

Are We Satisfied with the Umbilical Cord Clamps?

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Abstract

BACKGROUND/AIMS: To determine the opinions of mothers and healthcare workers about the currently used umbilical cord clamps.

MATERIALS AND METHODS: In this study, 150 mothers with 0–1-month-old infants who were admitted to the university hospital were interviewed. In the survey conducted with health workers, no sample selection was made, and all midwives, nurses, and doctors (n=55) work in the field of obstetrics and pediatrics were interviewed. The surveys were prepared via literature review and taking obstetrics and pediatrics expert opinions. Satisfaction, problems, and views about the currently used umbilical cord clamps were included in the survey applied to mothers. In the survey conducted with health workers, the thoughts about the clamp and problems they had while clamping the umbilical cord were included.

RESULTS: When mothers' views on clamp dimensions were examined, 64.7% stated that the clamp was bigger than necessary. Among the problems related to the clamp, 53.3% of mothers were afraid of the accidental clamp slippage while taking off the baby clothes; 66.7% of the mothers stated that they would prefer a different design clamp. 54.5% of healthcare workers indicated that they had problems with clamp (slipping from hand when inserting, difficulty in locking). 74.5% responded positively about the need for a different design clamp.

CONCLUSION: Our observations and the results obtained from the surveys agree with the fact that parents and health personnel frequently raise doubts and problems about the traditional umbilical clamps. It may be recommended to repeat the research in different institutions by increasing the sample size and conducting research for a novel umbilical clamp design.

Keywords: Umbilical cord clamp, midwifery, newborn, birth

INTRODUCTION

The umbilical cord is an essential structure with an average length of 50–60 cm and a thickness of 1–2 cm and it serves as a vital connection between the placenta and the fetus.¹ After the birth, the umbilical cord is cut after being clamped 1–2 cm above the abdominal wall under sterile conditions. The cord begins to dry immediately after birth and falls completely dry in 10–14 days.² The techniques used for the umbilical cord care after birth are clamping, tying with a string or ribbon, candle melting, and waiting without cutting the cord (lotus birth). The underlying logic in the cord ligation is to compress the umbilical

vessels and to prevent possible bleeding until the umbilical cord dries and falls off. The history of the clamps produced for this purpose dates back to the early 60s. The conventional clamps consist of two legs a fine-toothed clamping surface approximately 6 cm long and 4.5 cm thick (Figures 1, 2 and 3).³⁻⁵ The most frequently observed problems by the healthcare professionals are difficulties in locking the clamp and slippage of the clamp from the hand. Some families are worried about the size and shape of the umbilical clamp, which may harm the baby. However, we could not find a study evaluating the satisfaction of healthcare workers and families with the traditional clamps in the published literature. Our study determined the opinions

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of mothers and healthcare workers about the umbilical cord clamps currently used.

MATERIALS AND METHODS

This study was conducted in a university hospital within the period between February and July 2018. When calculating the study population and sample, we determined that the number of births in the hospital was between 350 and 400, so it was estimated that 136 samples (95% confidence interval and 5% error margin) were needed to perform the study with 90% power. The study population consists of 150 mothers with newborn babies who admitted to university hospital pediatrics and obstetrics outpatient clinics for routine control. In the survey carried out with the health personnel, we did not perform a sample selection because the number of health personnel working in the hospital was limited. All midwives, nurses, and doctors (n=55) working in pediatrics and obstetrics inpatient and outpatient clinics, delivery and operating rooms of the university hospital constituted the study population. Surveys were developed by the researchers after taking expert opinions in pediatrics and obstetrics (6 faculty members, two midwives,

one nurse, one doctor). In the survey applied to mothers, we included socio-demographic data, satisfaction, opinions about the umbilical clamp and the problems encountered in the period until complete drying and fall of the umbilical cord. In the survey prepared for health professionals; socio-demographic characteristics, challenges encountered during the use of the current umbilical clamps (clamp slippage, locking, leaking problems) were investigated.

The necessary permissions for conducting the study were obtained from the Ethics Committee of Near East University (YDU/2018/55-520). The aim of the study was explained both verbally and written, and an informed consent form was obtained from the participants.

Statistical Analysis

Data was analyzed by SPSS 21.0 (Statistical Package for Social Sciences, v. 21.0 Armonk, NY, USA). The frequency and percentage values were used to define the socio-demographic characteristics of families and health workers, and chi-square analysis was used to make comparison between groups. Mann-Whitney U and Kruskal-Wallis tests were used to compare the satisfaction scores of healthcare workers. Post hoc tests were performed for further analysis.

