Original Research Article

Quality of Life in Pediatric Cancer Patients

ABSTRACT

Background: In recent years the survival rates for children diagnosed with cancer has increased as result of successful treatment. Evaluation of health related quality of life during the process of treatments is important for recognition of acute dysfunction related to therapy and disease. **Aim** of the study is to identify the health-related quality of life in pediatric cancer patients and to detect the potential predictors of a total quality of life and its domains. **Material and Methods:** It is a cross-sectional study done on convenient sample of pediatric cancer patients. Their diagnosis was confirmed at pediatric hematology clinic and day care unit at King Abdulaziz University Hospital, Jeddah, Saudi Arabia.

Results: a total number of 51 children participated in this study, their age ranging from 8-15 years with mean 10.15± 2.52. Hematological malignancies represented 70.5% of the sample, with the highest percentage for acute lymphocytic leukemia (45%). The mean value of total quality of life is 73.48. The best scores of subscales were cognitive problems (92.54), communication (82.67), and nausea (76.86), otherwise poorer score was detected. Although the value of total quality of life was relatively good however visiting the hospital more than 3 times per month, male gender, duration of therapy and duration of diagnosis more associated with more pain and hurt, great worry and treatment anxiety. So, our **conclusion:** an early and continuous evaluation of these factors can supply the essential for interventions to enhance response to treatment.

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Key Words: Health-related quality of life; QOL; cancer; children.

1. INTRODUCTION

In recent years the survival rates for children diagnosed with cancer has increased as result of successful treatment. However, many studies reported that these treatments take part in the formation of physical and psychosocial weakness for cancer survivors [1].

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Globally, the incidence of cancer in children differs from 48 to 70 per million children less than 15 years of age [2]. The incidence of childhood cancer in some developed countries, such as in United State, Ireland, Switzerland, and in Australia has reported with rates of 15.3, 13, 13.5, and 16 per 100,000 children, respectively, however in Asia the data are generally lower [3-11].

In Saudi Arabia cancer in children about 8% of total cancer cases. The greatest prevalent cancers were leukemia (34.1%), lymphoma (15.2%), brain (12.4%), and kidney cancers (5.3%) [12].

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Concerning the children with cancer, evaluation of health related quality of life (QOL) during the process of treatments is important for recognition of acute dysfunction related to therapy and disease, in addition, to assessing predicted remaining dysfunction in long-term survivors [13,14]. Health related QOL targets a variation of aspects covering physical, mental and social areas [15].

Despite the enhanced survival statistics, malignancy in children remains a life-threatening condition, and act as a great challenge to both child and family. During treatment course, most children experience disagreeable physical adverse-effects [16].

This study designed to identify the health-related quality of life in childhood cancer patients and to detect the relationship between disease, treatment, and sociodemographic factors with the total quality of life and its subscales. Additionally, to

detect the potential predictors of a total quality of life and its subscales. To our knowledge, no similar study was found in search engine at Jeddah

2. MATERIAL AND METHODS

2.1 Study Design, Sampling and sitting

This study is a cross-sectional study and conducted on a convenient sample of pediatric cancer patients (We enrolled all cancer patients who came to the hospital from April to November ,2018). Their diagnosis was confirmed at pediatric hematology clinic and day care unit at King Abdulaziz University Hospital (KAUH), Jeddah, Saudi Arabia. Our inclusion criteria of the study including children 8-15 years of age, diagnosed with cancer for more than one month, and receiving cancer treatments during the time of data collection. Data collected by interviewing questionnaire. Ethical approval was obtained from the Institutional Review Board/Ethics Committee and informed consent taken from all parents of children in the study.

2.2 Study tool

Data collection tool is the Pediatric Quality of Life Cancer Module (PedsQL™ 3.0) [17], in addition to sociodemographic information. We used the Arabic version after taking consent from the authors, the study tool is valid and reliable [17-19]. It is intended to measure health related QOL domains specifically for pediatric cancer. It includes 8 fields with the entire of 27 items for the whole module; pain and hurt include 2 items, procedural anxiety, treatment anxiety, worry, perceived physical appearance, and communication, each one of them includes 3 items, whereas nausea and cognitive problems include 5 items for each [14].

