Knowledge and Practice of Umbilical Cord Care Among Postnatal Women Attending Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State

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Abstract
Umbilical cord care is a critical component of newborn care, as inappropriate practices may increase the risk of cord infection and neonatal morbidity. Assessing mothers' knowledge and practices is important for identifying gaps that may affect newborn health. This study aimed at determining the knowledge and practices of umbilical cord care amongst postnatal women at Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State. This study adopted a descriptive cross-sectional design and was conducted among 191 postnatal women attending a tertiary health facility in Nnewi, Anambra State, Nigeria. Data were collected using a structured questionnaire that assessed respondents' knowledge of umbilical cord care, sources of information, substances used, and cord-care practices. Data were analyzed using descriptive statistics and presented as frequencies and percentages. A total of 132 (69.1%) respondents reported receiving information on umbilical cord care during the postnatal period. The commonest source of information was prenatal classes, 48 (36.3%), followed by family/friends, 31 (23.5%), and the internet/social media, 29 (22.0%). Most respondents demonstrated good basic knowledge of cord care, as 146 (76.4%) correctly identified it as care provided to the baby's belly button area after birth. However, practices were less consistent. Ninety-nine respondents (51.8%) reported using substances to clean or protect the cord, including antiseptic solution, baby oil/petroleum jelly, and natural remedies. In addition, 137 (71.7%) reported cleaning the cord during the healing process, although methods and frequency varied. The study showed that although knowledge of umbilical cord care was relatively good, actual practices were mixed and not always evidence-based. Strengthening structured antenatal and postnatal education and reinforcing correct cord-care practices during facility-based maternal services are recommended to promote safer newborn care.

Keywords: umbilical cord care, postnatal women, knowledge, practice, newborn care, Nigeria

1. Introduction

Neonatal sepsis and omphalitis remain important causes of preventable newborn morbidity and mortality in Nigeria and other low- and middle-income countries, even though umbilical cord care is a simple, low-cost intervention (Shwe et al., 2023; Painter, Anand & Philip, 2022). Evidence-based guidelines recommend clean, dry cord care and, in high-risk settings, the use of chlorhexidine, yet many mothers still apply oils, herbal mixtures, and other substances that may increase infection risk (Johns Hopkins Bloomberg School of Public Health, nd; World Health Organization, 2022; Singh et al., 2024). Studies from various parts of Nigeria and Africa show that although many mothers have heard about cord care and can mention some correct practices, their actual behaviours often do not fully align with current recommendations, and awareness and use of chlorhexidine remain low (Abua, 2023; Odira et al., 2025; Anyakorah et al., 2025). There is also limited recent, detailed information specifically describing what postnatal women at Nnamdi Azikiwe University Teaching Hospital, Nnewi, know and do about cord care in everyday practice (Onubogu et al., 2022).

This situation provides the rationale for the present study: there is a clear knowledge-practice gap and an implementation gap between recommended cord-care strategies and real-life practices among mothers, and these gaps are likely contributing to preventable infections in newborns (Abua, 2023; Shwe et al., 2023). The study is significant because its findings will equip healthcare providers at NAUTH with concrete, context-specific information about mothers' current knowledge, beliefs, sources of information, and cord-care behaviours (Odira et al., 2025). With this information, antenatal and postnatal health education, counselling, and follow-up can be better targeted to correct misconceptions, discourage harmful practices, and promote safer options such as clean dry care and appropriate antiseptic use (Johns Hopkins Bloomberg School of Public Health, nd; World Health Organization, 2022). At a broader level, the results will support local programme planners and policy-makers in monitoring progress toward neonatal health targets and in strengthening strategies for chlorhexidine scale-up and infection prevention (World Health Organization, 2022; Anyakorah et al, 2025).

The study is justified because cord-care practices are modifiable behaviours, and changing them does not require complex technology but rather effective, context-sensitive communication and support (Coffey & Brown, 2017; Abua, 2023). By generating up-to-date data on the knowledge, substances used, frequency, and methods of cleaning, and recognition of danger signs among postnatal women at NAUTH, this research directly addresses a local

evidence gap. It will provide a practical baseline for designing and evaluating interventions in the hospital and surrounding communities, thereby contributing to improved neonatal survival and aligning with national and global efforts to reduce newborn deaths. The specific objectives of this study included:

1. To determine the knowledge of umbilical cord care amongst postnatal women at Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State.