RESULTS

Findings of the Research with Mothers

The mean age of the mothers participating in our study was 31.6 ± 5.2 (min-max: 20–44), and 44% of the mothers received undergraduate education. 70% of mothers were employed, and 90% lived in an urban area. 54% of the mothers had their first pregnancy, and 62% had their first baby, and all births occurred in the hospital. All infants' umbilical cord clamps were clamped with umbilical cord clamps.

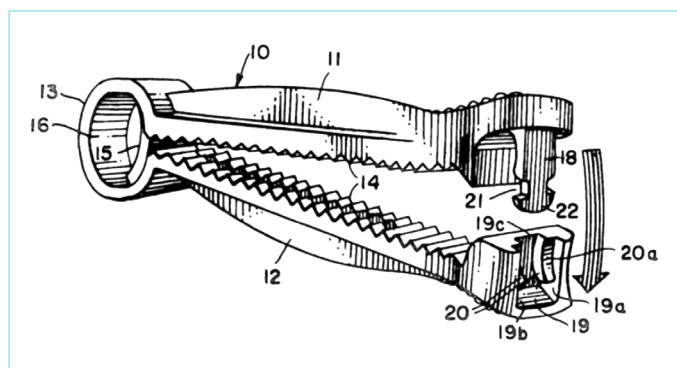


Figure 1. Umbilical cord clamp drawing patented by Nolan J.L in 1980 (Nolan, J.L, 1980).

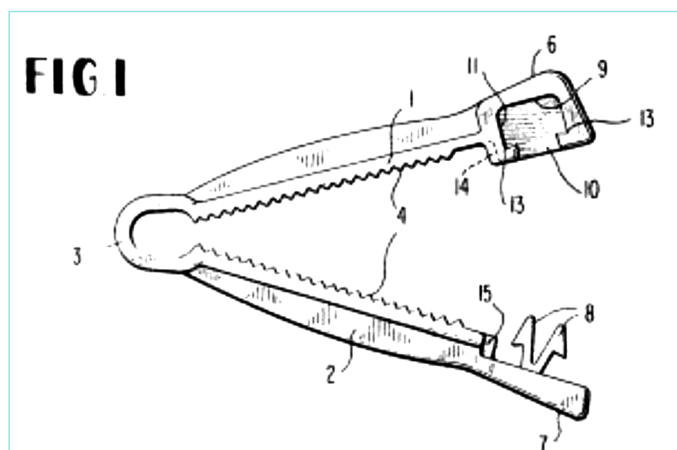


Figure 2. Drawing of umbilical cord clamp patented by Laugherty in 1974 (Laugherty L, 1974).

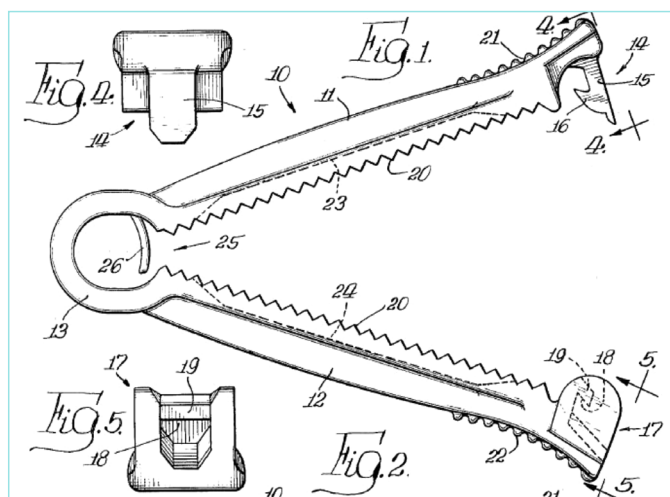


Figure 3. Umbilical cord clamp drawing patented in 1966 by J.D Schneider (Schneider JD, 1966).

When asked whether mothers were satisfied with the traditional clamp dimensions, 55.3% answered “No.” 64.7% of the mothers stated that the clamps were larger than necessary and 53.3% of mothers experienced fears during the dressing and taking off baby’s clothes. However, 36.6% of the mothers stated that they had no problems with the clamp. When the measures taken by mothers not to harm the baby’s cord were examined, 35.3% reported that a cloth was wrapped around the cord to prevent harm to the baby’s skin from the cornered edges of the clamp (Table 1).