Each item of the instrument is consisting of a 5-point Likert scale (0 = never a problem; 1 = almost never a problem; 2 = sometimes a problem; 3 = often a problem; 4 = almost always a problem. Then we transformed the scale to an equivalent score from 0 to 100, where 0 denoted the poorest quality of life and 100 denoted the greatest quality of life. The whole QOL is the mean of the scores for all fields, while QOL for

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each field is the mean of scores of its items. Moreover, we divided the score of whole QOL and fields into two grades, good scale which reflect the good quality of life (> 70) and poor scale (< 70) which reflect the poor quality of life.

Procedures associated with treatments: *a) intensity of therapy* ,which divided into three levels, low intensity had a score 1, represented the patients had surgery only and/or six months chemotherapy with a satisfactory prognosis, medium intensity had a score 2 , represented the patients with chemotherapy longer than 6 months with an intermediate prognosis, in addition to high intensity of treatment that referred to treatment according to high risk protocols, bone marrow transplantation, and/or diseases with less satisfactory prediction, it took score 3 [20,21]. *b) Rate of hospital visits:* classified into less than or equal to 3 and > 3 visits per month. *c) Treatment duration*: low duration represented ≤ 6 months, medium duration from 6 months to 1 year, and high duration denoted to ≥1 year. *d) Treatment phase*: it divided into two sets, one who is on-treatment (continue getting anticancer treatment) and the other who on the follow-up (cases completed their treatment and planned for interval follow up) [22].

2.3 Data Entry and Analysis

The data collected were analyzed using SPSS, version 16. Numerical data denoted by frequency while quantitative data existed as mean, and standard deviation (SD). We used independent sample t-test and analysis of variance (ANOVA) to detect the differences in total and mean subscale scores of the PedsQL3.0 cancer module between the studied variables. Binary logistic regression analysis test used to find out the predictors of total QOL and all subscale. P value < 0.05 was considered significant.

3. RESULTS

3.1 Characters of the study group:

A total number of 51 children participated in this study, 62.7% male and 37.3% female, their age ranging from 8-15 years with mean 10.52; median 8 years and 5.45 as mean family size. About 94.1% of them are non-Saudi and 5.9% are Saudi. 58.8% of children stopped the education, while 41.2% are continuous. Hematological

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malignancies represented 70.5% of the sample, with the highest percentage for acute lymphocytic leukemia (ALL) (45%). A high proportion of children (60.8%) were visiting the hospital more than 3 times per month. Regarding the type of treatment, most of them (88.2%) on chemotherapy treatment. Low intensity of therapy (54.9%) was more frequent than medium and high intensity (35.3% and 9.8%, respectively). (table 1). In addition, 72.5% of the participants had treatment duration less than one year at the time of data collection with a compliance rate of 98% of the sample. A high frequency of the children's mothers and fathers had educated (84.3% and 90.2%, respectively).

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3.2 PedsQL 3.0 subscales

Table 2, show mean scores of total health QOL and its subscales among the study group. The value of total health related QOL is 73.48 The best scores of subscales (greater than 70) were detected in three out of eight subscales which are cognitive scale (92.54), communication (82.67and nausea (76.86). while the lowest scores were found in procedural anxiety (60.78) followed by worry (61.76), pain & hurt (65.45) treatment anxiety (66.01) and perceived physical appearance (69.77).

3.3 Association between study group characteristics and PedsQL 3.0 subscales:

The influence of variables on total health related QOL and subscale were demonstrated in table 3. We observed that worry subscale was statistically great among patients visiting the hospitals more than 3 times per month than children visiting less than 3 times (P=0.03) and those with duration of diagnosis equal to one year or more in comparison to children with diagnosis duration less than one year (P= 0.01). However, pain and hurts statistically increased among male children than female (P=0.04). While treatment anxiety was statistically increased among children with duration of therapy equal to 1 year or more (P=0.03).

