



# Comparison of Verbal Explanations, Graphics, and Film Presentations for Increasing Parental Satisfaction with Lumbar Puncture Performance in Children with Febrile Seizure

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### ABSTRACT

**Introduction:** The present study aimed to determine the effect of training parents through films, posters/graphics, and verbal explanations on increasing their satisfaction with lumbar puncture performance.

**Methods:** This cross-sectional quasi-experimental study was conducted on children with febrile seizures referred to the Emergency and Pediatric Wards of hospitals affiliated with Mashhad University of Medical Sciences. They were LP candidates; however, their parents did not consent to this procedure. The children were randomly assigned to three groups. In the first group, videos of the location and method of LP were presented to the parents. The second group received this information via posters, and the parents in the third group were given verbal explanations.

**Results:** The children included 49 (4.54%) females with a mean age of 15 months. There was a significant relationship between the reason for parental refusal of LP and their final satisfaction ( $P=0.022$ ). There was a significant relationship between parents' satisfaction with LP and their education ( $P=0.029$ ). The film method had the lowest chance of success, while the verbal explanation method had the most remarkable success in enhancing parental satisfaction ( $P= 0.013$ ).

**Conclusion:** Although posters and videos were less effective than verbal explanations, they increased satisfaction with LP in some parents. It is more beneficial to try to alter parental misperceptions of LP in non-emergency situations.

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### Introduction

One of the goals of the World Health Organization in children's health is to reduce the incidence of diseases and enhance early diagnosis and treatment. Viral and bacterial infections, which are common among infants and children, may spread to the central nervous system, leading to primary or secondary infections in the nervous tissue. One of the diagnostic tests is taking cerebrospinal fluid or Lumbar Puncture (LP) (1), which is an essential diagnostic tool in a wide range of pediatric

clinical conditions. A common indication is to diagnose or rule out serious intracerebral infections in febrile children. Its likelihood of success can be increased with proper position, technique, and the operator's skill.

Central nervous system infection in children is associated with significant morbidity and mortality worldwide. Early diagnosis and treatment are critical to the improvement of outcomes. The LP has been recognized as the most common method to take spinal fluid for diagnosing and managing these infections for

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more than a century. Nowadays, LP plays a role in diagnosing and treating several central nervous system disorders in children (2). Nonetheless, LP is postponed or ignored in hospitals due to parents' concerns regarding the supposed complications and their limited experiences.

Families should be convinced that the real benefits of early meningitis detection outweigh the potential risks associated with LP (3). Refusal rates of LP have been reported to be as high as 30% in developing countries. Without LP, patients may receive suboptimal treatment or suffer from potential complications in the future (4). Considering the invasiveness and difference of LP from other common tests in children, usually, anxious parents may disagree with LP and even disturb the diagnosis and treatment process. Although this issue is almost common, a few studies have been performed, especially in our country Iran (5).

According to previous studies, the side effects of LP, such as paralysis, give rise to considerable dissatisfaction among most parents. The other common reasons for LP refusal are fear of the child's death and infertility and the pain involved in this process. Considering the parents' lack of knowledge about using LP in diagnosing and treating children, it seems that raising parents' knowledge and changing their attitudes towards this procedure will improve their decision-making behavior (6).

Failure to perform LP leads to unnecessary empiric therapies, such as intravenous antivirals and broad-spectrum antibiotics, which increase the risk of drug resistance. Moreover, it increases the length of hospitalization, patient costs, and the overload of health services. Consequently, families should cooperate with doctors to make wise decisions to improve treatment results. Special attention should be devoted to parents' expectations and good communication among doctors, parents, and children in difficult situations (7, 8).

Considering the importance of performing LP in diagnosing and determining the treatment strategy, finding an appropriate way to raise parents' awareness of the benefits of this test and the disadvantages of its rejection helps make better interaction between medical staff and parents. Undoubtedly, on-time performance of LP leads to faster diagnosis and timely therapeutic interventions, as well as avoiding self-diagnosis in borderline cases (9, 10).

The present study aimed to investigate and compare the three methods of verbal explanation, graphics, and film presentation to increase satisfaction with the LP procedure in parents

who did not initially consent to this procedure.

