

EFFECT OF AN EDUCATIONAL PROGRAM ON KNOWLEDGE AND PRACTICE OF NURSES CARING FOR NEPHROTIC CHILDREN

By

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Abstract

Pediatric nurses had unsatisfactory knowledge and practice as to care of nephritis syndrome children. The study evaluated the effect of an-educational program on knowledge and practice of nurses caring for nephritis children.

A quasi-experimental design was utilized on 57 pediatric nurses caring for nephritis syndrome children. Two tools were utilized for data collection; self-administered questionnaire sheet included personal characteristics of pediatric nurses, knowledge, and observational checklist for evaluation the nursing practices of children.

The results showed that majority of them had unsatisfactory knowledge and inadequate practice about nephritis syndrome before program implementation. This was significantly improved in immediate and 3 months after program implementation, with a positive correlation between nurses' knowledge, age and years of experience, also between nurses' practice, age, pediatric year and general experience.

Key words: Educational program, nephritis syndrome, Nurses, knowledge, practice, children.

Introduction

Nurses have a major role in teaching child and family to report immediately any changes in sensation, warmth, comfort or appearance (color, activity and edema). They may teach family how to monitor blood values for white blood count, initiate strategies to prevent infection by use aseptic technique, assess child urinary output, fluid intake and make balance to prevent hypervolemia, hematuria, to assess proteinuria, to prevent thrombosis, assess the treatment program or diuretic therapy, steroid therapy and immunization to prevent hypovolemic shock, hypertension, growth failure and iatrogenic (Ishikura *et al*, 2015). Nephrotic syndrome (NS) is usually due to a glomerular disease and categorized into primary and secondary forms. The primary NS or INS (90%), both terms denote a similar vagueness as to cause not associated with any underlying disease. Syndrome manifests with varied clinical and pathologic states. Term secondary NS (10%) relates to ream of clinical diseases affecting kidneys, such as anaphylactic purpura, systemic lupus erythematosus, diabetes mellitus, sickle cell disease, syphilis, neoplasms, dru-

gs and infections (Burgstein, 2008). It is characterized by edema, proteinuria, hypoalbuminemia, and hyperlipidemia. Minimal change disease, the most common cause in childhood, clinical evaluation involved distinguishing primary and secondary causes and monitoring for disease complications such as blood clots and risk infections as spontaneous bacterial peritonitis and massive protein loss in urine (Wang and Greenbaum, 2019).

Nursing consideration is very important for establishing a basic lines of care and family education: first, monitoring intake and output in young children and weighing the diapers, second, edema assessment by observing swelling around eyes and dependent area, third, diet should be restricted like salt and fluids and high protein during appearance of edema and fourth protected the child with nephritis syndrome from infection especially when the child was received corticosteroid therapy (Zyarah and Mua'ala, 2011).

A good nursing care helps child with nephrotic syndrome reduce sufferings and control illness condition effectively. It is an important part for patients to recover, so learning how to arrange a good nursing care is a

must for parents having child with nephrotic syndrome (Safaei and Maleknejad, 2009). Nurses must master knowledge about health illness, and human responses to each; they must be good leaders and good team members; they must think critically and creatively; they must both use and advance the science of nursing; they must participate in inter professional collaborations; they must be both caring and professional; and they must grapple with profound ethical dilemmas related to new technologies not dreamed of even a few years ago (Wong, 2014a).

This study was aimed to evaluate effect of an educational program on knowledge and practice of nurses caring for the nephritic children.

Research hypotheses: Nurses receiving an educational program would improve knowledge score in the post-test program.

Materials and Methods

Research design: A quasi- experimental design was utilized and the study was carried out on inpatient Department in Suez Canal University Hospitals and Ismailia Ministry Health & Population General Hospital.

Sample: The convenient sample of 57 nurses available were involved regardless their personal characteristics (sex, qualifications, training course(s) and years of experiences). The involved children had the following criteria: 1- Preschool and school children diagnosed as nephritic patient. 2- Free from any other disease.

Data collection by Tool I: Self-administered questionnaire sheet: (Pre/Post-Test) included the two following parts:

Part 1: A self-administered tool designed by the student based on the literature review; it was including items related to socio-demographic characteristics of pediatric nurses as age, sex, qualifications, years of general and pediatric experience, and whether they attended any training program as to health care of NS children.