3.4 Predictors of health-related quality of life in the study group:

The binary logistic regression model represented in table 4 and showing predictors of health related QOL in each subscale. The most common predictors for pain and hurt subscale were gender, age at the time of diagnosis and duration of diagnosis. Males were more likely to have pain and hurt than female (AOR= 8.77), children diagnosed with the disease at age less than 7 years are more likely to have pain &hurt than those who diagnosed with cancer at an age equal to 7 years or more (AOR=4.74), and children with duration of diagnosis more than one year are more likely to feel pain and hurt than those with duration of diagnosis less than one year (AOR= 8.87), the differences were statistically significant. Children with a medium score of treatment intensity are likely to have more nausea than those with the low and high score (AOR=3.28). moreover, males likely to worry four times more than female (AOR=4.53).

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4. DISCUSSION

Our study reported that the score of total QOL in childhood cancer was 73.48 and seemed to be relatively good may be due to half of the study group had low intensity of therapy, this means good prognosis and short period of chemotherapy; other cause the parents may display passion and love in a trial to get away from the impendence of cancer. Simultaneously, the children promote their own protection, so the effect of the disease onto their QoL may be restricted. This result agrees with some studies done in different countries as United State (US), it was 73.6, 72.2 for the Indonesian, 71.02 for the Chinese mandarin child- hood cancer patients and 72.75 for Lebanon [23-27]. Moreover, our score is better than the results of the Pakistani study [14] which demonstrated a much lower total QOL score of 42.07 and 62.29 in the Egyptian study [1].

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In this study, although the mean value of total heath related QOL was relatively good and similar to the score of some developed countries, however we observed low mean value in pain and hurt; procedural anxiety, treatment anxiety; worry and perceived physical appearance subscales. We did not find any statistically significant effect when the total QOL compared with the social and medical

characteristic of study group, maybe due to small sample size. However, in some subscales, we found males experienced significantly more pain and hurt than females and this is compatible with regression model in our results which reported that the most common predictors for pain and hurt subscale were gender, as males feel pain seven times more than females. This result opposite to that reported from Lebanon, Egypt and US, [26, 1, 17], the reason may be due to the differences in study type or methodology or age of the participants. In addition to the gender we found also age at the time of diagnosis and duration of diagnosis (more than one year) were other predictors for pain & hurt and this like other study [13].

Additionally, we reported children with a duration of therapy more than one year suffer more treatment anxiety, may be due to high frequency of visiting the hospital and long duration of treatment or may have experience more pain during the procedures, this is in agreement with the results of Canadian and Lebanon studies [27,26].

Furthermore, great worry increased in children visiting the hospital more than three times per month and those with duration of therapy more than one year. such findings indicated more frequent exposure to hospital atmosphere and subsequently more therapy administration could be a leading reason. This results consistence with other results [13,1].

We observed that Children with a medium score of treatment intensity are likely to have more nausea than those with a low score, the explanation may be the medium intensity of treatment represents the cases treated with chemotherapy longer than six months according to the treatment protocol so they have more nausea than a lower score treatment which represents the surgery only and/or six months chemotherapy and this in agreement with results of some studies [1,13,28].

5.CONCLUSION AND RECOMMENDATION:

In this study although the total heath related QOL was relatively good however high frequency of visiting the hospital, male gender and long duration of therapy and

increased treatment intensity are associated with poor QOL in the subscales among childhood cancer patients. So, an early and continuous evaluation of these factors and predictors can supply the essential for interventions to enhance response to treatment and detection of children at risk of poor QOL during and after treatment. We recommend another studies in the same context and containing large number of children.

LIMITATION

This study includes some limitation like dependence on mothers' evaluations of their child's QOL. Although most of study group were older but there was a difficulty to asking them directly as they tended to be too ill to respond. In addition, we depend more on the mothers than fathers as because she tends to be more contact and care with the child during the period of disease and treatment. They more responsible for everything as medication, treatment and more likely to stay in the hospital with the child. This may influence parent's perception of child's QOL. Others have noted that the multiple different perspectives of QOL including the parent perspective are all important and contribute to our understanding of child health [29]. Although our sample was convenient, but we recruited all children visited the hospital during that period.