## Materials and Method

This cross-sectional quasi-experimental study was conducted in the Emergency and Pediatric Wards of Qaem, Imam Reza, Dr. Sheikh, and Akbar hospitals affiliated with Mashhad University of Medical Sciences from April 2019 to May 2020.

### Inclusion and Exclusion criteria

The inclusion criteria included all the parents whose children were admitted to the emergency and pediatric wards of the studied hospitals and were candidates for performing LP but did not initially consent to this procedure. The unwillingness of the family to participate in the study was regarded as an exclusion criterion.

### Study design

The research instrument was a researcher-made checklist, including the children's demographic information. In order to fill out the checklist, the pediatric assistant in charge of the patient interviewed the parents of the patients who were candidates for LP but did not initially consent to LP after obtaining their verbal consent. After that, these parents were randomly assigned to three groups. One group was shown a video of the performance of LP with Persian subtitles, and the other group was shown a poster of the exact location of LP and its distance from the spinal cord. Finally, their level of satisfaction with the performance of LP was compared with that of the control group (interview and dialogue).

### Statistical analysis and sample size

In this study, the sample size was estimated at 57 subjects using the data in the study by Alwahbi (1), an alpha of 0.05, a beta of 0.2, and a "d" of 0. However, it was increased to 90 cases considering sample attrition. Accordingly, three groups of 30 people were included in the study.

$$n = \frac{Z_{1-\alpha/2} \cdot P(1-P)}{d^2}$$

The collected data were entered into SPSS software (Version 16). The mean and standard deviation were used to describe quantitative data, while tables and charts were used for qualitative data. The Chi-square test was employed to compare the variables between the studied subgroups. In all studies, a p-value less than 0.05 was considered statistically significant.

### Ethical consideration

This study has the ethics committee code of

IR.MUMS.fm.REC.1396.427. It was approved with code 960698.

## Results

The current study was conducted on 90 parents who initially disagreed with the performance of LP on their children. In this study, 30 families as the control group were provided with the necessary information about LP through verbal explanation, 30 through movie screenings, and 30 through viewing posters or graphs. The age range of the studied children varied from 0 to >5 years old. In this way, 24 (26.6%), 14 (15.5%), 25 (27.7%), 22 (24.4%), and 5 (5.5%) subjects were under one-month-old, 1-3-month old, 3-12-month old, 1-5-year-old, and older than 5, respectively. There was no significant relationship between the age of the children and grouping (control, video, and poster) ( $P=0.484$ ).

In the control group, out of 30 children, 16 (53.3%) were female, and 14 (46.7%) were male. In the video group, out of 30 children, 16 (53.3%) were female, and 14 (46.7%) were male. In the poster or graphics group, 17 (56.7%) were female, and 13 (43.3%) were male. There was no significant relationship between the gender of children and the grouping ( $P=0.956$ ). In the control group, 10 (33.3%), 10 (33.3%), and 10 (33.3%) cases were in good, bad, and uncertain general conditions, respectively. Meanwhile, in the film group, 12 (40%), 12 (40%), and 6 (20%) cases were in good, bad, and uncertain general conditions, respectively. In the graphics group, 18 (60%), 7 (23.3%), and 5 (16.7%) subjects were in good, bad, and uncertain general conditions, respectively. The data analysis demonstrated no significant relationship between children's general condition and grouping ( $P=0.206$ ).

In this study, 67 (74.4%) families lived in Mashhad, and 23 (25.6%) resided in other cities of Razavi Khorasan province. In the control group ( $n=30$ ), 23 (76.7%) children lived in Mashhad, and 7 (23.3%) children lived in other cities in the province. In the film group, 23 (76.7%) children lived in Mashhad, and 7 (23.3%) children lived in other cities in the province. In the graphics group, 21 (70%) subjects lived in Mashhad, and 9 (30%) resided in other cities of the province. No significant relationship existed between the families' city of residence and grouping ( $P=0.792$ ).