Part 2: Nurses' knowledge regarding health care of NS: it includes definition, causes, signs and symptoms, warning signs, complica-

tions, diagnostic studies, management, side effect, relapse and nursing care. Each item of the part 2 of self- administered questionnaire sheet was given 1 score for correct answer and zero for wrong. Total score of nurses' knowledge about NS was 81 scores. The scores transferred to percentage as follows: Satisfactory knowledge $\geq 60\%$ or unsatisfactory knowledge $< 60\%$.

Tool II: An observational checklists: (pre/post-test) was adopted by the student to evaluate the following skills: 1- Urine analysis for albumin. 2- Care of edema. 3- Protect child from infection. 4- Measure vital signs and child anthropometric measures. The observational check list score was followed: Each step was given 1 score if done correctly and zero if not done or done incorrectly. Total check list score was 85 scores.

The scores transferred as adequate practice $\geq 60\%$, and inadequate practice $< 60\%$.

Tool III: Health Educational Program: The health educational program was developed by the student after reviewing the related literature on EKB & Pub-med to educate nurses about NS and care of nephritic children.

Validity of study tools: The content validity was tested by a jury consisted of three Professors expertise in Pediatric Nursing and Medicine to ascertain that the tools were relevant, understood, and applicable; with minor modifications were carried accordingly.

Tools reliability: Coefficient of reliability was measured by Cronbach's α (alpha). Cronbach alphas were calculated for the overall tested items of the studied nurses including total knowledge and total level of practice. Furthermore, a reliability test was conducted on the domains of the knowledge and practice. Reliability of knowledge scales exceeded the acceptable level (0.7 standards), while the reliability of each of practice scales exceeded the good level (0.8 standards).

Ethical considerations: The Helsinki Declaration Guidelines (2008) were critically followed. Each nurse was asked to give oral consent to participate in the study after full explanation of nature and the main aim of

the study and expected outcomes and benefits. Each participant was free to either participate or not in this study and had the right to withdraw from the study at any time without any rationale. The student assured voluntary participation, anonymity and confidentiality of the gathered data.

Procedure: Official permission was from

the proper communication channel. Approvals were kindly obtained from the Authorities of Suez Canal University's Hospitals, and the Authorities of Ismailia Ministry of Health & Population to carry out this practical field study.

Results

The results were given in tables (1, 2, 3, 4 & 5).

Table 1: Distribution of pediatric nurses as to personal characteristics (n=57).

Variations		No.	%
Age (years)	20-<30	41	72.0
	>30	16	28.0
Mean age \pm SD		26.5 \pm 5.3	
Sex	Male	7	12.3
	Female	50	87.7
Educational level	Diploma	25	43.9
	Technical Institute	28	49.1
	Bachelor	4	7.0
Experience in nursing generally	1-<6	30	52.6
	6-<11	15	26.3
	11+	12	21.1
Mean general experience \pm SD		7.2 \pm 5.5	
Pediatric experience	1-<6	41	71.9
	6-<11	12	21.1
	11+	4	7.0
Mean pediatric experience \pm SD		4.4 \pm 3.9	
Training courses	Yes	9	15.8
	No	48	84.2

Pediatric nurses (72%) with ages ranged from 20 to <30years (26.5 \pm 5.3), and 87.7% were females. Nurses 49.1% & 43.9% were Technical Institute and Diploma respectively, 52.6% had experience in general nursing (1 to <6 years), & 71.9% had pediatric nursing experience in (1 to <6years (4.4 \pm 3.9), but 84.2% didn't have training courses.

Table 2: Total nurses' knowledge scores before, immediate & 3 months after program implementation.

Variables	Before		Immediate		3 months' after		χ^{2Y}	p-value
	No.	%	No.	%	No.	%		
Satisfactory	29	50.9%	49	86.0%	44	77.2%	16.2	<0.0001**
Unsatisfactory	28	49.1%	8	14.0%	13	22.8%		

Highly significant improvement in immediate & 3 months after program (86% & 77.2%) p= <0.0001.

Table 3: Total nurses' practice scores of nephrotic syndrome children before, immediate & 3 months' after program implementation.