LIST OF ABBREVIATION

ALL: Acute Lymphocytic Leukemia
ANOVA: Analysis of Variance
AOR: Adjusted Odds Ratio
KAUH: King Abdulaziz University Hospital
PedsQL 3.0: Pediatric Quality of Life Inventory ™ 3.0 Cancer Module
QOL: quality of life
SD: Standard Deviation
SPSS: Statistical Package for the Social Sciences
US: United State

COMPETING INTERESTS

The authors declared that they have no competing interests.

CONSENT

Informed consent taken from all parents of children in the study with the guide lines of ethical committee .

ETHICAL APPROVAL

Ethical approval was obtained from the Institutional Review Board/Ethics Committee at Faculty of Medicine, King Abduaziz University.

Table 1: Demographic and medical characteristics of the study group.

Variable	Frequency (n=51) n (%)
Age /year	
Mean ± SD	10.15 ± 2.52
Rang	8-15
Median	8
Gender:	
Male	32 (62.7)
Female	19 (37.3)
Nationality:	
Saudi	3 (5.9)
Non-Saudi	48 (94.1)
Educational Status:	
Continuous:	21 (41.2)
Stopped	30 (58.8)

Type of malignancy:	
Hematological:	**36 (70.5)**
ALL (Acute Lymphoblastic Leukemia)	23 (45.0)
AML = Acute Myeloid Leukemia	5 (9.8)
chronic myeloid leukemia	1 (2.0)
HD = Hodgkin Lymphoma	4 (7.8)
NHD= non-Hodgkin lymphoma	3 (5.9)
Solid:	**15 (29.5)**
Brain tumor	6 (11.7)
Nephroblastoma	1 (2.0)
Skin cancer	1 (2.0)
Ewing's sarcoma	5 (9.8)
Adenocarcinoma	1 (2.0)
Malignant neoplasm of parotid gland	1 (2.0)
Hospital visits:	
Three times or less/ month	20 (39.2)
More than three times /month	31 (60.8)
Type of treatment:	
Chemotherapy	45 (88.2)
Radiotherapy	2 (3.9)
Surgical	4 (7.8)
Intensity of therapy:	
Low	28 (54.9)
Medium	18 (35.3)
High	5 (9.8)
Treatment phase:	
On-treatment	31 (60.8)
Follow up	20 (39.2)

ALL (Acute Lymphoblastic Leukemia), AML = Acute Myeloid Leukemia
chronic myeloid leukemia , HD = Hodgkin Lymphoma, NHD= non-Hodgkin lymphoma

Table 2: Mean scores of total health QOL and its subscales among study group.

Scale / subscale	No of items	Mean	Std. Deviation	Median
Total Quality of life		73.48	15.78	77.60
Pain & hurt	2	65.45	25.58	70.50
Nausea	5	76.86	24.69	90.00
Procedural Anxiety	2	60.78	34.85	66.66
Treatment Anxiety	3	66.01	33.41	75.00
Worry	3	61.76	30.51	66.66
Cognitive Problem	5	92.54	14.36	100.00

Perceived Physical appearance	3	69.77	27.02	75.00
Communication	3	82.67	28.52	100.00

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275 **Table 3: Association between study variables with total QOL and its subscales.**

	Total QOL	Pain & Hurts	Nausea	Procedural Anxiety	Treatment Anxiety
Age at diagnosis:					
<7 years (n=18)	72.30±15.18	84.02±29.01	80.83±18.96	57.87±34.82	62.03±32.36
≥ 7 years (n=33)	74.12±16.30	73.86± 29.70	74.69±27.35	62.37±35.30	61.61±29.96
t test	-0.38	1.18	0.94	-0.46	-0.48
P value	0.69	0.24	0.35	0.66	0.63
Gender:					
Male (n=32)	75.26±15.50	71.87±33.89	77.65±21.92	63.28±34.96	70.57±32.16
Female (n=19)	70.49±16.22	86.84±17.41	75.52±29.38	56.57±35.19	58.33±34.91
t test	1.04	2.07	0.29	0.66	1.27
P value	0.30	**0.04***	0.76	0.51	0.20

