Paediatric and Perinatal Epidemiology

doi: 10.1111/ppe.12118

Survival at the Threshold of Viability: a Nationwide Survey of the Opinions and Attitudes of Physicians in a Developing Country

Lama Charafeddine,[a] Farah Ammous,[b] Mariam Kayle,[c] Thalia Arawi[d]

[a]*Department of Pediatrics and Adolescent Medicine*

[b]*Department of Medicine, Indiana University School of Medicine, Indianapolis, IN*

[c]*Duke University School of Nursing, Durham, NC*

[d]*Salim El-Hoss Bioethics & Professionalism Program, American University of Beirut, Beirut, Lebanon*

Abstract

Background: To explore physicians' opinions and attitudes regarding resuscitation of extremely premature infants (EPIs) in a developing country with suboptimal resources.

Methods: A survey was developed, revised, and pilot-tested. All 964 paediatricians registered in the Lebanese Order of Physicians were contacted; physicians involved in resuscitation of EPIs were eligible. Between February and April of 2009, anonymous surveys were mailed to consenting participants.

Results: Three hundred twenty-eight eligible physicians agreed to participate. One hundred twenty (36%) returned the survey, 45.3% of which were neonatologists. The vast majority agreed that parents would like to be informed and to participate in the resuscitation decision of an EPI. The majority of physicians considered infants at gestational age of ≤25 weeks (78%) or ≤800 g (89%) as non-viable. Physician's age, years of practice, and practising neonatal intensive care unit level were significantly associated with the choice of birthweight at which infants were considered non-viable.

Conclusions: The majority of surveyed physicians consider infants at gestational age less than or equal to 25 weeks gestation or 800 g at birth as non-viable, and therefore would not attempt their resuscitation. Factors influencing threshold of viability in developing countries need to be addressed and explored further.

Keywords: *resuscitation decision, extremely premature infant, threshold of viability, developing countries, middle income country, physician attitude, end of life ethics.*

With increasing rates of prematurity and advancement in neonatal intensive care, more infants are surviving at gestational ages as low as 22–23 weeks in developed countries.[1–4] This has resulted in a shift in the grey zone of viability to 22–25 weeks gestation in those countries.[5–9] In developing countries, prematurity rates have increased as well, yet the neonatal mortality of extremely premature infants (EPI), defined as birth before 28 weeks gestation,[10] remains high.[11,12] It is not clear to what extent this increased mortality is due to lack of resources or to physicians' reluctance to initiate resuscitation of EPIs.

Studies comparing outcomes of proactive resuscitation policies have shown a significant improvement in the survival of EPIs without an increase in disabilities.[13–15] However, evidence-based practices, involvement of parents, and ethical dilemmas concerning resuscitation of EPIs remain the subjects of continuing discussion and research.[16] Studies exploring resuscitation practices of physicians and their attitudes towards parental involvement in resuscitation decisions of EPIs show diverse practices from offering palliative care only to full resuscitation.[5–7,17–20] These variations are likely to be influenced by a myriad of social and cultural factors.[7,21] Generally, health care professionals tend to overestimate futility,[22–24] which might influence their attitude in the delivery room and result in delayed resuscitation. International guidelines for resuscitation of EPIs are typically based on data from developed countries.[19,25,26] Such guidelines are lacking in the setting of developing countries where practices result from a multitude of factors, including local resources, professional training, cost of care, and possibly different ethical considerations, thus leading to different treatment choice.[19]

Editor's note: A commentary for this paper appears on page 179.

Correspondence:
Lama Charafeddine, American University of Beirut Medical Center, PO Box 11 – 0236, Riad El Solh 1107 2020, Beirut, Lebanon.
E-mail: lc12@aub.edu.lb

© 2014 John Wiley & Sons Ltd

In many developing countries, such as Lebanon, knowledge regarding resuscitation practices and prenatal counselling at the threshold of viability is lacking. This is exacerbated by the lack of local guidelines and survival outcome data. This study was conducted to answer the following questions in the particular setting of a developing country: What are the physicians' opinions and attitudes towards resuscitation of EPIs? To what extent are the physicians willing to involve parents in the decision to resuscitate EPIs? What are the factors that influence physicians' decisions regarding resuscitation of EPIs?