In terms of education, the parents of 1 (3.3%), 9 (30%), 8 (26.7%), and 12 (40%) children in the control group had no education, high school education, a diploma, and academic degrees, respectively. In the video group, the parents of 2 (6.7%), 17 (56.7%), 8 (26.7%), and 3 (10%) children had no education, high school

education, a diploma, and academic degrees, respectively. In the graphics group, the parents of 4 (13.3%), 15 (50%), 10 (33.3%), and 1 had no education, high school education, and a diploma, respectively; moreover, the parents of 1 (3.3%) child hold an academic degree. A significant relationship was observed between education and grouping ( $P=0.007$ ). Based on the results, higher education did not increase the chance of an agreement with the performance of LP (B coefficient = 2.88 and  $P=0.07$ ).

The reasons for parental refusal of offered pediatric LP were as follows: fear of child paralysis (30%), insufficient information about LP (16.7%), disbelief in the necessity of the test (11.1%), fear of child infertility (10%), fear of insufficient equipment and the skillful physician performing LP (9%), and other reasons (23.3%). A significant relationship was observed between the reasons for parental refusal of offered pediatric LP and grouping ( $P=0.022$ ). In the control and poster groups, most parents were worried about the child's paralysis, while in the film group, most parents were opposed to this procedure for other reasons.

In this study, 43 (47.7%) families agreed with the performance of LP, and 47 (52.3%) families did not. The LP was introduced via interviews, videos, and posters to 19 (44.2%), 8 (18.6%), and 16 (37.2%) parents who consented to LP. Meanwhile, 11 (23.4%), 22 (46.8%), and 14 (29.8%) parents who did not consent to LP received this information via interviews, videos, and posters, respectively. There was a significant relationship between parents' agreement or disagreement with LP and the method of introducing LP ( $P=0.013$ ). In this regard, film and poster methods were unsuccessful in obtaining parents' satisfaction. The level of satisfaction was higher in the verbal explanation method, followed by the poster method and film screening method.

According to the obtained data, out of the children whose parents consented to the performance of LP, 21 (48.8%), 15 (34.9%), and 7 (16.3%) cases were in good, bad, and uncertain general conditions, respectively. Moreover, out of the children whose parents did not consent to the performance of LP, 19 (40.4%), 14 (29.8%), and 14 (29.8%) cases were in good, bad, and uncertain general conditions, respectively. There was no significant relationship between parents' agreement or disagreement with the performance of LP and the child's general condition ( $P=0.317$ ).

Regarding residence, 34 (79.1%) parents who consented to LP lived in Mashhad, and 9 (29.9%) parents were from other cities in Razavi Khorasan province. Meanwhile, among the parents who did

not consent to LP, 33 (70.2%) resided in Mashhad, and 14 (29.8%) were from other cities in Razavi Khorasan province. There was no significant relationship between parents' agreement or disagreement with the performance of LP and their city of residence (P=0.336).

In terms of education, among the parents who consented to LP, 6 (14%) were illiterate, 16 (37.2%) had high school education, 10 (23.3%) had a diploma, and 11 (25.6%) had academic education. On the other hand, among the parents who did not consent to LP, 1 (2.1%) was illiterate, 25 (53.2%) had a high school education, 16 (34%) had a diploma, and 5 (10.6%) had academic education. There was a significant relationship between parents' agreement or disagreement with the performance of LP and parents' education (P=0.029). In this regard, illiterate and academically educated parents had a higher satisfaction level than other groups.

The distribution of parents' agreement and disagreement with LP based on the reason for parental opposition is displayed in Table 1. There was a significant relationship between parents' final agreement or disagreement with LP and the reason for parents' initial opposition (P=0.028). In this regard, the level of dissatisfaction with LP increased by fear of child paralysis, insufficient skills, defective equipment in the hospital, and disbelief in the necessity of LP.