Variables	Before				Immediate				3 months' after				χ^{2Y}	p-value
	Pass		Not		Pass		Not		Pass		Not			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Nursing practice														
Axillary temperature	26	45.6	31	54.4	45	78.9	12	21.1	42	73.7	15	26.3	16.3	<0.0001**
Peripheral pulse	17	29.8	40	70.2	41	71.9	16	28.1	35	61.4	22	38.6	22.1	<0.0001**
Respiratory rate	6	10.5	51	89.5	30	52.6	27	47.4	28	49.1	29	50.9	26.6	<0.0001**
Blood pressure	24	42.1	33	57.9	40	70.2	17	29.8	37	64.9	20	35.1	10.5	0.005**
Height	15	26.3	42	73.7	41	71.9	16	28.1	39	68.4	18	31.6	29.7	<0.0001**
Weight	22	36.6	35	61.4	44	77.2	13	22.8	30	52.6	27	47.4	17.7	<0.0001**
Urine analysis	36	63.2	21	36.8	49	86.0	8	14.0	45	78.9	12	21.1	8.5	0.014*
Skincare during edema	15	26.3	42	73.7	38	66.7	19	33.3	35	61.4	22	38.6	22.0	<0.0001**
Protection of infection	25	43.9	32	56.1	39	68.4	18	31.6	34	59.6	23	40.4	7.2	0.027*
Total practice	21	36.8	36	63.2	41	71.9	16	28.1	36	63.2	21	36.8	15.5	<0.0001**

*Significant at <0.05, **highly significant at <0.01, χ^{2Y} =chi-square with Yates correction test, Fisher=Fisher's exact probability test.

Significant improvement in nursing practice included peripheral pulse, respiratory rate, blood pressure, height, weight, urine analysis, skincare during edema & protecting infection were immediate and after program implementation ($P = <0.0001$).

Table 4: Total knowledge score and demographic characteristics of pediatric nurses (n=57).

Variations	r- value	P-value
Age (years)	0.29	0.029*
Educational level	0.07	0.619
General experience/years	0.18	0.176
Pediatric experience/years	0.25	0.042*

*Significant at <0.05 , **highly significant at <0.01 .

Positive correlations were between total knowledge score, nurses' ages but with year of pediatric experience without correlation.

Table 5: Total practice score and demographic characteristics of pediatric nurses.

Variations	r- value	P-value
Age (years)	0.423	0.001**
Educational level (grades)	0.197	0.141
General experience (years)	0.320	0.015*
Pediatric experience (years)	0.318	0.016*

*Significant at <0.05 , **highly significant at <0.01 .

Significant positive correlations between total practice score and age at ($r=0.423$, $p=0.001$), general experience ($r= 0.320$, $p=0.015$), and with pediatric experience at ($r=0.318$, $p=0.016$).

Table 6: Correlations between total knowledge and total practice scores of nurses (n=57)

Total knowledge score	r- value	P-value
Total practice score	0.869	<0.0001 **

*Significant at <0.05 , **highly significant at <0.01 .

Strong positive correlation between total knowledge and total practice scores of pediatric nurses with significant difference ($P=<0.000$).

Discussion

Children are the most precious part of the nation's life and the biggest promise for the future; their life development and protection are a basic responsibility of the community and the family. Nurses working with children who have NS have a significant supportive role in helping the family understand various therapies, preventing or managing expected side effects or toxicities, and observing for late effects of treatment. Education is a constant feature of the nursing role especially in terms of new treatment, clinical trials, and home care (Wong *et al*, 2014).

The study results showed that slightly less than three quarters of the pediatric nurses' aged were at 20-30 years old. This agreed with Kahriman and Bostan (2017), they reported that the majority of the pediatric nurses age were between 20-29 years old, This also agreed with Jabber and Nasir (2017) in Kufa, who found that the majority of the pediatric nurses (control and study) ages were at 20-30 years old.

The current study results showed that the majority of nurses were females. This agreed with Mukhlif and Hattab (2016) in Baghdad, who reported that the largest number of recruited nurses were females.