Methods

Sample and setting

The study population consisted of all practising paediatricians and neonatologists registered at the Lebanese Order of Physicians (LOP), the official governing body overlooking the practice of physicians in Lebanon. Participants were eligible if they were actively practising and if their practice included the resuscitation of EPIs regardless of the practice setting. The study was approved by the institutional review board.

A total of 964 paediatricians and neonatologists were registered at the LOP. Between February and April 2009, we contacted potential participants by phone and determined their eligibility for the study. Of the 964 paediatricians and neonatologists, six declined and 328 were eligible and provided verbal consent by phone to participate in the study (Figure 1). The survey was mailed to the participants and a one-time reminder phone call was placed 1–2 months later.

Measures

A survey was developed based on a review of published relevant surveys.[15–18,20] Questions were formulated by one bilingual author (LC) in English and French since these are the languages of medical education in Lebanon. Preliminary drafts in both English and French were reviewed by six bilingual neonatologists for clarity, neutrality, comprehensiveness, and the ability to meet research objectives. A revised version of the survey was pilot-tested on a sample of another 12 neonatologists and paediatricians. Further revisions resulted in the final version of the survey (Appendix S1).

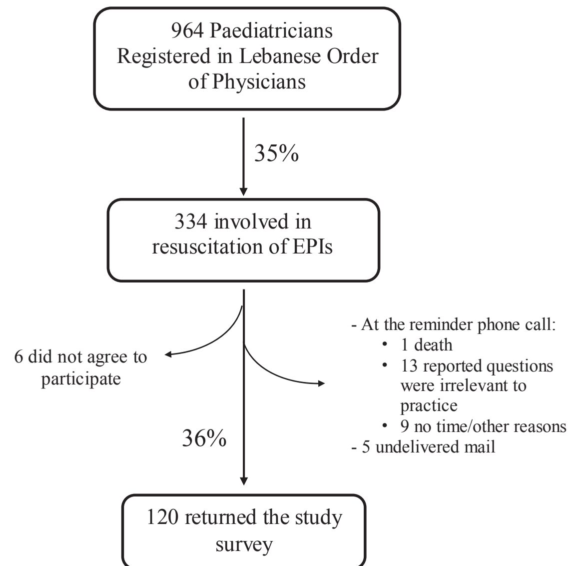

Figure 1. Study flow.

In order to minimise the influence of resources availability as a confounder, participants were asked to fill the survey assuming that all the resources needed to take care of EPIs are available at the practice setting, or that infants can be transferred to a hospital equipped with the needed resources. No specific definition was provided for 'heroic resuscitation'; this was left to the open interpretation of participants. Level 3+ neonatal intensive care units (NICU) were defined as units with conventional and high frequency respirators, nitric oxide, total parenteral nutrition and surgery.

Statistical analysis

Data were analysed using the Statistical Package for Social Sciences (SPSS) version 17.0 (SPSS Inc., Chicago, IL, USA, www.spss.com). Bivariate analyses to assess association with categorical outcomes were done using chi-square test and Fisher's exact test when applicable, while mean difference and *t*-test were used for continuous variables. A significant difference was set at a double sided *P*-value of <0.05. Unless noted, results were similar between neonatologists and paediatricians.

Results

Respondents' characteristics

Table 1 shows the participants' characteristics. One hundred twenty of the 328 eligible participants (36%)

© 2014 John Wiley & Sons Ltd

13653016, 2014, 3, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/ppe.12118 by HINARI-LEBANON, Wiley Online Library on [20/03/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

13653016, 2014, 3, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/ppe.12118 by HINARI-LEBANON, Wiley Online Library on [20/03/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Table 1. Respondents' characteristics

Characteristic	*n*	%[a]
Male gender	78	68.4
Age		
<35 years	11	9.2
35–45 years	47	39.2
46–55 years	34	28.3
≥55 years	28	23.3
Parent	102	87.9
Practising religion		
Muslim/Druze	60	50.0
Christian	37	30.8
Does not practise religion	14	11.7
Other/missing	9	7.5
Training		
Paediatric	64	54.7
Neonatology	53	45.3
Years of practice		
<10 years	32	26.7
10–20 years	50	41.7
>20 years	38	31.7
Medical school		
American	12	10.5
French	54	47.4
Other European and Arab Universities	12	10.5
Eastern European/other	36	31.6
Highest practice level of NICU		
Level 1 (no NICU)	18	18.0
Level 2	29	29.0
Level 3	21	21.0
Level 3+	32	32.0
Highest practice NICU hospital type		
Academic hospital	20	21.3
Non-academic hospital	74	78.7

