regression was used to assess the relationships between T-scores as well as pass/fail status and gender, race, age, education, socioeconomic status and number of children.

Table I. Study population demographics (n = 81).

Demographics	No. (%)
Age (years)	
< 21	0 (0)
21–30	27 (33.3)
31–40	49 (60.5)
> 40	5 (6.2)
Gender	
Male	30 (37.0)
Female	51 (63.0)
Race	
Chinese	68 (84.0)
Malay	7 (8.6)
Indian	3 (3.7)
Others	3 (3.7)
Housing type	
HDB* flat	58 (71.6)
Executive condominium	7 (8.6)
Private apartment	11 (13.6)
Landed housing	5 (6.2)
Highest educational qualification	
Postgraduate	8 (9.9)
University	42 (51.9)
Polytechnic	10 (12.3)
Diploma	9 (11.1)
College / pre-university	2 (2.5)
Secondary	6 (7.4)
Primary	1 (1.2)
Others	3 (3.7)
Number of children	
0	67 (82.7)
1	13 (16.0)
3	1 (1.2)
Previous premature children	0 (0)

*Housing Development Board flat: a form of subsidised government housing.
For analysis of housing, HDB flats and executive condominiums were counted as public housing.

RESULTS

A total of 81 out of 98 participants returned the survey forms, giving a response rate of 82.7%. Table I shows the demographical information of those surveyed. Respondents were predominantly female, Chinese and public-housing dwellers. The majority had achieved educational qualifications of polytechnic diploma or above. More than 80% did not have any children yet. Among those with a valid entire T-score (72% of surveyed subjects), a pass was achieved by 69% (Table II). The median score was 13 (range 3–21) with a mode score of 19. It is noted that a 100% pass rate among all non-Chinese subjects compared significantly with a 64% pass rate among Chinese subjects. Also, those with children achieved a significantly higher

Table II. Relationship between entire T-scores, pass rates and demographic characteristics (n = 58).

Characteristic	Total no.	Pass		T-score	
		No. (%)	p-value	Median (range)	p-value
Age group					
Younger	18	11 (61)	0.386	12 (3–21)	0.458
Older	40	29 (73)		13 (3–20)	
Gender					
Male	23	16 (70)	0.936	14 (3–20)	0.473
Female	35	24 (69)		12 (3–21)	
Race					
Chinese	50	32 (64)	0.048	13 (3–20)	0.155
Non-Chinese	8	8 (100)		15 (11–21)	
Housing type					
Public housing	45	28 (62)	0.046	12 (3–21)	0.031
Non-public housing	13	12 (92)		16 (10–20)	
Highest educational qualification					
Regular education	7	5 (71)	1.000	15 (3–19)	0.640
Higher education	51	35 (69)		13 (3–21)	
Any children?					
No	48	31 (65)	0.150	13 (3–20)	0.027
Yes	10	9 (90)		17 (9–21)	

Table III. Relationship between prematurity knowledge, T-scores, pass rates and demographic characteristics (n = 76).

Characteristic	Total no.	Pass		T-score	
		No. (%)	p-value	Median (range)	p-value
Age group					
Younger	24	13 (54)	0.349	11 (1–19)	0.316
Older	52	34 (65)		12 (0–19)	
Gender					
Male	29	18 (62)	0.974	12 (0–19)	0.752
Female	47	29 (62)		11 (1–19)	
Race					
Chinese	65	39 (60)	0.517	12 (1–19)	0.734
Non-Chinese	11	8 (73)		12 (0–19)	
Housing type					
Public housing	60	33 (55)	0.021	11 (0–19)	0.026
Non-public housing	16	14 (88)		15 (6–19)	
Highest educational qualification					
Higher education	11	8 (73)	0.517	12 (2–19)	0.347
Regular education	65	39 (60)		11 (0–19)	
Any children?					
No	63	36 (57)	0.114	11 (0–19)	0.118
Yes	13	11 (85)		13 (3–19)	

entire T-score compared to those without. A pass in entire T-score was achieved among 62% of those who lived in public housing compared to 92% of those who lived in non-public housing. This difference was statistically significant. The latter group also achieved a significantly higher entire T-score. Among those with a valid prematurity knowledge T-score, the pass rate was 61.8% with a median score of 12 (range 0–19) and a mode score of 12 (Table III). Those who lived in public housing fared significantly differently from those in non-public housing, achieving both a lower prematurity knowledge pass rate as well as a lower prematurity knowledge T-score. There was also a notable trend, though not adequately statistically significant, towards a higher prematurity knowledge pass rate and a higher prematurity knowledge T-score between those with and without children.