Regarding the shape and size of the currently used clamps; 66.7% stated that there is a need for a different shape, 49.3% reported that they wanted the clamp to be smaller, 11.3% wanted it in oval form, and 10.6% wanted it to be produced from a softer material (Table 2).

There was a statistically significant difference between the mothers’ satisfaction with the traditional clamp according to their place of residence and the number of children. 85.5% of the mothers living in the urban area ($p=0.043$) and 53% of the mothers with single children ($p=0.030$) were less satisfied with the traditional clamp than the other group (Table 3).

The mothers who tended to wrap a cloth around the cord and clamp to avoid pricking the baby’s belly had high school education ($p=0.001$), moderate-income level ($p=0.043$), were living in the urban area ($p=0.047$), had one child ($p=0.003$) and were employed ($p=0.045$) (Table 4).

We found that mothers in the 18–23 age group experienced more problems with the clamps ($p=0.021$). Also, employed mothers reported more issues with the traditional clamps ($p=0.029$). The mothers who lived in the urban area experienced more problems with the conventional clamp than the mothers living in rural areas ($p=0.026$) (Table 5).

Findings of the Research with Healthcare Professionals

The mean age of the healthcare workers was 31.4 ± 6.1 (range: 20–59). In terms of occupational distribution, 61.8% were nurses, 25.5% were doctors, and 12.7% were midwives. While 56.4% of the health personnel had undergraduate education, the ratio of personnel with graduate education was 40%. Approximately half of the health personnel have been working for more than five years. The distribution of the working period of healthcare workers in neonatology area was as follows; 45.5% have worked for 1–5 years, 40.0% have worked for 6–11 years, and 14.5% have worked for 12 years or more.

65.5% of the respondents stated that they were not satisfied with the current umbilical cord clamp. When asked if they had any problems with the conventional clamp, 54.5% indicated that they had difficulty locking and 60% reported that clamp tend to slip from their hand while using. Also, 76.4% of the respondents

stated that they observed various degrees of family anxiety until the umbilical cord dried up and fell off and 67.3% noticed that the families wrapped a fabric around the cord and clamp. 74.5% of the healthcare workers thought that they needed a different design clamp.

No statistically significant difference was found between the age, education level, occupation, total working years, and satisfaction of health workers with traditional clamp ($p>0.05$). A statistically significant difference was found between the duration of work and the satisfaction with the traditional clamp among personnel working in the area of neonatology. The clamp satisfaction rates of the staff whose working period is 12 years or older decreased significantly ($p=0.025$).

DISCUSSION

The observations of the researchers indicate that mothers and healthcare personnel complain about some problems arising from the umbilical cord clamps and try taking some precautions during the use of the conventional clamp. The literature review conducted to determine the issues related to the use of the current umbilical clamps by mothers and health personnel, yielded no result in this area.

Because of the satisfaction surveys of the traditional umbilical cord clamp applied to the mothers, we noticed that most of the mothers perceive the umbilical clamps as big, and more than half of the them encountered problems while dressing the baby. One-third of the mothers were worried about the traditional clamp pricking the baby’s belly or cause skin irritation (Table 6). In a study conducted by Jain et al.⁶, it was found that breastfeeding positions were negatively affected as the mothers were worried that the clamp would prick the baby’s skin.

When asked about possible design clamp ideas, two-thirds of the mothers reported that they needed a different design and nearly half of the mothers indicated that they wanted a smaller clamp. We think that the aesthetic aspect of the clamp design, which dates back to the 1960s, was not paid enough attention as it functions flawlessly. Considering that medical instruments and devices have the common goal of improving the quality of healthcare, we can say that designing a smaller and more ergonomic clamp will reduce the worries and provide more comfortable care.