[a]Instances when column total are different reflect missing data.

returned the survey, 55% of whom were paediatricians. Most participants had 10 or more years of practice, graduated from medical schools that followed a French medical education system, and were practising in non-academic hospitals. The overall characteristics were not significantly different between neonatologists and paediatricians, except that neonatologists were more likely to be male (74% vs. 59%, $P = 0.03$).

Parental involvement and prenatal counselling

The majority of participants (82.5%) 'strongly agreed'/ 'agreed' that parents would like to be informed and to participate in the decision to resuscitate an EPI, but 55.6% agreed that 'the resuscitation decision should be left to the neonatologist and/or obstetrician according to the hospital's guidelines'. When counselling parents in a situation with uncertain outcome, 60.2% of the participants would tell parents they will honour their decision regarding resuscitation, yet 69.4% would tell parents that 'it will be up to the medical team to make the appropriate decision for the best interest of the baby'. Furthermore, the vast majority (93.8%) of the participants would inform parents that 'the resuscitation decision might need to be modified depending on the infant's condition and assessment of the gestational age at the time of birth'.

Table 2 compares the physicians' opinion regarding parents' desire to be involved in resuscitation decisions of an extremely premature infant (<26 weeks gestation) vs. their counselling advice before birth. Only about 55% of those reporting they believe parents would like to be involved stated that they would honour the parents' decision regarding resuscitation, compared with two thirds of those who did not think that the parents wanted involvement in decision making. In both cases, whether physicians thought parents liked to be involved or not, an average of 63% responded that ultimately it is up to the physician to take decisions. No differences were noted between the physicians' counselling advice before birth and their opinion regarding parental involvement in the decision making.

Limits of viability

The majority (63.3%) chose the gestation limit of above 26 weeks as the gestational age at which they thought 'resuscitation is beneficial and is in the best interest of the infant and its family', while 21.2% chose the limit of 25 weeks. However, when asked to choose the gestational age at which participants would not offer to attend the delivery because they considered infants to be non-viable, responses were more diverse, with 50.5% choosing 23 weeks or less, and 28.2%, 16.2%, and 5.1% choosing 24 weeks, 25 weeks, and 26 weeks, respectively (Figure 2). When asked about the birthweight limit at which participants considered infants to be non-viable and would not offer to attend the delivery, 12.8% choose <800 g, 17.5% <700 g, 22.2% <600 g, and 36.8% <500 g (Figure 3).

None of the demographic- or practice-related factors were found to be associated with the choice of gestational age where infants were considered non-viable, and the physicians said they would not offer to

© 2014 John Wiley & Sons Ltd

Table 2. Physicians' opinion regarding parents' desire to be involved in resuscitation decisions of an extremely premature infant (less than 26 weeks gestation) vs. their counselling advice before birth

Parents like to be involved[a]	Strongly agree/ agree ($n = 99$)	Neutral/strongly disagree/ disagree ($n = 21$)	*P*-value
Parental decision to initiate or withhold resuscitation will be honoured			0.501
Strongly agree/agree	54.5%	66.7%	
Neutral/disagree/strongly disagree	38.4%	33.3%	
Missing	7.1%	0	
Decision to resuscitate may be modified based on infants' condition and assessment at birth			0.763
Strongly agree/agree	86.9%	95.2%	
Neutral	6.1%	4.8%	
Missing	7.1%	0	
Decision will be up to the medical team acting in the best interest of the baby			0.410
Strongly agree/agree	64.6%	61.9%	
Neutral/disagree/strongly disagree	26.3%	38.1%	
Missing	9.1%	0	

[a]Physicians were asked the following question: In your opinion, Lebanese parents and families like to be informed and like to participate more in making decisions with the physician regarding resuscitation of an extremely premature infant (less than 25 weeks gestation).

attend the delivery. However, older physicians (aged between 46–55 years and above 55 years) were more likely to choose a higher birthweight as the limit of viability (Table 3). Similar results were seen for physicians' years of experience: 10–20 years (*P*-value 0.024) and >20 years (*P*-value 0.001). Physicians practising in higher level NICUs (levels 3+) had a significant trend of choosing lower birthweight limit of viability compared with those practising at a facility with no NICU (*P*-value 0.006) (Table 3).