Section A (Table IV) tested for knowledge on risk factors predisposing to preterm delivery. A pass in the Section A T-score among those with valid scores was achieved by 62%, with the median being 3 (range 0–5) and the mode being 4. The majority of participants did not know that preterm delivery could be caused by DM in pregnancy not requiring treatment with medication. Smoking and alcohol were known by the majority of the participants to cause preterm labour. There were no significant differences in pass rates or T-scores among different demographic groups for Section A.

Section B (Table V) evaluated knowledge on problems that premature babies were more likely to face, in both the short- and long-term, as well as outcomes of premature births. A pass in the Section B T-score was obtained by 53.2%. The median score was 8 (range 0–15) and the

Table IV. Section A of the questionnaire on risk factors for prematurity.

Question	No. of valid responses	No. (%) of correct responses
1. If a pregnant woman has high blood pressure, it may result in premature delivery even when well controlled. (T)	81	41 (50.6%)
2. If a pregnant woman has diabetes mellitus, she only needs to be concerned about it causing early delivery if she is on medication for control of diabetes mellitus. (F)	81	30 (37.0%)*
3. If a pregnant woman has persistent high fever but feels otherwise well, it is safe to watch the fever and give herself panadol, as it is unlikely to affect the unborn child. (F)	80	50 (62.5%)
4. Smoking during pregnancy may potentially result in preterm delivery. (T)	80	73 (91.3%)
5. Alcohol intake during pregnancy does not result in preterm delivery. (F)	80	53 (66.2%)

* denotes correct response that fell below 50%.

Table V. Section B of the questionnaire on short- and long-term outcomes for preterm infants.

Question	No. of valid responses	No. (%) of correct responses
1. The following are short-term problems that a premature baby is more likely to have:		
(a) Difficulty keeping warm (T)	80	51 (63.7)
(b) Difficulty breathing (T)	80	62 (77.5)
(c) Bleeding in the brain (T)	80	22 (27.5)*
(d) Weaker resistance to infections (T)	80	67 (83.8)
(e) Potential eye problems (T)	80	37 (46.3)*
(f) Difficulty feeding (T)	80	28 (35.0)*
2. The following are long-term problems that a premature baby is more likely to have:		
(a) Muscle tightness and motor delay (T)	79	40 (50.6)
(b) Speech and language delay (T)	79	40 (50.0)
(c) Learning difficulty (T)	80	37 (46.3)*
(d) Hearing problems (T)	80	33 (41.3)*
(e) Visual problems (T)	80	33 (41.3)*
(f) Attention deficits (T)	80	34 (42.5)*
3. Babies born premature require long-term follow-up for several years even if they are healthy and physically well. (T)	79	39 (49.4)*
4. Babies who are born earlier than seven months of pregnancy do not have a chance of survival. (F)	78	44 (56.4)
5. Babies who are born earlier than seven months can be healthy. (T)	78	45 (57.7)

* denotes correct responses that fell below 50%.

mode, achieved by a large majority, was 14. Section B1 assessed knowledge on the short-term problems that premature babies were more likely to face. A pass in the Section B1 T-score was obtained by 73.8%, with a median of 4 (range 0–6) and a mode of 6. A large proportion of the participants did not know that premature babies could suffer from bleeding in the brain, eye problems and difficulty with feeding.

Section B2 evaluated knowledge on long-term problems that premature babies are more likely to face. A pass in the Section B2 T-score was achieved by 50.6%, with a median of 3 (range 0–6) and a mode of 0. Only two questions in this section received correct answers from the majority, viz. the questions on muscle tightness and motor delay, and on speech and language delay. The Section B2 T-score was distributed at two extremes, with 35.4% scoring 0 and 27.8% scoring full marks. Those who scored full marks for Section B2 were also likely to have scored at least 4 marks in Section B1. There were 13 participants who achieved a full score for Sections B1 and B2. The other three questions in Section B tested for general knowledge on the survival and health of premature infants, as well as the need for long-term follow-up. Notably, almost half of the participants did not know that even apparently healthy premature babies required long-term follow-up for several years. Similar to the entire and prematurity knowledge T-score trends, those living in public housing scored significantly lower for the Section B T-score (median 7 [range 0–15]) as compared to those living in non-public housing (median 12 [range 3–15]) ($p = 0.01$). However, the former did not achieve a significantly lower pass rate in this section.