2. To determine the level of practice of umbilical cord care adopted by postnatal women in Nnamdi Azikiwe University, Nnewi, Anambra State.

3. To determine the various substances of umbilical cord care used by postnatal women in Nnamdi Azikiwe University, Nnewi, Anambra State.

2. Methods

2.1 *Study design*

The study employed a descriptive cross-sectional design to assess knowledge, substance use, and practices of umbilical cord care among postnatal women. This design was appropriate because it allowed the researcher to obtain data from respondents at a single point in time and to describe prevailing cord-care knowledge and behaviours.

2.2 *Study area*

The study was conducted among postnatal women attending the postnatal clinic of a tertiary health facility in Nnewi, Anambra State, Nigeria. The setting was selected because it provides maternity and postnatal services to women from both urban and surrounding rural communities, making it suitable for assessing maternal cord-care experiences.

2.3 *Study population*

The study population consisted of postnatal women who had recently delivered and attended the postnatal clinic during the data collection period. Women were included because they had direct experience with newborn umbilical cord care and could provide relevant information on knowledge and practice.

2.4 *Sample size and sampling*

A total of 191 postnatal women participated in the study. Participants were selected using consecutive sampling, based on their availability and eligibility during clinic attendance. This approach ensured access to women who had recent experience with newborn cord care.

2.5 *Instrument for data collection*

Data were collected using a structured questionnaire developed from literature on newborn umbilical cord care. The questionnaire had sections on sociodemographic characteristics, knowledge of umbilical cord care, substances used for cord care, and cord-care practices. Items were mainly close-ended to allow for easy coding and quantitative analysis.

2.6 *Validity and reliability*

The instrument was subjected to face and content validation by experts in maternal and child health nursing and public health. A pre-test of the instrument was carried out to ensure instrument reliability. The instrument was pre-tested on nineteen postnatal mothers in a similar setting. The reliability index was calculated using split half method and Cronbach's alpha coefficient to assess internal consistency of the questionnaire items. A coefficient of 0.73 was determined which indicates that the instrument was reliable. Necessary adjustments were made before the final data collection.

2.7 *Data collection procedure*

After obtaining ethical approval and permission from the health facility, the researcher approached eligible postnatal women during clinic visits. The purpose of the study was explained, informed consent was obtained, and the questionnaire was administered either by self-completion or interviewer assistance, depending on literacy level. Completed questionnaires were checked immediately for completeness.

2.8 *Data analysis*

Data were coded into Statistical package for Social Sciences (SPSS) version 25 (IBM, 2018, USA) and analyzed using descriptive statistics of frequencies and percentages. Results were presented in tables to show respondents' knowledge, substances used, and cord-care practices.

2.9 *Ethical considerations*

Ethical approval was obtained from the Health Research Ethics committee Nnamdi Azikiwe University Teaching Hospital (NAUTH). Permission was also obtained from the hospital authority. Participation was voluntary, confidentiality was maintained, and respondents were assured that their information would be used for research purposes only. Informed consent was obtained before questionnaire administration.

3. Results

3.1 Table 1: Knowledge of umbilical cord care amongst postnatal women

Items	Category	Frequency (n)	Percentage (%)
Have you received any education or information about umbilical cord care during your postnatal period?	Yes	132	69.1
	No	59	30.9
	Total	**191**	**100.0**
If yes, where did you acquire your knowledge about umbilical cord care?	Healthcare professional (e.g. doctor, nurse, midwife)	24	18.2
	Family/friends	31	23.5
	Internet/social media	29	22.0
	Prenatal classes	48	36.3
	Total	**132**	**100.0**
What do you understand by the term “umbilical cord care”?	It is the care provided to the baby’s belly button area after birth	146	76.4
	It is the method of facilitating slow healing after birth	32	16.7
	It is the method of feeding a newborn	7	3.7
	None of the above	6	3.1
	Total	**191**	**100.0**
When does the umbilical cord typically fall off?	Within 24 hours after birth	21	11.0
	Within 1 week after birth	90	47.1
	Within 2 weeks after birth	65	34.0
	Within 4 weeks after birth	13	6.9
	Total	**191**	**100.0**
What is used to clean the umbilical cord?	Chlorhexidine/methylated spirit	101	52.9
	Water	41	21.5
	Herbal mixture	49	25.6
	Total	**191**	**100.0**