Regarding gender, out of the children whose parents consented to LP, 23 (46.9%) were female, and 20 (46.5%) were male. On the other hand, out of the children whose parents did not consent to LP, 26 (55.3%) were female, and 21 (44.7%) were male. There was no significant relationship between parents' agreement or disagreement with LP and the child's gender (P=0.862). The distribution of parental agreement or disagreement with LP according to the child's age is illustrated in Table

**Table 1:** Distribution and percentage of parents' agreement or dissatisfaction with the performance of LP based on the reasons of parental opposition

LP	Frequency	Reasons of opposition						Total frequency	P Value
		Paralysis	Infertility	Other reasons	Lack of skill and equipment	Unnecessity	Lack of information		
Consent	Frequency	11	5	8	2	4	13	43	0.028
	LP	22.6%	11.6%	18.6%	4.7%	9.3%	30.2%	100%	
	Reason for opposition	40.7%	55.6%	38.1%	25%	40%	86.7%	47.8%	
Dissatisfaction	Frequency	16	4	13	6	6	2	47	
	LP	34%	8.5%	27.7%	12.8%	12.8%	4.3%	100%	
	Reason for opposition	59.3%	44.4%	61.9%	75%	60%	13.3%	52.2%	
Total	Frequency	27	9	21	8	10	15	90	
	LP	7.8%	45.6%	28.9%	17.8%	11.1%	16.7%	100%	
	Reason for opposition	100%	100%	100%	100%	100%	100%	100%	

LP: lumbar puncture \* Chi-square test was used to compare two groups

**Table 2:** Distribution and percentage of parental agreement or dissatisfaction with the performance of lumbar puncture according to the child's age

LP	Frequency	Age of children					Total frequency	P-Value
		Less than one month	One to three months	Three months to one year	One to five years	More than five years		
consent	Frequency	10	5	16	10	2	43	0.409
	LP	23.3%	11.6%	37.2%	23.3%	4.7%	100%	
	Age	41.7%	35.7%	64%	45.5%	40%	47.8%	
dissatisfaction	Frequency	14	9	9	12	3	47	
	LP	29.8%	19.1%	19.1%	25.5%	6.4%	100%	
	Age	58.3%	64.3%	36%	54.5%	60%	52.2%	
Total	Frequency	24	14	25	22	5	90	
	LP	26.7%	15.6%	27.8%	24.4%	5.6%	100%	
	Age	100%	100%	100%	100%	100%	100%	

: Lumbar puncture

2. There was no significant relationship between parents' agreement or disagreement with LP and the child's age ( $P=0.409$ ).

## Discussion

In this research, out of 90 participating parents, 43 (47.7%) consented to LP, and 47 (52.3%) did not. The obtained results indicated a significant relationship between parents' agreement or disagreement with LP and the method of introducing LP. In this regard, films and posters were less effective than conversation and oral explanation in enhancing satisfaction with LP in dissatisfied parents.

In this research, there was a significant relationship between parents' agreement or disagreement with LP and the reason for parents' initial opposition. In this regard, fear of the child's paralysis was a major cause of dissatisfaction with LP. In addition, there was a significant relationship between parents' satisfaction and dissatisfaction with LP and parents' education. The level of satisfaction with LP was higher in the two groups of illiterate and academically educated parents than in the other two groups (high school education and diploma). The present study pointed out that the child's age, gender, city of residence, and general condition did not significantly correlate with the level of satisfaction with LP.

In the study by Mahdizadeh et al. in Dr. Sheikh, Qaem, and Imam Reza hospitals in Mashhad in 2015, it was found that the performance of a 60-min educational program among 60 mothers whose children needed LP significantly reduced their concerns about the procedure ( $P=0.001$ ) (11). Although the mentioned study was carried out on mothers who were satisfied with LP (unlike our study, which was conducted on dissatisfied parents), it pointed to the critical role of educating parents in reducing their concerns (it should be mentioned during our literature review, the mentioned study was the most similar and the only study close to the present research).

In line with the current research, in a study by Mushtaq et al. in Pakistan on 215 children aged 0-12 years who needed LP, the main reason for parental refusal to perform LP was the fear of paralysis (2, 64.0%). Moreover, in line with the present study's findings, they reported that parental dissatisfaction was unrelated to the child's gender ( $P=0.1$ ) (12). In the study by Alwahbi et al. in 2018 in Saudi Arabia, 751 patients aged one month to 13 years had meningitis symptoms. When companions were asked to consent to LP, 44.3% disagreed, and 55.7% agreed. According to the results, the main

reason for children's dissatisfaction with LP was parents' fear of such side effects as paralysis (1). Consistent with the study by Alwahbi, the level of parental satisfaction with LP was 47.7%, and the dissatisfaction rate was 52.3%; moreover, fear of paralysis was a major concern of parents. These agreements can be ascribed to religious and cultural similarities between the participants of these two studies.