In the present study, more than two fifth of pediatric nurses were graduated from Nursing Secondary School (Diploma), less than half of them were graduated from Technical Institute of nursing and less numbers were graduated from Faculty of Nursing (Bachelor Degree). This agreed with Mukhlif and Hattab (2016), who found that two fifth of pediatric nurses were graduated from Nursing Secondary School, more than one third of them were graduated from Technical Institute, but minority were graduated from Faculty of Nursing (Bachelor). This disagreed with Jabber and Nasir (2017), they reported that two fifth of nurses were graduated from Technical Nursing Institutes and Faculty of Nursing. Undoubtedly, the Egyptian Nurses reflected the distribution of the nursing qualifications, due to the so many Faculties and

Technical Institutes of Nursing

The current study results showed that more than half of the pediatric nurses less than six years of general experience in nursing and the majority of them have experience in pediatric nursing between 1-10 years of experience. This agreed with Mukhlif and Hattab (2016), who reported that higher percentage of study nurses were between 1-10 years of experience in Nephrology Units, but disagreed with Jabber and Nasir (2017), who reported that the majority of nurses were between (1-2) years of experience in Nephrology Units.

The present study reported that the majority of pediatric nurses didn't have any courses on nursing care of children with nephrotic syndrome, and minority of them attended training courses on different pediatrics topics. This disagreed with Jabber and Nasir (2017), who reported that majority of nurses have training courses. Yu and Han (2021) in China reported that the direct and indirect evidence to judge whether evidence-based nursing combined with clinical nursing pathway can improve the treatment and post-treatment prognosis in nephritic syndrome children.

The present study showed that the majority of pediatric nurses had unsatisfactory knowledge about causes and incidence of NS before implementing the educational program. This agreed with Mukhlif and Hattab (2016), who reported that the majority of the nurses had unsatisfactory knowledge regarding cause and incidence before program implementation due to lack in training services program whether in Faculty of Nursing or Ministry of Health Hospitals' Pediatric Units.

The current study showed that the majority of pediatric nurses have good knowledge about edema and clinical manifestations before program implementation, immediately and three months after implementing the educational program. Mohammed *et al.* (2017) in Egypt reported that there was significant difference before and after program implementation regarding to nurse's knowledge and

their practice.

The present study showed that as investigations to diagnose NS, the pediatric nurses have adequate knowledge regarding urine analysis for proteinuria, kidney imaging, and kidney function tests during treatment before implementing the educational program, but renal biopsy was the least known one before implementing the educational program. This agreed with Mukhlif and Hattab (2016), who reported that the knowledge was at a good level for majority of pediatric nurses' relative to disease diagnosis. White *et al.* (2011) in the UK, who reported that the NS diagnosis is mainly based on laboratory results and that most of NS children were treated initially without the risky kidney biopsy, if done a lesion other than MCNS was suspected.

The present study showed that the majority of nurses considered corticosteroids as the main NS treatment before program implementation, which was 100% improved after program implementation. But, this disagreed with Mukhlif and Hattab (2016), who found that knowledge, was at a poor level among majority of pediatric nurses as to NS treatment and management. This result might be due to the fact that the corticosteroid is the first choice drug to treat NS.

The present study revealed that slightly less than half of nurses reported renal failure as a complication of NS before program implementation. This agreed with Mukhlif and Hattab (2016), who reported that slightly less than half of nurses have knowledge about NS complications. On the contrary, Friedman (2010) reported that unlike other causes of NS, idiopathic NS didn't progress to chronic renal failure but frequent relapses among most children played a critical role in developing renal failure as complications of NS.

The present study showed that more than half of nurses mentioned edema or weight gain as the main side effect and two fifth of them mentioned moon face is the main side effect before the program and was improved after immediate program implementation. This agreed with Mukhlif and Hattab (2016),

who reported that slightly more than half of nurses have knowledge about medical side effects. No doubt, moon face is the side effects of the cortisone and easily recognized. Hockenberry and Wilson (2009) in USA reported that side effects of the steroids include weight gain, rounding of face, behavior changes, and increased appetite. They added that long term therapy caused hirsutism, growth retardation, bone demineralization and hyperglycemia.

The present study found that the majority of pediatric nurses have adequate knowledge as to relapse cause(s), the most NS warning signs and that oliguria/anuria and proteinuria are two warning signs of nephrotic syndrome but they realized that the exposure to people with contagious disease was warning signs of nephritis syndrome. Bendal (2009) reported that infection protection can be met via avoiding overcrowding; contagious disease people, and hand-washing. Pediatric nurses have knowledge about relapsing causes and warning signs as these facts are always discussed by the medical staff with parents of NS children.