Family size:					
≤ 5 children (n=28)	73.63±15.87	81.25±26.24	76.07±27.05	63.09±33.44	63.69±35.73
> 5 children (n= 23)	73.30±16.03	72.82±33.21	77.82±22.04	57.97±37.05	68.84±30.89
t test	0.07	1.01	-0.25	0.51	-0.54
P value	0.94	0.31	0.80	0.60	0.58
Hospital visits:					
≤ 3 times/ month (n=20)	71.19±16.07	80.00±29.63	77.75±24.35	56.25±34.50	60.00±31.36
>3 times / month (n=31)	74.95±15.68	75.80±29.91	76.29±25.29	63.70±35.32	69.89±34.60
t-test	-0.82	0.49	0.20	-0.74	-1.03
P value	0.41	0.62	0.83	0.46	0.30
Type of treatment:					
Chemotherapy (n=45)	72.83±15.84	76.38±29.70	75.44±25.10	58.70±34.81	65.37±33.84
Radiotherapy (n=2)	81.19±2.87	56.25±44.19	77.50±31.81	70.83±41.24	75.00±35.35
Surgical (n=4)	76.92±20.13	1.00±0.00	92.50±15.00	79.16±36.32	68.75±36.24
F test	0.36	1.75	0.87	0.71	0.09
P value	0.69	0.18	0.42	0.49	0.91
Duration of diagnosis:					
≤ 6 months (n=24)	70.39±17.24	72.39±32.96	73.75±24.41	65.27±31.81	64.23±33.28
> 6 months (n=7)	85.00±8.19	85.71±24.39	77.85±27.21	63.09±40.78	90.47±12.19
≥ 1 year (n=20)	73.16±14.61	80.62±27.04	80.25±24.99	54.58±37.11	59.58±35.79
F test	2.46	0.73	0.37	0.52	2.40
P value	0.09	0.48	0.68	0.59	0.10
Therapy duration:					
≤ 6 months (n=32)	72.35±16.59	73.82±33.05	75.62±22.99	63.02±33.12	67.70±32.70
> 6 months(n=5)	81.56±6.98	82.50±24.36	89.00±11.40	53.33±39.79	91.66±11.78
≥ 1 year (n=14)	73.18±16.07	83.92±22.16	75.35±31.34	58.33±39.08	52.97±35.44
F test	0.73	0.63	0.66	0.20	2.76
P value	0.48	0.53	0.52	0.81	**0.03***
Intensity of treatment:					
Low (n=28)	72.12±17.53	76.78±30.37	76.42±23.48	62.20±34.43	68.45±31.12
Medium (n=18)	73.61±14.46	79.16±30.01	74.16±27.87	57.87±35.29	58.33±38.87
High (n=5)	80.66±8.49	75.00±29.31	89.00±19.49	63.33±42.73	80.00±20.91
F test	0.61	0.05	0.70	0.09	0.98
P value	0.54	0.94	0.49	0.90	0.38
Treatment phase:					
On-treatment (n=30)	73.69±16.72	75.40±31.37	74.67±24.66	64.78±33.31	70.16±31.6
Follow-up (n=21)	73.16±14.61	80.62±27.04	80.25±24.99	54.58±37.11	59.58±35.79
t-test	0.11	0. 61	0. 78	1.02	1.10
P value	0.90	0.54	0.43	0.31	0.27

≤ = less than or equal to > = More than * = significant (p< 0.05)

Continue table 3: Association between study variables with total QOL and its subscales.

Variables	**Worry**	**Cognitive Problem**	**Perceived Physical appearance**	**Communication**
Age at diagnosis:				
< 7 years (18)	62.03±32.36	91.38±14.93	64.35±27.23	75.00±31.95