In the study by Nasma Naji Al-Hajjiah et al. in 2018 in Iraq on 74 parents whose children needed LP, 60.8% did not consent to LP. Inconsistent with the present study's findings, in the mentioned research, children's age and gender were related to parents' dissatisfaction, so the highest dissatisfaction rate was observed in the parents of boys under one year of age (13). In a study by Hassib Narchi et al. in the UAE in 2012, 24 parents participated, and the average age of children was 11.9 months. Similar to our study, parents' satisfaction showed no significant relationship with children's age and gender. Nonetheless, inconsistent with the current study, no significant relationship was found between parents' education level and satisfaction rate (14).

Similarly, another study by Wan Aliaa Wan Sulaiman in Malaysia in 2018 evaluated the attitude of 294 parents with an average age of 34 years, and the results demonstrated that parents' education level and occupation had a significant relationship with their attitudes. This relationship was also determined in our research regarding the education of academically literate parents. In the current study, an increase in final satisfaction was also observed in illiterate parents. This finding can be attributed to the fact that parents with academic education already had more information, listened more carefully during the doctor's explanation, and were less affected by non-specialists. Since the illiterate group did not have much information, they paid more attention to the doctor's advice and did not rely on themselves for decision-making. Nonetheless, the group with low levels of education had insufficient information, were more influenced by others, and were less likely to trust the doctor (4).

In another study, 96 families of university employees and 236 families with academic education were present. This study showed that the level of previous knowledge of the families had a positive relationship with their satisfaction with LP. However, the acquaintances' prior experience with LP had no relationship with their satisfaction or dissatisfaction (15). These results were slightly different from those obtained in the current study, in which the parents of 15 (16.7%) children did not consent to LP due to a lack of prior information.

However, in the current study, this finding was related to an increase in their final satisfaction.

In another study conducted by Acoglu et al. in Turkey in 2018, there were 84 patients with an average age of 6.4 years. Among the parents, 55 (65%) had no prior knowledge of LP. Major parental concerns for LP included paralysis (25%), subsequent infertility (2%), and disease progression (1%); however, in this study, only 5% of parents did not consent to LP (16).

## Conclusion

Considering the critical role of LP in the early diagnosis of meningitis, the high rate of parental refusal to perform this test faces doctors and patients with diagnostic and therapeutic challenges. In the current study, out of 90 families who initially did not consent to LP, 43 (47.8%) agreed to perform LP, and 47 (52.2%) did not. According to the results of this study, the most important cause of dissatisfaction was the fear of paralysis. It was also found that the parents' city of residence, the patient's general condition, and the age and gender of the children did not affect their level of satisfaction. In addition, there was a significant relationship between parents' satisfaction with LP and parents' education, so the level of satisfaction with LP was higher in the two groups of illiterate and academically educated parents than in the other two groups (high school education and diploma).

Furthermore, the results of this study pointed to a significant relationship between parents' satisfaction with LP and the method of introducing this procedure. In this regard, videos and posters were less successful than explanations and interviews in enhancing parental satisfaction with LP. Although posters and videos made some parents agree to LP, they were less effective than verbal explanations. It seems that an attempt to obtain parents' consent through videos or posters had less effect on reducing their concerns than giving them a verbal explanation. Moreover, it may evoke fear in some people with no positive impact on changing their opinion in anxiety-provoking situations. In fact, changing parents' misconceptions about LP would be more beneficial and give them more time to change their minds before their exposure to illness in non-emergency conditions.

## Study limitations

Among the notable limitations of this study we can refer to parents' unwillingness to participate in the study, fathers' presence at the children's bedside, and failure to interview fathers.

## Conflict of interest

The authors have no proprietary, financial, or other personal interest of any nature or kind in any product, service, and/or company presented in this article.

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