Section C (Table VI) tested for knowledge of hospital room charges and total costs per day, and comprised only two questions. The participants were unfamiliar with the unsubsidised room charges of a day's stay in NICU, with 45.9% knowing that the room charges were more than $400 a day. A pass T-score was still achieved by 75.4%. Logistic regression, looking at the impact of the age

Table VI. Section C of the questionnaire on costs incurred in the care of preterm infants.

Question	No. of valid responses	No. (%) of correct responses
1. The full, unsubsidised cost of stay in the neonatal intensive care unit (room charges per day) is usually > $400. (T)	61	28 (45.9%)*
2. The full, unsubsidised cost of stay in the neonatal intensive care unit (all charges including room, investigations and treatment charges) may exceed $1,000 per day. (T)	77	42 (54.5%)

* denotes correct response that fell below 50%.

category, gender, race, type of housing, educational level or having had previous children, did not reveal any factors that significantly increased the chances of getting a pass or a higher score in the entire T-score, prematurity knowledge T-score, Sections A, B or C T-scores.

DISCUSSION

In the last decade, the survival of low birth weight (LBW) infants has improved significantly.[13,14] Parental educational levels have also improved and with this, increased awareness of both short- and long-term complications of prematurity. Nevertheless, few parents are prepared for the event of prematurity in their own pregnancies, physically, emotionally, mentally as well as financially. While emotional social support can be provided to a significant extent at many levels from hospital to home, the journey through the initial hospitalisation is often a roller-coaster ride. In addition, financial support is often limited and the family will have to dip into their savings. Furthermore, the premature infant may require intensive intervention, not only in the neonatal period, but for as long as the child lives. With this in mind, it was deemed important that the general public, especially the parents-to-be, should have basic knowledge of both the risks of preterm delivery as well as the risks of and the costs involved in the care of the premature infant.

The cohort of survey participants was a select cohort with high motivation, as evidenced by their voluntary signing up for the pregnancy and child health seminar. The cohort was a heterogeneous population with a good correlation to the target population whom the authors wanted to assess,[15] viz. the Singaporean population of child-bearing age and their partners. The majority of the survey population were similar to the profile of the older Singaporean child-bearing woman in their being older than 30 years of age and dwelling in public housing. However, the cohort was not representative of the target population with regard to ethnicity, with the surveyed population being overwhelmingly Chinese, making up 84%. This cohort was also more educated than the Singaporean population, with two-thirds having at least graduate qualifications.

The overall knowledge on the topic of prematurity was fair, with about two-thirds achieving a pass in entire T-scores as well as prematurity T-scores. However, the respective median scores of 13 out of a possible 23, and 12 out of a possible 21, showed the presence of deficits, even in this majority tertiary-educated population. These scores are certainly not adequate for a group that should be well read and should have been reached by the campaigns organised by the various governmental ministries and medical organisations over the years. Possibly, this could be explained by the fact that the majority were public-housing dwellers, who tended to have lower scores than those who lived in non-public housing. However, logistic regression did not reveal any significant factors, including type of housing, as a significant factor contributing to higher T-scores or a pass. Therefore, it is clear that deficits in knowledge do exist. More collaboration among the various ministries must thus be achieved and better systematic outreach be planned in order to reach the masses, especially those in the child-bearing age group, the public-housing dwellers as well as those planning for their first pregnancies. Methods can involve public campaigns on a nationwide scale, community drives at the grassroots level, seminars for target group involvement and mass media publicity.

In looking at their knowledge on specific risk factors (Section A), the authors chose the more common medical conditions of hypertension and DM, as well as the social risks of smoking and alcohol consumption. Maternal fever during pregnancy was also included, as that was a common problem during pregnancy, sometimes of innocuous cause and sometimes of great medical impact. Hypertension, a well-known risk factor for preterm labour, has a prevalence of 20.4% in Singapore among the female population aged 30–69 years.[16] More specifically, the prevalence of hypertension reported in the National Health Survey carried out in 2004 (NHS04) among those aged 30–39 years, which comprises two-thirds of our study cohort, is 4.6%. Hypertension is also known to complicate 6% of pregnancies beyond 20 weeks' gestation,[17] a condition known as pregnancy-induced hypertension (PIH). PIH-preeclampsia is the most common medical complication of pregnancy with a reported incidence of 6%–10%.[5] The majority of cases occur in healthy nulliparous women with a reported incidence in this group of 10%–12%.[18,19] In the United States, physicians deliver approximately

15% of women with mild PIH between 34 and 36 weeks' gestation.[10] In other academic centres, preterm delivery in mothers with PIH ranges from 5.3% to 7.0%.[19] The average amount of time of neonatal hospitalisation in these patients is five days.