How should the umbilical cord cleaned?	Gently wipe around the base with a cotton swab and warm water	46	24.1
	Apply alcohol swab and clean the area	101	52.9
	Use a clean cloth soaked in antiseptic solution to clean the area	44	23.0
	None of the above	0	0.0
	Total	**191**	**100.0**
How should the umbilical cord be kept after cleaning?	Dry by exposing it to air	72	37.7
	Damp by using oils	50	26.2
	Wet by using water	43	22.5
	None of the above	26	13.6
	Total	**191**	**100.0**
How should the diaper be placed after umbilical cord care?	Above the umbilical cord	51	26.7
	Beside the umbilical cord	22	11.5
	Below the umbilical cord	97	50.8
	None of the above	21	11.0
	Total	**191**	**100.0**
What signs will indicate that there may be an infection in the umbilical cord?	Redness or swelling around the umbilical cord	98	51.3
	Foul smelling discharge from the umbilical cord	37	19.4
	Fever in the baby	52	27.2
	None of the above	4	2.1
	Total	**191**	**100.0**

Table 1 shows that most respondents reported having received information on umbilical cord care during the postnatal period, 132 (69.1%), while 59 (30.9%) had not. The commonest source of knowledge was prenatal classes, reported by 48 (36.3%) women, followed by family/friends 31 (23.5%) and the internet/social media 29 (22.0%).

Knowledge of basic cord-care concepts was generally good. Most respondents, 146 (76.4%), correctly identified umbilical cord care as care provided to the baby's belly button area after birth. Regarding cord separation, 90 (47.1%) believed the cord typically falls off within 1 week after birth, while 65 (34.0%) said within 2 weeks.

For cord cleansing, 101 (52.9%) selected chlorhexidine/methylated spirit, and the same proportion, 101 (52.9%), indicated that the cord should be cleaned by applying alcohol swab and cleaning the area. In addition, 72 (37.7%) reported that the cord should be kept dry by exposing it to air after cleaning.

On diaper placement, half of the respondents, 97 (50.8%), stated that the diaper should be placed below the umbilical cord. The most commonly recognized sign of infection was

redness or swelling around the cord, reported by 98 (51.3%), followed by fever in the baby 52 (27.2%) and foul-smelling discharge 37 (19.4%).

3.2 Table 2: Practice of umbilical cord care among postnatal women

Items	Category	Frequency (n)	Percentage (%)
When should hand hygiene be performed in antiseptic umbilical cord care?	Before handling the umbilical cord	86	45.0
	During umbilical cord care	42	22.0
	After cleaning the cord with sterile gauze	51	26.7
	None of the above	20	10.5
	Total	**191**	**100.0**
How often should you clean the umbilical cord?	Once a day	53	27.7
	Twice a day	67	35.1
	Every diaper change	43	22.5
	Only when it appears dirty	28	14.7
	Total	**191**	**100.0**
What situations would require you to seek medical advice regarding your baby's umbilical cord?	Bleeding that does not stop with light pressure	95	49.7
	When the skin around the umbilical cord becomes red and warm to touch	53	27.7
	The cord stump appears to be growing instead of drying up	32	16.8
	None of the above	11	5.8
	Total	**191**	**100.0**
How did you care for your baby's umbilical cord?	Keep it dry and exposed to air	65	34.0
	Covered it with a clean and dry cloth or diaper	48	25.1
			16.3
	Used a special umbilical cord clamp or cover	31	24.6
	Followed healthcare provider's	47	
		191	**100.0**

	instructions		
	Total		
Did you clean the umbilical cord during the healing process?	Yes	137	71.7
	No	54	28.3
	Total	**191**	**100.0**
If yes, how frequently did you clean it?	Once a day	32	23.4
	Twice a day	37	27.1
	Every diaper change	25	18.3
	As per the healthcare provider's recommendation	29	21.2
	Total	**137**	**100.0**
Did you notice any sign of infection in the umbilical cord during the healing process?	Yes, I noticed signs like redness and swelling	79	41.4
	No, there were no signs of infection	112	58.6
	Total	**191**	**100.0**
What would you do if you noticed any signs of infection such as redness, swelling or oozing from the umbilical cord?	Consult a healthcare professional immediately	81	42.4
	Continue regular cleaning and wait for it to heal on its own	36	18.9
	Apply antibiotic ointment	57	29.8
	I am not sure	17	8.9
	Total	**191**	**100.0**