Initiation of resuscitation

Physicians' attitudes towards initiating resuscitation were assessed in two hypothetical scenarios:

In the first scenario, the participant is called to attend the delivery of a 23–25 weeks gestation infant when parents have requested no heroic resuscitation. In this scenario, 5.9% of the participants responded that they would not attend the delivery, 11.9% would attend the delivery but would not initiate resuscitation, and 65.3% would attend the delivery and might 'initiate resuscitation if the newborn is breathing and has a good heart rate', while the rest (16.9%) would immediately initiate resuscitation and transfer the newborn to the neonatal intensive care irrespective of parental wishes.

In the second hypothetical scenario, the participant had no chance to counsel the family and attends the delivery of a 23 weeks gestation infant who has no

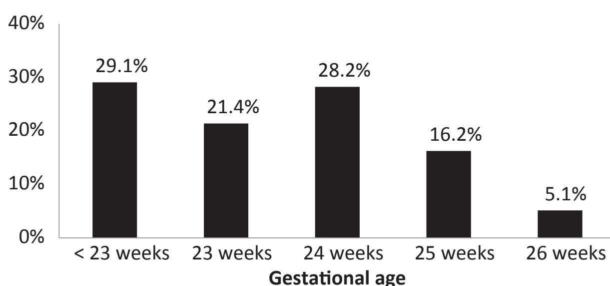

Figure 2. Gestational age at which respondents considered the baby to be non-viable and would not offer to attend the delivery.

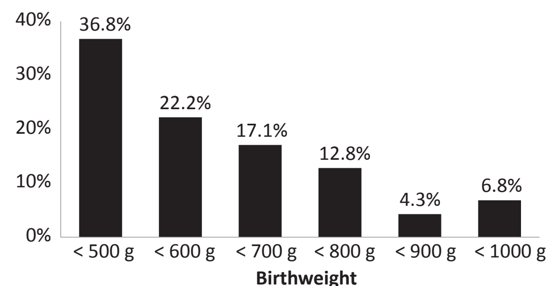

Figure 3. Birthweight at which respondents considered the baby to be non-viable and would not offer to attend the delivery.

© 2014 John Wiley & Sons Ltd

13653016, 2014, 3, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/ppe.12118 by HINARI-LEBANON, Wiley Online Library on [20/03/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Table 3. Factors associated with the choice of birthweight limit of viability[a]

	<500 g (n = 43)	<600 g (n = 26)	<700 g (n = 20)	<800 g (n = 15)	<900 g (n = 5)	<1000 g (n = 8)	P-value
Age (years)							
<35	54.5%	27.3%	18.2%	0	0	0	Reference
35–45	47.8%	17.4%	21.7%	6.5%	4.3%	2.2%	0.439
46–55	24.2%	24.2%	9.1%	27.3%	6.1%	9.1%	0.018
≥55	25.9%	25.9%	18.5%	11.1%	3.7%	14.8%	0.039
Years of Practice							
<10	61.3%	16.1%	19.4%	0	0	3.2%	Reference
10–20 years	30.0%	26.0%	14.0%	20.0%	6.0%	4.0%	0.004
>20	25.0%	22.2%	19.4%	13.9%	5.6%	13.9%	0.001
Highest practice level of NICU							
Level 1 (No NICU)	22.2%	11.1%	27.8%	22.2%	5.6%	11.1%	Reference
Level 2	22.2%	22.2%	18.5%	18.5%	11.1%	7.4%	0.759
Level 3	38.1%	23.8%	19.0%	9.5%	0.00	9.5%	0.119
Level 3+	54.8%	22.6%	6.5%	9.7%	0.00	6.5%	0.006

[a]Participants were asked the following question: At which birthweight would you consider the baby to be nonviable and would not offer to attend the delivery?

additional co-morbidities. In this scenario, 27.5% of the participants would assess the breathing and heart rate of the infant and would not intervene if they think the infant is non-viable, 44.2% would resuscitate immediately, then stop all resuscitation efforts after 10 min if there is no response, and 28.3% would resuscitate immediately and transfer the newborn to intensive care.