The clamp satisfaction of mothers living in the urban areas and who had one child was lower than the other groups. We think that this may be due to their greater access to healthcare and education in the urban areas. The negative experience about the traditional clamp in families with fewer children may be less than in families with multiple children. Studies have found that primiparous mothers lack information about infant care, development, and diseases, and mothers’ level of anxiety about infant care decreases with education and counseling provided by

Table 1. Mothers' satisfaction and problems experienced with traditional umbilical cord clamp (n=150)		
Satisfaction and problems of mothers with traditional clamp	Number (n=150)	Percentage (%)
Traditional clamp dimensions satisfaction		
Yes	67	44.7
No	83	55.3
Not satisfied with traditional clamp (reasons)*		
Too big	69	46
Worried about pricking the skin	7	4.6
Too rigid	4	2.6
Hook to the baby's clothes	7	4.6
Too long	7	4.6
May irritate the skin	4	2.6
Opinions about traditional clamp sizes		
Smaller than necessary	2	1.3
Normal	51	34
Bigger than necessary	97	64.7
Clamp problems*		
I had no problems	55	36.6
Hooking to the baby's clothes	80	53.3
Pricking the skin	45	30
Bleeding from the cord because the clamp opened	9	6
Wrap something around the cord		
Wrapping	53	35.3
Not wrapping	97	64.7
*More than one answer was accepted, n: number.		

Table 2. Mothers' views on a possibly different umbilical cord clamp design (n=150)		
Mothers' views on a possibly new design	Number (n=150)	Percent (%)
Current clamps need new design		
Yes	100	66.7
No	50	33.3
How should the new design of the clamp be?		
Should close safely	3	2
Should be soft	16	10.6
Should be smaller	74	49.3
Should be with rounded corners	4	2.6
Should be thinner	4	2.6
Should be oval	17	11.3
Should be shorter	3	2
Other*	18	12
*Rope-shaped, bead-shaped, colorful, animal figured. The statements are combined as other. n: number.		

Table 3. Comparison of demographic characteristics of mothers and satisfaction with the traditional clamp (n=150)

Socio-demographic characteristics		Satisfaction with traditional clamp			X ²	df	p-value
		Total n (%)	Yes n (%)	No n (%)			
Age	18–23	11 (7.3)	3 (4.5)	8 (9.6)	5.308	3	0.151
	24–29	37 (24.7)	22 (32.8)	15 (18.1)			
	30–35	68 (45.3)	29 (43.3)	39 (47.0)			
	35+	34 (22.7)	13 (19.4)	21 (25.3)			
Education	High school	37 (24.7)	13 (19.4)	24 (28.9)	3.570	2	0.168
	Undergraduate	66 (44.0)	35 (52.2)	31 (37.3)			
	Postgraduate	47 (31.3)	19 (28.4)	28 (33.7)			
Employment	Employed	105 (70.0)	48 (71.6)	57 (68.7)	0.155	1	0.693
	Unemployed	45 (30.0)	19 (28.4)	26 (31.3)			
Income status	Income less than expense	27 (18.0)	13 (19.4)	14 (16.9)	1.807	2	0.405
	Income equal to expense	86 (57.3)	41 (61.2)	45 (54.2)			
	Income is more than expense	37 (24.7)	13 (19.2)	24 (28.9)			
Social security	Yes	139 (92.7)	60 (89.6)	79 (95.2)	1.728	1	0.220
	No	11 (7.3)	7 (10.4)	4 (4.8)			
Place of residence	Rural	15 (10.0)	3 (4.5)	12 (14.5)	4.103	1	0.043*
	City	135 (90.0)	64 (95.5)	71 (85.5)			
Family type	Elementary family	131 (87.3)	57 (85.1)	74 (89.2)	0.558	1	0.455
	Extended family	19 (12.7)	10 (14.9)	9 (10.8)			
Number of pregnancies	1	81 (54.0)	41 (61.2)	40 (48.2)	3.329	2	0.189
	2	43 (28.7)	18 (26.9)	25 (30.1)			
	3 and above	26 (17.3)	8 (7.5)	18 (16.9)			
Number of living children	1	93 (62.0)	49 (73.1)	44 (53.0)	7.007	2	0.030*
	2	40 (26.7)	14 (20.9)	26 (31.3)			
	3 and above	17 (11.3)	4 (6.0)	13 (15.7)			
Total		150 (100)	67 (100)	83 (100)	-		

Significant values are shown in bold.