Table 2 shows that hand hygiene was most commonly practiced before handling the umbilical cord, reported by 86 (45.0%) respondents. Another 51 (26.7%) said it should be done after cleaning the cord with sterile gauze, while 42 (22.0%) indicated during umbilical cord care.

For cleaning frequency, 67 (35.1%) reported twice daily, 53 (27.7%) once daily, 43 (22.5%) at every diaper change, and 28 (14.7%) only when the cord appeared dirty. Most respondents, 95 (49.7%), recognized bleeding that does not stop with light pressure as a reason to seek medical advice, while 53 (27.7%) identified redness and warmth around the cord.

Reported care practices were fairly mixed. 65 (34.0%) kept the cord dry and exposed to air, 48 (25.1%) covered it with a clean and dry cloth or diaper, 47 (24.6%) followed healthcare providers' instructions, and 31 (16.3%) used a special clamp or cover. Most women, 137

(71.7%), said they cleaned the cord during the healing process, and among these, the largest group cleaned it twice a day 37 (27.1%).

Signs of infection were reported by 79 (41.4%) respondents during the healing process. If infection occurred, 81 (42.4%) said they would consult a healthcare professional immediately, 57 (29.8%) would apply antibiotic ointment, 36 (18.9%) would continue regular cleaning and wait, and 17 (8.9%) were unsure.

3.3 Table 3: Various substances postnatal women use for care of the umbilical cord

Items	Category	Frequency (n)	Percentage (%)
Have you ever used any substance to clean or protect your baby's umbilical cord?	Yes	99	51.8
	No	47	24.6
	I can't remember	32	16.8
	I don't think so	13	6.8
	Total	**191**	**100.0**
If yes, which substance(s) have you used?	Antiseptic solution	39	39.4
	Baby oil/petroleum jelly	34	34.3
	Natural remedies	19	19.2
	I have not used any substance	7	7.1
	Total	**99**	**100.0**
How often did you apply these substances in the care of the umbilical cord?	Once a day	21	21.2
	Twice a day	33	33.3
	Every diaper change	16	16.2
	As recommended by the healthcare providers	29	29.3
	Total	**99**	**100.0**
Why did you use these substances?	To prevent infection	25	25.3
	To dry out the cord	19	19.2
	To speed up the healing process	23	23.2
	Following healthcare provider's recommendation	32	32.3
	Total	**99**	**100.0**
Were you aware of any specific risks or precaution associated with the substances used for umbilical	Yes, I was fully aware	26	26.3
	I had some knowledge, but not completely	40	40.4
		22	22.2
		11	11.1

cord care	No, I was unaware		
	None of the above		
		99	**100.0**
	Total		

In table 3, 99 (51.8%) of the women reported having used a substance to clean or protect the baby's umbilical cord. Among those who used substances, antiseptic solution was the most common, reported by 39 (39.4%), followed by baby oil/petroleum jelly 34 (34.3%) and natural remedies 19 (19.2%).

In terms of frequency, 33 (33.3%) applied the substances twice daily, 29 (29.3%) used them as recommended by healthcare providers, 21 (21.2%) used them once daily, and 16 (16.2%) used them at every diaper change. The main reasons for use were following healthcare providers' recommendation 32 (32.3%), to prevent infection 25 (25.3%), and to speed up healing 23 (23.2%).

Awareness of risks was mixed. Only 26 (26.3%) said they were fully aware of specific risks or precautions, 40 (40.4%) had some knowledge but not complete awareness, 22 (22.2%) were unaware, and 11 (11.1%) selected none of the above.