None of the demographic- and practice-related factors were significantly associated with the actions of the participants.

Factors influencing resuscitation decision and management

Most of the participants (51.3%) chose 'chance of survival and possibility of future disability' as the most important factor determining the decision to resuscitate, followed by lack of hospital resources (39.5%). Family decision (16.2%), socio-economic status (10.7%), and lack of community resources (6.3%) were the least important factors.

With respect to the factors influencing management choice, 74.4% of participants selected 'the condition at birth' as the most important factor. Other factors listed as the least important were (i) likelihood of death (18.6%), (ii) potential of long-term suffering (10.8%), (iii) Lebanese medical law and ethics (10.3%), (iv) potential of mental retardation (9.9%), (v) potential of severe cerebral palsy (9%), and (vi) potential burden to the family (8%).

Comment

This study explored the opinions and attitudes of physicians involved in the resuscitation of premature infants on a national scale in a developing country. The results were similar to reported trends in developed countries in some aspects, yet differed in others, mainly on expectations of survival at lower gestational age and birthweight.

Our results suggest that there is no clear consensus among physicians regarding parental involvement in resuscitation decisions. The Lebanese Law (240),[27] which was revised in 2012, calls for the involvement of patients or their guardians in decisions regarding their medical care and the provision of the informed consent for all medical procedures. It mandates providers to involve parents, who are the surrogate decision makers for their infants, in the care of those infants. Our findings suggest that there is either a lack of knowledge or non-adherence to this law among physicians involved in the resuscitation of EPIs in Lebanon.

Moreover, there are inconsistencies between what physicians think parents want regarding resuscita-

© 2014 John Wiley & Sons Ltd

13653016, 2014, 3, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/ppe.12118 by HINARI-LEBANON, Wiley Online Library on [20/03/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

tion and what physicians say they will do during resuscitation, suggesting that a paternalistic attitude of physicians prevails in Lebanon. The majority of our participants acknowledged that parents like to be involved in resuscitation decisions, yet they still believe that physicians' judgement should supersede parental decisions. In settings similar to ours, involving parents in 'do not resuscitate order' has been addressed by da Costa *et al*., who showed that parents often rely on the medical team for final decisions.[28] Previous studies have also shown that physicians would resuscitate EPIs against parental requests when they thought resuscitation is in the best interest of the infant.[5,29,30] We found that the majority of the participants would initiate resuscitation at 23 weeks gestation, despite the fact that they think it is not in the best interest of the infant. However, in line with the American Academy of Pediatrics guidelines, whenever there is uncertainty regarding survival outcome a high percentage of the respondents would make a decision after assessing the infant's condition at birth.[31] In our survey, a good proportion of the participants disagreed about leaving the resuscitation decision entirely to either parents or physicians. It is plausible that this group of participants believes that a joint decision between parent and physician should be made; however, this option was not made available to the participants in our survey. Most participants agreed that infants who are less than or equal to 23 weeks gestation are non-viable and that infants of 26 gestational weeks or older are viable. For infants between 23 and 25 weeks, physicians' opinions varied largely, indicating that in our surveyed sample this gestational age constitutes the grey zone of viability. Our findings contrast with recent studies from developed countries that show a grey zone of viability from 22 to <25 weeks.[5–9] One study in Mongolia, which surveyed 113 providers, reported a 28 to <31 weeks as the earliest gestational age at which providers would perform resuscitation.[32] da Costa *et al*. mentioned in their context that infants less than 24 weeks of gestation are not considered for resuscitation.[28]

Limiting the questions about viability to the birthweight or gestational age is rather simplistic since it does not take into consideration other important factors such as gender, prenatal corticosteroids,[4] and parental education[33] that influence the chances of survival and long-term outcome.[4] However, physicians in our setting largely rely on gestational age and birthweight to project outcome (pers. comm.). Furthermore, the use of prenatal steroids by our obstetricians continues to be limited in cases of preterm labour below 26 weeks of gestation.[34]