*p<0.05 level of significance, n: number.

healthcare workers.^{7,8} We found that approximately half of the mothers who were employed, who had lower education, and middle-income mothers were more likely to wrap the umbilical cord with a cloth. Wrapping the umbilical cord with a non-sterile fabric or drapes increases the risk of infection and adversely affects the healthy drying of the umbilical cord. The umbilical cord should be kept as dry and clean as possible. The wrapping of the cord is mostly done to prevent the traditional clamp traumatizing the abdominal skin of the newborn. This result suggests that mothers' education and income levels may adversely affect their awareness of cord care. Nearly half of the mothers who had only one child wrapped a cloth around the clamp. This is thought to be the result of mothers' concerns about baby care when they have children for the first time. Published studies determined that education level, employment, and income status were important

variables affecting neonatal infant care. It was determined that prenatal health education, given to mothers expecting their first baby reduced mothers' anxiety and increased correct practices in infant care.⁹⁻¹¹

We found that mothers in the younger age group experienced more problems related to the clamps and it is a fact that women who give birth at an early age are less experienced in terms of infant nutrition and care compared to older women.^{12,13} Also, we found that a large proportion of women living in the urban setting had more problems with the umbilical clamp. Women living in the city do not have difficulty accessing health education, health institutions, social media, and health personnel and it can be stated that their satisfaction with cord care and clamp compared to women living in the

Table 4. Comparison of demographic characteristics of mothers and wrapping the cord (n=150)

Socio-demographic characteristics		Wrapping the cord with a cloth			X ²	df	p-value
		Total n (%)	Yes n (%)	No n (%)			
Age	18–23	11 (7.3)	7 (15.2)	4 (3.8)	6.711	3	0.082
	24–29	37 (24.7)	11 (23.9)	26 (25.0)			
	30–35	68 (45.3)	17 (37.0)	51 (49.0)			
	35+	34 (22.7)	11 (23.9)	23 (22.1)			
Education	High school	37 (24.7)	20 (43.5)	17 (16.3)	13.199	2	0.001*
	Undergraduate	66 (44.0)	17 (37.0)	49 (47.1)			
	Postgraduate	47 (31.3)	9 (19.6)	38 (36.5)			
Employment	Employed	105 (70.0)	27 (58.7)	78 (75.0)	4.037	1	0.045*
	Unemployed	45 (30.0)	19 (41.3)	26 (25.0)			
Income status	Income less than expense	27 (18.0)	13 (28.3)	14 (13.5)	6.290	2	0.043*
	Income equal to expense	86 (57.3)	26 (56.5)	60 (57.7)			
	Income is more than expense	37 (24.7)	7 (15.2)	30 (28.8)			
Social security	Yes	139 (92.7)	43 (93.5)	96 (92.3)	0.064	1	0.549
	No	11 (7.3)	3 (6.5)	8 (7.7)			
Place of residence	Rural	15 (10.0)	8 (17.4)	7 (6.7)	4.027	1	0.047*
	City	135 (90.0)	38 (82.6)	97 (93.3)			
Family type	Elementary family	131 (87.3)	37 (80.4)	94 (90.4)	2.854	1	0.091
	Extended family	19 (12.7)	9 (19.6)	10 (9.6)			
Number of pregnancies	1	81 (54.0)	18 (39.1)	63 (60.6)	5.964	2	0.051
	2	43 (28.7)	17 (37.0)	26 (25.0)			
	3 and above	26 (17.3)	11 (23.9)	15 (14.4)			
Number of living children	1	93 (62.0)	20 (43.5)	73 (70.2)	11.649	2	0.003*
	2	40 (26.7)	16 (38.4)	24 (23.1)			
	3 and above	17 (11.3)	10 (21.7)	7 (6.7)			
Total		150 (100)	46 (100)	104 (100)			

Significant p-values are shown in bold

*p<0.05 level of significance, n: number.

rural areas was because of their increased awareness of care. In addition to the problems experienced by the families regarding the clamp, we observed that the healthcare workers experienced some problems (difficulty in locking the clamp, slipping from hand when inserting, spontaneous clamp opening and cord bleeding) in the clinic. More than half of the healthcare staff reported that they unsatisfied with the traditional clamp dimensions and the majority stated that the clamps tended to slip from their hands while applying. Additionally, a significant portion of the health team stated that the families were worried until the umbilical cord fell off and that most of the families tended to wrap something around the cord and clamp. Most of the healthcare personnel agreed to need in a different design.

Our findings suggest that healthcare personnel experienced similar problems to those we have observed during our practice. We also found that the satisfaction of more experienced healthcare personnel in the area of neonatology was significantly lower.

CONCLUSION

The currently used umbilical cord clamps were designed to provide secure clamping of the cords of various thicknesses and apparently the appearance and size of the clamp were not considered a priority compared to its functionality. However, our observations and the results obtained from the surveys agree with the fact that parents and health personnel frequently raise doubts and experience problems about the traditional clamps.