Similarly, DM is a common and increasing complication of pregnancy. According to the NHS04, the age-specific prevalence of DM in females aged 18–29, 30–39 and 40–49 years was 0.8%, 2.1% and 6.0%, respectively.[20] Prevalence of spontaneous preterm delivery was 10.0% in those with gestational DM and 25.5% in those with pregestational DM.[11] DM still remained an independent risk factor for spontaneous preterm delivery, even when other risk factors were adjusted for.[11] The risk of iatrogenic preterm delivery was also increased for DM patients with microvascular disease such as hypertension, nephropathy and retinopathy, as a result of intrauterine growth retardation, foetal distress and maternal hypertension.

As a result of westernisation, smoking as well as drinking are increasingly prevalent among female Singaporeans, especially among those of childbearing age and younger.[9,12] In the NHS0410, the age-specific prevalence of regular alcohol consumption, defined as > 4 days a week, in those aged 18–29, 30–39 and 40–49 years were 2.0%, 1.8% and 2.6%, respectively. This compared with 9.4%, 3.0% and 2.4%, respectively for binge drinking (defined as at least five drinks on a single occasion at least once in the past month). The proportion of young women aged 18–29 years, in particular, has risen over the years from 5.2% in 1998 to 6.6% in 2004. This has been proven to be hazardous not only with regard to pregnancy but also to the overall health of the individual.[9] Yet, in our cohort, only two-thirds were aware of the fact that alcohol drinking is linked to preterm delivery.

It was heartening to know that the majority of the study group demonstrated good general knowledge of the risk factors for preterm labour, with the best known risk factor being smoking. The efforts by the Health Promotion Board in increasing public awareness of the ills of smoking have therefore not been in vain. In contrast, the results for the questions on hypertension and DM are dismal, with only 50.6% and 37.0% obtaining the correct answer. More must be done to educate this at-risk population about the relationship between their chronic medical conditions and pregnancy. Upon learning that it can affect future pregnancies, young diabetics and hypertensives may be more persuaded to gain better control over their condition. A complicated pregnancy may be of more immediate relevance to young women, as opposed to the long-term complications that are traditionally taught in public health talks. An awareness drive in these aspects would therefore be timely.

In looking at their knowledge on problems associated with prematurity (Section B), we looked at both short-term and long-term problems as well as the follow-up needs of such infants. Some of the multiple challenges that a premature infant faces shortly after birth include difficulty in temperature regulation, respiratory difficulty, feeding difficulty, intracranial haemorrhage and retinopathy. Due to their relatively larger surface area to volume ratio, as well as thin skin, with the transition from a well-maintained, tightly temperature-regulated, *in utero* environment to the harsh dry, cold, *ex utero* environment, the preterm infant is at high risk of water loss as well as hypothermia.[21] Respiratory difficulties are also among the first problems that the preterm infant encounters and is often the determining factor for the immediate outcome. These can be secondary to respiratory distress syndrome (due to surfactant deficiency in the immature lungs), poor respiratory effort due to their small muscle bulk and low energy and infection.[22-24]

Preterm infants also face issues with establishing feed tolerance and adequate nutrition, having had inadequate chances to build stores in the last trimester of pregnancy.[24] Sometimes, their gastrointestinal tracts may not be ready for milk feeds, may sustain ischaemic insult or acquire an infection.[25,26] The incidence of intracranial haemorrhage in the preterm newborn ranges from 2% to > 30% depending on the gestational age and type of intracranial haemorrhage.[27,28] The gelatinous brain structures of very LBW (VLBW) infants in particular puts them at high risk for intraventricular bleeding. Cranial ultrasonography is thus a routine investigation that will be carried out serially for all VLBW infants in most practices, as intracranial bleeding can have severe consequences. Retinopathy of prematurity is prevalent, especially among those in the VLBW category, with one study showing that retinopathy incidence is 68% among infants of birth weight < 1,251 g.[29,30] Outcomes can include myopia, astigmatism, visual impairment and, in severe cases, blindness.[31]

Follow-up studies conducted on these infants have found that they were at increased risk for developmental delay[14,32] and other medical complications,[33] compared to their full-term counterparts of normal birth weight. For example, the incidence of cerebral palsy is 7%–12% in VLBW and 11%–15% in ELBW infants.[34] The most common type of cerebral palsy is spastic diplegia, correlating with injury to the corticospinal tracts in the periventricular white matter. LBW infants were also found to be at risk for lower cognitive scores.[35] Even with normal cognitive scores, they were still prone to having learning difficulties and poor academic achievements.[36] Hearing problems are almost three times more common

in NICU graduates[37] than full-term neonates in the well-baby nursery.