Since the majority of physicians in our sample practise in hospitals where there are no written guidelines for resuscitation of EPIs, we might conclude that these answers reflect the physicians' own anecdotal experience/knowledge of chances of survival. In contrast to the findings of Duffy and Reynolds, where older physicians were more aggressive in resuscitation and more likely to attend the delivery of infants born at 22 weeks gestation or less,[30] older and more experienced paediatricians in our study had significantly higher odds of choosing higher birthweight as the limit of viability compared with younger and less experienced paediatricians. Yet none of these factors were associated with decisions among neonatologist. It remains unclear whether this is due to the level of training or knowledge or the degree of maturity or empathy that these physicians may have. Of note is the fact that long-term follow-up data on EPIs are largely lacking in this setting. Perhaps the more experienced neonatologists rely on their personal experience, allowing them to have more long-term follow-up of the EPI.

Our results show that the most important factor in determining resuscitation decision by the physicians was the chance of survival and possibility of future disability, followed by lack of hospital resources. However, since local outcome data are largely missing, physicians are forced to base their decisions on published data from developed countries, which might not reflect the local context. Factors considered by physicians to be the most important in end-of-life decisions were similar to those reported by Verhagen *et al*., where paediatricians practising in a less developed care setting ranked quality of life and suffering as more important than economic burden and legal considerations.[20] Similar results were reported by Martinez *et al*., Singh *et al*., and Norup.[7,8,35]

The most important factor influencing management in our sample was the condition at birth (74.4%). This is concerning because previous studies have shown that outcome prediction by physicians is not reliable and that providers tend to underestimate survival of EPI.[8,23,24,36] Hence, this finding might be contributing to the 'self-fulfilling prophecy' of high mortality at the lowest gestational ages.

Surprisingly, medical law and ethics were listed as the least important. Since our survey did not address

© 2014 John Wiley & Sons Ltd

13653016, 2014, 3, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/ppe.12118 by HINARI-LEBANON, Wiley Online Library on [20/03/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

this specifically, it is difficult to speculate the reasons behind this finding. One interpretation could be because outcome is largely unknown and physicians tend to overestimate future disability.[23,24,36] Another possible interpretation is that physicians are more likely to follow their religious beliefs (prolife) rather than medical ethics or law *per se*.

This study has limitations that need to be acknowledged. First, the instrument developed for the purpose of the study relied on expert opinion and was pilot-tested on a limited number of neonatologists. The languages chosen were English and French since these are the languages used in medical education in Lebanon; not having an Arabic version may have introduced some bias and may have led to misinterpretation of certain questions.

Some concepts, such as aggressive resuscitation, were not defined on purpose and were left to the individual interpretation of each respondent. Moreover, one of the decision questions combined chances of survival and possibility of future disabilities, which are two different concepts and might have influenced the answers. Finally, in such surveys, physicians may say what they do but in actuality do something else. Short of doing an actual observation to the physicians' practice in delivery rooms, which is practically impossible, we tried to capture what the physicians actually do when they were asked about their '*resuscitation actions*' in two different situations.

Despite the above limitations, one of the major strength of this study is that it explored the opinions of physicians in a developing country where resuscitation practices of EPIs are largely unexplored. Physicians from across the entire nation including all regions, different religions, years of experience, and backgrounds were surveyed; therefore, the results are presumed representative of this particular setting.

Conclusion

This study examined physicians' opinions and attitudes in a developing country, and their willingness to involve parents, and identified potential factors influencing their decision regarding resuscitation of EPIs. Our findings suggest that there is inconsistency between what physicians think parents want and what they (physicians) actually do regarding resuscitation of EPIs. Despite advancement in neonatal care in Lebanon, the majority of physicians continue to consider infants less than 26 weeks of gestation or 800 g at birth as non-viable, and that 23–25 weeks gestation constitute the grey zone of viability in this context. However, the majority would still resuscitate EPIs despite parental requests and their own belief of case futility. In our context, resuscitation decisions seem to be driven by the chances of survival and possibility of future disability, yet long-term outcome studies from countries similar to our setting are largely lacking. Such studies are needed to allow physicians and parents to make informed decision and to assess factors influencing decisions at the grey zone of viability. These studies are expected to impact policy making in developing countries and advocate for more comprehensive laws addressing care of EPIs.

Acknowledgements

The authors would like to thank Drs Joumana Alameh, Alia Araj, Taleb Jammal, Nabil Mounla, Najwa Tfaily, and Khalid Yunis for their review of the survey tool. The study was funded by the American University of Beirut Medical Center Medical Practice Plan.