The present study results more than half of the pediatric nurses had unsatisfactory knowledge to give health teaching on nephrotic syndrome before the program implementation, but total satisfaction level of health teaching was significantly improved after program implementation. Wong (2014b) in New Zealand, reported that health teaching may be nursing direct goal, such as during parenting classes, or may be indirect, such as helping parents and children understand a diagnosis and treatment by encouraging children to ask personal questions, referring families to health-related professional or lay groups and providing anticipatory guidance. No doubt, health teaching is one area in which nurses often need preparation and practice with competent role models because it involved transmitting information at child's and family's level of understanding and desire for information (Singh *et al*, 2022).

The present results indicated that the total

knowledge about Nephrotic syndrome showed that nearly half of the pediatric nurses got unsatisfactory scores before program implementation. This agreed with Mukhlif and Hattab (2016), who found that the majority of nurses had unsatisfactory knowledge as to caring of nephritic children before the program implementation. Also, Nishi *et al*. (2016) in Japan reported that original studies on nephrotic syndrome (NS) were done by the Ministry of Health, Labor and Welfare, NS Research Group. The first definition of NS was reported by the MHLW NS research group in 1973. Subsequently, the criteria for treatment effects were documented in 1974. Based on the continued clinical researches and social actions by the HLWM NS research group, the definition of refractory NS was determined in 1999. NS already treated with various agents, such as the steroids that didn't reach complete or incomplete remission within six months after treatment of the known as refractory NS.

The present results revealed that the majority of pediatric nurses' practices about the vital signs in nephrotic syndrome children were at a poor level before program. There were significant improvements immediate after the program implementation regarding measuring of vital signs, and found that the axilla is the choice site that commonly used to measure child temperature at hospitals to prevent infection also, nurses use it as a simple way as compared to oral or rectal. Waly and Bakry (2022) reported that the Egyptian mothers showed insufficient levels of knowledge and domestic management practices towards preschool childhood fever. They added that health education interventions must be targeted to mothers to improve their knowledge and practice

The present study showed that the majority of pediatric nurses' practices on measuring weight and height in children with nephrotic syndrome were at a poor level before program, with significant improvements immediate after the program implementation. Wong (2014b) reported that measurement of physi-

cal growth in children is a key element to evaluate their health status especially weight and height. The assessment of growth by objective anthropometric methods of weight, length/height, and body mass index is crucial in child care to assess the nutritional status and for growth failure identification. Reference data are central to growth monitoring and they help doctors, health care workers, and policymakers to diagnose bad nutrition, overweight and obesity, and other growth-related and endocrines (Khadilkar and Khadilkar, 2011).

The present study revealed regarding practice of urine analysis between pre and post-test was significant improvement, due to the urine analysis is the routine practice for nephrotic patient.

The present care of edematous skin showed that the majority of pediatric nurses' practices was at a poor level before program, but significantly improved in immediate after program implementation in the following steps of the procedure as clean eyelids daily by wet cotton followed by use layer of cotton between skin folds and use testicular lifter for male child to decrease testes swelling after the program implementation. This agreed with Mukhlif and Hattab (2016), who reported about edema care, was poor before program implementation. Ball and Bindler (2009) reported that nephrotic child's skin was stretched with edema, which became thin and fragile and needed meticulous care.

The present study showed that nursing care to protect child from infection was at very poor level among the majority of them before program implementation. This agreed with Rosster and Robert (2012), who found that the level of education had effects positively on nurses' practices due to shortage of nursing staff which made them loaded with the basic duty as medication preparation, making investigation...etc. The study results also showed that the majority of them had incompetent practices regarding care of nephrotic syndrome children. Khanjari *et al.* (2018) in Iran reported that nephrotic synd-

rome is a common nephrology disorder in children affecting quality of health of the children and adolescents significantly. Training the nephrotic syndrome children with special emphasis on using blended training might provide new opportunities for improving their quality of life.

The present study showed that the nurses' total practice scores of different procedures improved significantly after program implementation with significant difference between pre-test and post-test results, This agreed with Chun-yan (2011), who indicated that there was a high significant difference between pre-posttest scores.