As none of the study cohort had previous premature children, the results of Section B should represent a cohort with no first-hand experience of a premature infant. Knowledge of the complications of prematurity was low in this study cohort, with 47.0% failing to achieve a pass T-score. As good overall knowledge of the short-term complications of prematurity (Section B1) was demonstrated by the cohort, the poor showing for Section B T-scores could be attributed to poor knowledge on the long-term complications of prematurity. The breakdown for each question by correct answers showed that the largest proportion of the cohort that answered an individual question correctly was only 50.6%. The greatest deficits were shown in the areas of potential visual and hearing problems, as well as attention deficits. Consistently, the majority did not know eye problems could be present relatively early during the baby's life. Only just over a quarter and a third knew that premature infants could suffer from difficulty feeding and bleeding in the brain, respectively. A large proportion, though less than 50%, did not know that babies born before seven months or 28 weeks of pregnancy have a chance of survival or can be healthy. These deficits in knowledge were also reflected in more than half the cohort being unaware of the need to follow up premature children over several years.

We attempted to look at their understanding of the costs involved. They did not demonstrate consistent knowledge of the possible high costs involved, possibly because many assume that financial assistance and subsidies are available. Good knowledge of the problems associated with prematurity (i.e. passing entire T-scores or prematurity, Sections A and B T-scores) was not correlated to better knowledge of the costs of prematurity, i.e. awareness of risks does not translate into awareness of costs. The financial burden of prematurity in the long run should not be taken lightly. Premature babies need to be followed up closely for several years, with the attendant costs of consultation. This is a considerable disruption to the parents' schedule, especially in busy Singapore. Even healthy premature infants are not excluded from this follow-up, as learning issues and attention problems may not surface till the child reaches school-going age. Additional intervention such as physiotherapy or speech therapy is not only costly but has intangible effects, such as less attention paid to siblings and the need to plan around the child's appointments with the therapists.

Thus, we can conclude that a significant gap in knowledge about prematurity exists. Given the high impact of a premature infant upon the family, both emotionally and financially, this gap needs to be remedied urgently. Public forums and talks could be held by relevant professionals at hospitals and public venues to raise awareness. The local print media has also proved to be highly advantageous in raising awareness of such health issues in an easily digestible format, as shown by the "Mind Your Body" newspaper supplement run every Thursday. On the individual level, gynaecologists and obstetricians could opportunistically educate their patients about prematurity, and provide handouts. Counselling about the increased risk of prematurity should also be done for mothers at risk, with the long-term burden emphasised. This emphasis should provide deterrence and hopefully improve compliance in making lifestyle changes. Improving the basic knowledge of the general population would also assist in joint decision-making with regard to the care of the premature infant. The parents cannot fully and ethically discharge their duty as surrogate decision-makers if they possess inadequate knowledge about prematurity. As the birth of a premature infant with complications is an emotionally-charged issue, it is unreasonable to expect parents to rapidly absorb high volumes of information and utilise that same information to come to reasonable conclusions. As such, there is a pressing need to pre-emptively educate the whole population against the occurrence of a premature infant and yet, should prematurity be the end outcome of a particular pregnancy, to ensure that the parents would be empowered to participate collaboratively with the medical staff in care and decision-making as well as plan for resource mobilisation.

The birth of a premature infant therefore has the potential to greatly impact its family unit in many aspects far beyond the initial birth period. With improving technology and medical care, the survival of the premature infant is also increasingly observed. Yet, with societal changes, risk factors for prematurity, such as "affluent diseases" e.g. hypertension and DM, as well as "social ills" e.g. alcohol use and smoking, are becoming significantly prevalent. Of particular concern is the upward trend in incidence among the younger population, especially the child-bearing age-groups. Among the survey population, knowledge on prematurity is at a bare minimum, and inadequate for the average Singaporean. Even with this minimal awareness, the knowledge on costs was not consistent. The key to treatment for prematurity is prevention. As such, there is a needful call for more to be done to raise the awareness of prematurity and its risks. Perhaps with increased awareness, a reduction in the incidence of prematurity and more support can then be provided for this group of children, many of whom have special needs requiring intensive intervention.

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