Conflict of interest: None.

References

1 Lemons JA, Bauer CR, Oh W, Korones SB, Papile LA, Stoll BJ, *et al*. Very low birth weight outcomes of the National Institute of Child health and human development neonatal research network, January 1995 through December 1996. NICHD Neonatal Research Network. *Pediatrics* 2001; 107:E1

2 Lucey JF, Rowan CA, Shiono P, Wilkinson AR, Kilpatrick S, Payne NR, *et al*. Fetal infants: the fate of 4172 infants with birth weights of 401 to 500 grams—the Vermont Oxford Network experience. *Pediatrics* 1996–2000; 113:1559–1566.

3 Ananth CV, Joseph KS, Oyelese Y, Demissie K, Vintzileos AM. Trends in preterm birth and perinatal mortality among singletons: United States, 1989 through 2000. *Obstetrics and Gynecology* 2005; 105:1084–1091.

4 Tyson JE, Parikh NA, Langer J, Green C, Higgins RD. Intensive care for extreme prematurity—moving beyond gestational age. *The New England Journal of Medicine* 2008; 358:1672–1681.

5 Peerzada JM, Richardson DK, Burns JP. Delivery room decision-making at the threshold of viability. *The Journal of Pediatrics* 2004; 145:492–498.

6 Peerzada JM, Schollin J, Hakansson S. Delivery room decision-making for extremely preterm infants in Sweden. *Pediatrics* 2006; 117:1988–1995.

7 Martinez AM, Partridge JC, Yu V, Wee Tan K, Yeung CY, Lu JH, *et al*. Physician counselling practices and decision-making for extremely preterm infants in the