The present study results showed no significant correlation between nurses' level of education and their knowledge. This agreed with Elgazzar *et al.* (2023) in Egypt, who reported that there was scope for development in knowledge, practice, and self-efficacy by the educational program among nurses. Training programs must be implemented in quality control to aid nurses in realizing the significance of information in reducing disease and death and enhancing the quality of care.

The current study showed no significant correlation between sexes and knowledge. This agreed with Al-Sai'dikhamees (2007), who didn't find significant correlation between nurses' knowledge and sexes. Besides, Haghighat *et al.* (2021) in Isfahan reported that the knowledge and performance of female nurses about oral care were higher than males, but the attitude of both sexes was almost the same.

The present study showed positive significant correlations between total knowledge score and ages. There were significant positive correlations between total practice score and age, general, and pediatric experiences. Al-Qahtani (2023) in Saudi Arabia reported that female nurses who were older and had more experience, as well as those who had received formal hand hygiene training, displayed better knowledge and attitudes compared to their counterparts.

The present study showed a significant co-

relation between nurses' knowledge and pediatric experience years. Adams *et al.* (2020) in Ghana reported no significant relationship between nurse's knowledge and years of experience as well as no significant relationship between knowledge and number of working years, but without significant relationship between nurses' knowledge and their attitude. The level of knowledge and attitude towards postoperative management were generally inadequate among nurses. Therefore, there was the need to implement in-service training on pain management for nurse' working in surgical units frequently.

Generally speaking, some protozoa as acute toxoplasmosis can induce Nephrotic syndrome in some children and anti-*Toxoplasma* treatment was effective in remission of NS in these cases (Sorkhi *et al.*, 2022). Also, some helminthes cause Nephrotic syndrome as Greenham and Cameron (1980) in the UK reported that two boys with nephrotic syndrome, on treatment from schistosomiasis *haematobium* they recovered from NS. Van Velthuysen and Florquin (2000) in the Netherlands reported that *Plasmodium malariae* (quartan malaria) and *P. falciparum* (malignant malaria) were clearly associated with renal disease, but in a small percentage of patients, also filariasis (*Wuchereria bancrofti*, *Brugia malayi* and *Onchocerca volvulus*) were reported to cause NS as well as echinococcosis/hydatidosis. Amann *et al.* (2012) in Germany reported an unusual case of HIV-1 infection with a severe renal manifestation of visceral leishmaniasis that developed years after repeated visits to Mediterranean Countries. Abdullah *et al.* (2018) in USA reported that the remission of nephrotic syndrome after strongyloidiasis treatment suggested a possible causal relationship between *S. stercoralis* and the nephrotic syndrome. Jia *et al.* (2023) in China reported that the normal CRP or IL-6 levels didn't rule out bacterial co-infection in NS in children on long-term glucocorticoid therapy. Moustafa *et al.* (2023) in Egypt reported that NS was one of the commonest chronic kidney diseases in

children. They added that the steroid sensitive type constituted about 90% and steroid resistant 10% of total cases Kumar *et al.* (2019) in India reported that infection remains an important cause of morbidity and mortality in children with nephrotic syndrome.

Generally speaking, the majority of these zoonotic parasites were encountered in Egypt (Abo-Madyan *et al.*, 2004; Abdel-Motagaly *et al.*, 2017; Morsy, 1997, 2013; Morsy *et al.*, 2020, 2023 and others)

Conclusion

Pediatric nurses' knowledge and practice in nephrotic syndrome were improved significantly immediate and three months after program implementation.

There was significant improvement in nursing practice including peripheral pulse, respiratory rate, blood pressure, height, weight, and urine analysis, skin care during edema and infection protection after program implementation. There was significant positive correlation between total knowledge and total practice scores of the pediatric nurses.

Recommendations

Study recommended the following: 1- In service training program should be conducted for the pediatric nurses in their workplace to update their knowledge and improved their practices. 2- Pediatric nurses must be provided with specific guidelines about nephrotic syndrome to safeguard their practice by extending their skills. 3- Simple Arabic illustrative booklets including required knowledge and practices about care of children with nephrotic syndrome must be available for nurses at the Pediatric Department. 4- The need for the effective structured training program on the NS. 5- Study replication on large sample of pediatric nurses to generalize is indicated. 6- Excluding parasitic cause(s) in children suffering from nephrotic syndrome is a must.

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