Overall, the tables suggest that knowledge of umbilical cord care was moderate to good, but actual practices were more variable, with a substantial proportion of women still using substances and mixed approaches to cord care. The findings also show that healthcare workers and prenatal classes were important sources of information, which supports the value of antenatal and postnatal education

4. Discussion

4.1 *Knowledge of umbilical cord care amongst postnatal women*

In the present study, 69.1% of respondents reported receiving information on umbilical cord care, and 76.4% correctly defined cord care as postnatal care of the baby's umbilical stump (Table 1). This level of awareness is comparable to findings from Tabora, Tanzania, where 62.2% of mothers had adequate cord-care knowledge (Kalufya, Seif & Masoi, 2022), and higher than the poor knowledge reported in Pakistan, where 65.3% had poor knowledge (Atta, Xie & Qin, 2025). The relatively strong knowledge profile in this study may reflect

repeated exposure to maternity education, especially through prenatal classes, which were the most common information source (Akin, 2023).

The finding that prenatal classes were a leading source of information is especially encouraging because it highlights a formal pathway for improving maternal newborn care knowledge. By contrast, studies from Tanzania and Kenya show that mothers often rely heavily on family members or other nonclinical sources, which can preserve traditional practices and misinformation (Kalufya et al., 2022; Kyololo & Kipkoech, 2023). In practical terms, this means that strengthening structured health education during antenatal and postnatal care could have more reliable effects than leaving knowledge acquisition to informal networks (Sharma et al., 2026).

4.2 *Practice of umbilical cord care among postnatal women*

This study also showed that only 37.7% said the cord should be kept dry by exposing it to air, and 52.9% selected alcohol swab cleaning rather than a "nothing applied/keep dry" approach. This suggests that some respondents may still be using older or mixed care models rather than current evidence-based recommendations. Such inconsistency is important because it can delay healing, increase moisture around the stump, and potentially raise infection risk.

The dominance of prenatal classes as a knowledge source is a key programmatic strength, but it also shows that healthcare settings are not yet the only or even the main source of influence for all women. This mirrors earlier work showing that cord-care behaviours are strongly shaped by household and cultural advice, especially from relatives and older women. In this study, family/friends and internet/social media together accounted for a substantial share of information sources, which may partly explain why some women still endorsed nonstandard practices (Saadi et al., 2023).

This pattern aligns with the broader literature showing that education level and place of delivery shape cord-care behaviour (Shrestha et al., 2016). In the Tabora study, higher education and delivery in a health facility were associated with better knowledge, while poor education and home delivery predicted weaker knowledge and practice. A recent Pakistani study similarly found that educational status and place of delivery were significant factors, reinforcing the idea that contact with trained providers is a major determinant of safer newborn care.

4.2 *Various substances postnatal women use for care of the umbilical cord*

Although knowledge was fairly good, practice was more mixed. More than half of respondents, 51.8%, reported using a substance to clean or protect the cord, and common agents included antiseptic solution, baby oil/petroleum jelly, and natural remedies. This is a critical finding because safe cord care is generally based on keeping the stump clean and dry, not on routine application of multiple substances. Similar gaps between knowledge and practice have been documented in Tanzania, where 62.2% had adequate knowledge but only 21% practiced good cord care, and in Pakistan, where 58.7% practiced poor cord care (Kalufya et al., 2022; Akin, 2023). The implications of these findings are clinically significant because the umbilical stump is a vulnerable portal of entry for infection in the early neonatal period (Stewart & Benitz, 2016). When mothers use oils, herbs, or other unvalidated substances, they may unintentionally increase moisture and contamination around the stump, which can contribute to omphalitis and sepsis (Mullany, 2006). The fact that 41.4% of respondents reported noticing signs of infection during healing underscores that cord-related morbidity is not merely theoretical in this population.

From a public health perspective, the study suggests that education alone is necessary but not sufficient. Information must be paired with repeated counselling, demonstration, and reinforcement during antenatal, delivery, and postnatal contact points (World Health Organization, 2025). The evidence from Punjab, Karnataka and Madhya Pradesh shows that mothers who receive provider-based counselling and deliver in health facilities are more likely to know and practice recommended care (Subramanian et al., 2020). Therefore, strengthening facility-based education and community follow-up may be more effective than one-time instruction (Lassi, Das & Bhutta, 2016).