© 2014 John Wiley & Sons Ltd

13653016, 2014, 3, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/ppe.12118 by HINARI-LEBANON, Wiley Online Library on [20/03/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Pacific Rim. *Journal of Paediatrics and Child Health* 2005; 41:209–214.
8 Singh J, Fanaroff J, Andrews B, Caldarelli L, Lagatta J, Plesha-Troyke S. Resuscitation in the 'gray zone' of viability: determining physician preferences and predicting infant outcomes. *Pediatrics* 2007; 120:519–526.
9 Nuthalapaty F, Lu G, Ramin S, Nuthalapaty E, Ramin KD, Ramsey PS. Is there a preferred gestational age threshold of viability?: a survey of maternal-fetal medicine providers. *The Journal of Maternal-Fetal and Neonatal Medicine* 2007; 20:293–297.
10 Tucker J, McGuire W. Epidemiology of preterm birth. *British Medical Journal (Clinical Research Edition)* 2004; 329:675–678.
11 Al-Mohdzar SA, Haque E, Abdullah WA. Changes of perinatal statistics in a semiurban setup between two time periods in Malaysia. *Asia-Oceania Journal of Obstetrics and Gynaecology* 1993; 19:401–405.
12 Atasay B, Gunlemez A, Unal S, Arsan S. Outcomes of very low birth weight infants in a newborn tertiary center in Turkey. *The Turkish Journal of Pediatrics* 1997–2000; 45:283–289.
13 Yu VY. Is neonatal intensive care justified in all preterm infants? *Croatian Medical Journal* 2005; 46:744–750.
14 Doyle LW. Neonatal intensive care at borderline viability—is it worth it? *Early Human Development* 2004; 80:103–113.
15 Hakansson S, Farooqi A, Holmgren PA, Serenius F, Hogberg U. Proactive management promotes outcome in extremely preterm infants: a population-based comparison of two perinatal management strategies. *Pediatrics* 2004; 114:58–64.
16 Higgins RD, Delivoria-Papadopoulos M, Raju TN. Executive summary of the workshop on the border of viability. *Pediatrics* 2005; 115:1392–1396.
17 Doron MW, Veness-Meehan KA, Margolis LH, Holoman EM, Stiles AD. Delivery room resuscitation decisions for extremely premature infants. *Pediatrics* 1998; 102:574–582.
18 Lavin JP Jr, Kantak A, Ohlinger J, Kaempf JW, Tomlinson M, Campbell B. Attitudes of obstetric and pediatric health care providers toward resuscitation of infants who are born at the margins of viability. *Pediatrics* 2006; 118 (Suppl. 2):S169–S176.
19 Pignotti MS, Donzelli G. Perinatal care at the threshold of viability: an international comparison of practical guidelines for the treatment of extremely preterm births. *Pediatrics* 2008; 121:e193–e198.
20 Verhagen AA, Janvier A, Leuthner SR, Andrews B, Lagatta J, Bos AF, *et al*. Categorizing neonatal deaths: a cross-cultural study in the United States, Canada, and The Netherlands. *The Journal of Pediatrics* 2010; 156:33–37.
21 Rebagliato M, Cuttini M, Broggin L, Berbik I, de Vonderweid U, Hansen G. Neonatal end-of-life decision making: physicians' attitudes and relationship with self-reported practices in 10 European countries. *Journal of the American Medical Association* 2000; 284:2451–2459.
22 Saigal S, Stoskopf BL, Feeny D, Furlong W, Burrows E, Rosenbaum PL, *et al*. Differences in preferences for neonatal outcomes among health care professionals, parents, and adolescents. *Journal of the American Medical Association* 1999; 281:1991–1997.
23 Manley BJ, Dawson JA, Kamlin CO, Donath SM, Morley CJ, Davis PG. Clinical assessment of extremely premature infants in the delivery room is a poor predictor of survival. *Pediatrics* 2010; 125:e559–e564.
24 Morse SB, Haywood JL, Goldenberg RL, Bronstein J, Nelson KG, Carlo WA. Estimation of neonatal outcome and perinatal therapy use. *Pediatrics* 2000; 105:1046–1050.
25 Byrne S, Goldsmith JP. Non-initiation and discontinuation of resuscitation. *Clinics in Perinatology* 2006; 33:197–218.
26 Schenker JG. Codes of perinatal ethics: an international perspective. *Clinics in Perinatology* 2003; 30:45–65.
27 Lebanese Law Number 240. The Official Newspaper, October 25, 2012.
28 da Costa DE, Ghazal H, Al KS. Do not resuscitate orders and ethical decisions in a neonatal intensive care unit in a Muslim community. *Archives of Disease in Childhood. Fetal and Neonatal Edition* 2002; 86:F115–F119.
29 Lavoie PM, Keidar Y, Albersheim S. Attitudes of Canadian neonatologists in delivery room resuscitation of newborns at threshold of viability. *Journal of Obstetrics and Gynaecology Canada* 2007; 29:719–725.
30 Duffy D, Reynolds P. Babies born at the threshold of viability: attitudes of paediatric consultants and trainees in South East England. *Acta Paediatrica* 2011; 100:42–46.
31 Kattwinkel J (ed.). *Textbook of Neonatal Resuscitation*, 5th edn. Elk Grove Village, IL: American Academy of Pediatrics and American Heart Association, 2006.
32 McAdams RM, Erdenebileg A, Batra M, Gerelmaa Z. Attitudes of healthcare providers towards non-initiation and withdrawal of neonatal resuscitation for preterm infants in Mongolia. *Journal of Health, Population, and Nutrition* 2012; 30:346–352.
33 Beaino G, Khoshnood B, Kaminski M, Marret S, Pierrat V, Vieux R. Predictors of the risk of cognitive deficiency in very preterm infants: the EPIPAGE prospective cohort. *Acta Paediatrica* 2011; 100:370–378.
34 Nassar AH, Awwad J, Bu ZN, Cheaib S, Adra A, Usta IM. Prescribing practices among Lebanese obstetricians for prenatal corticosteroids to enhance fetal lung maturity. *International Journal of Gynaecology and Obstetrics* 2009; 104:144–145.
35 Norup M. Treatment of extremely premature newborns: a survey of attitudes among Danish physicians. *Acta Paediatrica* 1998; 87:896–902.
36 Laventhal N, Spelke MB, Andrews B, Larkin LK, Meadow W, Janvier A. Ethics of resuscitation at different stages of life: a survey of perinatal physicians. *Pediatrics* 2011; 127:e1221–e1229.

Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Appendix S1.

© 2014 John Wiley & Sons Ltd

13653016, 2014, 3, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/ppe.12118 by HINARI-LEBANON, Wiley Online Library on [20/03/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License