Table 5. Comparison of mothers' demographic characteristics with their problems with traditional clamps (n=150)

Socio-demographic characteristics		Problems with the clamp**			χ ²	df	p-value
		Total n (%)	Yes n (%)	No n (%)			
Age	18–23	11 (7.3)	11 (12.2)	0 (0.0)	9.713	3	0.021*
	24–29	37 (24.7)	22 (24.4)	15 (25.0)			
	30–35	68 (45.3)	41 (45.6)	27 (45.0)			
	35+	34 (22.7)	16 (17.8)	18 (30.0)			
Education	High school	37 (24.7)	26 (28.9)	11 (18.3)	2.557	2	0.279
	Undergraduate	66 (44.0)	39 (43.3)	27 (45.0)			
	Postgraduate	47 (31.3)	25 (27.8)	22 (36.7)			
Employment	Employed	105 (70.0)	57 (63.3)	48 (80.0)	4.762	1	0.029*
	Unemployed	45 (30.0)	33 (36.7)	12 (20.0)			
Income status	Income less than expense	27 (18.0)	16 (17.8)	11 (18.3)	0.830	2	0.660
	Income equal to expense	86 (57.3)	54 (60.0)	32 (53.3)			
	Income is more than expense	37 (24.7)	20 (22.2)	17 (28.3)			
Social security	Yes	139 (92.7)	85 (94.4)	54 (90.0)	1.046	1	0.349
	No	11 (7.3)	5 (5.6)	6 (10.0)			
Place of residence	Rural	15 (10.0)	13 (14.4)	2 (3.3)	4.938	1	0.026*
	City	135 (90.0)	77 (85.6)	58 (96.7)			
Family type	Elementary family	131 (87.3)	81 (90.0)	50 (83.3)	1.446	1	0.229
	Extended family	19 (12.7)	9 (10.0)	10 (16.7)			
Number of pregnancies	1	81 (54.0)	47 (52.2)	34 (56.7)	3.994	2	0.136
	2	43 (28.7)	23 (25.6)	20 (33.3)			
	3 and above	26 (17.3)	20 (22.2)	6 (10.0)			
Number of living children	1	93 (62.0)	55 (61.1)	38 (63.3)	2.367	2	0.306
	2	40 (26.7)	22 (24.4)	18 (30.0)			
	3 and above	17 (11.3)	13 (14.4)	4 (6.7)			
Total		150 (100)	90 (100)	60 (100)			

*p<0,05 level of significance, **Irritation, pricking, hooking to the clothes.
n: number.

MAIN POINTS

- Conventional design umbilical cord clamps are being used for a long time without a major change in the design. Families and health professionals frequently express concerns about the problems they experience with the clamp.
- Most of the families stated that the clamp was hooked by the baby’s clothes and they were afraid that the umbilical cord would break off.
- Health professionals mostly stated that the clamp tend to slip from their hands during application.
- Both families and health professional emphasized the need for a different umbilical cord clamp design.

ETHICS

Ethics Committee Approval: This study was approved by Near East University Ethics Committee (YDU/2018/55-520).

Informed Consent: The aim of the study was explained both verbally and written, and an informed consent form was obtained from the participants.

Peer-review: Externally peer-reviewed

Authorship Contributions

Concept: B.M., G.V., Design: B.M., G.V., Data Collection and/or Processing: B.M., G.V., Analysis and/or Interpretation: B.M., G.V., Literature Search: B.M., G.V., Writing: B.M., G.V., Critical Review: B.M., G.V.

Table 6. Satisfaction of healthcare personnel with traditional umbilical cord clamps (n=55)

Traditional health professionals clamping opinions		Number (n=55)	Percent (%)
Satisfied with the clamp dimensions	Yes	14	25.5
	No	36	65.5
	Undecided	5	9
Encountered a problem with the clamp	Yes	30	54.5
	No	21	38.2
	Undecided	3	7.3
Clamp tends to slip from hand while clamping	Yes	33	60.0
	No	13	23.6
	Undecided	9	16.4
Families are worried until the clamp falls off	Yes	42	76.4
	No	5	9.1
	Undecided	8	14.5
Families wrap the cord and the clamp	Yes	37	67.3
	No	11	20.0
	Undecided	7	12.7
We need a different design	Yes	41	74.5
	No	4	7.3
	Undecided	10	18.2

n: number.

DISCLOSURES

Conflict of Interest: The authors declare no conflict of interest.

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