≥ 7 years (33)	61.61±29.96	93.18±14.24	72.72±26.86	86.86±26.02
t test	0.04	-0.42	-1.05	-1.43
P value	0.69	0.67	0.29	0.15
Gender:				
Male (n=32)	66.92±30.26	95.00±8.13	73.17±25.37	83.59±29.59
Female (n=19)	53.07±29.68	88.42±20.75	64.03±29.40	81.14±27.33
t test	1.59	1.60	1.17	0.29
P value	0.11	0.11	0.24	0.77
Family size:				
≤ 5 children (n=28)	57.14±35.33	93.92±12.71	72.32±26.35	81.54±28.45
> 5 children (n= 23)	67.39±22.87	90.86±16.28	66.66±28.09	84.05±29.18
t test	1.19	0.75	0.74	-0.31
P value	0.23	0..45	0.46	0.75
Hospital visits:				
≤ 3 times/ month (n=20)	69.08±28.07	94.75±6.97	71.66±27.49	78.75±29.67
>3 times / month (n=31)	50.41±31.35	91.12±17.54	68.54±27.10	85.21±27.94
t-test	2.16	0.87	0.39	-0.78
P value	**0.03***	0.38	0.69	0.43
Type of therapy:				
Chemotherapy (n=45)	62.40±29.38	91.77±15.11	69.62±25.57	82.96±27.74
Radiotherapy (n=2)	87.50±17.67	95.00±0.00	87.50±5.89	1.00±0.00
Surgical (n=4)	41.66±41.94	1.00±0.00	62.50±47.87	70.83±43.30
F test	1.62	0.62	0.56	0.70
P value	0.20	0.54	0.57	0.49
Duration of diagnosis:				
≤ 6 months (n=24)	59.37±29.92	90.62±14.01	62.50±29.38	75.00±34.75
> 6 months (n=7)	91.66±10.75	98.57±3.77	75.00±26.78	97.61±6.29
≥ 1 year (n=20)	54.16±30.52	92.75±16.81	76.66±22.87	86.66±22.19
F test	4.64	0.82	1.69	2.11
P value	**0.01***	0.44	0.19	0.13
Therapy duration:				
≤ 6 months (n=32)	62.50±29.78	92.65±12.76	65.62±27.98	77.86±32.35
> 6 months (n=5)	66.66±38.64	96.00±5.47	76.66±27.25	96.66±7.45
≥ 1 year (n=14)	58.33±31.35	91.07±19.72	76.78±24.49	88.69±21.08
F test	0.15	0.21	1.01	1.39
P value	0.85	0.80	0.37	0.25
Intensity of treatment:				
Low (n=28)	60.11±30.62	92.50±13.50	65.77±28.26	74.70±33.44
Medium (n=18)	63.42±32.35	91.11±17.45	73.61±28.04	91.20±19.06
High (n=5)	65.00±28.50	98.00±2.73	78.33±11.18	96.66±7.45
F test	0.09	0.44	0.73	2.66
P value	0.91	0.64	0.48	0.08
Treatment phase:				
On-treatment (n=30)	66.66±29.96	92.41±12.83	65.32±28.87	80.10±32.03
Follow-up (n=21)	54.16±30.52	92.75±16.81	76.66±22.87	86.66±22.19
t-test	1.44	-0.07	-1.48	-0.79
P value	0.15	0.93	0.14	0.42

≤ = less than or equal to > = More than * = significant (p< 0.05)

Table 4: Binomial logistic regression showing predictors of health-related quality of life in study group.

	Pain & Hurts			Nausea			Procedural Anxiety			Treatment Anxiety		
	B	OR	P	B	OR	P	B	OR	P	B	OR	P
Gender: Male	2.06	7.85	**.04***	.05	1.05	.94	-.47	.62	.49	-.97	.37	.16
Age at diagnosis time: <7 years	2.55	4.74	**.04***	-1.02	.35	.14	.80	2.23	.21	.54	1.73	.39
Mother education: Educated	-1.20	.32	.28	-1.15	.315	.25	.64	1.90	.45	.67	1.96	.43
Hospital visits: > 3 time/m	.48	1.63	.54	.01	1.01	.98	.73	2.08	.24	.92	2.52	.14
Duration of diagnosis: > 1 year	2.18	8.87	**.04***	.04	1.05	.95	-.78	.45	.33	.43	1.54	.59
Therapy duration: > 1year	-.25	.77	.87	-1.97	2.72	.99	.72	2.06	.59	.64	1.91	.63
Intensity of treatment: Low	.06	1.06	.97	. 61	1.84	.69	-.34	.71	.80	.34	1.40	.79
Medium	-1.37	.25	.38	1.04	3.28	**.03***	-.75	.47	.51	-.47	.62	.68

B= β coefficient OR = odds ratio P= p value

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