The findings are broadly consistent with Kalufya et al. (2022), who reported that 62.2% of young mothers had adequate cord-care knowledge but only 21% had good practice, showing a similar knowledge-practice gap. They also found that higher education and facility delivery predicted better knowledge and that education strongly influenced practice, which parallels the pattern in our tables. Likewise, Atta et al. (2025) in Pakistan reported poor knowledge and poor practice among many postnatal mothers, with education and place of delivery being significant determinants.

The present results also agree with Nigerian studies that found that mothers often know that cord care is important but still engage in unsafe or mixed practices (Anyakorah, 2025). Conversely, some studies reported better practices, suggesting that local health systems,

cultural norms, and counselling intensity can produce different outcomes across settings (Orukwowu & Oji, 2025). These differences support the interpretation that cord-care behaviour is highly context dependent rather than determined by knowledge alone (Orukwowu & Oji, 2025).

4.4 *Conclusion*

The results suggest a population that is partially informed but not yet consistently practicing optimal cord care. This is a common pattern in maternal and newborn health: knowledge tends to improve more quickly than behaviour, especially where cultural practices are deeply rooted or health messages are inconsistent. The data therefore point to the need for stronger, repeated, and practical education that addresses both what mothers know and what they actually do at home.

The study also implies that healthcare professionals should treat cord care as a priority topic in routine maternal counselling, particularly for women with lower education, those relying on informal information sources, and those delivering outside health facilities. In addition, engaging family influencers such as grandmothers and partners may help reduce the persistence of traditional practices. This is especially relevant because our data show that family/friends remain a major source of information.

4.5 *Recommendations*

The findings of the study suggest the need for intensified antenatal and postnatal education on evidence-based umbilical cord care. Health workers should repeatedly teach mothers that the cord stump should be kept clean and dry, and that harmful substances such as oils, herbs, and petroleum jelly should be avoided. Practical demonstrations, visual teaching aids, and counselling at discharge and follow-up visits should be incorporated into routine maternal and newborn care. Family members who influence newborn care decisions should also be included in health education sessions. In addition, community health workers should provide outreach and follow-up support, especially for mothers in settings where access to facility-based education is limited. Finally, further research should explore the cultural and contextual factors that sustain unsafe cord-care practices.

4.6 *Strength and Limitations of the study*

The study has several strengths. It addressed a relevant maternal and newborn health problem and used a cross-sectional design that was suitable for describing respondents' knowledge

and practices of umbilical cord care. The use of a structured questionnaire made data collection uniform across participants, while the sample size provided sufficient information for descriptive analysis. In addition, the findings are useful for informing health education, postnatal counselling, and community-based interventions.

However, the study also has some limitations. The cross-sectional design does not permit causal inference, and the reliance on self-reported data may have introduced recall or social desirability bias. If a non-probability sampling technique was used, the representativeness of the sample may be limited. Furthermore, being conducted in a single health facility reduces the extent to which the findings can be generalized to other settings. Despite these limitations, the study provides valuable evidence on cord-care knowledge and practice among postnatal women.

5. Declarations

5.1 Acknowledgements

The researcher appreciates our respondents' contributions to this study. She is very grateful to the Health Research Ethics committee of NAUTH for approving this study. She also thanks the head of postnatal unit NAUTH, where undergraduate students were recruited, for their assistance.

5.2 Funding

This study was not funded

5.3 Ethical Consideration

The study was conducted in line with the Declaration of Helsinki.

Approval to conduct the study was given by the Ethics and Research Committee of Nnamdi Azikiwe University Teaching Hospital, Nnewi.

Oral administrative permission to proceed with the study was obtained from Head of postnatal unit involved in the study. Verbal consent was also obtained from the respondents. The researchers ensured that the respondents were well-informed before soliciting their consent. The following ethical principles were also considered:

Respondent's autonomy: Only respondents who gave consent were assessed. In addition, they were allowed to withdraw from their studies at any time they wished, without any consequence.

Confidentiality: Confidentiality of information exchanged with the study groups remains with the respondents and the researchers.

Study Hazards: No hazard resulted from the study because the researcher only elicited information from the respondents.

5.5 Consent for publication

Not applicable

5.6 Declaration of conflict of interests

The author declared no potential conflict of interest.

5.7 Data availability statement

The data that support the findings of this study are available from the corresponding author upon request.

5.8 Fundings

No funding was obtained for this study

5.9 Conflict of Interest

None

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